



Call count monitoring of Northland brown kiwi 2015

Megan Topia



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1. Introduction

1.1 Objective

The objective of this report is to summarise the results of the 2015 call count monitoring of Northland brown kiwi (*Apteryx mantelli*).

1.2 Background

In the early 1990s a network of call count stations was established nationally in order to determine trends in populations over time (McLennan 1992). In Northland, 24 stations were established in four geographic areas (Northern, Eastern, Southern, Western) with kiwi call count monitoring occurring annually since 1995. Additional stations have since been added to this network (see Appendix 1) and the information gathered allows us to assess how the monitored kiwi populations are changing over time i.e. are they stable, increasing or decreasing. The extensive involvement of local communities in the protection of Northland brown kiwi and the associated expansion of the number of kiwi listening stations provides strong information on the current distribution and density of kiwi throughout their range in Northland (Fig. 1).

Kiwi call count surveys in Northland are used to:

- Monitor the trends in call counts (and hence population size) over time at the 24 original (1995) listening stations in the four geographic areas (Northern, Eastern, Western, Southern).
- Monitor the trends in kiwi populations at the growing number of kiwi management sites throughout Northland.

1.3 Northland listening sites

The 24 original kiwi listening stations that were established at the four geographic areas in Northland where kiwi were known to be present (Pierce & Westbrooke, 2003) are listed in Table 1 and shown in Fig. 1. The Northern area contains six stations either in or on the edge of extensive forest in the Herekino-Raetea-Puketi Forests area. The Eastern area has six stations in forest remnants and extensive exotic forestry near the Bay of Islands spanning Purerua Peninsula-Waitangi-Russell Peninsula. In the Western area five stations are in extensive forest (two in Waipoua) or forest remnants (Kaitui, Trounson and Paerata). The Southern area has seven stations within 30 km of Whangarei, all northwest to northeast of the city and involving forest remnants, including two also with exotic forests (Glenbervie 7A & 9A). Additional listening stations have predominantly been added in managed areas where community groups are working to protect kiwi.

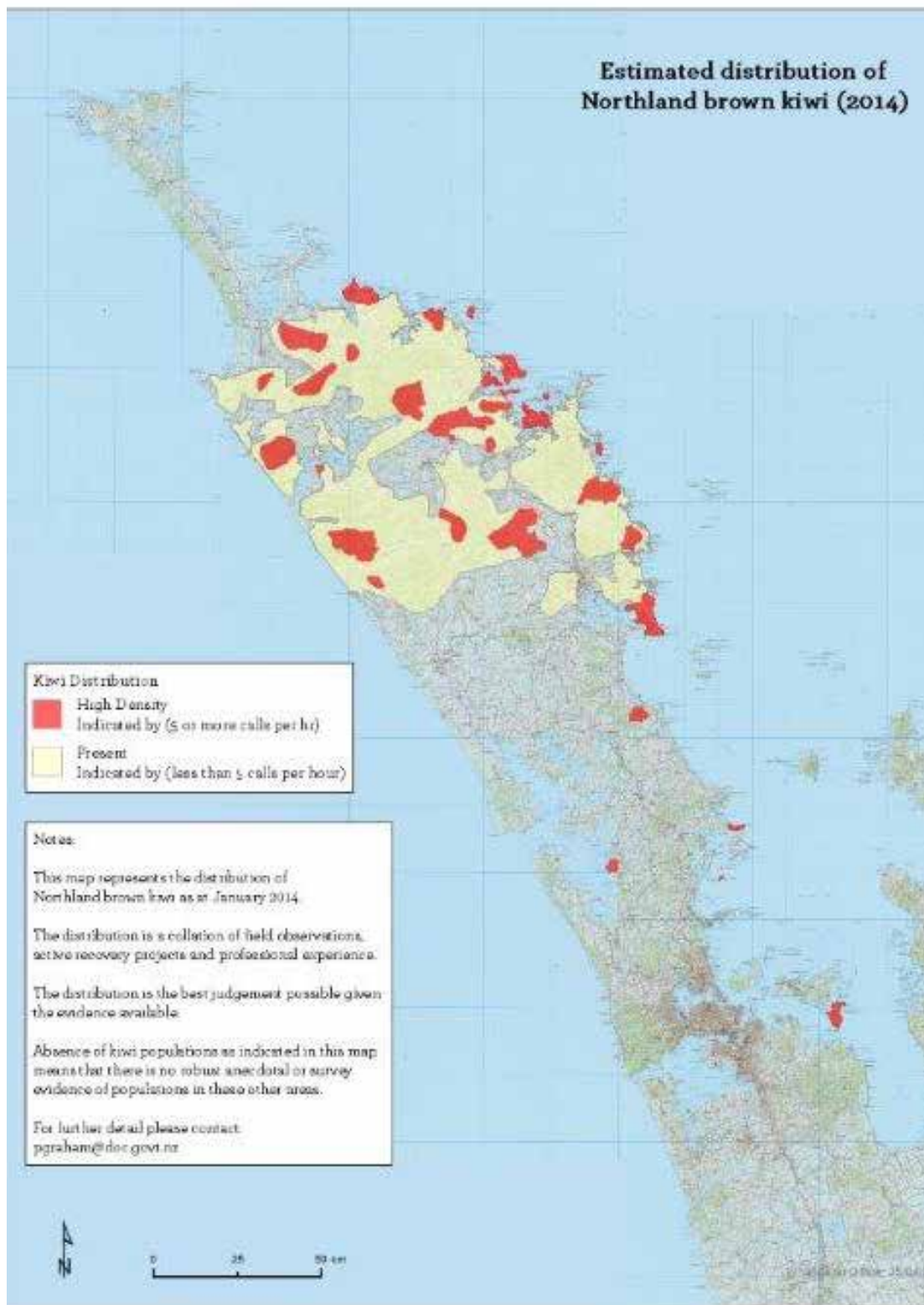


Figure 1. Northland kiwi distribution and relative abundance as known in 2014.

Table 1. The original Northland kiwi listening stations, grouped by geographic area and with corresponding station numbers.

NORTHERN	EASTERN	WESTERN	SOUTHERN
1 Diggers Valley	10 Marsden Cross	16 Kaitui	21 Glenbervie 7A
2 Takahue	11 Puketotara	17 Trounson	22 Glenbervie 9A
4 Gartons	12 Rangitane	18 Cathedral	23 Marlow Road
5 Kaiaka	13 Waitangi No 12	19 Waipoua L/Out	24 Purua N
7 Puketi Forest	14 Mt Bledisloe	20 Paerata	25 Rarewarewa S
8 Puketi Scenic Reserve	15 Tikitikioe		26 Mimiwhangata
			27 Sandy Bay

2. Methods

The 2015 Northland brown kiwi call count survey followed the national kiwi call scheme methodology outlined in the Kiwi Best Practice Manual (Robertson & Colbourne 2003). Listening was carried out during the dark phase of the moon for the first two hours of darkness, for four nights. The ideal kiwi listening conditions are dry and still, so these conditions were favoured wherever possible.

Listening for kiwi was carried out from 7 May to 26 May 2015, with a back-up window 6 June to 24 July 2015.

2.1 2015 kiwi listening data

Call-count data from 2014 were received from the following kiwi management areas:

- Mangatete
- Whaakangi
- Honeymoon Valley
- Mahinepua – Radar Hill
- Waimate North
- Hupara
- Puketi Forest
- Russell Peninsula
- Whangarei Heads – Bream Head
- Motatau–Marlow
- Purua–Rarewarewa
- Tutukaka
- Sandy Bay
- Waipoua Forest complex
- Tawharanui
- Marunui

3. General patterns

3.1 Northland monitoring trends since 1995

Trends in call count data collected since 1995 at the 24 original listening stations (see Table 1) in the Northern, Eastern, Southern and Western survey areas are graphed for comparison in Fig. 2 and the summary data is presented in Appendix 1.

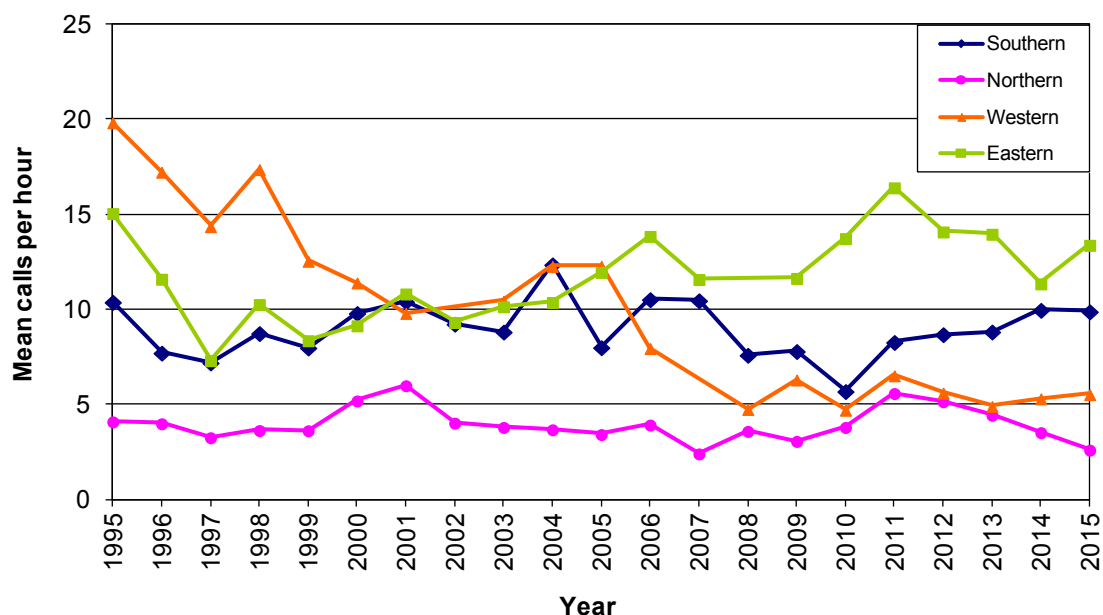


Figure 2. Mean annual kiwi call rates per hour for each of the original four Northland monitoring areas 1995 – 2015. The mean for the Northern and Southern clusters was estimated with one station missing each (Diggers Valley (last listened at in 2011) and Glenbervie 7A (last listened at in 2013) respectively) and the Western cluster used the previous year’s results for Kaitui and Paerata to avoid skewing the data.

Northern Area

Call rates in the Northern area have continued their downward trend since 2011, with a mean call rate of 2.60 calls/hr recorded in 2015. The mean call rate in the Northern area has consistently stayed under five calls/hr for the majority of the 21 years that kiwi listening has been carried out, with no observable recovery in the population (Fig. 2). The relatively high results from two stations (stns 7 & 8) in Puketi Forest have been propping-up the results in recent years. Providing real cause for concern for this area are the results from Takahue (stn 2) and Gartons (stn 4) (Fig. 3). The kiwi population at the Gartons station has consistently recorded relatively low call rates (with a few peaks) since 1995 (Fig. 3), indicating a small population struggling to hold on, and sadly, no calls were recorded there in 2015. Takahue station had been recording decent call rates (around 5.5 calls/hr) from 1995 to 2013, but has experienced a sharp decline in the past couple of years, dropping down to nearly zero calls with only one male call being heard in 2015 (Fig. 3). These are sobering results and highlight the plight of kiwi in areas that are not being managed. Puketi Scenic Reserve (stn 8) results are also showing a concerning decline trend since its peak in 2012. Five out of the six stations in the Northern area were listened at for four nights. Diggers Valley (stn 1) has not been listened at since 2011 and we are really missing out on information about what is happening at this station as well missing its contribution to the Northern cluster analysis. It is strongly recommended that the DOC Kaitiaki office organises for this site to be listened at in 2016 to provide a more complete picture for kiwi in the Northern area. The other five stations had four complete nights of listening carried out at them in 2015.

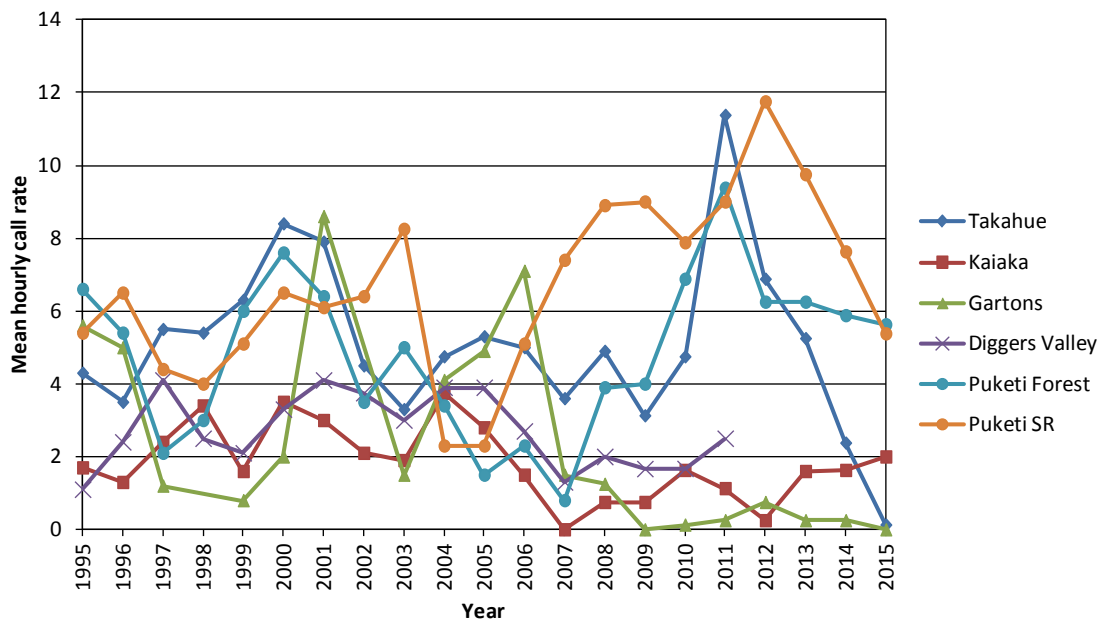


Figure 3. Mean annual call rates for the listening stations that make up the Northern cluster from 1995 to 2015.

Eastern Area

In 2015 the mean call rate for the Eastern area increased to 13 calls/hr, up from 11 calls/hr in 2014. This was predominately due to the Marsden Cross station (stn 10) recording a mean call rate of 30 calls/hr, up significantly from the depressed mean call rate of 19 calls/hr recorded in 2014. It was also supported by increased call rates at Waitangi (stn 13), Mt Bledisloe (stn 14) and Tikitikiore (stn 15) (Fig. 4). It is pleasing to see that the dip in call rates at the Marsden Cross station experienced in 2014 did not continue this year and this station bounced back fantastically to record the second highest nightly call rate (30.38 calls/hr) in 2015 for all the areas monitored. The high level of community involvement in the protection of kiwi in the Eastern area continues to be a success for kiwi conservation. All six stations in the Eastern area had four nights of listening completed in 2015.

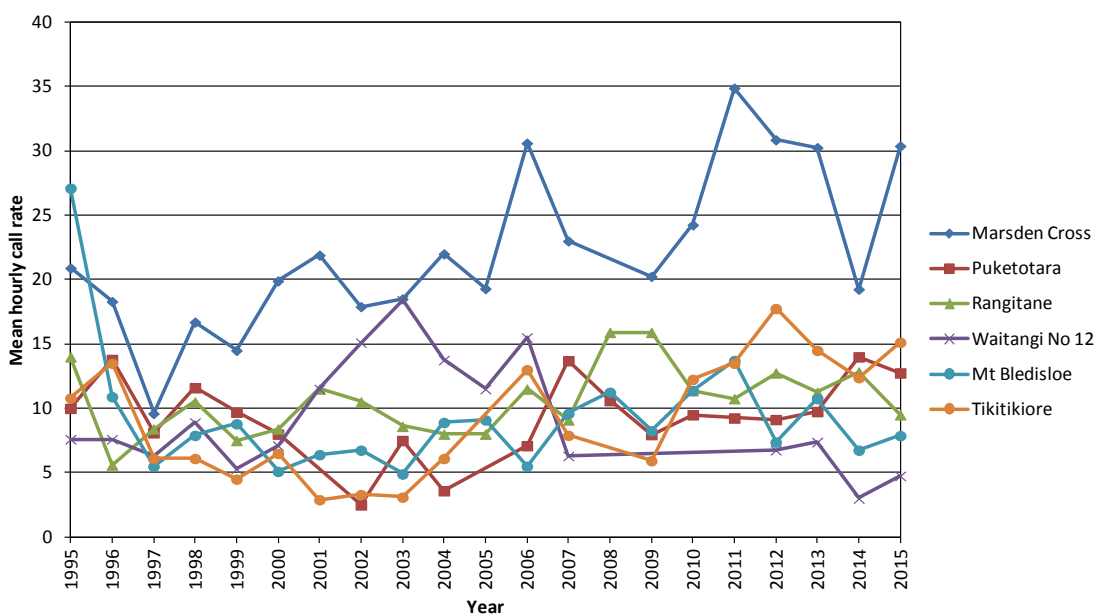


Figure 4. Mean annual call rates for the listening stations that make up the Eastern cluster from 1995 to 2015.

Southern Area

Call counts in the Southern area remained stable this year, with a mean call rate of 10 calls/hr recorded, similar to 2014. One stand-out station in this region is Marlow Road (stn 23), which has doubled its call rate since 2006 (Fig. 5). The Marlow Road station listens into the Riponui Scenic Reserve which is predator trapped as part of the Whangarei Kiwi Sanctuary and has had 1080 toxic bait operations carried out in 2009 and 2014. Most of the other stations that make up the Southern cluster have had stable or increasing call rate trends over the past 5 years. However, the two Glenbervie stations are showing sad signs of decline and a kiwi population struggling to hold on. The forestry company Rayonier have initiated some predator control within the forest and it is a strategic location within the Kiwi Coast project. It will be important to continue listening at these two stations to provide robust data for both the Northland kiwi listening report and as part of the outcome monitoring for Kiwi Coast. However, it is noted that access to Glenbervie 7A is currently difficult due to the logging operation underway there. It may be more appropriate for a kiwi listening device to be located at this site if it cannot be accessed by people for four nights of listening surveys. Six of the seven stations had four nights of kiwi listening completed at them in 2015. Listening has not been completed at Glenbervie 7A (stn 21) since 2013.

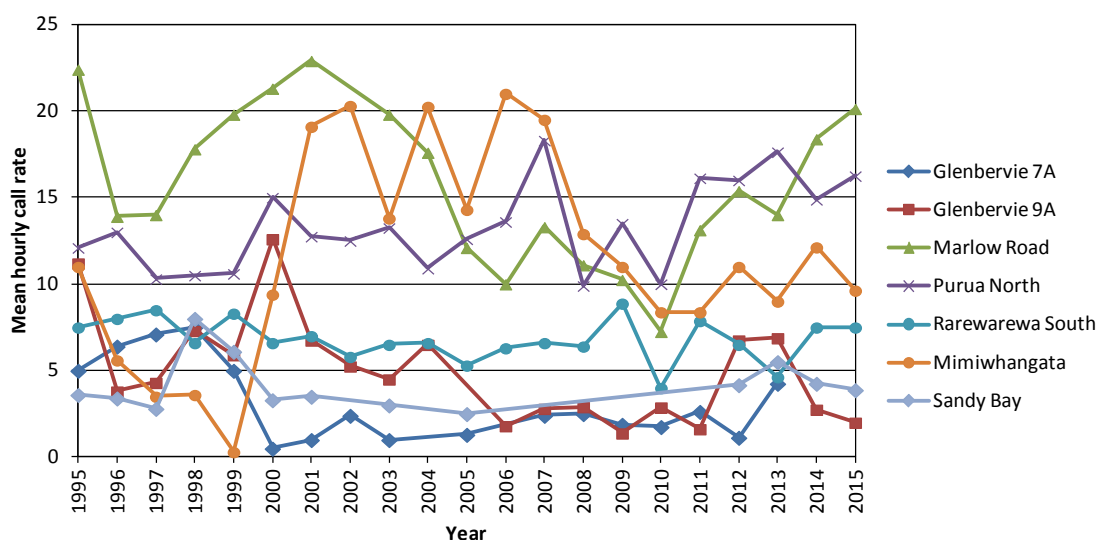


Figure 5. Mean annual call rates for the listening stations that make up the Southern cluster from 1995 to 2015.

Western Area

The mean call rate of 5.55 calls/hr recorded at stations in the Western area in 2015 was also very similar to the 2014 result for this area. Since 2008 the mean call rate in the Western area has been hovering around 5–6 calls/hr, indicating that the decline that had been occurring since 1995 has halted. This is because two of the stations Kaitui (stn 16) and Paerata (stn 20) had fallen to as low as they could go by this stage and the other three stations have maintained consistent or increasing call rates (Fig. 6). The Cathedral Grove (stn 18) listening station has been recording increasing call counts since 2012, which is a positive result. However, the call count rates from Trounson (stn 17) are a little bit concerning as they have been showing a downward trend for the past 10 years, although an increase in call rates was recorded this year, which was probably helped by four complete nights of listening being carried out in 2015, compared with only two in 2014. Three of the five stations in the Western area had four nights of kiwi listening completed at them in 2015. Both Kaitui and Paerata stations were not listened at in 2015, but the 2014 results were used for calculating the mean call rate, as their omission would have skewed the data considerably. Effort still needs to be

put into listening at these sites in future surveys despite the low call rates. An internal DOC boundary change means that Paerata has changed from the Whangarei area to the Kauri Coast area of responsibility.

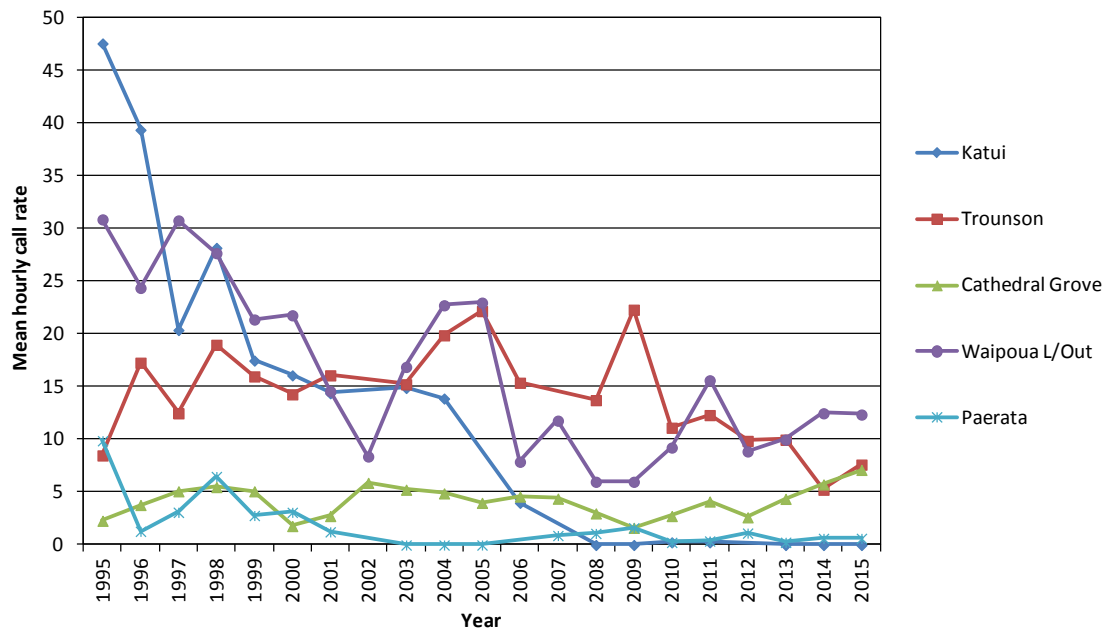


Figure 6. Mean annual call rates for the listening stations that make up the Western cluster from 1995 to 2015.

3.2 Monitoring of trends in the four geographic areas

There is great value in having data since 1995 from the original 24 listening stations, as it provides a general indication about population trends in the four different geographic areas. This information is complimented by the finer-scale analysis of kiwi listening results at managed populations within each of the geographic areas that show whether those sites are conforming with or bucking the overall trend. To ensure that the monitoring of trends in the four geographic regions continues to have value, it is just as important that we still monitor stations where call counts are dwindling or are absent, as those that are growing. If low-call-rate stations are not monitored and data comes only from sites with good call rates, it will not be a true indicator of what is happening over time. The Department of Conservation (DOC) offices that have stations in their areas should make it a priority to organise each of the original stations to be listened at so accurate monitoring of trends can continue.

4. Trends at managed populations

Each year, results from the same listening stations are used so that comparisons in call counts rates over time and the estimates of trends in managed populations are as accurate as possible. Only these selected stations contribute data for the mean hourly call rate calculations depicted in the bar graphs for each management site provided below. It is important that kiwi coordinators prioritise these stations for listening at each year to allow the most accurate depictions of population trend occurring in management areas to be obtained. The stations that are used in this analysis are listed and data summarised in Appendix 3 for each management site. These should be referred to when organising kiwi listening in 2016 and subsequent years.

Also included in this section are graphs of the kiwi listening results from all stations in each management area that are consistently listened at so that readers can track changes at individual stations, especially for those stations that are listened at but not included in the main analysis.

4.1 Summary of sites

4.1.1. Mangatete

Mangatete Landcare Group was established in 2012 and is protecting 1000 ha of kiwi habitat east of Kaitaia. This is the first time that data from stations in this area have been included in the kiwi listening report as a management site, although listening has been carried out by this group at the Lightning Hill station (stn 3) from 2012 (Fig. 8). A second listening station was added in 2014 and the mean call rate from these two stations has been graphed (Fig. 7). It is too early yet for a trend in the data to be obtained; however, the results show that both stations are recording high mean call rates (Fig. 8), especially considering that the general trend in call rates for the northern region has been averaging 5 calls/hr (Fig. 2). As kiwi listening continues at this site it will be essential for both stations to be listened at annually in order for a mean to be calculated.

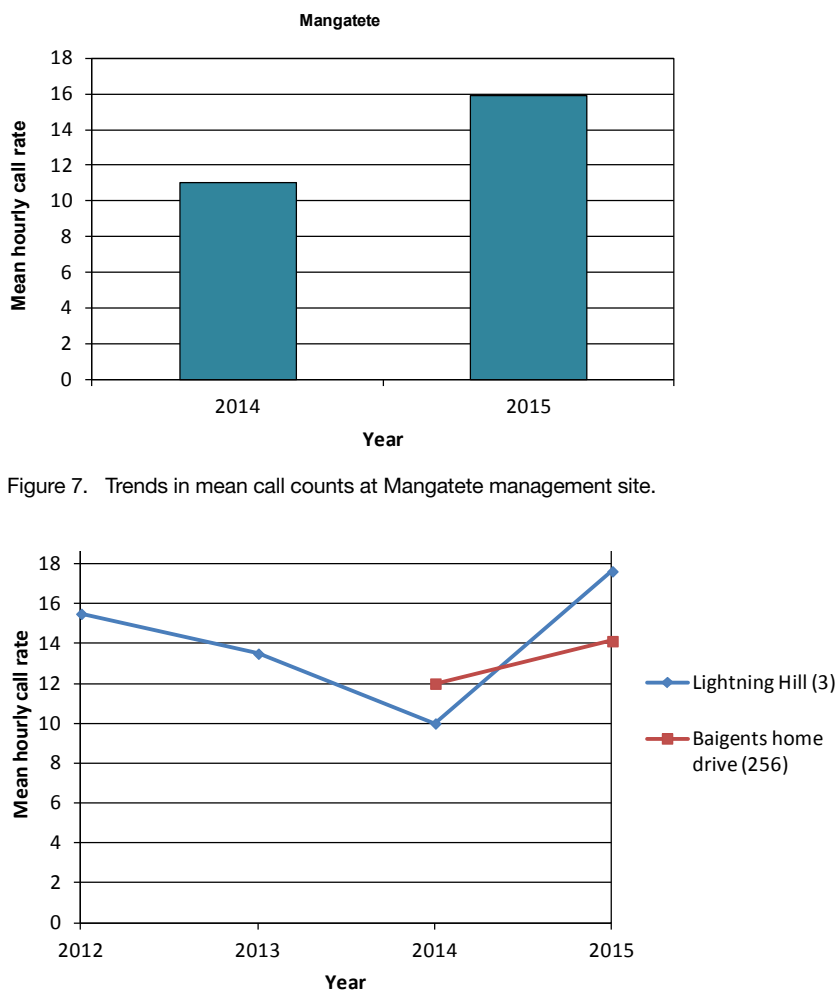


Figure 7. Trends in mean call counts at Mangatete management site.

Figure 8. Kiwi call count results for Mangatete listening stations (station number in brackets).

4.1.2 Honeymoon Valley

Honeymoon Valley Landcare Group was established in 2009 and this is the first year that data from kiwi listening there has been included in this report. Four stations had four nights of listening completed in 2015 and returned a mean call rate of 1.47 calls/hr. These stations have been allocated a station number to be referenced for future kiwi listening (see Appendix 1) and will be used to derive the mean for this management site. Graphing of data will begin once there is more than 1 year of data to compare. It is great to have more data from management areas in the northern region and we will look forward to watching the progress of the group's kiwi protection efforts.

4.1.3 Whakaangi

After four years of declining call rates, Whakaangi recorded a mean of 8 calls/hr in 2015, up from 6.52 calls/hr in 2014 (Fig. 9). While it is tempting to celebrate this increase, it has to be noted that this result was heavily influenced by a 350% increase in call rates at Whakaangi 2 (stn 131), up from 3.13 calls/hr in 2014 to 14.3 calls/hr in 2015. Whether this change is due to a different listener, a real increase in the population or is just an anomaly cannot be determined and it will require subsequent years' results to provide a clearer picture. Prior to the large spike this station had been showing a clearly declining trend (Fig. 10). This is true of all the stations at Whakaangi and in 2015 most of them experienced further declines in call rates or returned similar results to last year (Fig. 10). Although the results are not

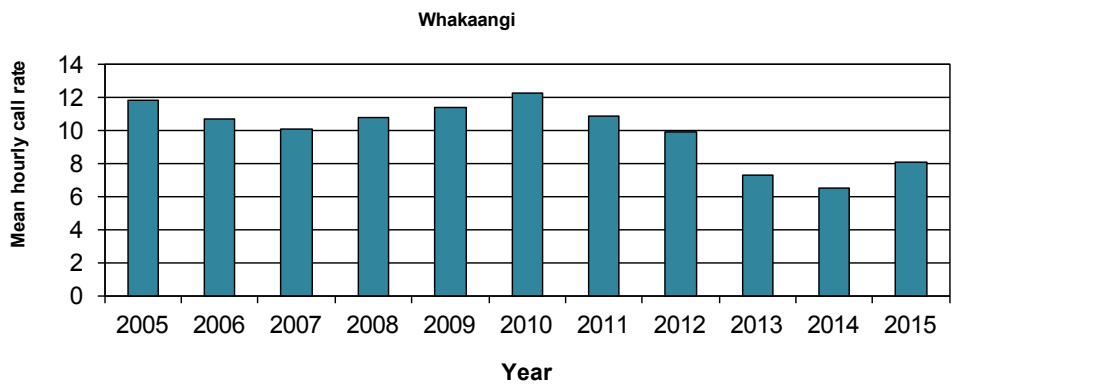


Figure 9. Trends in mean call counts at Whakaangi management site.

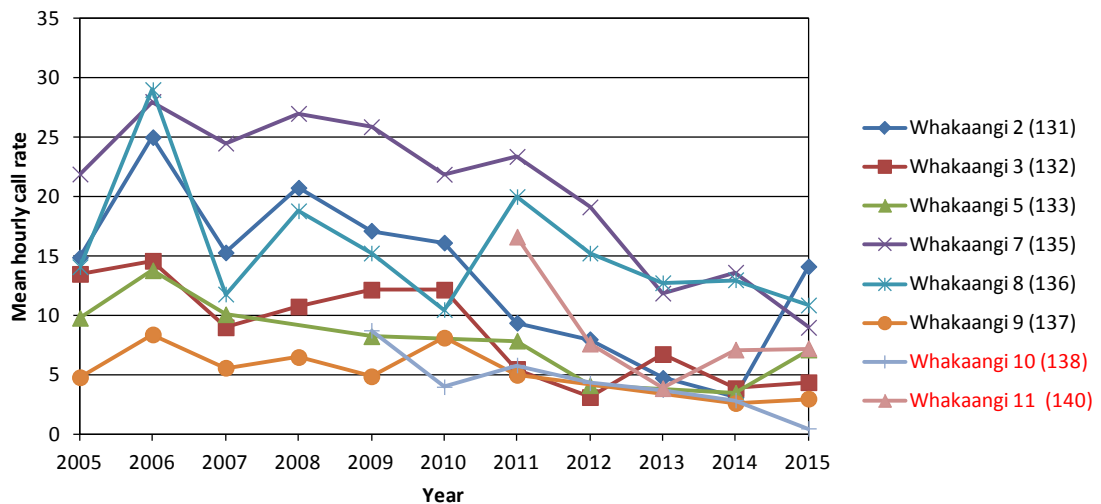


Figure 10. Kiwi call count results for Whakaangi listening stations (station number in brackets) since 2005. Stations highlighted in red are **not** used in calculations to derive the mean.

great, the effort that goes into listening by the volunteers at Whakaangi highlights their commitment to monitoring what is happening in their area and trying to turn things around. A total of eight stations were listened at in 2015, all of which had four nights of listening. Six of these stations were used to calculate the mean for Whakaangi.

4.1.4 Mahinepua – Radar Hill

Mahinepua-Radar Hill recorded a mean call count in 2015 of 6.45 calls/hr, up from 5.73 calls/hr recorded in 2014. This result fits in nicely to the increasing population trend that has been occurring at this site since 2009. All listening stations at this site are showing steady signs of increase, albeit with natural fluctuations (Fig. 12).

Six stations were listened at this year, with four nights of listening completed at each station. Five of these stations were used to calculate the 2015 mean call rate.

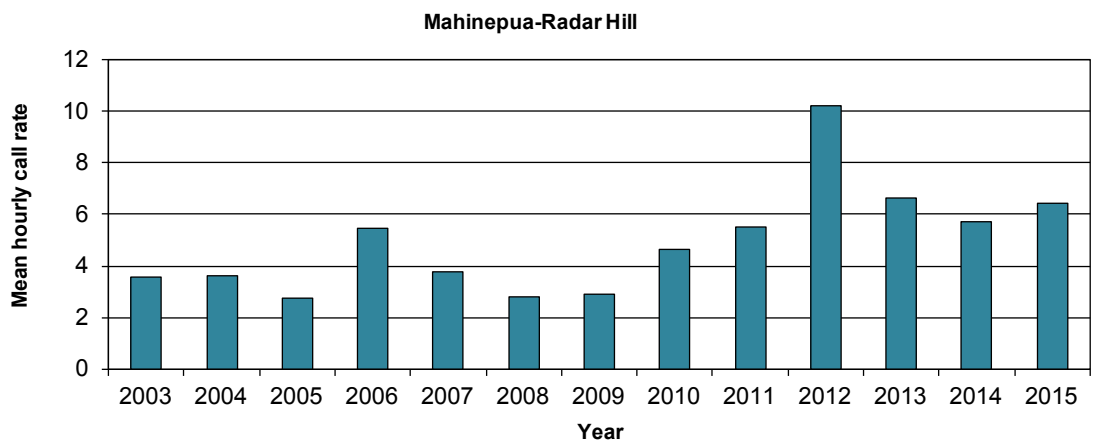


Figure 11. Trends in mean call counts at Mahinepua-Radar Hill management site.

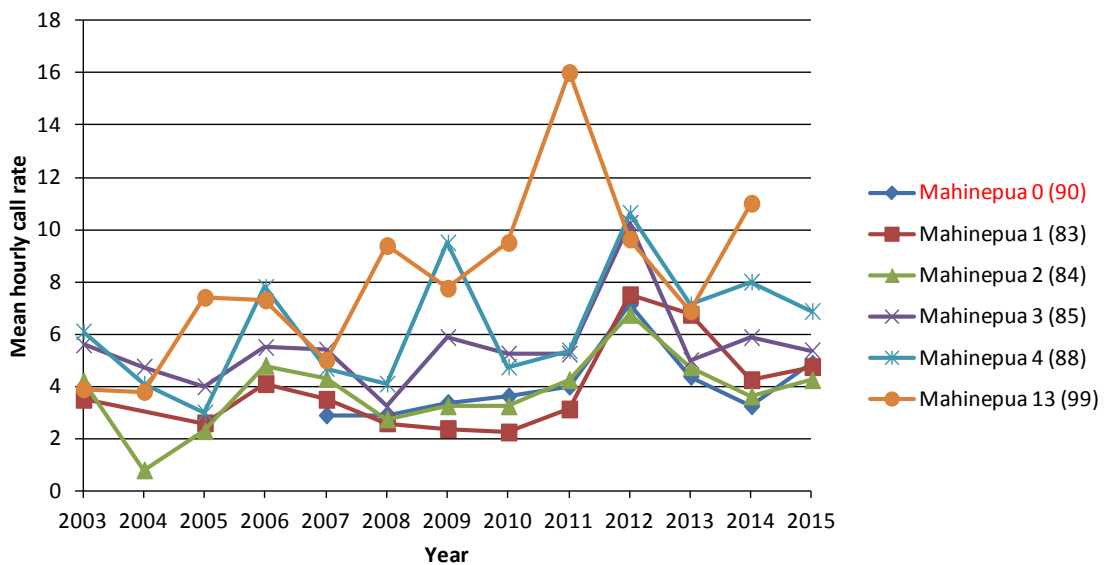


Figure 12. Kiwi call count results for Mahinepua-Radar Hill listening stations (station number in brackets) since 2003. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.5 Russell Peninsula

Call counts at Russell peninsula have continued on their upward trend, with the highest ever count (13.78 calls/hr) recorded in 2015 (Fig. 13). However, this figure is probably slightly inflated due to the low-call-rate Shortlands station (stn 173) not being listened at for the second consecutive year, so that its results are missing from the mean calculation. It is recommended that the Shortlands station be listened at in 2016 to provide a more accurate mean calculation. However, it must be noted that the team of listeners at Russell are consistently listening at nine stations (making for a busy Fig. 14!) and even with the missing data from the Shortlands station there is no denying that the kiwi population at Russell appears to be doing very well and showing a very positive increasing population trend.

A total of nine stations were listened at in this cluster, all for four full nights. Four of these stations were used to calculate the 2015 mean call rate.

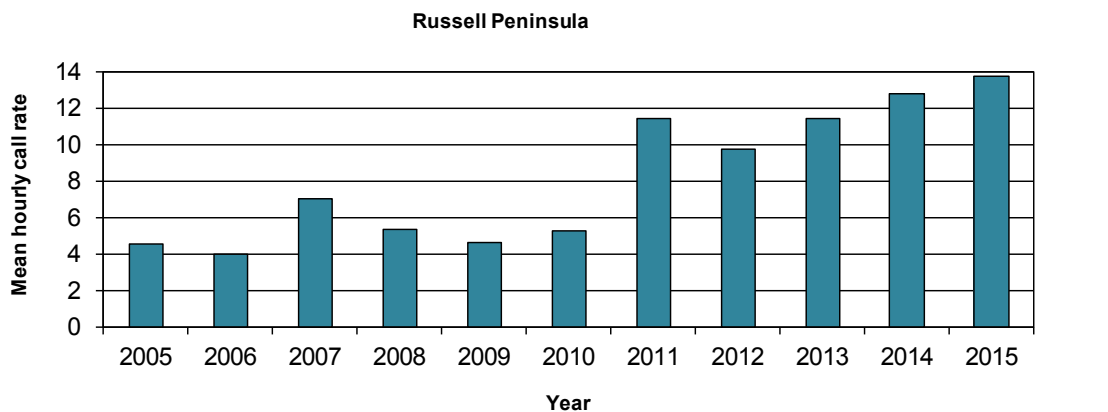


Figure 13. Trends in mean call counts at Russell Peninsula management site.

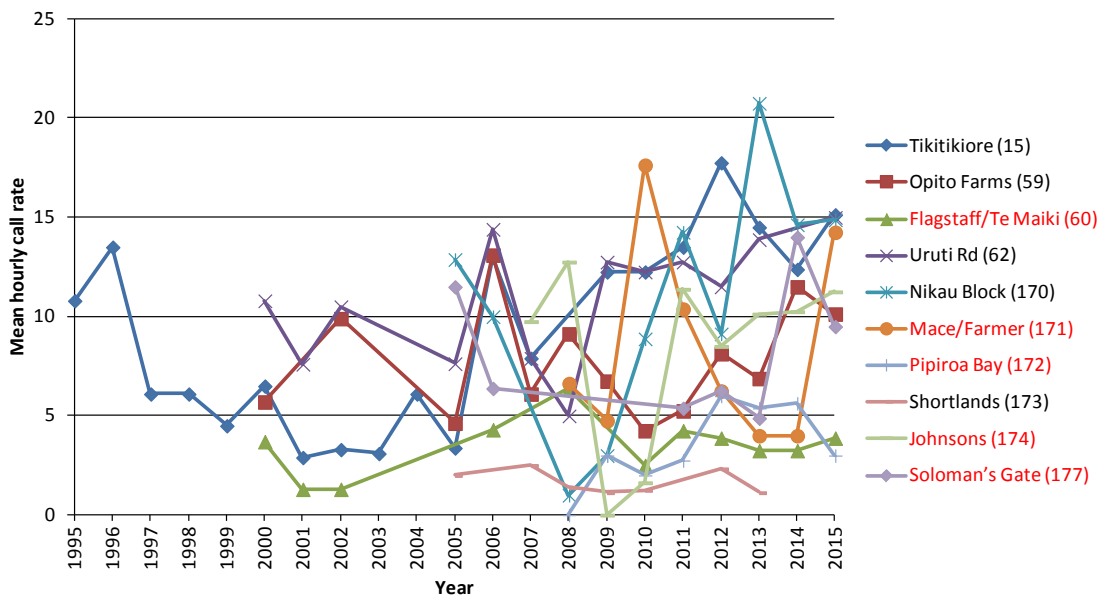


Figure 14. Kiwi call count results for Russell Peninsula listening stations (station number in brackets) since 1995. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.6 Puketi Forest

In 2015, the mean call rate for Puketi Forest dropped to below three calls/hr (2.88 calls/hr) (Fig. 15). The large spike recorded in 2014 was attributed to the lack of data from three out of the six stations used to calculate the mean, which had an inflationary effect on the hourly call rate. In 2015, five out of the six stations were listened at, providing a more reliable mean call rate that was slightly below the 3-4 calls/hr average that had been occurring since 2009. Thank you Puketi listeners for making an effort to listen at the stations that were used to derive the mean in 2015. Although it causes your call rate to go down, it also provides you with more robust data to base management decisions on.

A total of nine stations were listened at (Fig. 16), five of which were used to derive the mean for this management site and all had four complete nights of listening carried out at them.

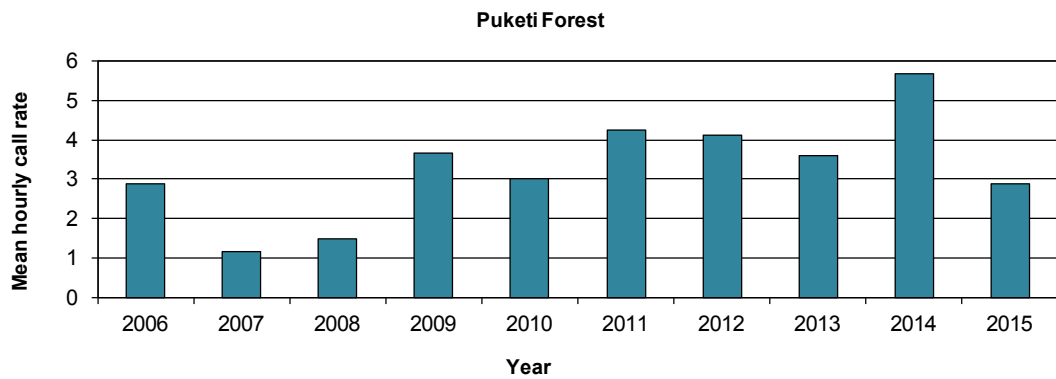


Figure 15. Trends in mean call counts at Puketi Forest management site.

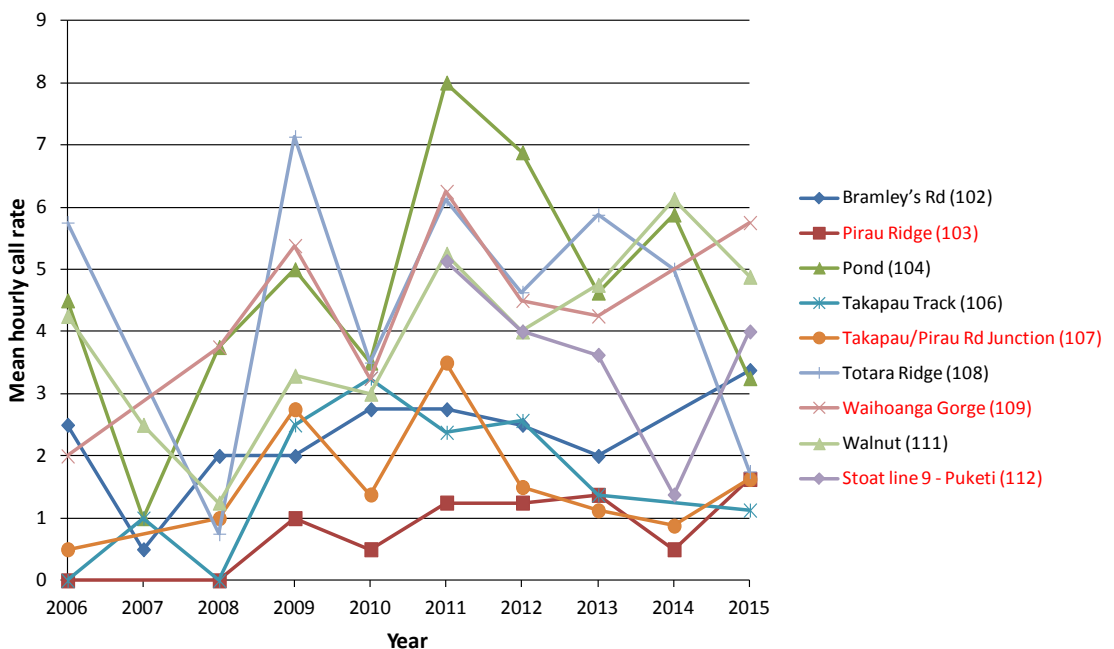


Figure 16. Kiwi call count results for Puketi listening stations (station number in brackets) since 2006. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.7 Waimate North

Waimate North recorded a mean call rate of 8.06 calls/hr in 2015, a similar result to 2014. The predator control being carried out at Waimate North is successfully maintaining a stable population trend that has seen call rates ranging between 6 and 9 calls/hr since 2005 (Fig. 17). Although not used to calculate the mean call rate, station W1 (stn 113) is a standout for this management site. Very high call rates of over 20 calls/hr are consistently recorded there and, for the second year running, in 2015 the highest call rate in Northland (30.75 calls/hr) was recorded there (Fig. 18), just beating out Marsden Cross in the Bay of Islands. While the rest of the stations at Waimate North record much lower mean call rates when compared to W1, they have all been very consistent over the past 10 years.

A total of nine stations were listened from for this site, including all five stations from which the mean call rate is derived from. Great job Waimate North listeners! Eight stations had four full nights of listening with one station (stn 114) having two nights completed.

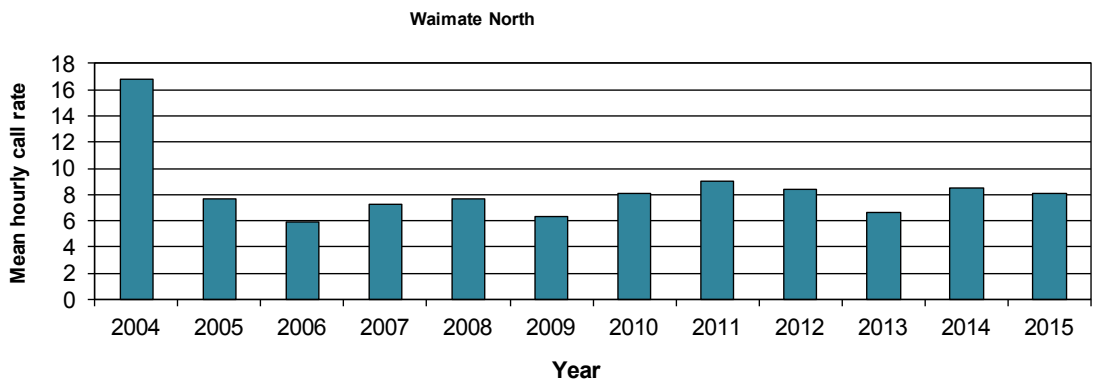


Figure 17. Trends in mean call counts at Waimate North management site since 2005.

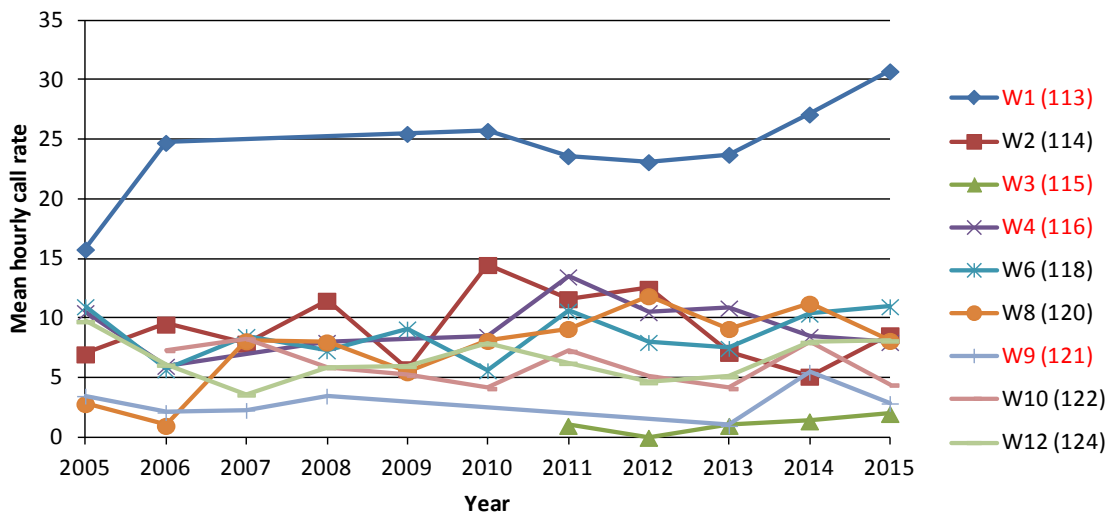


Figure 18. Kiwi call count results for Waimate North listening stations (station number in brackets) since 2005. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.8 Hupara

This is the first year that listening data from Hupara Landcare Group has been included in the Northland kiwi listening report. Members from this group have been carrying out kiwi listening since 2012 and this data has been retrospectively added in this report (Figs 19 & 20). Although it is too early to comment on population trends for this site, the results show that they are recording very impressive mean call rates that are being maintained through their predator control efforts. Since 2014 three stations have been listened at and these will be used to calculate the mean for this management site. It is recommended that listening is carried out for four nights at all three stations annually to avoid skewing data.

In 2015 two stations had four full nights of kiwi listening, with one station (stn 245) having three nights of listening completed.

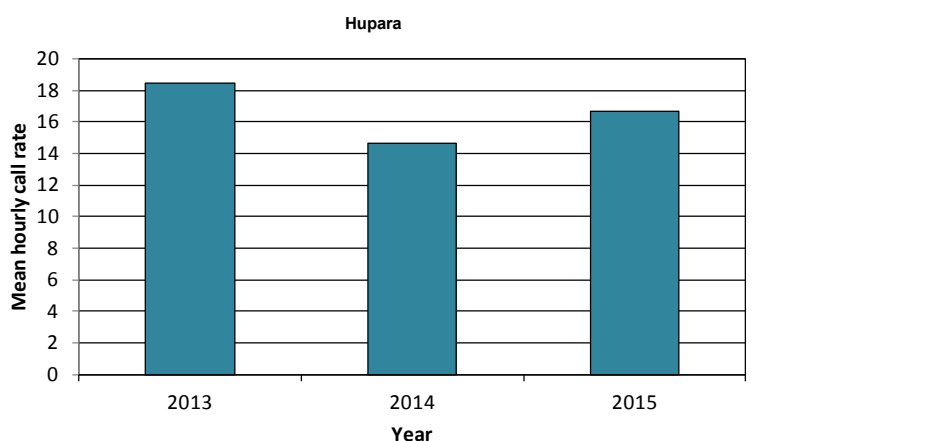


Figure 19. Trends in mean call counts at Hupara management site since 2013.

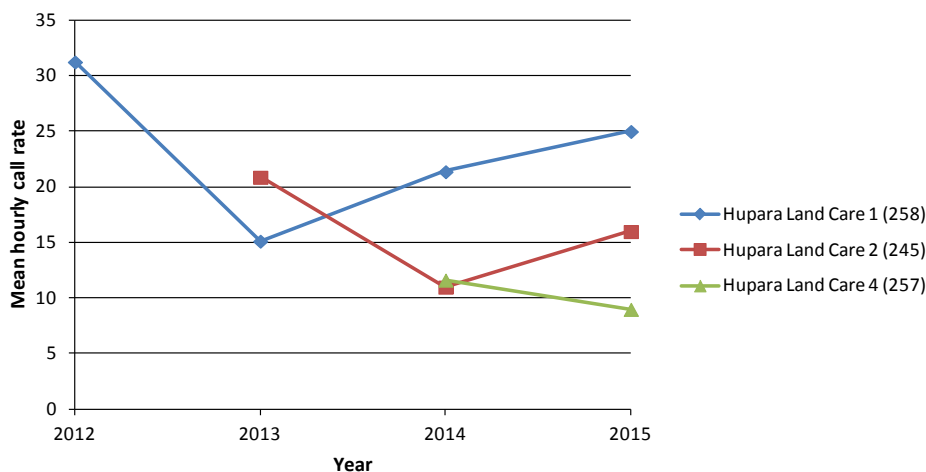


Figure 20. Kiwi call count results for Hupara listening stations (station number in brackets) since 2013.

4.1.9 Sandy Bay

A mean call rate of 4.54 calls/hr was recorded at Sandy Bay in 2015, up from the 3.71 calls/hr recorded in 2014 (Fig. 21). There was a 2 call/hr increase at the Sandy Bay 2 station (stn 260) where a kiwi listening device was used instead of a person for the first time in 2015 (Fig. 22). Whether the increase is directly related to this is difficult to determine without having had a cross-over period between a person and listening device at this station to allow comparison between results. As kiwi listening at Sandy Bay is carried out by just one person it makes

sense to utilise kiwi listening devices to minimise the time demands on this person of trying to complete listening at all three stations. Looking ahead, it is preferable to make a decision and keep with one method at each station rather than swapping between a person and listening device year to year. The other two stations that make up the mean for this management site recorded call rates that were similar to 2014 and the overall result indicates a currently stable population with average call rates of 3–5 calls/hr.

Three stations were listened at in 2015 with four nights of listening being completed at each station.

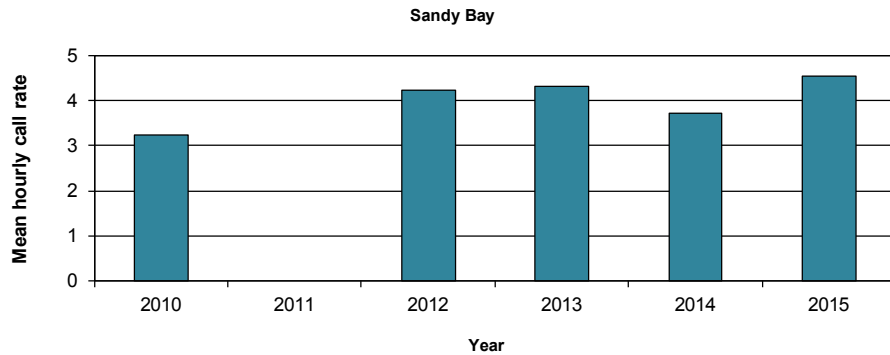


Figure 21. Trends in mean call count rates at Sandy Bay management site.

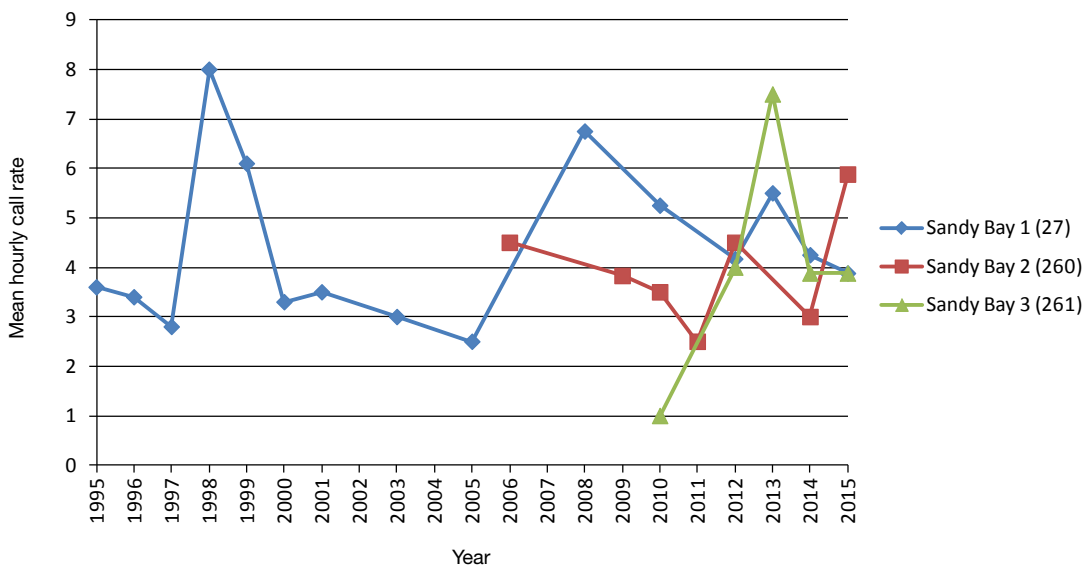


Figure 22. Kiwi call count results for Sandy Bay listening stations (station number in brackets) since 2013. NB: In 2015 Sandy Bay 2 (260) results were recorded by a kiwi listening device.

4.1.10 Tutukaka

A mean call rate of 7.46 calls/hr was recorded for Tutukaka in 2015, up from 6.25 calls/hr in 2014 (Fig. 23). Only three stations were listened at this year, but they were all stations (out of a possible five) that are used to calculate the mean. Mean call rates at Tutukaka have mostly fluctuated between 6 to 10 calls/hr since 2005, indicating a relatively stable kiwi population. However, this population has been supplemented by translocated kiwi for a number of years, so there is an expectation that this, combined with predator control, would lead to an increasing population and a resulting increase in call rates. As mentioned in the 2014 report, kiwi listening at Tutukaka would benefit from a comprehensive listening coverage

for 2016 and beyond to help get a better idea about what is happening with the population at this site and to better track the impact translocated kiwi are having on call rates.

A total of three stations were listened at in 2015 (Fig. 24) all with four nights of listening completed at them. All three stations were used to calculate the mean.

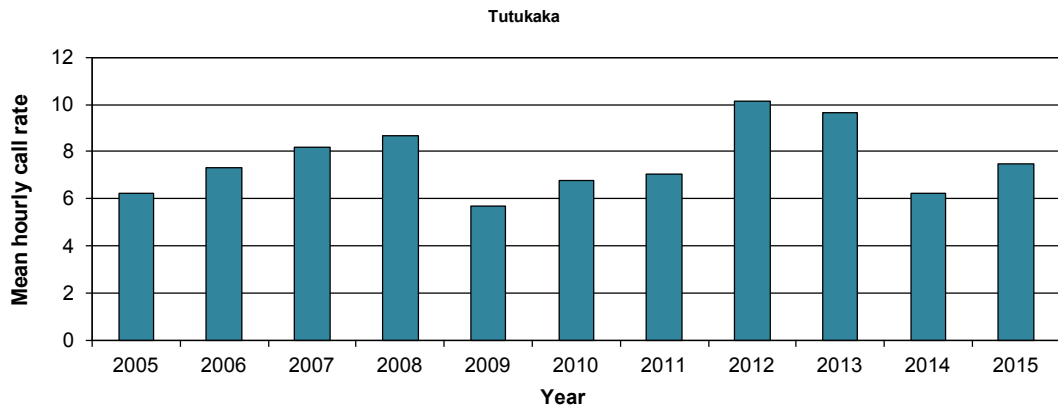


Figure 23. Trends in mean call count rates at Tutukaka management site.

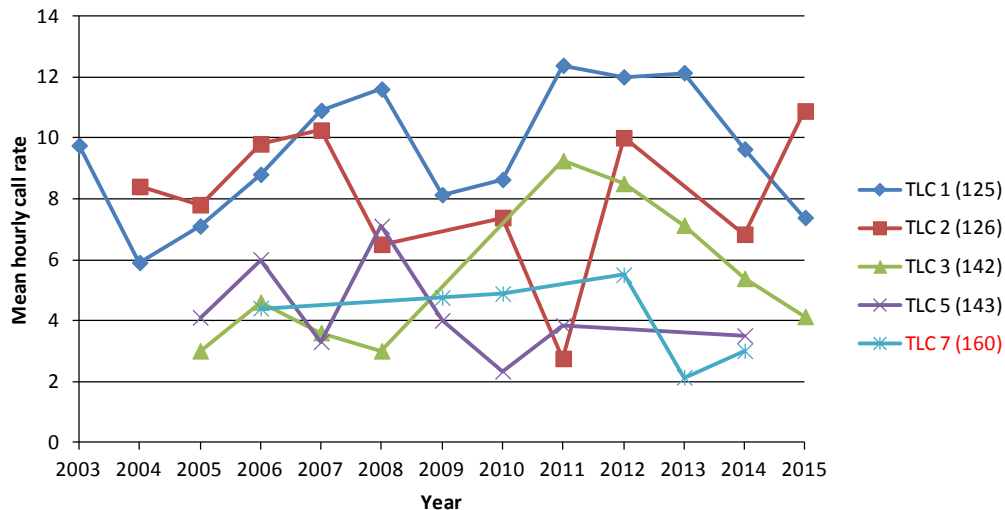


Figure 24. Kiwi call count results for Tutukaka listening stations (station number in brackets) since 2003. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.11 Manaia–The Nook

This management site recorded a decrease in call counts from 6.81 calls/hr in 2014 to 5.80 calls/hr in 2015 (Fig. 25). All five stations used to calculate the mean were listened at in 2015, providing a really robust measure. In fact, the 2015 result is very similar to the adjusted figure of 5.78 calls/hr that was calculated in the 2014 report to compensate for the absence of data from station 71 (Manaia 8). This result provides a really good example of why it is important to prioritise listening at all the selected stations that are used to derive the mean so a more complete picture for comparisons can be made each year. There are two stations from this management site that have results that immediately draw the eye—Manaia 2 (stn 48) and The Nook 2 (56). These two stations have produced counts at the opposite end of the spectrum since 2011, with Manaia 2 going through a substantial increase in call rates and the Nook 2 experiencing a substantial rate of decline (Fig. 26).

A total of six stations were listened at, all with four nights of listening completed at them. Five of these stations were used to derive the mean. Good work listening coordinator and listeners!

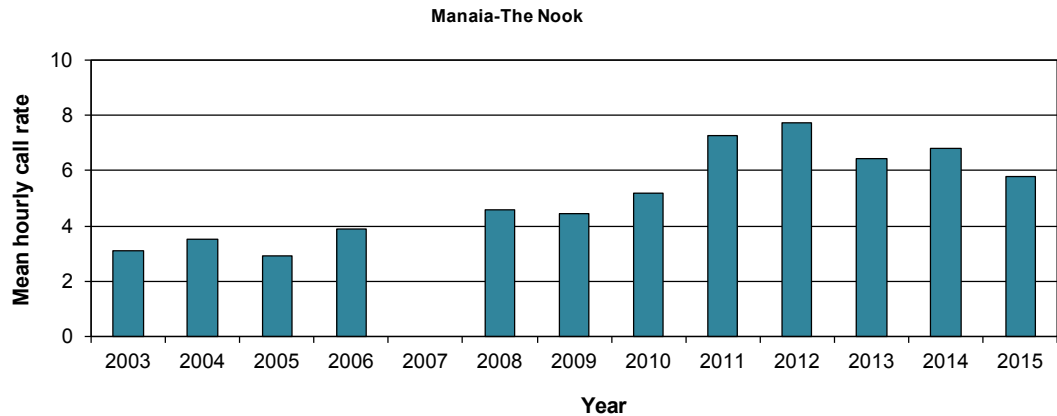


Figure 25. Trends in mean call count at Manaia-Nook management site.

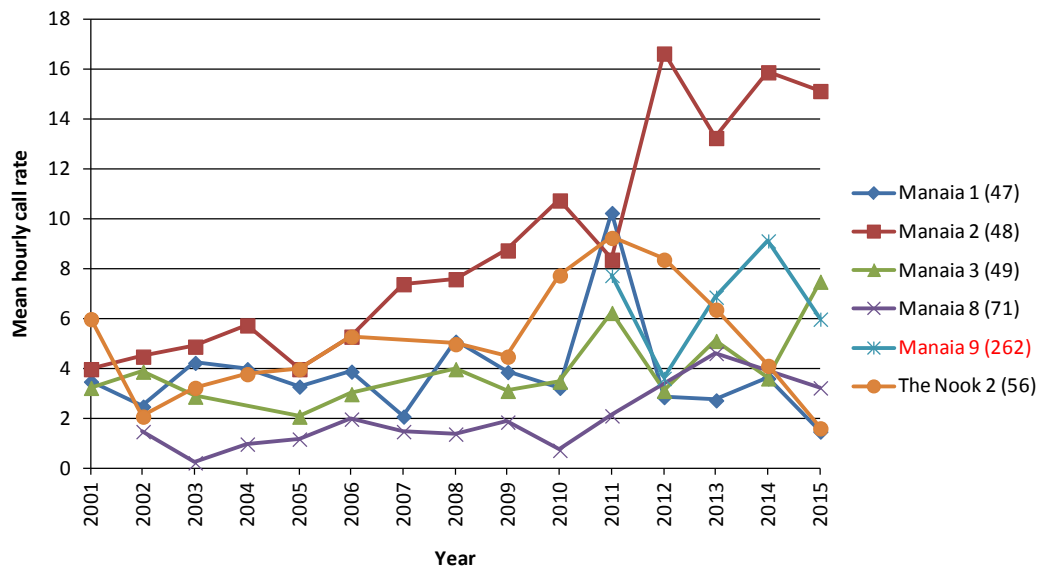


Figure 26. Kiwi call count results for Mt Manaia-The Nook listening stations (station number in brackets) since 2003. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.12 Kauri Mountain

The mean kiwi call count for Kauri Mountain increased to 5.38 calls/hr in 2015, up from 4.95 calls/hr in 2014 (Fig. 27). All listening stations are showing an increasing trend (Fig. 28) and this is the first time since listening began at this management site that the 5 call/hr threshold (that identifies an area as having a high kiwi density) has been crossed (Fig. 27). This is a milestone to be celebrated! Well done to Backyard Kiwi and the community that are working together to make this happen. The use of kiwi translocations as advocacy opportunities combined with sustained predator control has Kauri Mountain continuing merrily on its kiwi recovery path.

All five stations that are used to derive the mean for this management site were listened at for four nights. Great work!

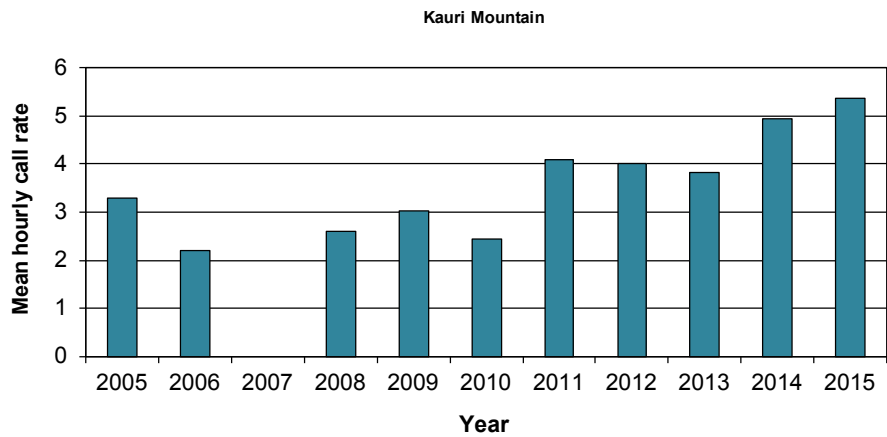


Figure 27. Trends in mean call counts at Kauri Mountain management site.

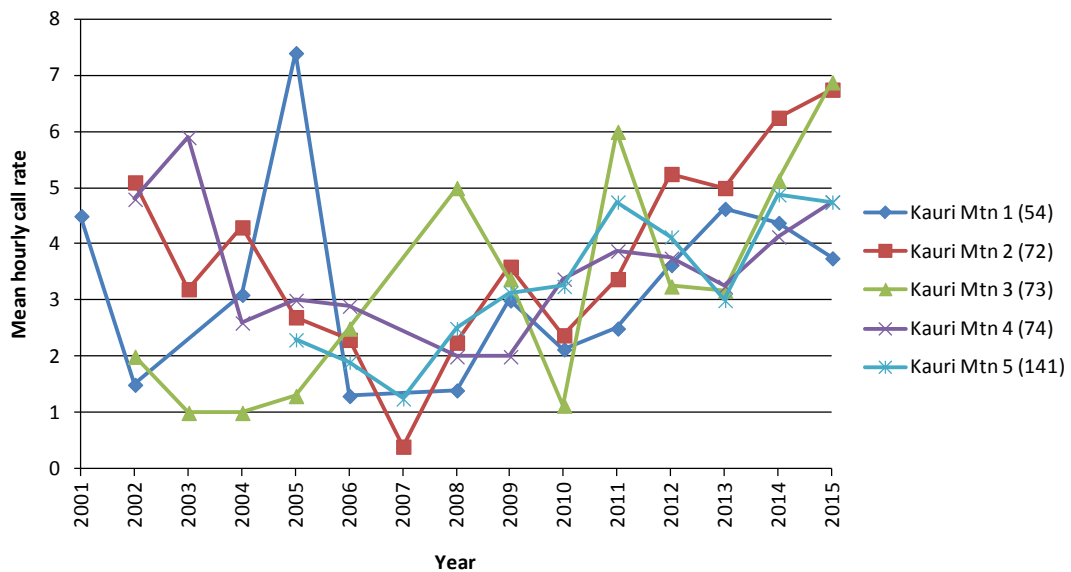


Figure 28. Kiwi call count results for Mt Manaia-The Nook listening stations (station number in brackets) since 2001.

4.1.13 Bream Head/Taurikura

The 2015 results for Bream Head/Taurikura showed an increase in mean call rates since 2014 to 7.46 calls/hr (Fig. 29). This result was derived from just three stations (out of a possible five). Over the past couple of years the results from Bream Head/Taurikura have been affected by listening not occurring at all of the stations that are used to calculate the mean for this site. Five stations were listened at in 2015 at this site, but only three of these are used to calculate the mean. It is highly recommended that listening effort is prioritised to the stations that are used to derive the mean. Please refer to Appendix 3 for the station numbers. Despite this, it is still clear that the 2015 result fits in with an increasing population trend at this site.

A total of five stations were listened at for four nights (Fig. 30). Three of these stations were used to calculate the mean.

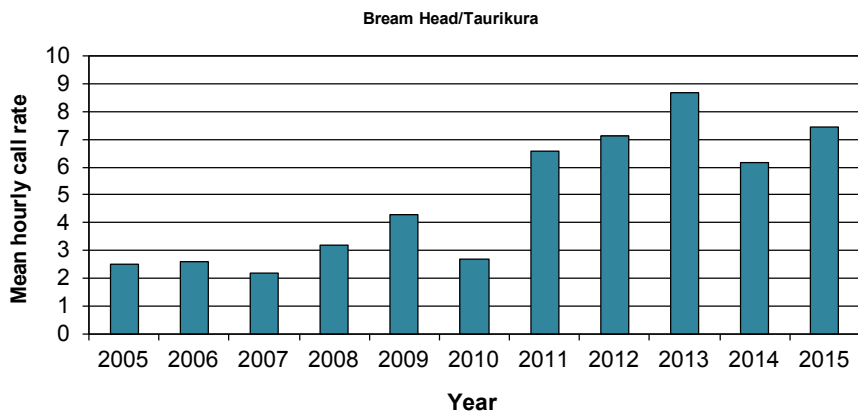


Figure 29. Trends in mean call counts at Bream Head/Taurikura management site.

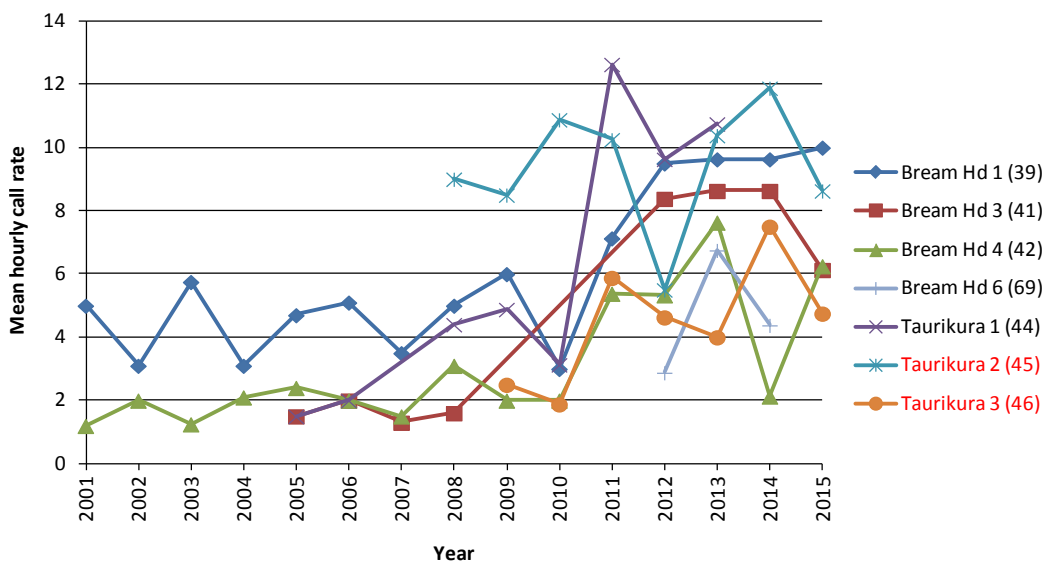


Figure 30. Kiwi call count results for Bream Head/Taurikura listening stations (station number in brackets) since 2001. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.14 Motatau-Marlow

At Motatau-Marlow there was an increase in mean kiwi call counts from 8.67 calls/hr in 2014 to 9.83 calls/hr in 2015. This result is derived from only three stations (stns 23, 34 & 129). Over the last 4 years mean call counts have varied around the 8–9 calls/hr mark and have showed an increasing trend since 2010 (Fig. 31). However, it is the impressive results from station 23 that are maintaining the mean of this management site, as the other three stations that have been consistently listened at over the years are showing a decreasing trend (Fig. 32). It would be good to get a more complete picture of what is happening at this site by getting more consistent results from the other stations that make up this cluster.

A total of three stations were listened at for four nights, all of which were used to calculate the mean.

4.1.15 Purua-Rarewarewa

The mean kiwi call rate for the Purua-Rarewarewa cluster decreased from 14.18 calls/hr in 2014 to 12.65 calls/hr in 2015 (Fig. 33); however, this is still a strong result for this management site and more likely reflects a natural fluctuation than a real decline in the population. This area is a core part of the Whangarei Kiwi Sanctuary, with most of the

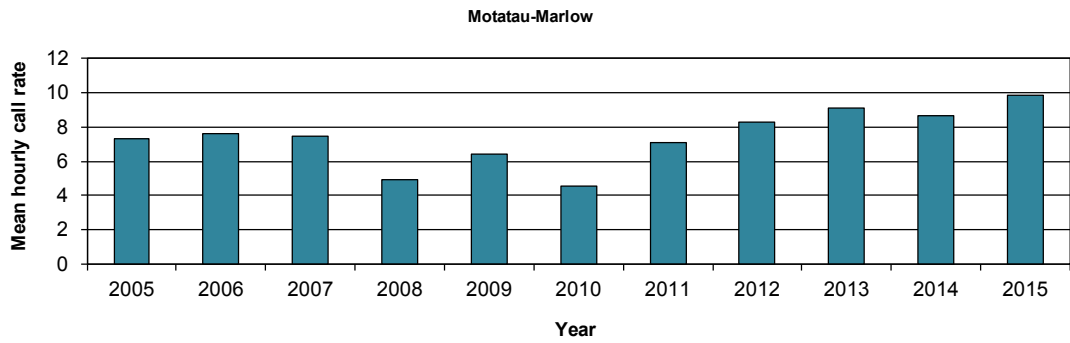


Figure 31. Trends in mean call counts at Motatau-Marlow management site.

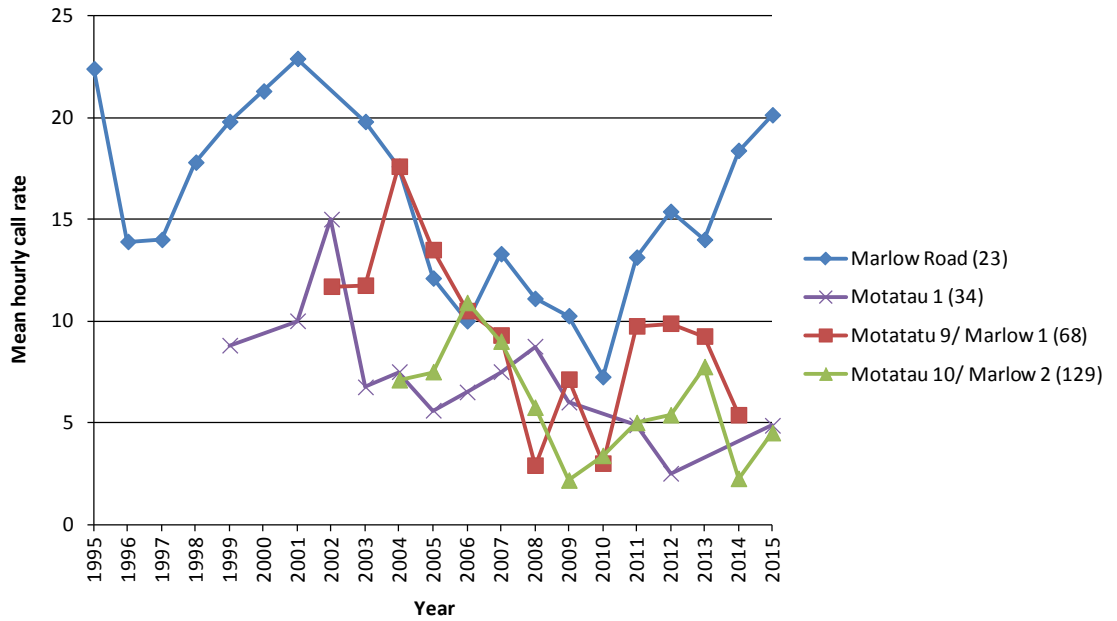


Figure 32. Kiwi call count results for Motatau-Marlow listening stations (station number in brackets) since 1995.

stations maintaining stable call rates since listening at them began (Fig. 34). The Hodges Bush station (139) is the exception to this, experiencing a large increase in call rates since 2010 and recording 23 calls/hr in 2015 (Fig. 34).

The data for this cluster was derived from all of the five stations each of which had four nights of listening. Thank you listeners!

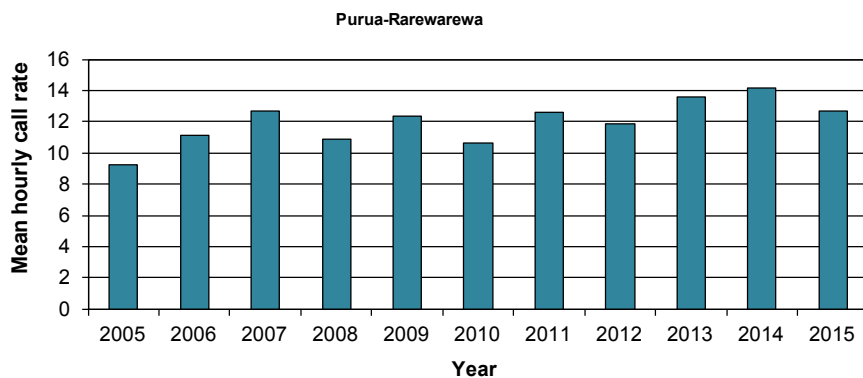


Figure 33. Trends in mean call count rates at Purua-Rarewarewa management site.

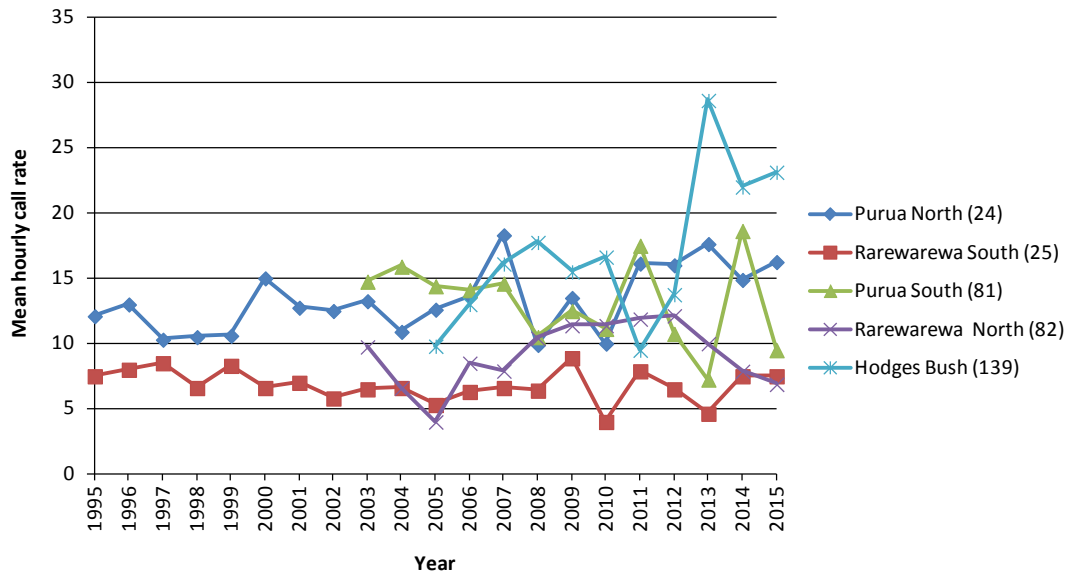


Figure 34. Kiwi call count results for Motatau-Marlow listening stations (station number in brackets) since 1995.

4.1.16 Waipoua-Trounson

The mean call rate for the Waipoua-Trounson site increased from 6.25 calls/hr in 2014 to 8.72 calls/hr in 2015 (Fig. 35). The absence of data from Kaitui (stn 16) for 2015 has an inflationary effect as this station has been recording zero calls since 2008. If the Kaitui average of zero calls/hr was factored into the calculations the adjusted figure would decrease to 6.98 calls/hr. What is pleasing is that the adjusted result is still higher than the 2014 mean and confirms that there has been a real increase in call rates across the rest of the stations that make up this cluster. Despite Kaitui not being listened at in 2015 there was a greater listening effort put in across a number of other stations this year. Although there has been significant decline at most of the listening stations it is positive to see that there appears to be a stabilisation of call rates (Figs 35 & 36). One station in particular, Cathedral Grove (stn 18), which has had historically low call rates since listening began in 1995, has been showing an increasing trend since 2012 and recorded its highest call rate so far (7.13 calls/hr) in 2015.

A total of nine stations were listened at in 2015 (Fig. 36). Four of these stations were used to calculate the mean and all of these stations had four nights of listening completed at them.

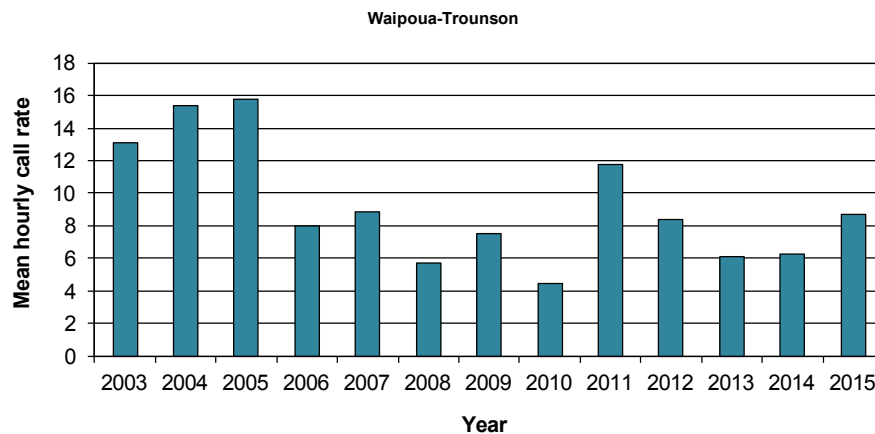


Figure 35. Trends in mean call counts at Waipoua-Trounson management site.

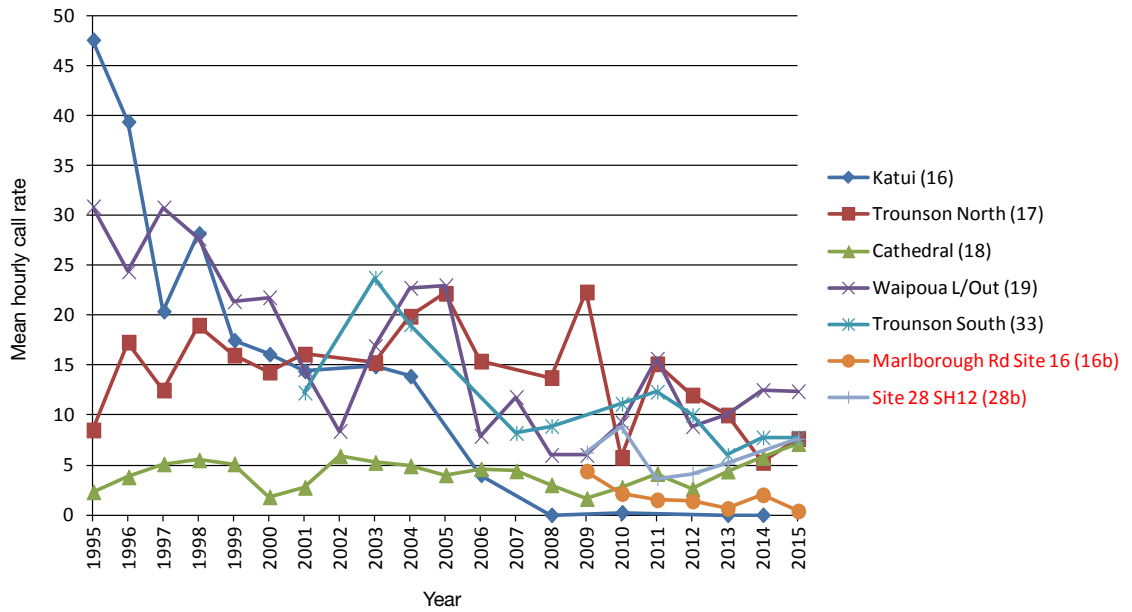


Figure 36. Kiwi call count results for Waipoua-Trounson listening stations (station number in brackets) since 1995. Stations highlighted in red are **not** used in calculations to derive the mean.

4.1.17 Tawharanui

The mean call count for Tawharanui in 2015 (4.54 calls/hr) was very similar to that recorded in the previous year (2014: 4.58 calls/hr) (Fig. 37). Although progress may have slowed compared with the jump in call rates that occurred between 2013 and 2014, it is good to see that the mean has remained elevated at more than 4 calls/hr for a second year. The results from the individual stations provide a really clear picture of how they are tracking, with some stations obviously doing better than others but all showing an increasing trend (Fig. 38). Station 164 (Possum Gully) decreased to 3 calls/hr after a jump up to 8 calls/hr in 2014 which had an effect on the average, but this was compensated for by increases or stability at the other five stations.

The 2015 mean call rate was derived from six stations; each listened at for four nights. Good work Tawharanui listeners!

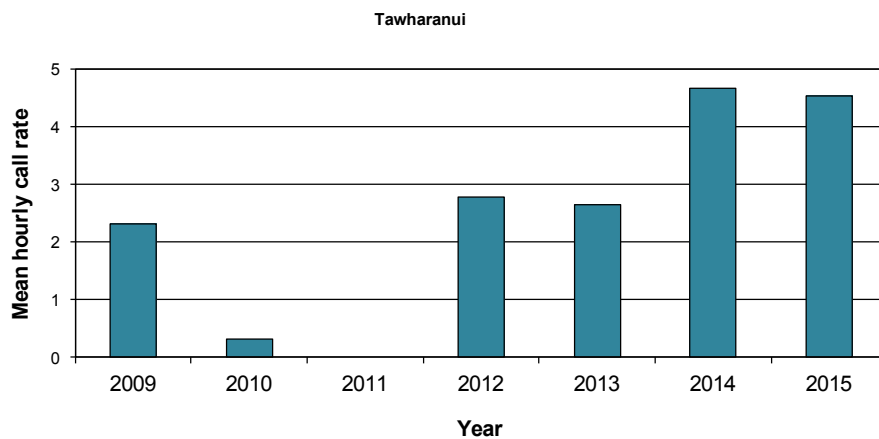


Figure 37. Trends in mean call counts at Tawharanui Open Sanctuary management site.

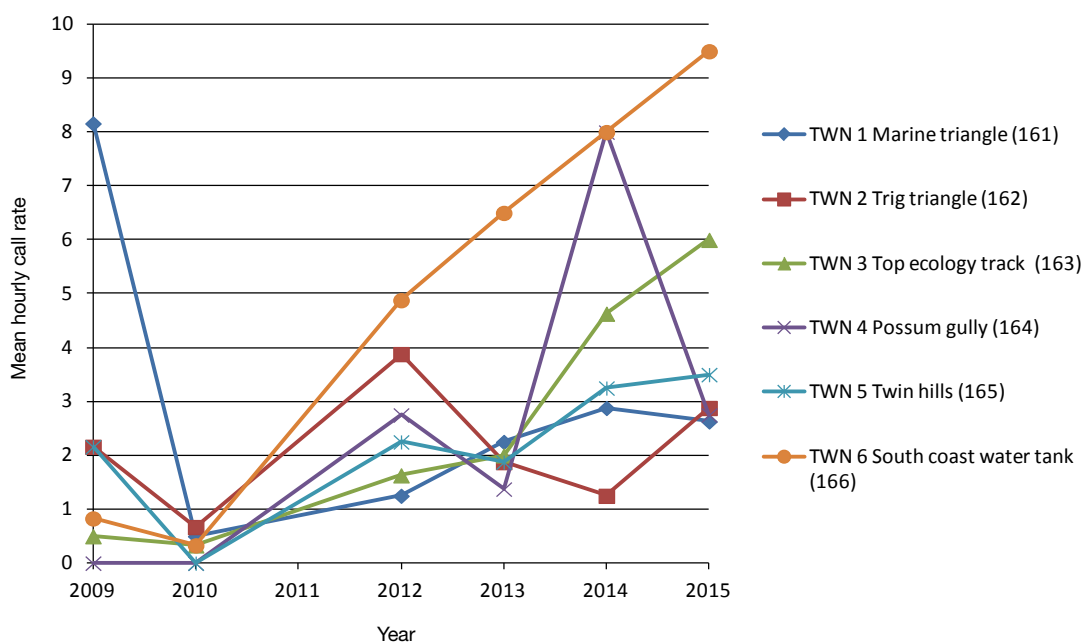


Figure 38. Kiwi call count results for Tawharanui listening stations (station number in brackets) since 2009.

4.1.18 Maranui

Maranui, in the southern Brynderwyn's, became a new site for a translocated population of Northland brown kiwi in 2013 and they are known to be successfully breeding. Kiwi listening was carried out for the first time in 2014 at one listening station which returned a call rate of 1.13 calls/hr. In 2015, a second station was added and the two stations returned a mean of 2.15 calls/hr. Both stations have been allocated station numbers to be referenced against each year (refer to Appendices 1 & 3). It would be good if a third station was added to the listening network to try and provide greater coverage, but if not, both existing stations must be listened at so that a mean can be calculated and graphed. Graphing of results will begin once there is more than 1 year of data from two or more stations.

5. Discussion and general recommendations

The overall result of Northland kiwi listening in 2015 was really positive, with most management sites returning call counts that had increased or stayed similar to those of the previous year. Three new management sites have been added to the report this year as well, which helps to capture more knowledge on kiwi density and distribution. The one on-going issue with kiwi listening reporting that is slowly getting better but still requires improvement is to ensure that the stations that are used to derive the mean are listened at every year. The absence of data from the missing stations makes it difficult to provide robust means for comparison from year to year. Could local kiwi listening coordinators PLEASE refer to Appendix 3 and check what stations are used in the analysis and prioritise listening to occur at those stations, even if they have low kiwi numbers or kiwi are now absent.

Please note that kiwi listening data should include the following:

- The station is identifiable to those who enter and analyse the data for this report, and to future listeners who will repeat listening at the same station. This means that each and every kiwi listening card must include the **individual station number**, and this number must not be changed. Each card must also include an up-to-date GPS reference for the site. Both the station's number and GPS reference need to be written on every card, every night;
- There is consistency in kiwi listeners. Ideally this will mean the same person will listen from the same station for each of the four nights, and in subsequent years. If this is not practical, aim for at least having the same person covering the same stations for all four nights;
- Each station needs to be covered for four nights if at all possible. If this cannot be finished in the first kiwi listening window, the second window can be used. **It is more important that fewer stations are listened at for four nights** than more stations are listened at for only one or two nights. This will produce more robust data and will give a more accurate measure of kiwi in your area;
- **Kiwi call cards need to be filled out in full, including all the fields, each night.**
- Reduced capacity in the Whangarei Kiwi Sanctuary team means that groups are now required to enter their kiwi listening data into the spreadsheet themselves. This needs to be sent to Rolf Fuchs at the Whangarei Area Office, Department of Conservation, **no later than the 31st of August in the year in which it was collected.** If it is not submitted by this date it will not be included in the yearly call count monitoring report.

5.1 Other recommendations

- Provide new listeners with adequate training. This not only includes how to identify the difference between male/female kiwi calls; other species' calls that may be mistaken as kiwi; compass use and judging distances but also **how to fill out the forms fully, correctly, and legibly.**
- Try to map the location of calling birds during the four nights of listening. This will help to identify the minimum number of individuals and pairs heard from each station.
- If you add a new station in your area, please identify it very clearly as a new station so that it can be allocated a consistent station number. Please make sure you also provide GPS co-ordinates for the station, a name that will make sense to everyone, and any other identifying or necessary information about the station.
- Please check the station numbers listed in Appendix 1. If any of these numbers are not accurate, please let Rolf Fuchs (rfuchs@doc.govt.nz) know as soon as possible.

Thanks to those who followed these recommendations for 2015, your efforts are very much appreciated. Thanks also to everyone who clearly used the station number when identifying their spot, this has made reporting and analysis much easier.

5.2 Kiwi listening 2016

Kiwi listening for 2016 should preferably be carried out from 25 May to 12 June, with a back-up window from 23 June to 12 July.

Information about kiwi listening can be found on the Kiwis for kiwi website <http://www.kiwisforkiwi.org/resources/call-count-monitoring/>.

6. Acknowledgements

Thank you to all the people who carried out kiwi listening in 2015. Your time and effort in obtaining information about kiwi in your area on those cold winter nights is very much appreciated. Thanks also to local kiwi listening co-ordinators, and to those who took the time to enter the data into the spreadsheets which was a requirement for the first time this year. Also, please accept my personal apologies for the time that it has taken for me to get this report written and distributed to you.

7. References

McLennan, J.A. 1992: Nationwide monitoring of kiwi populations. *DSIR Land Resources Contract Report No 92/91*. Prepared for Science and Research Division, Department of Conservation, Wellington.

Pierce, R.J.; Westbrooke, I.M. 2003: Call count responses of North Island brown kiwi to different levels of predator control in Northland, New Zealand. *Biological Conservation* 109(2): 175-180.

Robertson, H.A.; Colbourne, R. 2003: Kiwi (*Apteryx* spp.) best practice manual. Department of Conservation, Wellington.

Appendix 1

Mean call count data for all Northland stations 1995–2015

STN NO.	STATION NAME	1995 MEAN	1996 MEAN	1997 MEAN	1998 MEAN	1999 MEAN	2000 MEAN	2001 MEAN	2002 MEAN	2003 MEAN	2004 MEAN	2005 MEAN	2006 MEAN	2007 MEAN	2008 MEAN	2009 MEAN	2010 MEAN	2011 MEAN	2012 MEAN	2013 MEAN	2014 MEAN	2015 MEAN
Northern																						
1	Diggers Valley	1.10	2.40	4.10	2.50	2.10	3.30	-	3.75	3.00	3.90	3.90	2.70	1.30	2.00	1.67	-	2.50	-	-	-	-
2	Takahue	4.30	3.50	5.50	5.40	6.30	8.40	-	4.50	3.30	4.75	5.30	5.00	3.60	4.90	3.13	4.75	11.38	6.88	5.25	2.38	0.13
4	Gartons	5.60	5.00	1.20	-	0.80	2.00	-	-	1.50	4.10	4.90	7.10	1.50	1.25	0.00	0.13	0.25	0.75	0.25	0.25	0.00
5	Kaika	1.70	1.30	2.40	3.40	1.60	3.50	-	2.10	1.90	3.75	2.80	1.50	0.00	0.75	-	1.63	1.13	0.25	1.60	1.63	2.00
7	Puketiki	6.60	5.40	2.10	3.00	6.00	7.60	-	3.50	5.00	3.40	1.50	2.30	0.80	3.90	4.00	6.88	9.38	6.25	6.25	5.88	5.63
8	Puketiki SR	5.40	6.50	4.40	4.00	5.10	6.50	-	6.40	8.25	9.40	2.30	5.10	7.40	8.90	9.00	7.88	9.00	11.75	9.75	7.63	5.38
Mangatete																						
3	Lightning Hill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.5	13.5	10.00	17.63
256	Baigents home drive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.00	14.13
Honeymoon Valley																						
271	H-moon Valley Green Bach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.38
272	H-moon Valley Lost Valley track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.63
273	H-moon Valley Central Ridge of Beth's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.63
274	H-moon Valley Greg's driveway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25
Whakaangi																						
130	Whakaangi 1	-	-	-	-	-	-	-	-	-	-	9.00	10.40	4.60	7.60	6.33	-	-	-	-	-	-
131	Whakaangi 2	-	-	-	-	-	-	-	-	-	14.90	20.75	25.00	15.30	20.75	17.13	16.13	9.38	8.00	4.75	3.13	14.13
132	Whakaangi 3	-	-	-	-	-	-	-	-	-	13.50	14.60	14.60	9.00	10.75	12.17	12.17	5.50	3.13	6.75	3.88	4.38
29	Whakaangi 4	-	-	4.50	-	2.90	1.90	-	3.75	4.90	6.60	2.30	6.80	6.30	4.90	5.75	9.83	5.00	-	-	-	-
133	Whakaangi 5	-	-	-	-	-	-	-	-	-	-	9.80	13.80	10.10	-	8.25	-	7.88	4.13	-	-	7.13
134	Whakaangi 6	-	-	-	-	-	-	-	-	-	-	6.00	7.30	3.90	-	9.50	7.00	-	4.50	-	-	-
135	Whakaangi 7	-	-	-	-	-	-	-	-	-	21.90	28.00	28.00	24.50	27.00	25.88	21.88	23.38	19.13	11.88	13.63	9.00
136	Whakaangi 8	-	-	-	-	-	-	-	-	-	14.10	18.80	29.00	11.80	18.80	15.25	10.5	20.00	15.25	12.75	13.00	10.88
137	Whakaangi 9	-	-	-	-	-	-	-	-	-	4.80	8.40	8.40	5.60	6.50	4.88	8.13	5.00	-	-	2.63	3.00
138	Whakaangi 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.75	4.00	5.83	4.33	3.75	2.88	0.50
140	Whakaangi 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.63	7.63	3.88	7.13	7.25
Mahinepua-Padar Hill																						
90	Mahinepua 0	-	-	-	-	-	-	-	-	-	-	-	-	2.90	2.90	3.38	3.63	4.00	7.13	4.38	3.25	4.88
83	Mahinepua 1	-	-	-	-	-	-	-	-	3.50	-	2.60	4.10	3.50	2.60	2.38	2.25	3.13	7.50	6.75	4.25	4.75

Continued on next page

STN NO.	STATION NAME	1995 MEAN	1996 MEAN	1997 MEAN	1998 MEAN	1999 MEAN	2000 MEAN	2001 MEAN	2002 MEAN	2003 MEAN	2004 MEAN	2005 MEAN	2006 MEAN	2007 MEAN	2008 MEAN	2009 MEAN	2010 MEAN	2011 MEAN	2012 MEAN	2013 MEAN	2014 MEAN	2015 MEAN
84	Mahinepua 2	-	-	-	-	-	-	-	-	4.20	0.80	2.30	4.80	4.30	2.75	3.25	3.25	4.25	4.75	3.63	4.25	
85	Mahinepua 3	-	-	-	-	-	-	-	-	5.60	4.75	4.00	5.50	5.40	3.25	5.88	5.25	5.25	5.00	5.88	5.38	
88	Mahinepua 4	-	-	-	-	-	-	-	-	6.10	4.10	3.00	7.80	4.70	4.10	9.50	4.75	5.38	7.13	8.00	6.88	
87	Mahinepua 5	-	-	-	-	-	-	-	-	-	-	-	-	2.40	0.90	2	-	-	-	-	-	
86	Mahinepua 6	-	-	-	-	-	-	-	-	1.00	2.50	2.30	-	0.40	0.75	1.25	-	-	-	-	-	
89	Mahinepua 7	-	-	-	-	-	-	-	-	0.90	5.90	1.80	4.80	1.90	0.40	-	-	-	-	-	-	
181	Mahinepua 8	-	-	-	-	-	-	-	-	-	-	-	-	0.80	0.40	-	-	-	-	-	-	
182	Mahinepua 9	-	-	-	-	-	-	-	-	-	-	-	-	0.10	0.10	-	-	-	-	-	-	
183	Mahinepua 10	-	-	-	-	-	-	-	-	-	-	-	-	1.60	1.25	-	-	-	-	-	-	
184	Mahinepua 11	-	-	-	-	-	-	-	-	-	-	-	-	2.90	1.25	1.25	-	-	-	-	-	
98	Mahinepua 12	-	-	-	-	-	-	-	-	-	3.50	2.30	3.80	2.50	3.40	2.88	-	-	-	-	-	
99	Mahinepua 13	-	-	-	-	-	-	-	-	-	3.90	3.80	7.40	7.30	5.00	9.38	7.75	9.50	9.63	6.88	11.00	
92	Mahinepua 14	-	-	-	-	-	-	-	-	-	-	-	-	0.60	1.25	1.13	1.38	0.75	-	-	-	
91	Mahinepua 15	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.10	1.63	1.75	3.13	-	-	-	
93	Mahinepua 16	-	-	-	-	-	-	-	-	-	-	-	-	1.30	6.00	2.00	2.63	5.25	-	-	-	
94	Mahinepua 17	-	-	-	-	-	-	-	-	-	-	-	-	2.50	4.90	5.00	3.38	6.88	-	-	-	
95	Mahinepua 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.75	-	-	-	-	-	
Eastern																						
10	Marsden Cross	20.90	18.30	9.60	16.7	14.50	19.90	21.90	17.90	18.50	22.00	19.30	30.60	23.00	-	20.25	24.50	34.88	30.86	30.25	19.25	30.38
11	Puketotara	10.00	13.80	8.10	11.6	9.70	8.00	-	2.50	7.50	3.60	-	7.10	13.70	10.60	6.17	9.50	9.25	9.13	9.75	14.00	12.75
12	Rangitane	14.00	5.60	8.40	10.5	7.50	8.40	11.50	10.50	8.60	8.00	8.00	11.50	9.10	15.90	15.25	11.38	10.75	12.75	11.25	12.83	9.50
13	Waitangi No 12	7.60	7.60	6.30	8.9	5.30	7.10	11.50	15.10	18.40	13.75	11.50	15.50	6.30	-	-	-	-	6.75	7.38	3.00	4.75
14	Mt Bledisloe	27.10	10.90	5.50	7.9	8.80	5.10	6.40	6.75	4.90	8.90	9.10	5.50	9.60	11.25	8.25	11.38	13.71	7.38	10.75	6.75	7.88
15	Tikitikio	10.80	13.50	6.10	6.1	4.50	6.50	2.90	3.30	3.10	6.10	3.38	13.00	7.90	-	12.25	12.25	13.50	17.75	14.50	12.38	15.13
Russell Peninsula																						
59	Opito Farms	-	-	-	-	-	5.70	-	9.90	-	-	4.63	13.10	6.10	9.13	6.75	4.25	5.25	8.13	6.88	11.50	10.13
60	Flagstaff/Te Maiki	-	-	-	-	-	3.70	1.30	1.30	-	-	-	4.30	-	6.38	-	2.50	4.25	3.88	3.25	3.25	3.88
61	Milne Ct	-	-	-	-	-	-	-	-	-	-	-	6.30	5.80	-	-	-	-	-	-	-	-
62	Uruti Rd	-	-	-	-	-	10.80	7.60	10.50	-	-	7.63	14.40	7.90	5.00	12.75	12.25	12.75	11.5	13.88	-	15.00
156	Russell Heights	-	-	-	-	-	-	-	-	-	-	-	9.80	4.80	5.00	2.50	5.00	-	-	-	-	-
170	Nikau Block	-	-	-	-	-	-	-	-	-	-	12.88	10.00	-	1.00	3.00	8.88	14.25	9.13	20.75	14.63	14.88
171	Mace/Farmer	-	-	-	-	-	-	-	-	-	-	-	-	-	6.63	4.75	17.63	10.38	6.25	4.00	4.00	14.25
172	Pipiroa Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	3.00	2.00	2.75	6.00	5.38	5.63	3.00
173	Shortlands	-	-	-	-	-	-	-	-	-	-	2.00	-	2.50	1.38	1.13	1.25	-	2.33	1.13	-	-
174	Johnsons	-	-	-	-	-	-	-	-	-	-	-	-	9.75	12.75	-	1.63	11.38	8.50	10.13	10.25	11.25
176	Jarvis	-	-	-	-	-	-	-	-	-	-	5.38	4.30	-	-	-	-	-	-	-	-	-
177	Soloman's Gate	-	-	-	-	-	-	-	-	-	-	11.5	6.38	-	-	-	-	5.38	6.25	4.88	14.00	9.50
210	Paroa Bay, Russell	-	-	-	-	-	-	-	-	-	-	-	-	4.30	-	-	-	-	-	-	-	-

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STN NO.	STATION NAME	1995 MEAN	1996 MEAN	1997 MEAN	1998 MEAN	1999 MEAN	2000 MEAN	2001 MEAN	2002 MEAN	2003 MEAN	2004 MEAN	2005 MEAN	2006 MEAN	2007 MEAN	2008 MEAN	2009 MEAN	2010 MEAN	2011 MEAN	2012 MEAN	2013 MEAN	2014 MEAN	2015 MEAN
211	Eagles Nest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.50	-	-	-	-	-
Bay of Islands																						
146	Kauri Cliffs 1 (Pink Beach)	-	-	-	-	-	-	-	-	9.00	-	-	4.00	4.25	1.75	5.00	6.50	-	-	-	-	-
147	Kauri Cliffs 2 (Puiriri)	-	-	-	-	-	-	-	-	-	-	-	1.50	3.00	2.75	1.00	-	-	-	-	-	-
148	Wiwiki Beach	-	-	-	-	-	-	-	-	-	-	-	32.10	-	-	-	-	-	-	-	-	-
149	Mataka Stn Gate, Purerua	-	-	-	-	-	-	-	-	-	-	-	4.00	4.10	8.25	6.75	18.50	3.25	10.00	6.88	-	-
150	McKenzie Rd, Purerua	-	-	-	-	-	-	-	-	-	-	-	9.50	12.10	10.25	5.00	7.50	-	2.50	-	-	-
151	Mtn Landing (Lot 30) Purerua	-	-	-	-	-	-	-	-	-	-	-	12.30	10.20	18.75	12.60	25.00	22.75	20.25	-	-	-
152	Waitoto Block	-	-	-	-	-	-	-	-	-	-	-	4.00	-	-	-	-	-	-	-	-	-
153	Aroha Island	-	-	-	-	-	-	-	-	6.88	-	-	12.60	-	-	-	-	-	-	-	-	-
154	Napia Bay	-	-	-	-	-	-	-	-	-	8.70	5.50	4.60	4.00	4.50	3.25	5.60	7.50	3.60	4.00	-	-
155	Stirlings Quarry	-	-	-	-	-	-	-	-	7.30	9.80	13.00	12.40	10.20	8.30	4.00	8.50	-	-	-	-	-
97	Kurapari Rd	-	-	-	-	7.10	-	-	-	12.70	8.80	9.25	10.40	5.50	6.00	6.75	4.75	2.33	5.50	7.00	-	-
138	Hupara	-	-	-	-	-	-	-	-	-	25.6	19.3	27.8	-	-	-	-	-	-	-	-	-
185	Akeake Reserve, Kerikeri	-	-	-	-	-	-	-	-	-	-	-	-	-	2.75	0.50	-	6.00	-	-	-	-
186	Cunningham Gardens, Aroha Island	-	-	-	-	-	-	-	10.75	8.63	-	-	-	-	-	-	-	8.17	-	-	-	-
187	Gaitens, Rangitane Rd, Kerikeri	-	-	-	-	10.00	-	12.80	6.33	6.88	10.00	12.00	12.63	14.70	10.50	8.00	7.25	7.50	4.75	-	-	-
188	Blacksmiths Bay (east), Kerikeri (Lex Rennes)	-	-	-	-	-	-	-	10.25	10.30	7.67	8.26	6.20	6.00	8.00	4.50	6.88	8.75	6.40	0.00	-	-
189	Doves Bay, Kerikeri (Lockyer)	-	-	-	-	4.17	-	-	2.00	-	3.78	2.46	-	-	4.50	7.50	15.25	18.25	-	-	-	-
190	Rangitu, Opito Bay Road, Kerikeri	-	-	-	-	-	-	-	-	-	-	-	-	9.10	16.00	15.50	15.50	-	-	-	-	-
191	Tikorangi Road, Opito Bay, Kerikeri	-	-	-	-	-	-	-	-	-	-	-	-	-	4.50	4.50	4.00	-	-	-	-	-
192	Kraus, Hansen Rd, Purerua	-	-	-	-	-	-	-	-	-	3.33	-	-	-	-	11.00	-	-	-	-	-	-
193	Mataka Beach, Mataka Station, Purerua	-	-	-	-	-	-	-	41.50	-	30.00	39.00	32.67	24.50	41.75	30.00	41.25	-	30.83	30.88	-	-
194	Mataka Station, Ninepin Track, Purerua	-	-	-	-	-	-	-	-	-	30.00	-	-	-	50.75	43.50	-	18.00	-	24.00	-	-
195	Mountain Landing (Lot 30) Wharengaere, Purerua	-	-	-	-	-	-	-	-	-	-	-	12.25	10.20	18.75	12.60	25.00	22.75	20.25	13.25	-	-
196	Mountain Landing, Mataka Ridgeline, Purerua	-	-	-	-	-	-	-	-	-	-	-	7.50	10.10	18.00	25.50	14.25	22.00	-	-	-	-
197	Mountain Landing, Paddle (Entrance), Purerua	-	-	-	-	-	-	-	-	-	-	-	8.50	10.20	12.50	14.25	17.00	-	-	-	-	-

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STN NO.	STATION NAME	1995 MEAN	1996 MEAN	1997 MEAN	1998 MEAN	1999 MEAN	2000 MEAN	2001 MEAN	2002 MEAN	2003 MEAN	2004 MEAN	2005 MEAN	2006 MEAN	2007 MEAN	2008 MEAN	2009 MEAN	2010 MEAN	2011 MEAN	2012 MEAN	2013 MEAN	2014 MEAN	2015 MEAN
198	Mountain Landing, Poraenui Point	-	-	-	-	-	-	-	-	-	-	-	-	7.30	14.50	16.00	13.75	-	-	-	-	-
199	Paoneone	-	-	-	-	-	-	-	16.67	-	-	-	-	-	-	-	-	37.60	-	11.25	-	-
200	Pattersons Big Hill	-	-	-	-	-	-	-	9.00	-	-	30.50	-	4.01	20.50	70.25	33.00	35.50	-	-	-	-
201	Pattersons, Rocky Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	16.50	19.50	17.67	11.67	-	-	-	-
202	Tapuetahi	-	-	-	-	-	-	-	-	-	-	-	5.00	-	3.00	3.25	16.50	-	-	7.38	-	-
203	Wharengaere Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.50	15.50	-	-	-	-
204	Wiroa Station	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.50	6.67	-	-	-	-
205	Wiroa Station Hill 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	-	-	-	-	-
206	Maintenance Facility, Kauri Cliffs45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.00	13.13	-	-	-	-	-
207	Waiaua Bay, Matauri X	-	-	-	-	-	-	-	-	2.25	-	-	0.50	0.50	-	-	-	-	-	-	-	-
208	Waterfall, Kauri Cliffs, Takou Bay	-	-	-	-	-	-	-	-	6.00	-	-	5.50	2.25	4.50	3.50	-	-	-	-	-	-
209	Hikurua Rd (end)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
212	Drivers Whitehills farm	-	-	-	-	-	-	-	-	-	-	-	-	-	7.50	2.00	8.00	8.00	7.88	-	-	-
213	Landcorp Takou Kiwi covenant	-	-	-	-	-	-	-	-	-	-	-	-	-	8.50	0.75	3.00	-	-	-	-	-
214	Maori Block	-	-	-	-	-	-	-	-	-	-	-	-	1.50	-	-	3.50	-	-	-	-	-
215	Otaha Station (south end)	-	-	-	-	-	-	-	-	-	-	-	-	3.00	-	-	3.00	-	-	-	-	-
216	Just past Clinton's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-
217	End of Te Ra Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.25	-	-	-	-	-
219	Achtzhener, Bulls Gorge, Kerikeri	-	-	-	-	-	-	-	-	7.00	-	-	7.00	-	6.00	11.75	5.75	2.75	1.88	-	-	-
220	Airstrip Rd (Baigent-Mercer)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	3.25	-	-	-
221	Airstrip Rd (Sharp)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.00	-	-	-	-	-
222	Candy Bush, Puketi Road, middle ridge	-	-	-	-	-	-	-	-	-	-	-	-	-	0.75	6.00	-	-	-	-	-	-
223	Candy Bush, Puketi Road, red cliffs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.50	-	-	5.75	-	-	-
224	Candy Bush, Puketi Road, white/yellow path	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.00	-	-	11.00	-	-	-
225	Kauri Hills, Totara North	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.00	6.25	-	-	-
226	Pouitons, Kerikeri River, Mangapareua Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	9.00	-	6.50	-	4.63	-	-	-
227	Puketotara Rd = 709	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.00	-	-	-	-	-
228	Puketotara Rd = Kearney	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	-	-	-	-	12.88
229	Waipapa Rd West, Kerikeri (Arne C.)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-
230	Waipapa Rd West, Kerikeri (Isabella C.)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.60	0.50	-	-	-	-	-	-

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STN NO.	STATION NAME	1995 MEAN	1996 MEAN	1997 MEAN	1998 MEAN	1999 MEAN	2000 MEAN	2001 MEAN	2002 MEAN	2003 MEAN	2004 MEAN	2005 MEAN	2006 MEAN	2007 MEAN	2008 MEAN	2009 MEAN	2010 MEAN	2011 MEAN	2012 MEAN	2013 MEAN	2014 MEAN	2015 MEAN	
231	Waitoto, 500m west of Rhyolitic dome, Mangapareraua	-	-	-	-	-	-	-	-	-	-	-	4.00	-	-	-	-	-	-	-	-	-	
232	Waitoto, Rhyolitic dome, Mangapareraua Road	-	-	-	-	-	-	-	-	-	-	-	4.05	4.60	8.00	5.00	-	-	-	-	-	-	
233	Wharau Rd, Kerikeri (Manning)	-	-	-	-	-	-	-	-	-	-	-	-	3.60	2.50	-	5.50	3.50	4.50	-	-	-	
234	Wharau Rd, Kerikeri (Starr)	-	-	-	-	-	-	-	-	-	-	-	-	6.25	7.00	-	-	-	-	-	-	-	
Puketi Forest																							
102	Bramley's Rd	-	-	-	-	-	-	-	-	-	-	-	2.50	0.50	2.00	2.00	2.75	2.75	2.50	2.00	-	-	3.38
103	Pirau Ridge	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.00	1.00	0.50	1.25	1.25	1.38	0.50	1.63	
104	Pond	-	-	-	-	-	-	-	-	-	-	-	4.50	1.00	3.75	5.00	3.50	8.00	6.88	4.63	5.88	3.25	
105	Pudding Bowl Hill	-	-	-	-	-	-	-	-	-	-	-	0.30	0.75	1.13	2.04	2.00	1.00	-	3.00	-	-	
106	Takapau Track	-	-	-	-	-	-	-	-	-	-	-	0.00	1.00	0.00	2.50	3.25	2.38	2.57	1.38	-	1.13	
107	Takapau/Pirau Rd Junction	-	-	-	-	-	-	-	-	-	-	-	0.50	-	1.00	2.75	1.38	3.50	1.50	1.13	0.88	1.63	
108	Totara Ridge	-	-	-	-	-	-	-	-	-	-	-	5.75	-	0.75	7.13	3.50	6.13	4.63	5.88	5.00	1.75	
109	Waihoanga Gorge	-	-	-	-	-	-	-	-	-	-	-	2.00	-	3.75	5.38	3.25	6.25	4.50	4.25	-	5.75	
110	Waihoanga Gorge 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.50	2.50	1.50	-	4.50	-	-	
111	Walnut	-	-	-	-	-	-	-	-	-	-	-	4.25	2.50	1.25	3.29	3.00	5.25	4.00	4.75	6.13	4.88	
112	Stoat line 9 - Puketi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.13	4.00	3.63	1.38	4.00	
259	Puketi Nature Trail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.13	-	3.25	-	-	
Waimate North																							
113	W1	-	-	-	-	-	-	-	-	-	23.50	15.80	24.75	-	-	25.50	25.75	23.63	23.13	23.75	27.13	30.75	
114	W2	-	-	-	-	-	-	-	-	-	12.25	7.00	9.50	7.90	11.50	5.75	14.50	11.63	12.50	7.13	5.13	8.60	
115	W3	-	-	-	-	-	-	-	-	-	14.90	-	-	-	-	-	-	1.00	0.00	1.00	1.38	2.00	
116	W4	-	-	-	-	-	-	-	-	-	9.40	10.50	6.00	-	8.00	-	8.50	13.50	10.50	10.88	8.50	8.00	
117	W5	-	-	-	-	-	-	-	-	-	5.90	1.83	3.00	-	-	-	-	-	-	-	-	-	
118	W6	-	-	-	-	-	-	-	-	-	22.30	11.00	5.70	8.50	7.30	9.13	5.63	10.63	8.00	7.50	10.38	11.00	
119	W7	-	-	-	-	-	-	-	-	-	-	5.30	6.50	-	3.10	-	-	-	-	-	-	-	
120	W8	-	-	-	-	-	-	-	-	-	13.75	2.83	1.00	8.10	8.00	5.50	8.13	9.13	11.88	9.13	11.25	8.13	
121	W9	-	-	-	-	-	-	-	-	-	5.20	3.50	2.125	2.30	3.50	-	-	-	-	1.00	5.50	2.88	
122	W10	-	-	-	-	-	-	-	-	-	-	-	7.33	8.3	5.9	5.25	4.13	7.25	5.13	4.13	8.00	4.43	
123	W11	-	-	-	-	-	-	-	-	-	7.07	7.75	2.00	-	-	-	-	-	-	-	-	-	
124	W12	-	-	-	-	-	-	-	-	-	18.90	9.75	6.10	3.60	5.90	6.00	7.88	6.25	4.63	5.13	8.00	8.13	
178	W13	-	-	-	-	-	-	-	-	-	-	-	-	-	4.50	2.80	-	-	-	-	-	-	
127	W14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.88	0.50	0.00	-	-	-	-	
128	W16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.90	2.17	-	-	-	-	-	
Hupara																							
258	Hupara Land Care 1 (Bill's Plateau)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31.25	15.13	21.38	25.00	

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245	Hupara Land Care 2 (Mike Sullivan's)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.88	11.00	16.00
246	Hupara Land Care 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.38	-	-
257	Hupara Land Care 4 (Home Orange Tree)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.63	9.00
Tutukaka & Sandy Bay																						
125	TLC 1	-	-	-	-	-	-	-	-	9.75	5.90	7.10	8.80	10.90	11.60	8.13	8.63	12.38	12.00	12.14	9.63	7.38
126	TLC 2	-	-	-	-	-	-	-	-	-	8.40	7.80	9.80	10.25	6.50	-	7.38	2.75	10.00	-	6.83	10.88
142	TLC 3	-	-	-	-	-	-	-	-	-	-	3.00	4.60	3.60	3.00	-	-	9.25	8.50	7.13	5.38	4.13
28	TLC 4	-	7.30	-	-	8.00	4.40	-	-	10.70	7.25	4.40	10.00	-	-	8.17	4.5	-	-	-	6.50	-
143	TLC 5	-	-	-	-	-	-	-	-	-	-	4.10	6.00	3.30	7.10	4	2.33	3.83	-	-	3.50	-
144	TLC 6	-	-	-	-	-	-	-	-	-	-	9.20	-	13.00	15.20	6.50	8.75	-	-	-	-	-
160	TLC 7	-	-	-	-	-	-	-	-	-	-	-	4.40	-	-	4.75	4.88	-	5.50	2.13	3.00	-
100	Kaitea 1	-	-	-	-	-	-	-	-	-	1.60	-	-	-	-	-	-	-	-	-	-	-
101	Kaitea 2	-	-	-	-	-	-	1.20	2.00	1.25	2.10	-	-	-	-	-	-	-	-	-	-	-
27	Sandy Bay 1	3.60	3.40	2.80	8.00	6.10	3.30	3.50	-	3.00	-	2.50	-	-	6.75	-	5.25	-	4.17	5.50	4.25	3.88
260	Sandy Bay 2	-	-	-	-	-	-	-	-	-	-	-	4.5	-	-	3.83	3.5	2.5	4.5	-	3.00	5.88
261	Sandy Bay 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	4.00	7.50	3.88	3.88
Whangarei Heads																						
39	Bream Hd 1	-	-	-	-	-	-	5.00	3.10	5.75	3.10	4.70	5.10	3.50	5.00	6.00	3.00	7.13	9.50	9.63	9.63	10.00
40	Bream Hd 2	-	-	-	-	-	-	1.20	2.00	1.25	2.10	2.40	2.00	2.80	2.00	-	-	1.25	-	-	-	-
41	Bream Hd 3	-	-	-	-	-	-	-	-	-	-	1.50	2.00	1.30	1.60	-	-	-	8.38	8.63	8.63	6.13
42	Bream Hd 4	-	-	-	-	-	-	1.20	2.00	1.25	2.10	2.40	2.00	1.50	3.10	2.00	2.00	5.38	5.33	7.63	2.13	6.25
69	Bream Hd 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.88	6.75	4.38	-
44	Taurikura 1	-	-	-	-	-	-	-	-	-	-	1.50	2.00	-	4.40	4.88	3.13	12.63	9.63	10.75	-	-
45	Taurikura 2	-	-	-	-	-	-	-	-	-	-	-	-	-	9.00	8.50	10.88	10.25	5.50	10.38	11.88	8.63
46	Taurikura 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	1.88	5.88	4.63	4.00	7.50	4.75
47	Manaia 1	-	-	-	-	-	-	3.50	2.50	4.25	4.00	3.30	3.90	2.10	5.10	3.88	3.25	10.25	2.88	2.75	3.63	1.50
48	Manaia 2	-	-	-	-	-	-	4.00	4.50	4.90	5.75	4.00	5.30	7.40	7.60	8.75	10.75	8.38	16.63	13.25	15.88	15.13
49	Manaia 3	-	-	-	-	-	-	3.25	3.90	2.90	-	2.10	3.00	-	4.00	3.13	3.50	6.25	3.13	5.13	3.63	7.50
71	Manaia 8	-	-	-	-	-	-	-	1.50	0.25	1.00	1.20	2.00	1.50	1.40	1.88	0.75	2.13	-	4.63	-	3.25
262	Manaia 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	Kauri Mtn 1	-	-	-	-	-	-	4.50	1.50	-	3.10	7.40	1.30	-	1.40	3.00	2.13	2.50	3.63	4.63	4.38	3.75
72	Kauri Mtn 2	-	-	-	-	-	-	-	5.10	3.20	4.30	2.70	2.30	0.40	2.25	3.60	2.38	3.38	5.25	5.00	6.25	6.75
73	Kauri Mtn 3	-	-	-	-	-	-	-	2.00	1.00	1.00	1.30	2.50	-	5.00	3.38	1.13	6.00	3.25	3.17	5.13	6.88
74	Kauri Mtn 4	-	-	-	-	-	-	-	4.80	5.90	2.60	3.00	2.90	-	2.00	2.00	3.38	3.88	3.75	3.25	4.13	4.75
141	Kauri Mtn 5	-	-	-	-	-	-	-	-	-	-	2.30	1.90	1.25	2.50	3.13	3.25	4.75	4.13	3.00	4.88	4.75
127	The Nook 1	-	-	-	-	-	-	-	-	-	1.80	1.50	0.90	-	0.70	1.38	1.25	2.25	-	0.88	-	-
56	The Nook 2	-	-	-	-	-	-	6.00	2.10	3.25	3.80	4.00	5.30	-	5.00	4.50	7.75	9.25	8.38	6.38	4.13	1.63
128	The Nook 3	-	-	-	-	-	-	-	-	-	-	-	-	-	3.40	4.75	5.00	3.38	3.38	4.63	-	-
58	Nook Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	3.75	-	3.67	4.63	1.50	-	-	-

STN NO.	STATION NAME	1995 MEAN	1996 MEAN	1997 MEAN	1998 MEAN	1999 MEAN	2000 MEAN	2001 MEAN	2002 MEAN	2003 MEAN	2004 MEAN	2005 MEAN	2006 MEAN	2007 MEAN	2008 MEAN	2009 MEAN	2010 MEAN	2011 MEAN	2012 MEAN	2013 MEAN	2014 MEAN	2015 MEAN		
263	Craig Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.00	14.13	12.25	9.25	13.50		
75	McCleod Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.63	5.88		
Southern																								
21	Glenbervie 7A	5.00	6.40	7.10	7.50	5.00	0.50	1.00	2.40	1.00	-	1.30	-	2.40	2.50	1.88	1.75	2.63	1.13	4.25	-	-	-	
22	Glenbervie 9A	11.20	3.80	4.30	7.30	5.90	12.60	6.75	5.25	4.50	6.50	-	1.80	2.80	2.90	1.38	2.88	1.63	6.75	6.88	2.75	2.00	2.00	
23	Marlow Road	22.4	13.90	14.00	17.80	19.80	21.30	22.90	-	19.80	17.60	12.10	10.00	13.30	11.10	10.25	7.25	13.13	15.38	14.00	18.38	20.13	20.13	
24	Purua North	12.1	13	10.3	10.5	10.6	15	12.75	12.5	13.25	10.90	12.60	13.60	18.30	9.90	13.50	10.00	16.13	16.00	17.63	14.88	16.25	16.25	
25	Rarewarewa -early listen	-	-	-	8.00	10.40	4.60	7.00	6.50	4.60	5.90	5.60	4.80	6.00	-	-	-	-	-	-	-	-	-	-
25	Rarewarewa South	7.50	8.00	8.50	6.60	8.30	6.60	7.00	5.80	6.50	6.60	5.30	6.30	6.60	6.40	8.88	4.00	7.88	6.50	4.63	7.50	7.50	7.50	
26	Mimiwhangata	11.00	5.60	3.50	3.60	0.30	9.40	19.10	20.30	13.80	20.25	14.30	21.00	19.50	12.90	11.00	8.38	-	11.00	9.00	12.13	9.63	9.63	
34	Motatau 1	-	-	-	-	8.80	-	10.00	15.00	6.75	7.50	5.60	6.50	7.50	8.75	6.00	-	4.88	2.50	-	-	-	-	
35	Motatau 2	-	-	-	-	-	-	4.80	2.70	-	5.50	1.50	3.00	2.50	-	-	-	4.25	-	5.50	-	-	-	
36	Motatau 3	-	-	-	-	-	-	4.80	1.50	2.75	5.50	3.50	4.60	4.00	0.90	-	-	5.50	-	-	-	-	-	
38	Motatau 5	-	-	-	-	-	-	1.50	1.25	0.90	1.00	-	-	-	-	-	-	-	-	-	-	-	-	
68	Motatau 9/ Marlow 1	-	-	-	-	-	-	-	11.70	11.75	17.60	13.50	10.50	9.30	2.90	7.13	3.00	9.75	9.88	9.25	5.38	-	-	
81	Purua South	-	-	-	-	-	-	-	-	14.75	15.90	14.40	14.10	14.60	10.50	12.50	11.13	17.50	10.75	7.25	18.63	9.50	9.50	
82	Rarewarewa North	-	-	-	-	-	-	-	-	9.75	6.60	4.00	8.50	7.90	10.40	11.38	11.38	11.88	12.13	10.00	7.88	6.88	6.88	
129	Motatau 10/ Marlow 2	-	-	-	-	-	-	-	-	-	7.10	7.50	10.90	9.00	5.75	2.17	3.38	5.00	5.38	7.75	2.25	4.50	4.50	
139	Hodges Bush	-	-	-	-	-	-	-	-	-	-	9.80	13.00	16.10	17.75	15.50	16.63	9.50	13.75	28.63	22.00	23.13	23.13	
145	Whangaruru	-	-	-	-	-	-	-	-	-	-	-	6.00	6.00	10.25	13.38	10.75	24.29	13.50	9.38	7.75	4.38	4.38	
167	Kaikani Rd	-	-	-	-	-	-	-	-	-	-	-	-	8.50	11.60	15.00	8.38	7.25	3.75	2.88	-	-	-	
168	Worsp Rd	-	-	-	-	-	-	-	-	-	-	-	-	1.80	2.40	2.00	5.75	1.38	-	-	-	0.13	0.13	
264	Whau Valley Dam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	
Western																								
16	Katui	47.60	39.40	20.40	28.20	17.50	16.10	14.40	-	14.90	13.90	-	4.00	-	0.00	-	0.25	-	-	0.00	0.00	-	-	-
17	Trounson North	8.50	17.30	12.50	19.00	16.00	14.30	16.10	-	15.25	19.90	22.20	15.40	-	13.75	22.33	5.75	15.13	12.00	10.00	5.25	7.63	7.63	
18	Cathedral	2.30	3.80	5.10	5.50	5.10	1.80	2.75	5.90	5.25	4.90	4.00	4.60	4.40	3.00	1.63	2.75	4.13	2.63	4.38	5.75	7.13	7.13	
19	Waipoua L/Out	30.90	24.40	30.80	27.70	21.40	21.80	14.60	8.40	16.90	22.75	23.00	7.90	11.80	6.00	6.00	9.25	15.63	8.88	10.00	12.50	12.38	12.38	
20	Paerata	9.90	1.30	3.10	6.50	2.80	3.10	1.25	-	0.00	-	-	-	0.90	1.10	1.63	0.25	0.38	1.13	0.25	0.63	-	-	
31	Te Matua Ngarhere	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.25	4.13	-	-	-	-	1.17	1.17	
33	Trounson South	-	-	-	-	-	-	12.25	-	23.75	19.10	-	-	8.20	8.90	-	11.13	12.33	10.00	6.00	7.75	7.75	7.75	
79	Toronui Track	-	-	-	-	-	-	-	-	1.75	2.40	-	-	-	-	-	-	-	-	-	-	-	-	
96	Kawerau Rd Cr	-	-	-	-	-	-	-	-	3.40	2.00	0.30	0.40	1.00	-	-	-	-	-	-	-	-	-	
157	Opoukeke CHH	-	-	-	-	-	-	-	-	-	-	-	6.60	6.10	2.80	11.25	-	-	-	-	-	-	-	
158	Pipiwai CHH	-	-	-	-	-	-	-	-	-	-	-	7.30	0.50	1.50	-	-	-	-	-	-	-	-	
179	Mariborough 13	-	-	-	-	-	-	-	-	-	-	-	-	-	6.50	-	-	-	-	-	-	-	-	
244	Maunganui Bluff	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	-	
265	River Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
266	Wekaweka LC 1 (Aif's Cottage)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.00	-	-	-	-	-	
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.20	-	-	-	-	-	

Continued on next page

STN NO.	STATION NAME	1995 MEAN	1996 MEAN	1997 MEAN	1998 MEAN	1999 MEAN	2000 MEAN	2001 MEAN	2002 MEAN	2003 MEAN	2004 MEAN	2005 MEAN	2006 MEAN	2007 MEAN	2008 MEAN	2009 MEAN	2010 MEAN	2011 MEAN	2012 MEAN	2013 MEAN	2014 MEAN	2015 MEAN		
267	Wekaweka LC 2 (Rob's Place)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.67		
268	Wekaweka LC 3 (Libby's track)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25	
13b	Site 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.13	-	-	-	-	-	-	-	
14b	Site 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	
16b	Mariborough Rd Site 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.38	2.13	1.50	1.38	0.63	2.00	0.38	-	
18b	Site 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50	-	-	-	-	-	-	-	
28b	Site 28 SH12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.25	8.88	3.63	4.13	5.13	-	-	7.63	
30b	Site 30 SH12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.00	3.00	0.88	-	-	-	-	1.50	
31b	Site 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50	-	-	-	-	-	-	-	
32b	Site 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.88	-	-	-	-	-	-	-	
Tawharanui																								
161	TWN 1 Marine triangle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.16	0.50	-	1.25	2.25	2.88	2.63	-	
162	TWN 2 Trig triangle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.16	0.67	-	3.88	1.88	1.25	2.88	-	
163	TWN 3 Top ecology track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50	0.33	-	1.63	2.00	4.63	6.00	-	
164	TWN 4 Possum gully	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00	-	2.75	1.38	8.00	2.75	-	
165	TWN 5 Twin hills	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.16	0.00	-	2.25	1.88	3.25	3.50	-	
166	TWN 6 South coast water tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.83	0.33	-	4.88	6.50	8.00	9.50	-	
Kawau Island																								
269	Bostaquet Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
270	South Cove	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.57	-	-	-	-
Maranui																								
253	Marunui 1 (House 17 deck)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.13	2.63	-	
275	Marunui 2 (Pebblebrook Rd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.67
Mataia																								
254	Mataia 1 KLD (Top of fishing track)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.04	-	
255	Mataia 2 KLD (Mid pa track)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.46	-	

Appendix 2

Summary of Northland kiwi listening data for stations listened at in 2015

STN. NO.	STATION NAME	LISTENER	1		2		3		4		TOTAL	MEAN
			1	2	1	2	1	2	1	2		
Northern												
2	Takahue	F. Schou	0	0	0	0	0	0	0	1	1	0.13
4	Gartons	G. Upton	0	0	0	0	0	0	0	0	0	0.00
5	Kaiaka	K. Khaine & T. Higginson	7	0	1	2	0	0	3	3	16	2.00
7	Puketi	D. O'Halloran	8	3	4	13	4	5	3	5	45	5.63
8	Puketi SR	K. Aukett & S. Grimme	3	5	8	5	9	4	5	4	43	5.38
Mangateke												
3	Lightning Hill	L. Baigent	13	8	21	31	9	24	16	19	141	17.63
256	Home drive	A. Baigent	17	18	12	6	17	15	15	13	113	14.13
Honeymoon Valley												
271	Green Bach	Y. Steinemann	0	0	0	0	2	0	0	1	3	0.38
272	Lost Valley Track	W. Parsonson	0	2	0	3	0	0	0	0	5	0.63
273	Central ridge of Beth	C. Jones	4	0	3	7	4	14	2	3	37	4.63
274	Greg's driveway	M. Schmid	0	0	0	1	1	0	0	0	2	0.25
	Maungataniwha Forest	C. Jones	6	2							8	4.00
Whakaangi												
131	Wha 2	M. Langridge	13	9	18	13	13	16	19	12	113	14.13
132	Wha 3	M. Langridge	8	6	3	9	2	2	4	1	35	4.38
133	Wha 5	W. Sporle	8	6	9	5	8	4	10	7	57	7.13
135	Wha 7	W. Sporle	8	8	10	8	9	5	5	19	72	9.00
136	Wha 8	P. & P. Johnston	8	11	11	9	9	15	11	13	87	10.88
137	Wha 9	A. Goodwin	0	0	3	11	2	8	0	0	24	3.00
138	Wha 10	I. Mateer	0	0	1	1	1	0	0	1	4	0.50
140	Wha 11	J. Landridge	8	10	12	7	4	3	7	7	58	7.25
Mahinepua												
90	Site 0	V. Wright et al.	11	5	6	1	2	3	4	7	39	4.88
83	Site 1	J. Hill et al.	7	4	6	2	5	2	6	6	38	4.75
84	Site 2	G. Wade-Farrell et al.	7	6	6	1	4	2	3	5	34	4.25
85	Site 3	L. Barnes et al.	3	5	12	1	5	4	6	7	43	5.38
88	Site 4	C. Pusch et al.	2	1	7	6	15	6	9	9	55	6.88
99	Site 13	T. Kay et al.	8	9	15	10	12	9	12	13	88	11.00
Eastern												
10	Marsden Cross	R. Booth & C. Hambrook	47	19	29	34	28	23	49	14	243	30.38
11	Puketotara	A. Mentor	27	12	14	13	8	5	20	3	102	12.75
12	Rangitane	A. Walker	16	5	10	6	12	6	15	6	76	9.50
13	Waitangi No. 12	A. Holsted	3	7	12	7	4	3	2	0	38	4.75
14	Mt Bledisloe	S. M. McManus	16	13	3	4	1	9	10	7	63	7.88
15	Tikitikiore	L. Gordon	18	20	19	11	21	13	13	6	121	15.13
228	Puketotara Rd	J. Kearney & A. Mentor	27	12	14	13	8	6	20	3	103	12.88
Russell												
59	Opito	E. Harwood	7	3	10	13	14	8	17	9	81	10.13
60	Te Maiki/Flagstaff	H. Lindauer	3	0	4	2	12	3	4	3	31	3.88
62	Uruti Road	C. Richmond	20	19	12	7	16	19	17	10	120	15.00

Continued on next page

Appendix 2 continued

STN. NO.	STATION NAME	LISTENER	1		2		3		4		TOTAL	MEAN
			1	2	1	2	1	2	1	2		
170	Nikau Block	L. Gordon	13	11	25	10	13	14	23	10	119	14.88
171	Mace/Farmer	R. Robbins	11	14	10	9	24	10	12	24	114	14.25
172	Pipiroa	M. Pasco	2	0	0	3	0		9	7	21	3.00
174	Johnsons	M. Frankum	22	4	16	3	12	7	25	1	90	11.25
177	Solomon's Gate	L. Collins	5	9	19	8	12	8	11	4	76	9.50
Puketi Forest												
102	Bramley's Ridge	A. Linton & D. France	0	3	8	3	1	4	5	3	27	3.38
103	Pirau Ridge	I. Wilson et al.	3	0	4	3	1	1	1	0	13	1.63
104	Pond	I. Godbert et al.	0	5	1	0	1	4	10	5	26	3.25
106	Takapau Track	P. Hodgson	0	2	2	0	2	0	2	1	9	1.13
107	Takapau/Pirau Rd Jn	N. & E. Walker et al.	3	2	0	0	1	3	1	3	13	1.63
108	Totara Ridge	J. Mortensen et al.	1	3	0	2	0	0	5	3	14	1.75
109	Waihoanga Gorge	C. & R. Robinson	9	6	9	4	3	1	13	1	46	5.75
111	Walnut	A. Adams et al.	8	7	0	0	6	7	8	3	39	4.88
112	Stoat line 9 - Puketi	E. Whyte et al.	1	10	1	4	7	4	5	0	32	4.00
Hupara												
258	Hupara Land Care 1	W. & S. Atkinson et al.	20	23	30	29	32	17	29	20	200	25.00
245	Hupara Land Care 2	W. & S. Atkinson/S. Brown	12	20	21	16	15	12			96	16.00
257	Hupara Land Care 4	W. & S. Atkinson/S. Brown	8	16	6	9	5	9	4	15	72	9.00
Waimate North												
113	W1	P. Saunders et al.	27	17	45	38	35	29	33	22	246	30.75
114	W2	P. Saunders & I. Kerr	6	7	14	4	12				43	8.60
115	W3	A. Taylor et al.	0	3	2	1	0	0	8	2	16	2.00
116	W4	H. Horrobin	7	9	5	7	5	13	8	10	64	8.00
118	W6	D. Way	14	14	17	8	12	2	7	14	88	11.00
120	W8	A. Chiaroni	12	6	5	13	10	7	7	5	65	8.13
121	W9	B. Brown	5	0	2	2	3	5	6	0	23	2.88
122	W10	D. Liebert	1	8	6	1	4	8	3		31	4.43
124	W12	D. Way	9	9	10	9	10	1	14	3	65	8.13
Sandy Bay												
27	Sandy Bay 1	N. Pullman	3	5	5	2	4	5	1	6	31	3.88
260	Sandy Bay 2	Listening device	7	8	2	6	5	4	8	7	47	5.88
261	Sandy Bay 3	N. Pullman	3	6	4	2	4	4	4	4	31	3.88
Tutukaka												
125	TLC 1	M. Camm	5	12	5	1	11	10	10	5	59	7.38
126	TLC 2	N. Davies	20	6	4	2	14	17	11	13	87	10.88
142	TLC 3	S. Young	4	2	4	4	5	4	2	8	33	4.13
Whangarei Heads												
39	Bream Head 1	Rupert & Wendy	9	13	9	5	11	13	13	7	80	10.00
41	Bream Head 3	O. Petel	3	2	13	1	10	4	8	8	49	6.13
42	Bream Head 4	M. & C. Pearson	7	6	5	1	3	14	5	9	50	6.25
54	Kauri Mt 1	J. Nairn	1	7	0	4	6	6	4	2	30	3.75
72	Kauri Mt 2	M. Barteldres	5	3	6	14	6	7	5	8	54	6.75
73	Kauri Mt 3	T. Bull	3	7	6	10	4	10	5	10	55	6.88
74	Kauri Mt 4	G. & R. Faber	3	9	8	6	1	5	4	2	38	4.75
141	Kauri Mt 5	L. Brown	6	0	9	5	2	6	9	1	38	4.75
47	Manaia 1	U. Schmid	1	2	2	0	2	1	2	2	12	1.50
48	Manaia 2	F. Clayton & V. Lepper	16	11	13	14	20	10	28	9	121	15.13
49	Manaia 3	P. Richards	8	6	9	10	7	8	8	4	60	7.50
71	Manaia 8	S. Adams	3	12	2	1	0	2	4	2	26	3.25

Continued on next page

Appendix 2 continued

STN. NO.	STATION NAME	LISTENER	1		2		3		4		TOTAL	MEAN
			1	2	1	2	1	2	1	2		
262	Manaia 9	J. Williams	5	6	10	7	9	2	7	2	48	6.00
56	Nook 2	P King et al.	0	0	5	3	1	2	1	1	13	1.63
45	Taurikura 2	G. Pike	9	12	7	13	6	12	8	2	69	8.63
46	Taurikura 3	K. Lange	1	6	3	4	8	8	6	2	38	4.75
263	Craig Rd	C. & J. McNamara	12	21	9	11	11	15	11	18	108	13.50
75	McLeod Bay	W & V Biddle	7	4	7	3	5	4	14	3	47	5.88
Southern												
22	Glenbervie 9A	J. Griffin	6	3	0	3	1	1	2	0	16	2.00
23	Marlow Rd	G. Coulston	11	9	9	33	25	35	19	20	161	20.13
24	Purua N	R. Riegel	15	22	18	14	19	20	12	10	130	16.25
25	Rarewarewa S	F. Gordon	10	5	3	11	8	10	8	5	60	7.50
26	Mimiwhangata	R. Taylor	12	5	14	13	12	6	11	4	77	9.63
81	Purua S	J. Gillander & R. Fuchs	3	13	10	16	9	11	6	8	76	9.50
82	Rarewarewa N	M. Jordan	5	8	6	6	5	6	12	7	55	6.88
129	Motatau 10	R. Fuchs	2	3	5	8	9	5	4	0	36	4.50
139	Hodges	E. McCool	24	25	16	36	17	17	34	16	185	23.13
145	Whangaruru	R. & D. Hughes	4	6	7	2	5	3	5	3	35	4.38
168	Worsp Road	S. Wilkinson	0	0	0	0	0	0	1	0	1	0.13
34	Motatau 1	A. Taitoko	2	0	12	10	2	1	7		34	4.86
Western												
17	Trounson Nth	M. Leach	3	7	11	8	6	6	5	15	61	7.63
18	Cathedral	J. McCaughlin	3	5	13	3	5	15	7	6	57	7.13
19	Lookout	O. Knox & B. Searle	13	16	6	10	5	20	17	12	99	12.38
31	Te Matua Ngahere	T. Donovan	1	0	2	1	1	2			7	1.17
33	Trounson Sth	A. Meduna	12	8	8	4	4	6	10	10	62	7.75
265	River Road	J. Matthews	5	3	5	0	4	0	4	0	21	2.63
16b	Malborough Rd Site 16	M. Calder	1	0	1	0	0	0	1	0	3	0.38
28b	Site 28 SH12	M. Topia & S. Downey	8	6	12	3	6	4	10	12	61	7.63
30b	Site 30 SH12	I. Farrant	4	2	1	1	1	0	3	0	12	1.50
267	Rob's place (Wekaweka LC)	R. Anderson	1	2	0	1	0	0			4	0.67
268	Libby's track (Wekaweka LC)	E. Hooten	0	1	0	1	0	0	0	0	2	0.25
Tawharanui												
161	TWN 1 Marine triangle	P. Williams et al.	0	2	4	6	2	2	4	1	21	2.63
162	TWN 2 Trig triangle	E. Commers et al.	2	2	3	2	1	2	4	7	23	2.88
163	TWN 3 Top ecology track	S. Bier et al.	8	8	5	6	5	9	0	7	48	6.00
164	TWN 4 Possum gully	J. Quayle et al.	6	4	1	1	3	1	5	1	22	2.75
165	TWN 5 Twin hills	R. & M. Blackburn et al.	2	0	11	0	4	2	4	5	28	3.50
166	TWN 6 South coast water tank	R. Williams & M. Dymond	12	5	13	6	13	7	14	6	76	9.50
Marunui												
253	House 17 Deck	J. Hawley	1	6	1	0	1	2	8	2	21	2.63
275	Pebblebrook Rd	G. Stretch	4	0	3	1	1	1			10	1.67

Appendix 3

Trends in mean kiwi call count rates from annual monitoring at selected stations of managed Northlandkiwi populations

AREA	TOTAL NO. OF STNS	STATIONS USED TO CALCULATE MEANS	STATIONS USED IN 2015 TO CALCULATE MEAN	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mangatete	2	3, 256		-	-	-	-	-	-	-	-	-	-	-	11.00	15.88
Honeymoon Valley	4	271-274		-	-	-	-	-	-	-	-	-	-	-	-	1.47
Whakaangi	7-9	29, 130-137		-	-	11.80	10.70	10.10	10.80	11.68	12.23	10.88	9.93	7.33	7.33	8.08
Mahinepua-Radar Hill	8	83-85, 87-89, 98, 99		-	3.60	2.80	4.90	2.70	1.90	2.46	4.65	5.50	10.23	6.65	5.73	6.45
Russell Peninsula	5	15, 59, 62, 170, 173		-	-	4.53	4.01	7.04	5.35	4.61	5.54	11.44	9.77	11.4	12.83	13.78
Pukeki Forest	6	102, 104-106, 108, 111		-	-	-	2.88	1.15	1.48	3.66	3.00	4.25	4.11	3.60	5.67	2.88
Hupara	3-4	245, 246, 257, 258		-	-	-	-	-	-	-	-	-	-	18.46	14.67	16.67
Waimate North	5	114, 118, 120, 122, 124		-	10.46	4.28	-	6.80	6.48	4.68	8.05	8.98	8.43	6.6	8.55	8.06
Sandy Bay	3	27, 260, 261		-	-	-	-	-	-	-	3.25	-	4.22	4.33	3.71	4.54
Tutukaka	5	125, 126, 142, 143, 144, 28		-	-	6.24	7.30	8.21	8.68	5.67	6.77	7.05	10.17	9.63	6.25	7.46
Manatia-Nook	5	47-49, 56, 71		3.10	3.50	2.90	3.90	3.67	4.60	4.43	6.31	7.25	7.75	6.43	6.81	5.80
Kauri Mountain	5	54, 72-74, 141		-	-	3.30	2.20	-	2.60	3.02	2.45	4.10	4.00	3.83	4.95	5.38
Bream Head-Taurikura	5	39, 41, 42, 44, 69		-	-	2.50	2.60	2.20	3.20	4.29	2.70	6.59	7.14	8.68	6.19	7.46
Motatau-Marlow	6	23, 34-36, 68, 129		-	-	7.30	7.60	7.50	4.90	6.39	4.54	7.08	8.28	9.13	8.67	9.83
Purua-Rarewarewa	5	24, 25, 81, 82, 139		-	-	9.20	11.10	12.70	10.90	12.35	10.63	12.58	11.83	13.6	14.18	12.65
Waipoua	5	16-19, 33		13.08	15.36	15.78	7.98	8.90	5.69	7.49	4.50	11.80	8.38	6.08	5.60	8.72
Tawharanui Open Sanctuary	6	161-166		-	-	-	-	-	-	2.30	0.31	-	2.77	2.65	4.67	4.54
Maranui Conservation Limited	2	253, 275		-	-	-	-	-	-	-	-	-	-	-	1.13	2.15
Mataia Restoration Project	2	254, 255		-	-	-	-	-	-	-	-	-	-	-	1.25	-

Note: In previous reports up to 2009: where a single station was not covered, the previous year's results were used. However, some of the stations had not been listened from for several years, so the mean call count rates for the data from 2010 and beyond were calculated only from the relevant stations listened from for that year.