CALL COUNT MONITORING OF NORTHLAND BROWN KIWI 2022

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Thanks to Save the Kiwi for funding the writing of this report.

Cover: kiwi feet. Photo: Emma Craig.

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CONTENT

1.0 INTRODUCTION

1.1 Objective

The objective of this report was to provide a summary of the 2022 results for Northland brown kiwi (*Apteryx mantelli*) call count monitoring, and to provide recommendations for future monitoring.

1.2 Background

Northland populations of kiwi have declined mainly due to predation by dogs (*Canis familiaris*), stoats (*Mustela erminea*), ferrets (*M. furo*) and cats (*Felis catus*), along with increasing land development pressures throughout the region (Pierce *et al.* 2006). In the early 1990s, a network of kiwi call count listening stations was established nationally to determine trends (stable, increasing or decreasing) in kiwi populations over time (McLennan 1992). In 1993, 24 stations were established in four geographic areas in Northland (Northern, Eastern, Southern, Western) where kiwi were known to be present, with kiwi call count monitoring carried out annually since 1995. Call count surveys are one of the main tools used for assessing trends in kiwi populations and are used in Northland to:

• Monitor the trends in call counts (and hence population size) over time at the 24 original (1993) listening stations in the four geographic areas (Northern, Eastern, Western, Southern).

• Monitor the trends in kiwi populations at the growing number of kiwi management areas throughout Northland (20 additional clusters).

1.3 Northland listening sites

The 24 original kiwi listening stations that were established in 1993 at the four geographic areas (Pierce & Westbrooke 2003) are mapped in Figure 1 and listed in Table 1. In the Northern cluster six stations were established either in or on the edge of extensive forest in the Herekino-Raetea-Puketi Forests area. In the Eastern cluster six stations were established in forest remnants and extensive exotic forestry in the Bay of Islands area spanning Purerua Peninsula-Waitangi-Russell Peninsula. In the Western cluster five stations are in extensive forest (two in Waipoua) or forest remnants (Kaitui, Trounson and Paerata). The Southern cluster comprises seven stations within 30 km of Whangarei, all northwest to northeast of the city and involving forest remnants, including two that also include exotic forests (Glenbervie 7A & 9A). Over the years since 1993 many additional listening stations have been added, predominantly in areas where community groups are working to protect kiwi. The extensive involvement of local communities in the protection of kiwi and the associated expansion of the number of kiwi listening stations provides strong information on the current distribution and density of Northland brown kiwi throughout its range. (Fig. 1). Populations now extend across both public and private land in Northland and beyond, from Whakaangi in the Far North to Ponui Island in the south.

Table 1. The original Northland kiwi listening stations, grouped by geographic area 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 Tikitikiore		26 Mimiwhangata
			27 Sandy Bay

2.0 METHODS

The 2022 Northland brown kiwi call count survey followed the recommendations made by Robertson & Colbourne in the Kiwi Best Practice Manual (2003, 2017, and 2020; the relevant instructions from the latter are included in Appendix 1) and aligns with the findings of Colbourne & Digby (2016). Kiwi calls were listened for and counted during the first two hours of darkness, and during the dark phase of the moon, for four nights per station (n = 8 hours). A human listener was typically used to collect the data, but in some cases an artificial listening device (ALD) was used instead (as noted in Appendix 2). These results were comparable as humans and ALDs have similar listening abilities (Castro *et al.* 2019). Wherever possible quiet conditions were favoured, with little or no wind, rain, or background noise. At times the survey conditions varied slightly from those described above. This is noted in the report when it is relevant to the results presented. Kiwi listening was carried out 19 May - 8 June, with a back up window from 17 June – 7 July 2022.

2.1 2022 kiwi listening data

In addition to the original clusters, kiwi listening data for 2022 were received from the following management areas:

1. Mangatete
2. Whaakangi
3. Mahinepua - Radar Hill
4. Bay of Islands
5. Puketi Forest
6. Waimate North
7. Hupara
8. Russell Peninsula
9. Purua-Rarewarewa
10. Tutukaka Coast

11. KiwiLink
12. Glenbervie
13. Pukenui
14. Whangarei Heads
15. Piroa/Brynderwyn
16. Mataia
17. Tawharanui

There were no data received for Honeymoon Valley or Kawau Island; and insufficient data to monitor trends from Motatau-Marlow in 2022.

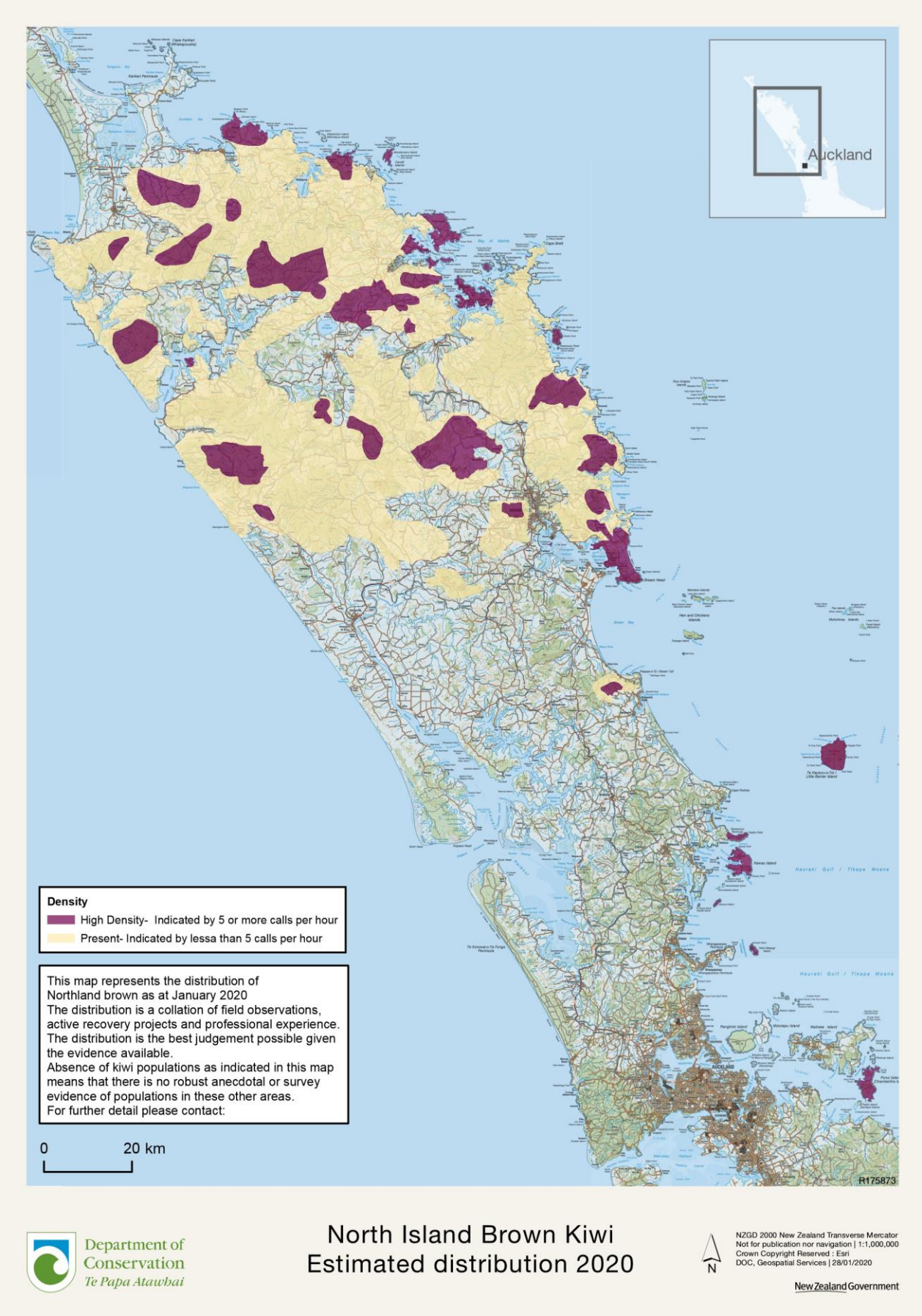

Figure 1. Northland kiwi distribution and relative abundance as known in 2020.

3.0 GENERAL PATTERNS

3.1 Northland monitoring trends since 1995

Trends in call count data collected since 1995 at the 24 original listening stations (Table 1) in the Northern, Eastern, Southern and Western clusters are graphed for comparison in Fig. 2 and the 2022 data for all Northland listening stations are presented and summarised in Appendices 2, 3 and 4.

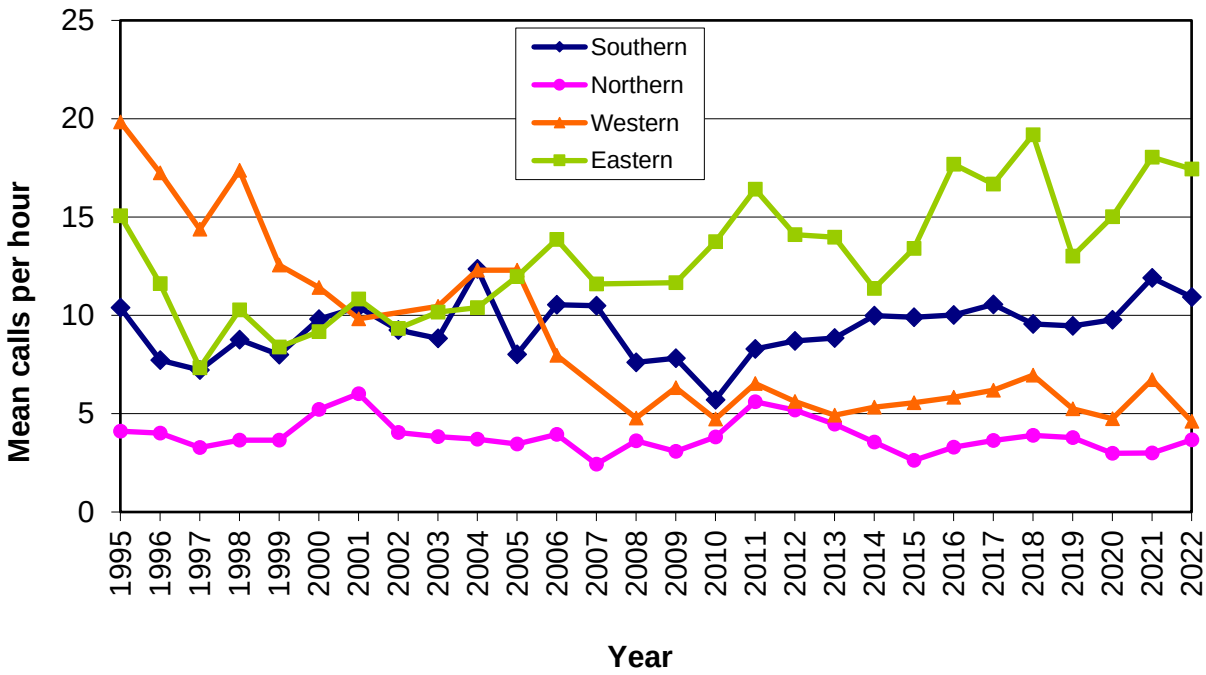

Figure 2. Mean hourly kiwi call rates per hour for each of the original four Northland monitoring areas 1995 – 2022. The mean for the Northern cluster was estimated using the 2016 data for one station (Station 2), the 2020 data for two stations (Station 1 and Station 5), and the 2021 data for one station (Station 4). The mean for the Eastern cluster was estimated from one night of listening for one station (Station 10), and from three nights of listening for one station (Station 14). The mean for the Western cluster was estimated using the 2014 data for one station (Station 20) the 2021 data for two stations (Station 16 and Station 19), and by using an ALD for two stations (Station 17 and Station 18. Note: Station 17 also had some listening undertaken in person). The mean for the Southern cluster was estimated by using an ALD for two stations (Station 21 and Station 22).

Northern Area

As with the previous seven years, the mean number of kiwi calls/hr heard for the Northern cluster showed little variation (range: 2.6 – 3.9 calls/hr; 2022 mean was 3.7 calls/hr; Fig. 2). Of the original listening stations, the Northern cluster showed the least variability in mean call counts over time (range; 2.4 – 6.0 calls/hr); and it was the only one which trended up between 2021 and 2022. Unfortunately, the 2022 data was from only two of the six stations for this cluster (Station 7 and Station 8). Both stations had results within their typically observed range. Continuing to collect data from all six stations is advisable for future kiwi call count surveys.

Eastern Area

There was a slight decrease in the mean number of kiwi calls/hr heard in the Eastern cluster; from 18.0 in 2021 to 17.4 in 2022 (Fig. 2). The mean was calculated from all six stations, although two were not

listened from for all four nights (Station 14 was three nights only, and Station 10 was one night only). Five of the stations had results which were within the typical observed range and not dissimilar to the number of calls heard in 2021; but one (Station 13) halved from 8.0 calls/hr in 2021, to 3.9 calls/hr in 2022. Although there was some variability in the results for this cluster, exceptionally high kiwi calls have been heard consistently (e.g. Station 10 with a mean of 41.5 calls/hr, the highest mean recorded for any station in 2022), indicating a thriving kiwi population in the area.

Southern Area

The mean number of kiwi calls heard decreased 1 call/hr in the Southern cluster, from 11.9 in 2021 to 10.9 in 2022 (Fig. 2). Despite the decrease, the 2022 mean was still relatively high for this cluster (the 3rd highest on record). There was a lot of variability between the 2021 and 2022 results. For example, Station 23 decreased from a mean of 24.4 calls/hr to 15.9 calls hr, whereas Station 24 increased from a mean of 23.8 calls/hr to 33.8 calls/hr in 2022 (which was the highest mean on record for this station). Station 25 halved from 15.5 to 7.0 calls/hr. The remaining four stations had results in 2022 which were within 2.5 calls/hr of the 2021 results. All seven stations were listened from for four nights; and two stations had data collected via an ALD (Station 21 and Station 22). It was promising to see Station 26 recover somewhat from the 6.3 mean calls/hr heard in 2021, to 8.6 calls/hr in 2022. The 2022 result was closer to the typically observed mean at this station.

Western Area

Data were received from two of the five listening stations in the Western cluster. The mean number of kiwi calls/hr heard was 4.6. This was a decrease from the 6.7 calls/hr heard in 2021, and the lowest ever recorded mean for this cluster (Fig. 2). The two stations listened from both had relatively low calls heard in 2022. Station 17 halved from 13.8 calls/hr in 2021 to 6.8 calls/hr in 2022. This was the least number of calls heard from this station since 2014, and the 2nd lowest on record. Station 18 decreased from 5.8 calls/hr in 2021 to 1.3 in 2022. This was the lowest ever mean recorded for this station, although it had high variability and there had been other low mean call counts recorded (e.g. 1.6 calls/hr in 2009). Station 18 was listened from using an ALD; and Station 17 was listened from partially with an ALD, and partially a human listener. Continuing to collect data from all five stations is advisable for future kiwi call count surveys, and it will be able to provide greater certainty about the trends observed for this cluster.

4.0 TRENDS AT MANAGED POPULATIONS

Each year, the same selection of listening stations were used to compare call rates over time to provide population trends for management areas. Only those core stations contributed data for the mean hourly call rate calculations presented in the bar graphs for each management area provided below. It

was important that kiwi coordinators prioritised kiwi listening from the core stations each year to ensure that the most accurate depictions of population trends that were occurring in management areas were obtained. The stations that were used in the analysis were listed and data summarised in Appendix 3 for each management site and should be referred to when organising kiwi listening each year.

4.1 Summary of sites

1. *Mangatete*

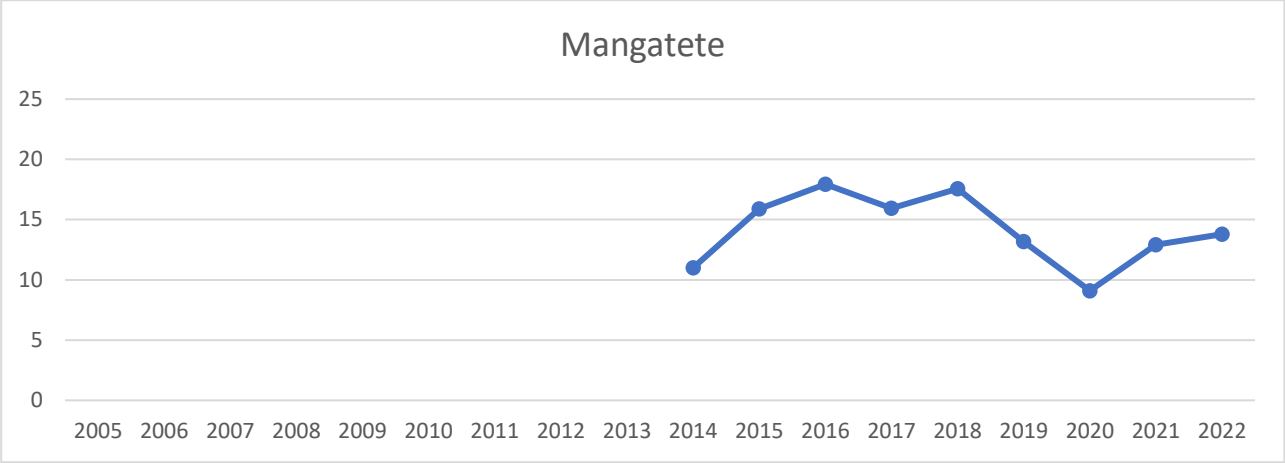

Figure 3. Trends in mean call counts at Mangatete cluster 2014-2022.

It was positive to see an increase in the mean number of kiwi calls heard in the Mangatete cluster, from 12.9 in 2021 to 13.8 calls/hr in 2022 (Fig. 3). This marked the second year in a row of increasing calls for this cluster, and the continuation of a mean call rate more than double that of the high density threshold (5 calls/hr). Four full nights of listening were completed for both stations in this cluster, and both had results within their normal range (Station 3: 14.8 calls/hr; Station 256: 12.8 calls/hr).

2. *Whakaangi*

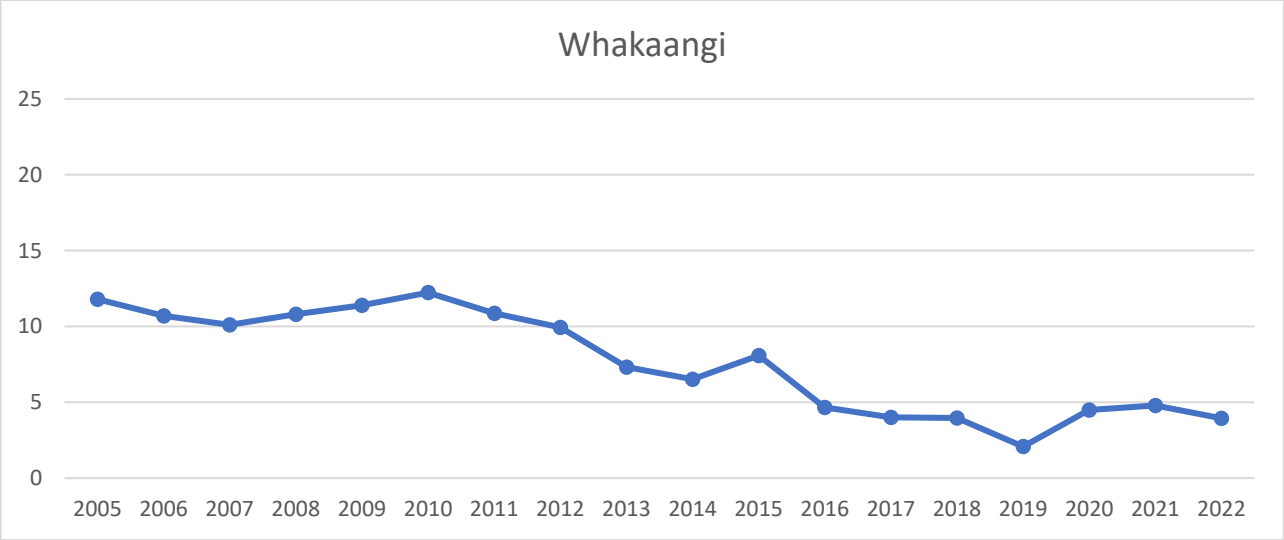

Figure 4. Trends in mean call counts at Whakaangi cluster 2005-2022.

The mean number of kiwi calls heard at the Whakaangi cluster decreased from 4.8 calls/hr in 2021 to 3.9 in 2022 (Fig. 4). The decreasing pattern was observed in three of the four stations used to calculate the mean (Station 29, Station 133, Station 136). The largest difference was observed at Station 133, decreasing from a mean of 6.9 calls/hr in 2021 to 2.3 in 2022; the lowest on record. Station 135 increased slightly, from a mean of 5.3 calls/hr in 2021 to 5.5 in 2022. This station, along with Station 136 have had highly variable results from year to year (range 0.5 to 28.0; and 1.3 to 29.0 respectively). The results for these stations have followed a general downward trend, but with some unpredictably sudden changes in call rates. It was hoped that the lower rate observed at Station 133 was due to the high variation heard in this cluster, rather than a decreasing kiwi population, although it is likely that the longstanding downward trend observed for this cluster does represent fewer adult kiwi in the area. Stations 29 and 133 were each listened from for two nights only, so these data aren't as robust as those from the other stations, which were listened from for four nights. It would be good to have all stations listened from for four nights for the 2023 survey and beyond.

3. *Mahinepua - Radar Hill*

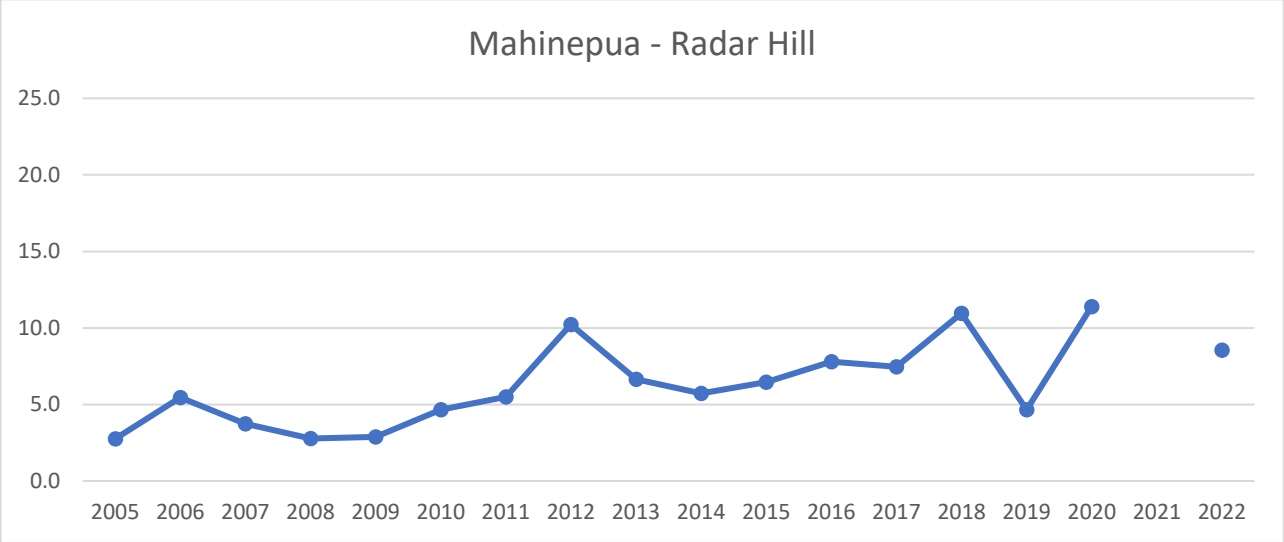

Figure 5. Trends in mean call counts at Mahinepua – Radar Hill cluster 2005-2022.

There were no data received from the Mahinepua - Radar Hill cluster for 2021, so it was not possible to compare the 2022 results directly with the year before. There was a mean of 8.5 calls/hr heard in 2022 (Fig. 5). Although this was lower than the 2020 mean (11.4 calls/hr), it was still a strong result for the cluster. There were data received from seven core stations in 2022 (all had four nights of listening completed), including Station 87 (not listened from since 2009) and Station 89 (not listened from since 2008). It was useful to have data once again from these stations, and good to see positive results. Station 87 had a mean of 5.9 calls/hr in 2022, the highest on record for this station; and Station 89 had a mean of 5.5 calls/hr in 2022, the 2nd highest on record. Station 84 had a mean of 12.5 calls/hr in 2022, also the highest on record for that station; and Station 88 had a mean of 15.0 calls/hr, the second

highest on record after 17.8 calls/hr in 2020. The most noticeable change in mean call rates was Station 99 with 12.4 calls/hr in 2022. The previous result was 10 calls/hr greater with a mean of 22.5 in 2020. Overall, the results indicated a thriving kiwi population in the Mahinepua – Radar Hill cluster, and the decrease from 2020 was largely due to Station 99 having an unusually high call count that year.

4. *Bay of Islands*

There were data received from the Bay of Islands area for the entirety of the longitudinal study, and from approximately 78 different listening stations (Appendix 1). The majority of the stations were not listened from every year, and many were added over time. The reporting of these data were historically captured via the Eastern and Russell Peninsula clusters; but these clusters did not adequately reflect what was happening with kiwi populations in the greater Bay of Islands region. In the future it would be desirable to create two additional clusters to capture the Bay if Islands trends; a Kerikeri cluster, and a Purerua Peninsula cluster.

It is recommended that the Kerikeri cluster use data from stations 12, 97, 185, 186, 191 and 233. These stations had been listened from relatively regularly, so the historical data could be drawn on to create an established trend for the cluster. It is recommended the coordinators and listeners in this cluster ensure the key stations are listened from each year.

It is recommended that the Purerua Peninsula cluster use data from stations 10, 149, 193, 196 and 198. As with the stations recommended for the proposed Kerikeri cluster, these had been listened from relatively regularly so the historical data could be utilised. It is desirable to prioritise collecting data from these stations annually going forward.

Once there are sufficient data for these clusters it will be possible to create graphs and monitor broad changes over time.

5. *Puketi Forest*

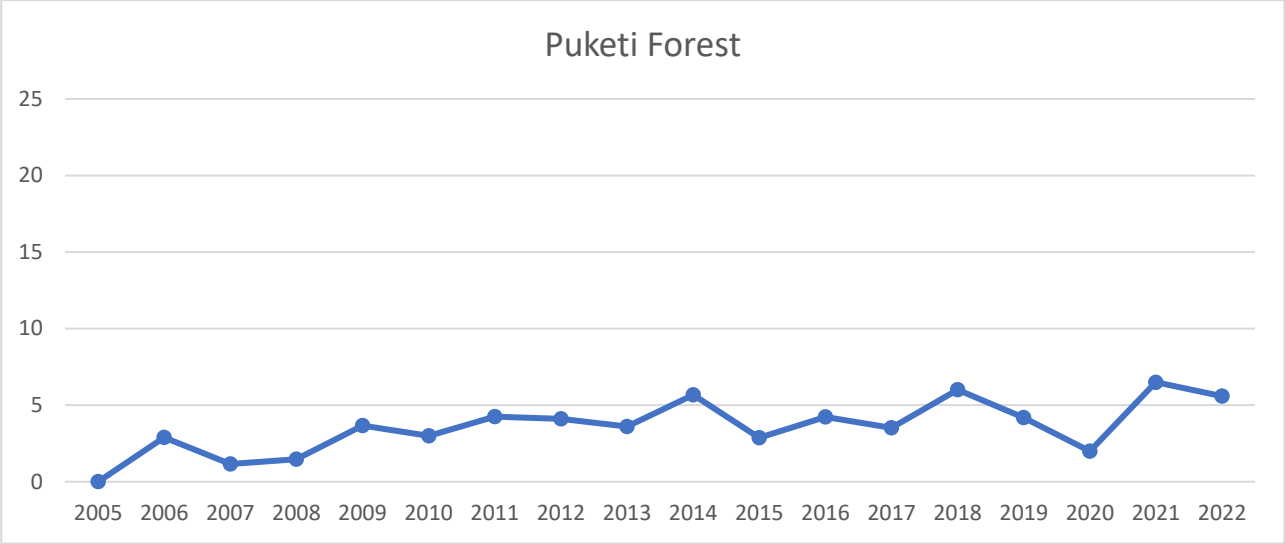

Figure 6. Trends in mean call counts at Puketi Forest cluster 2005-2022.

For the second year in a row, the mean number of kiwi calls heard at the Puketi Forest cluster remained above the 5 calls/hr threshold to be considered high density (6.5 calls/hr in 2021 and 5.6 calls/hr in 2022; Fig. 6). This was the first time the call counts for this cluster were above the threshold for more than a single year (as seen in 2014 and 2018). This was an important milestone, and a good reflection of the effort taken to protect kiwi in the area. The mean was calculated using data from four stations, three of which were listened from for four nights. One station (Station 102) had only the mean provided, so it was unclear how many nights of listening occurred. The mean for this station (3.7 calls/hr) was the second highest recorded. All other results were in the typically observed range. One of the core stations (Station 105) hadn't been listened from since 2013. It may be sensible to remove this as a core station, and replace it with an alternative long-standing station (e.g. Station 109) for 2023 and beyond.

6. Waimate North

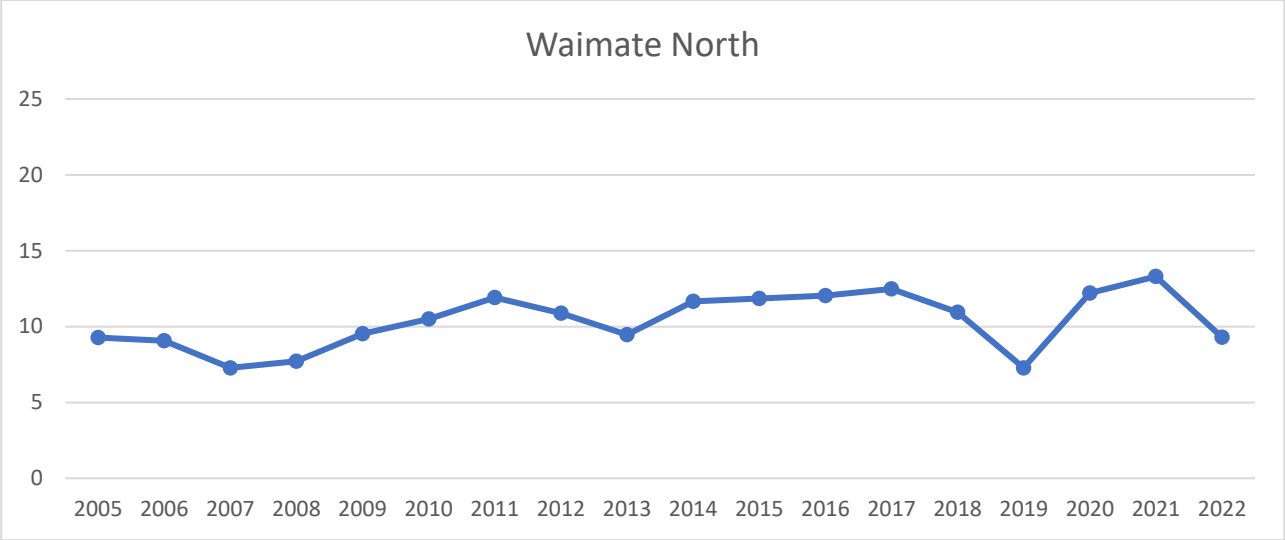

Figure 7. Trends in mean call counts at Waimate North cluster 2005-2022.

The mean number of kiwi calls heard for the Waimate North cluster trended downward; from 13.3 calls/hr in 2021, to 9.3 in 2022 (Fig. 7). This was relatively low for the cluster, with only two other occasions when the recorded call rate had been fewer than 10 calls/hr since 2009. The data were collated from all six core stations, and all were listened from for four nights. Most of the stations had 2022 results with their typical range, including Station 113 which saw a big decrease from the unusually high 38.3 calls/hr in 2021 to 24.6 calls/hr in 2022. Two stations had unusually low call counts recorded in 2022: Station 120 recorded just 1.5 calls/hr, which was the second lowest result for this station (the lowest was 1.0 calls/hr, recorded in 2009); Station 124 recorded 1.4 calls/hr, which was the lowest ever recorded for this station (call counts were typically >5calls/hr). It is important to keep listening from all the core stations in the future, but particular emphasis should be given to ensuring that Stations 120 and 124 are closely monitored to decipher whether the 2022 results were the result of a change in the breeding population of kiwi.

7. Hupara

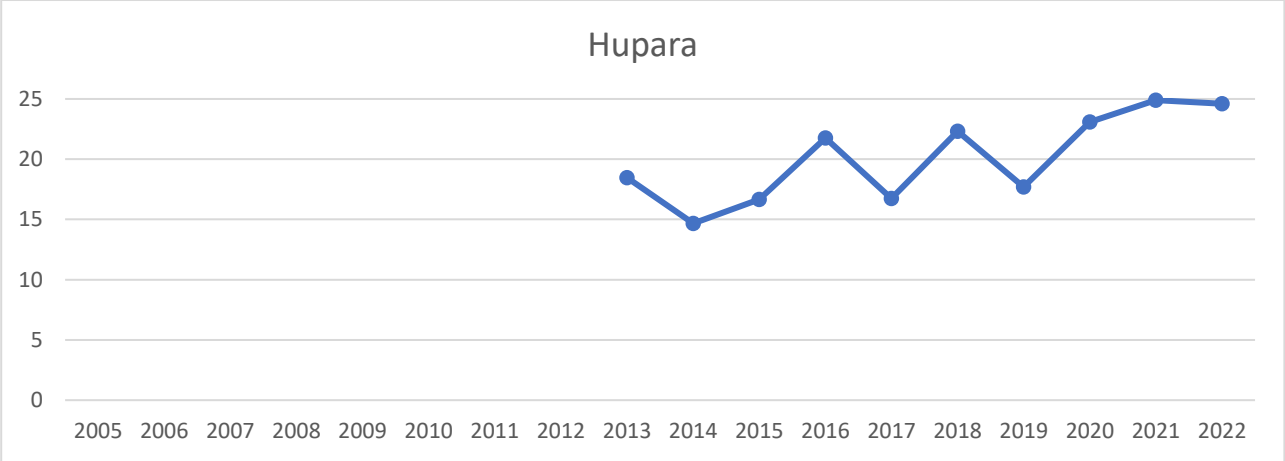

Figure 8. Trends in mean call counts at Hupara cluster 2013-2022.

There was little change for the Hupara cluster between the 2021 and 2022 kiwi call count surveys (a mean of 24.6 in 2022 cf. 24.9 in 2021; Fig. 8). As with the 2021 survey, the 2022 mean was derived from only two stations. Both were listened from for four nights. At Station 258 a mean of 37.0 calls/hr were heard, with a staggering 44 calls heard in one hour alone. This was the second highest result for this station, slightly behind the mean of 38.3 calls/hr in 2021. Station 257 increased from 11.6 calls/hr in 2021 to 12.1 in 2022. These data were both within the typical range for this station. Once again Hupara had the highest cluster mean for any location, and additionally had the second highest mean for an individual station in 2022 (Station 258 had a mean of 37.0 kiwi calls/hr, Station 10 at Marsden Cross was the highest with a mean of 41.5 calls/hr). It was positive to see the high result for this cluster retained. As mentioned in the 2021 report (Craig 2022), it would be useful to reinstate kiwi call count surveys at Station 245 and Station 246.

8. Russell Peninsula

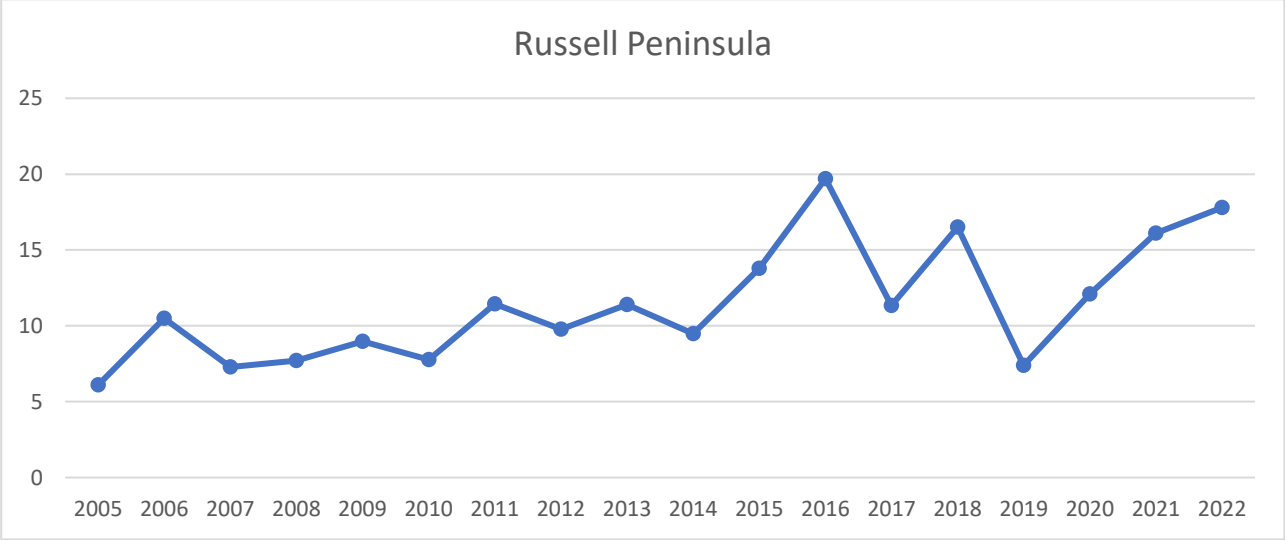

Figure 9. Trends in mean call counts at Russell Peninsula cluster 2005-2022.

Russell Peninsula had a mean of 17.8 kiwi calls/hr heard in 2022. This was an increase from 16.1 in 2021 (Fig. 9), and the third year in a row of increasing call rates - the longest period of an upward trend observed since 2005. All five core stations were listened from, and each for four nights. It was useful to have such a complete data set. Station 170 had an exceptionally high mean call count of 36.1 calls/hr. This was the highest recorded mean for this station; the third highest of any station in 2022; and substantially greater than the 20.5 calls/hr recorded in 2021. Station 62 increased slightly from a mean of 16.6 calls/hr in 2021 to 18.9 in 2022, the highest mean for this station since 2016. A large decrease was observed at Station 59, which halved from a mean of 30.4 in 2021 to 14.8 calls/hr in 2022. The 2021 result was unusually high, and the 2022 result was still the second highest recorded for this station. The other two stations had data within the typically observed range.

9. Purua-Rarewarewa

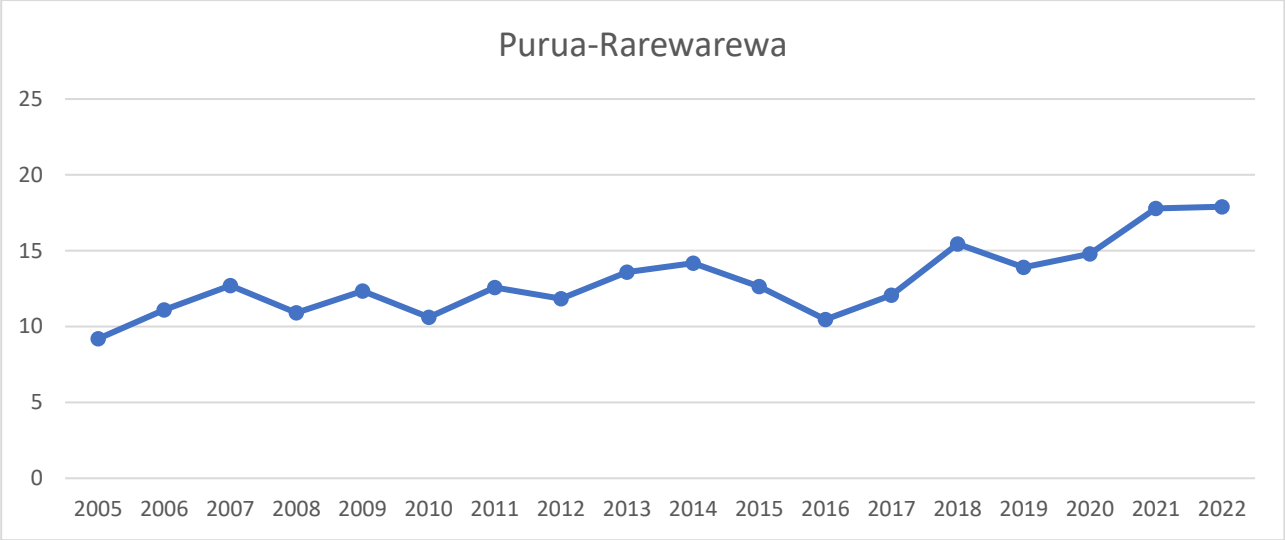

Figure 10. Trends in mean call count rates at Purua-Rarewarewa cluster 2005-2022.

There was little change in the mean number of kiwi calls heard between 2021 and 2022 at the Purua-Rarewarewa cluster (17.8 and 17.9 calls/hr, respectively: Fig. 10). The 2022 mean was the highest even recorded for this cluster. These data came from all five core stations in this cluster, of which four were listened from for four nights. One station (Station 139) only had two nights of listening completed. It was useful to have data from each station to compare between years. Most stations had calls heard in 2022 which were in the typically observed range, but Station 24 saw a substantial increase of 10 calls/hr from 23.8 in 2021 to 33.8 in 2022. This mean was the highest ever recorded for Station 24 (the 2021 mean being the second highest), and the fourth highest of any station in 2022 (Appendix 1). There was a partial change of listener in 2022, so it will be interesting to see if the 2023 results are equally high. Station 25 halved from a mean of 15.5 kiwi calls/hr in 2021 to 7.0 in 2022. This was the lowest observed mean since 2013. The Purua-Rarewarewa cluster had 17 years in a row of call counts >10/hr, indicative of a thriving kiwi population.

10. Tutukaka Coast

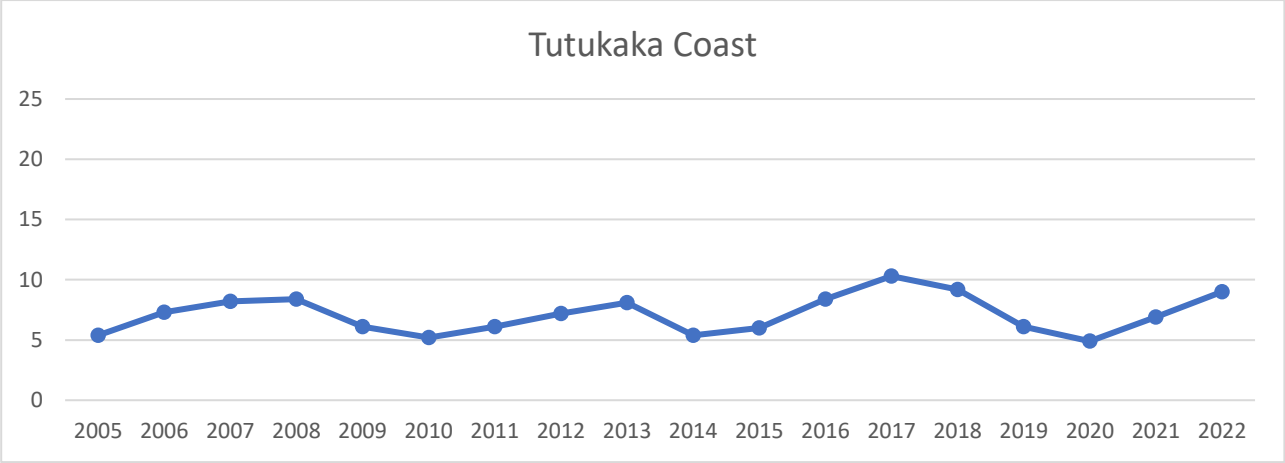

Figure 11. Trends in mean call count rates at Tutukaka Coast cluster 2005-2022.

The mean number of kiwi calls heard in the Tutukaka Coast cluster increased from 6.9 calls/hr in 2021 to 9.0 in 2022. The 2022 result was the third highest mean for this cluster (after 2017 and 2018; Fig. 11). There were four nights of data received from eight stations, with only one core station missing (Station 144, which hadn't been listened from since 2010 and should potentially be removed from the core stations if it is no longer suitable to be used as a listening station). Four stations had data collected via ALDs (stations 142, 143, 260, and 261). Using an ALD was a good option when it was not possible to use a human listener at the station, and this was much preferable to not collecting any data. Most stations had mean call counts which didn't differ substantially from either the 2021 mean, and/or from the typically observed range of kiwi calls heard. However, both Station 142 and Station 143 had the highest ever mean call counts recorded in 2022 (10.3 and 8.0 calls/hr, respectively). Station 142 hadn't been listened from since 2014, so it was useful to have these data included in 2022. The results from this cluster have been consistently at or above the high kiwi density threshold.

11. KiwiLink

The KiwiLink cluster is a grouping of kiwi listening stations centred east of Whangarei. Listening at one station commenced in 2014. There have since been a further ten stations added, but most (nine) were listened from for the first time in 2021 or 2022 (Appendix 1). There is not yet enough repetition or longevity to monitor trends for this cluster. It is recommended that stations 302, 314, 315, plus one or two others are monitored annually to establish long term trends. The mean number of calls/hr for the stations in this cluster have typically been fewer than 5 calls/hr, but in 2022 one station (Station 347) had a mean of 7.6 calls/hr heard. There is an expectation that this kiwi population is in a period of growth. It will be interesting to monitor the kiwi calls to see if they follow the expected trend.

12. *Glenbervie*

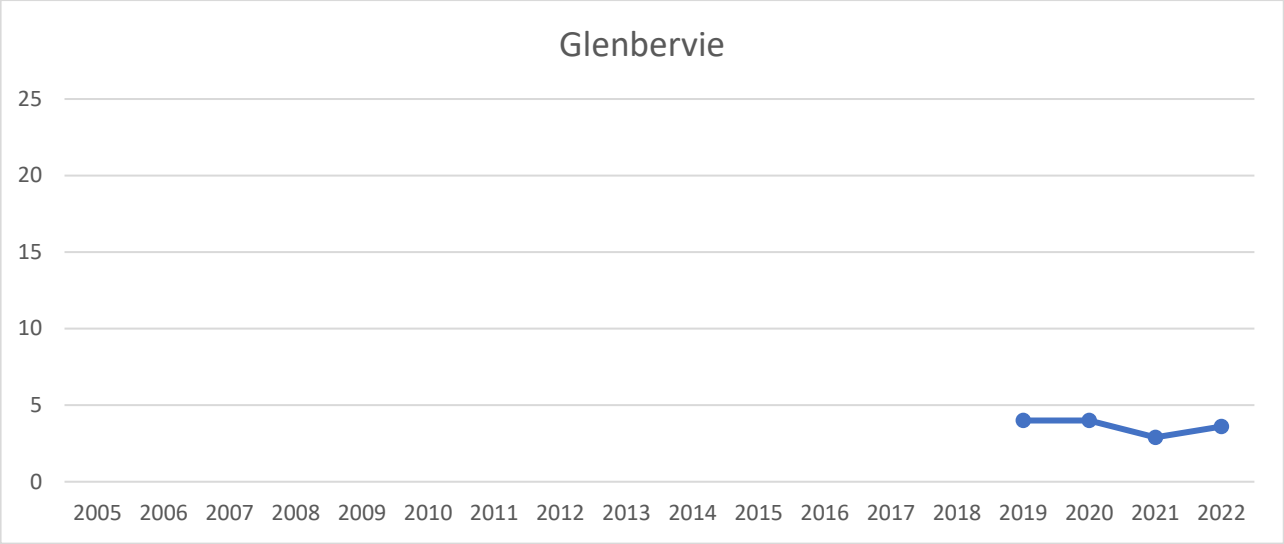

Figure 12. Trends in mean call counts at Glenbervie cluster 2019-2022.

2022 was the first year that the Glenbervie kiwi listening data was treated as a cluster via this reporting method. There were four years of data available, from 2019 to 2022 (Fig. 12). There were five stations in the cluster, and all were treated as core and used to calculate the mean call rates. The stations were 21, 22, 283, 284, and 296. It would be useful to continue to monitor each of these stations annually. In the 2022 survey each station was listened from for four nights, and all listening was via an ALD. The mean number of kiwi calls heard varied little between years; with a range from 2.9 calls/hr (as observed in 2022) to 4.0 calls/hr (as observed in both 2019 and 2020). In 2022 all stations had calls within the typically observed range, with the exception of Station 296 which had 1.0 calls/hr in 2020; 1.2 calls/hr in 2021; and 2.6 calls/hr in 2022. The 2022 result was the highest recorded, although it was not appreciably different to the previous results. Two stations (Station 21 and Station 22) had been listened from since 1995, and initially it wasn't unusual to have mean call counts higher than in more recent years (e.g. Station 21: 7.5 calls/hr in 1998 vs. 1.5 in 2022; Station 22: 12.6 calls/hr in 2000 vs. 6.0 in 2022). With increasing kiwi protection measures happening in the area it will be interesting to see if the mean number of kiwi calls heard returns to the figures of 20+ years prior.

13. Pukenui

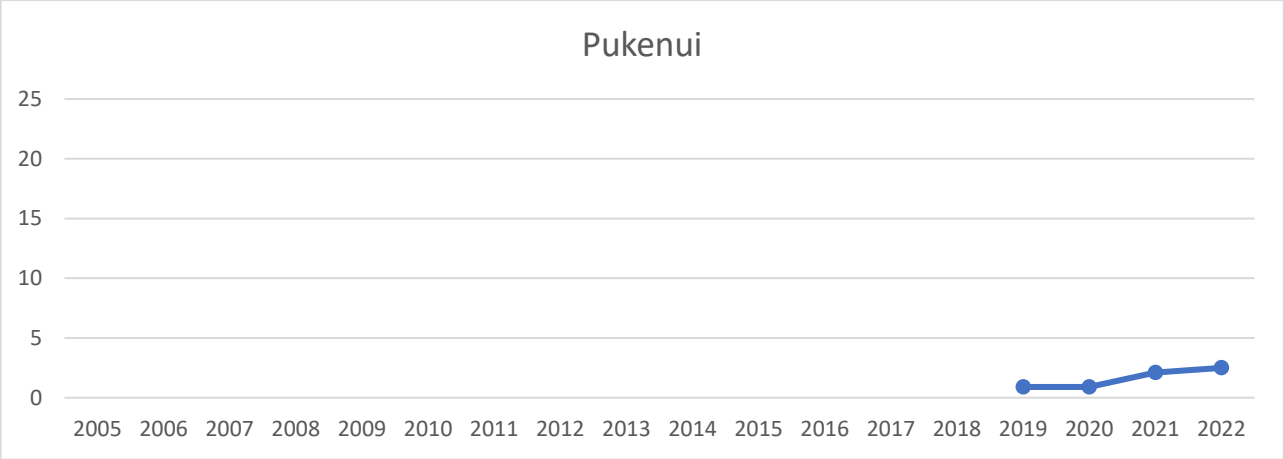

Figure 13. Trends in mean call counts at Pukenui cluster 2019-2022.

The mean number of kiwi calls heard at the Pukenui cluster increased slightly from 2.1 calls/hr in 2021 to 2.5 calls/hr in 2022 (Fig. 13). The 2022 result was the highest on record, with mean call counts of 0.9 heard in both 2019 and 2020. All three core stations for this cluster were listened from for four nights. There was no change from 2021 for Station 285 (both 2.0 calls/hr). Station 288 more than halved from a mean of 4.1 calls/hr in 2021 to 1.8 in 2022 (the 2022 result was still relatively high for this station). Conversely, Station 289 almost doubled from 2.1 calls/hr in 2021 to 3.9 in 2022. This mean was the second highest ever recorded from this cluster after 4.1 calls/hr at Station 288 in 2021. The gradual rate of increasing call counts was a great sign for this cluster and is expected to continue over time.

14. Whangarei Heads

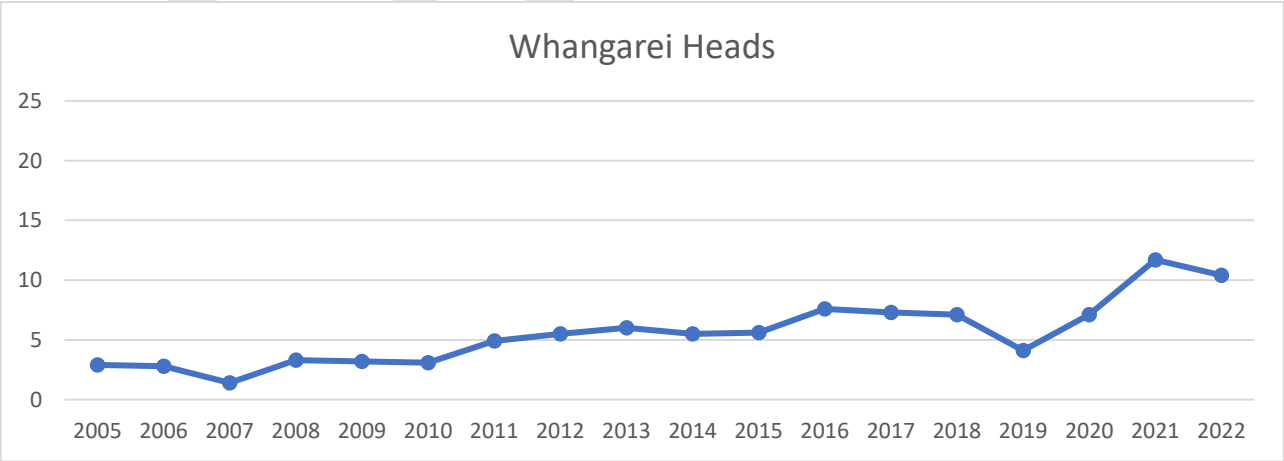

Figure 14. Trends in mean call count at Whangarei cluster 2005-2022.

There was a slight decrease in the mean number of kiwi calls heard in the Whangarei Heads cluster; from the peak of 11.7 calls/hr in 2021 to 10.4 in 2022 (Fig. 14). The 2022 result was still the second highest recorded for this cluster and double the mean number of calls required to meet the high density threshold. As detailed in the 2021 report (Craig 2022), there were 14 core stations for the Whangarei Heads cluster. Thirteen were listened from in 2022 (Station 141 was not). Station 54 was listened from for one night only; and Station 69 was listened from for three nights only. The remaining 11 stations were all listened from for four nights. Five stations had 2022 call counts at about half the mean of those heard in 2021 (Station 39: from 13.6 to 7.6 calls/hr; Station 41: from 20.4 to 8.9 calls/hr; Station 42: from 11.4 to 6.0 calls/hr; Station 69: from 13.6 to 5.7 calls/hr; Station 73: from 9.3 to 3.9 calls/hr). In all cases the mean number of kiwi heard in 2021 was unusually high, and the 2022 result a more typical figure. Six stations had their highest mean call counts recorded in 2022 (Station 47: 17.9 calls/hr; Station 49: 15.4 calls/hr; Station 54: 8.0 calls/hr; Station 71: 6.8 calls/hr; Station 72: 10.0 calls/hr; Station 74: 9.0 calls/hr). Station 56 was the only one which didn't have the highest mean recorded in either 2021 or 2022. Station 48 had the same mean of 28.8 calls/hr in both 2021 and 2022. The results indicated a thriving population in the Whangarei Heads area.

15. Piroa/Brynderwyn

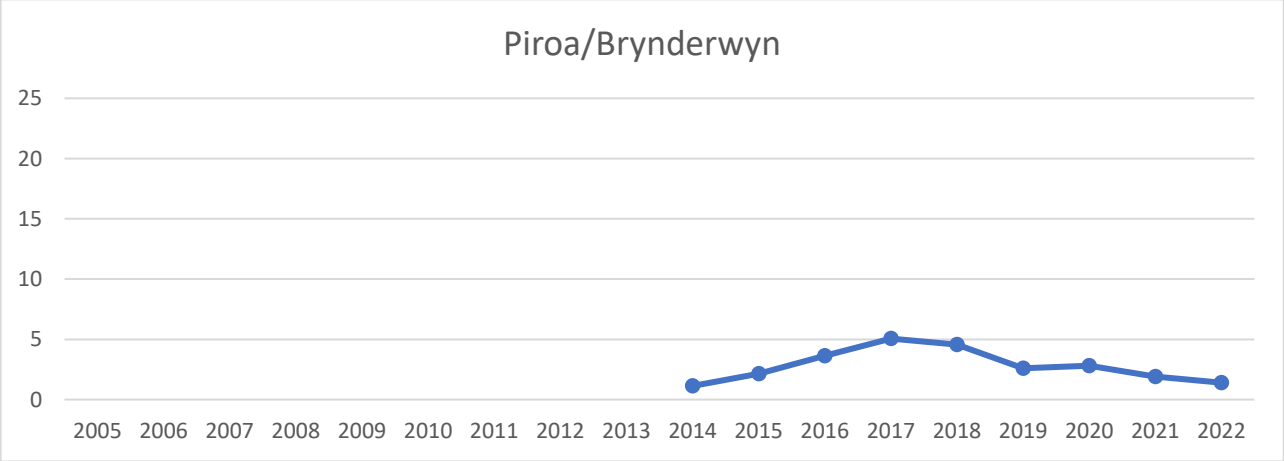

Figure 15. Trends in mean call counts at Piroa/Brynderwyn cluster 2005-2022.

There was a decrease in the mean number of kiwi calls/hr heard at the Piroa/Brynderwyn cluster between 2021 and 2022, from 1.9 calls/hr to 1.4 calls/hr (Fig. 15). This was the second year in a row of a decrease in the mean number of calls heard, and a continuation of the general trend of slightly decreasing call counts since 2017. This pattern was atypical when compared with the general trends across the other clusters over the same time period, and not what was generally expected in an area of ongoing community involvement and predator control. However, the call counts varied by <4 calls/hr across all years, and between any two consecutive years the changes were generally incremental. It will be good to continue to monitor this cluster to ascertain whether there has been a kiwi population

decrease in the area, or whether lower call counts with some fluctuation is typical for this cluster, and not necessarily a reflection of a decreasing population. The 2022 data came from three stations, all of which were listened from for four nights. One station (275) was listened from using an ALD, the other stations were via human listeners. Both Station 275 and Station 290 had their lowest mean result recorded in 2022; 0.6 calls/hr for Station 275, and 0.1 calls/hr for Station 290. Station 253 had similar results in both years (3.9 calls/hr in 2021, and 3.4 calls/hr in 2022).

16. Mataia

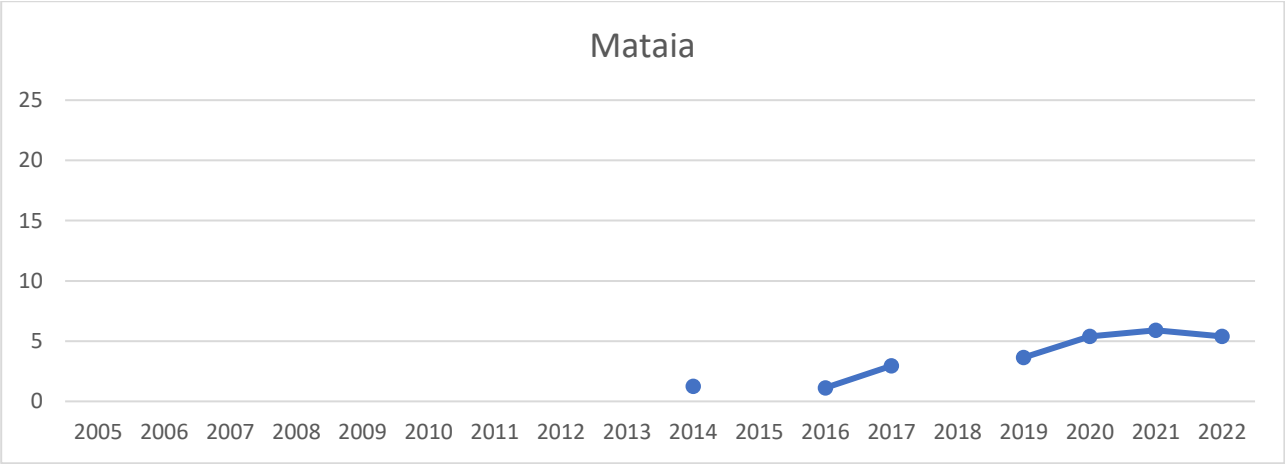

Figure 16. Trends in mean call counts at Mataia cluster 2014; 2016-2017; 2019-2022.

For the third year in a row, the mean number of kiwi calls heard in the Mataia cluster remained above the threshold for high kiwi density (5 calls/hr; there were 5.4 calls/hr heard in 2022). This was a marginal decrease from the 5.9 calls/hr heard in 2021, and equal to the mean number of kiwi calls heard in 2020 (Fig. 16). This was the first time the mean number of calls heard in consecutive years trended down for this cluster but given the relatively high call rate when compared with 2014 and 2016; and the general patterns throughout the other clusters, this should not be cause for concern. The two core stations both had mean call counts in 2022 within the recent typical range, and without large changes from 2021 (Station 254 decreased 0.8 calls/hr to 5.6; Station 255 decreased 0.1 calls/hr to 5.3). There was a third station listened from in 2022 – Station 328 with a mean of 5.1 calls/hr (similar to the cluster mean). It was useful to receive additional data for this cluster. All Mataia stations were listened from via ALDs, and all had four nights of listening completed.

17. Tawharanui

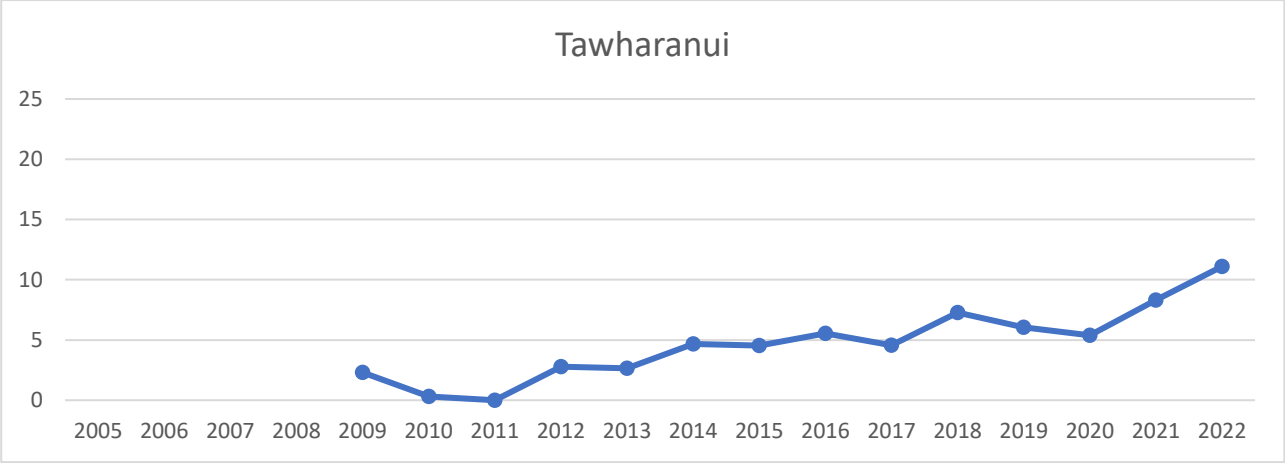

Figure 17. Trends in mean call counts at Tawharanui cluster 2009-2022.

The results of the kiwi call count survey at Tawharanui in 2022 were different to that seen throughout most of the clusters. There was an increase in the mean number of kiwi calls heard (from 8.3 calls/hr in 2021 to 11.1 calls/hr in 2022; Fig. 17. This was an increase of 2.8 calls/hr; the greatest increase observed at any cluster in 2022). All six core stations were listened from, and each for four nights. All stations had an increase in the mean number of kiwi heard when compared to the 2021 data. Five stations had their highest ever mean call rates recorded in 2022. Three of these (Station 162, Station 163, and Station 166) increased from the previously highest mean by around 1 call/hr. Station 165 increased by 3 calls/hr, and Station 164 increased by 75% - from 8.0 calls/hr observed in 2014, to 14.0 calls/hr in 2022. It was positive to see the continuing pattern of increasing call rates at this cluster, and to see the cluster mean surpass 10 calls/hr for the first time. It will be interesting to observe any changes in call counts at Tawharanui if kiwi are translocated out of the reserve in coming years.

18. Missing or insufficient data

Once again there were no data received from the Honeymoon Valley or the Kawau Island clusters. It would be useful to have data for these clusters in 2023. There were insufficient data received to create a mean for the Motatau-Marlow cluster in 2022. Only data from Station 23 were received, with a mean of 15.9 calls/hr. This was a lower mean for this station than the previous year (24.4 calls/hr in 2021), and similar to the 2021 cluster mean of 15.6 calls/hr. It would be good to have a more complete data set from Motatau-Marlow in the future, ideally with data from stations 34, 35 and 36 (which hadn't been listened from in several years) in addition to data from stations 23, 68 and 129.

5.0 DISCUSSION AND GENERAL RECOMMENDATIONS

There were overall mixed results for the 2022 Northland kiwi call count survey. Three of the four original clusters trended down after all had trended up in the previous year. The results were of particular concern in the Western cluster. Although only two core stations were listened from they both had results which were relatively low compared to previous call counts, and the cluster mean was the lowest ever recorded in 28 years of survey data. For this pattern to be noted during a time when the tools and efforts required to grow kiwi populations were well established; and when those tools had been a crucial factor in changing the conservation status of North Island brown kiwi to not threatened (Robertson *et al.* 2021) was of considerable concern.

The Iwi/community collaboration Kaitiaki Kiwi Waipoua Inc. has been doing exceptional work engaging the community and controlling predators in a core area of Waipoua Forest. Additional to this ongoing work, Waipoua Forest had 16,000 ha protected via an aerial 1080 operation in 2022. This was the first time 1080 had been used extensively in the forest since 2014. The previous 1080 operations (e.g. in 2005, 2011 and 2014) showed significant recovery for monitored flora and fauna including kiwi, so it is expected that there will be a positive result for kiwi in Waipoua Forest following the 2022 operation. It will be interesting to see if there is an appreciable difference in call counts noted at the Waipoua Forest stations in the future. Any positive results may not be seen via kiwi call count surveys for 3-4 years as kiwi typically don't call until adulthood.

Of the 17 additional clusters, 14 were listened from in both 2021 and 2022. Half of these trended up, and half trended down. None changed by more than 5 calls/hr, and most (nine) changed by less than 1 call/hr. So although there was some change from the 2021 survey when most clusters trended up (Craig 2022), overall the results show a general pattern of stability between 2021 and 2022. Within this general pattern there were a few outliers. Four of the 168 stations which were listened from in 2022 returned mean call counts greater than 30 calls/hr (Station 10 at Marsden Cross/Purerua Peninsula: 41.5; Station 258 at Hupara: 37.0; Station 170 at Russell: 36.1; Station 24 at Purua: 33.8). These were phenomenally high counts, and likely indicate exceptionally kiwi abundance.

Nationally some thought and attention has been given to estimating the number of individuals (or at least the number of males) calling during the kiwi call count survey. Being able to correlate the call count data with kiwi on the ground would be ideal, so it is good that there is some focus in this area. The best time to carry out this extra analysis is during the kiwi call count survey, as the listener has the best opportunity to capture these data accurately at the time. It can be achieved by plotting the calls (distance and direction) visually, then grouping those calls that are likely to be the same individual kiwi so they don't get counted more than once. Some kiwi calls sound noticeably different from others,

which can help with this task (Corfield *et al.* 2008). It would be helpful for listeners to add this analysis to their kiwi listening surveys and provide an estimate of individuals (or at least individual males) present for each survey night. It is not possible to estimate the number of kiwi present using ALDs as no directional bearing is available, so human listeners are preferred if possible.

It was discussed in the 2021 report (Craig 2022) that the high call counts observed in 2021 may have been a response to the 2020 drought (less breeding during the drought, followed by potentially better body condition and a boom in courtship in 2021). It was good to see that overall the 2022 results were not substantially lower than those observed the year before, indicating that the 2021 results were not a peak, but rather part of a general pattern of stable or increasing calls throughout the range of Northland brown kiwi.

As with the summer of 2020-2021, overall the rainfall for 2021-2022 was considered near normal for the region. However, the La Niña weather pattern and associated north-easterly winds meant that moist air and rainfall, and warmer temperatures were concentrated in the east, with the west having drier conditions (e.g. in April 2022 Glenbervie received 252% of the expected rainfall, while west Hokianga and Pouto received 62% and 61% respectively; https://www.nrc.govt.nz/environment/environmental-data/). This pattern extended into autumn It may be that during summer/autumn the kiwi in the western areas had less food available and/or less than optimal feeding conditions due to the relatively drier conditions when compared with their eastern counterparts, but there are too few stations in the western area to really test this theory. Both western clusters (Western and Mataia) did trend down when compared with the 2021 results.

Seasoned and new kiwi listeners alike are appreciating the ability to record their kiwi calls via the Kiwi Coast app, for both ease of use, and for greater accuracy in their data. The effort required to record eight hours of data during often cold and wet months is quite substantial, so having confidence that the data is secure and useable is motivating for the listener. You can find out more and download the app from the Kiwi Coast website (https://kiwicoast.org.nz/kiwi-listening-app). It is encouraged but not essential to use the app, but if the app is not used it is very important that the 2018 version of the kiwi listening spreadsheet template is used to store and collate the data. Paper field sheets are still required if this method is used. If listeners have any trouble with accessing or using the Kiwi Coast app or the correct template, they can contact the local kiwi listening co-ordinator or the Whangarei DOC Office.

It is important that coordinators ensure that all core stations are listened from, and that listeners include all the relevant data. Please take note of the following recommendations:

• 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 every kiwi listening card must include the individual station number (see Appendix 1), and this number must not be changed. If it is a new station that will be listened from consistently, please add the comment 'station number required' or similar in the comments field, and a number will be assigned in the subsequent report. Each card must also include an up-to-date GPS reference for the site. Both the stations number and GPS reference need to be written on every card, every night (this is automatically generated via the app);
• 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. The exception to this would be if the listener is no longer able to adequately detect kiwi calls, in which case a permanent replacement should be sought;
• Each station needs to be covered for four nights if possible. If this can't be finished in the first kiwi listening window it is possible to use the second window (unless other variables e.g. drought make using both windows preferable). It is more important that fewer stations are listened from for four nights than more stations for only 1–2 nights. This will produce more robust data and will give a more accurate measure of kiwi in your area;
• The core stations (those used to calculate the mean call rate for each cluster) are listened from each year. If it is not possible for a person to listen from each station then the use of ALD's should be considered. Both methods are thought to have similar listening ability (Castro *et al.* 2019);
• If the app isn't used then kiwi call cards need to be filled out in full, including all the fields, each night. The data then needs to be entered into the 2018 version of the excel spreadsheet. This needs to be sent to Tamra Gibson at the DOC Whangarei Area Office, no later than the 31st of July in the year in which it was collected. If it is not submitted by the 31st of July it will not be included in the report;
• Please ensure the data are accurate. If you notice any errors or inconsistencies in the data used for this report, please advise Tamra Gibson immediately. Even historical errors can be rectified.
• New listeners should be provided with adequate training. This should include how to identify the difference between male/female kiwi calls; other species' calls that may be mistaken as kiwi; compass use and judging distances, and how to fill out the forms or use the app fully, correctly, and legibly. The Kiwi Best Practice Manual (Colbourne *et al.* 2020) is a useful tool.
• Information about kiwi listening can be found on the Save the Kiwi website https://savethekiwi.nz/about-kiwi/kiwi-facts/kiwi-calls/.

Kiwi listening 2023

Kiwi listening for 2023 should preferably be carried out from 9 May – 28 May, with a back up window from 7 June – 26 June. As with 2020, these windows are relatively early. It may be advisable to spread

the listening across both windows if summer drought and/or other variables indicate a later than typical kiwi courtship period. The first two hours of darkness are around 6 pm – 8 pm.

6.0 ACKNOWLEDGEMENTS

A huge thank you to all the people who carried out or were involved with kiwi listening in 2022. The community contribution to this task was enormous, and it quite literally couldn't have been achieved without such an amazing team of keen kiwi listeners, coordinators, data experts, and back-up safety and support. Thanks especially to Tamra Gibson from DOC who ensured the region-wide data were captured in full and entered into spreadsheets ready for analysis. A big thank you to Save the Kiwi for funding the writing of this report.

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APPENDIX 1. Mean call count data for all Northland brown kiwi listening stations 1995-2022.

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	Northern																												
1	Diggers Valley	1.1	2.4	4.1	2.5	2.1	3.3	4.1	3.8	3.0	3.9	3.9	2.7	1.3	2.0	1.7	-	2.5	-	-	-	-	2.8	0.9	-	-	0.6	-	-
2	Takahue	4.3	3.5	5.5	5.4	6.3	8.4	7.9	4.5	3.3	4.8	5.3	5.0	3.6	4.9	3.1	4.8	11.4	6.9	5.3	2.4	0.1	0.0	-	-	-	-	-	-
4	Gartons	5.6	5.0	1.2	-	0.8	2.0	8.6	-	1.5	4.1	4.9	7.1	1.5	1.3	0.0	0.1	0.3	0.8	0.3	0.3	0.0	0.1	-	-	-	-	0.4	-
5	Kaiaka	1.7	1.3	2.4	3.4	1.6	3.5	3.0	2.1	1.9	3.8	2.8	1.5	0.0	0.8	-	1.6	1.1	0.3	1.6	1.6	2.0	-	-	-	-	3.0	-	-
7	Puketi	6.6	5.4	2.1	3.0	6.0	7.6	6.4	3.5	5.0	3.4	1.5	2.3	0.8	3.9	4.0	6.9	9.4	6.3	6.3	5.9	5.6	5.6	9.8	8.3	7.4	4.0	5.3	**5.4**
8	Puketi SR	5.4	6.5	4.4	4.0	5.1	6.5	6.1	6.4	8.3	9.4	2.3	5.1	7.4	8.9	9.0	7.9	9.0	11.8	9.8	7.6	5.4	9.3	9.0	12.1	12.4	10.1	8.8	**12.6**
	Mangatete																												
3	Lightning Hill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.5	13.5	10.0	17.6	20.5	17.1	17.6	16.0	8.1	12.0	**14.8**
256	Baigents home drive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.0	14.1	15.4	14.8	17.5	10.4	10.1	13.9	**12.8**
	Honeymoon Valley																												
271	H-moon Valley Green Bach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.5	-	0.0	-	0.3	-	-
272	H-moon Valley Lost Valley track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-
273	H-moon Valley Central Ridge of Beth's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.6	-	-	-	-	-	-	-
274	H-moon Valley Greg's driveway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-
301	NZFRT reserve, campsite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	5.1	4.4	-	1.8	-	-
	Toa Toa Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-
	Whakaangi																												
130	Whakaangi 1	-	-	-	-	-	-	-	-	-	-	9.0	10.4	4.6	7.6	6.3	-	-	-	-	-	-	-	-	-	-	-	3.8	-
131	Whakaangi 2	-	-	-	-	-	-	-	-	-	-	14.9	25.0	15.3	20.8	17.1	16.1	9.4	8.0	4.8	3.1	14.1	4.9	-	2.8	-	-	-	-
132	Whakaangi 3	-	-	-	-	-	-	-	-	-	-	13.5	14.6	9.0	10.8	12.2	12.2	5.5	3.1	6.8	3.9	4.4	5.9	-	4.2	-	4.3	-	-
29	Whakaangi 4	-	-	4.5	-	2.9	1.9	6.3	3.8	4.9	6.6	2.3	6.8	6.3	4.9	5.8	9.8	5.0	-	-	-	-	-	-	-	-	5.3	4.4	**2.8**
133	Whakaangi 5	-	-	-	-	-	-	-	-	-	-	9.8	13.8	10.1	-	8.3	-	7.9	4.1	-	3.5	7.1	6.8	-	5.2	-	4.5	6.9	**2.3**
134	Whakaangi 6	-	-	-	-	-	-	-	-	-	-	6.0	7.3	3.9	-	9.5	7.0	-	-	4.5	-	-	-	-	-	-	-	1.9	-
135	Whakaangi 7	-	-	-	-	-	-	-	-	-	-	21.9	28.0	24.5	27.0	25.9	21.9	23.4	19.1	11.9	13.6	9.0	5.3	0.5	2.6	3.3	1.5	5.3	**5.5**
136	Whakaangi 8	-	-	-	-	-	-	-	-	-	-	14.1	29.0	11.8	18.8	15.3	10.5	20.0	15.3	12.8	13.0	10.9	4.5	6.8	7.3	1.3	7.0	6.4	**5.3**
137	Whakaangi 9	-	-	-	-	-	-	-	-	-	-	4.8	8.4	5.6	6.5	4.9	8.1	5.0	-	-	2.6	3.0	0.8	4.8	1.8	1.8	-	-	-

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
138	Whakaangi 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.8	4.0	5.8	4.3	3.8	2.9	0.5	-	-	-	-	-	-	-
140	Whakaangi 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.6	7.6	3.9	7.1	7.3	7.6	7.6	8.9	2.8	-	4.5	-
247	Whakaangi 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.0	-	5.3	-	**5.0**
248	Whakaangi 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	-	-
250	Seon's Gate 17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	1.5	**3.2**
													Mahinepua-Radar Hill																
90	Mahinepua 0	-	-	-	-	-	-	-	-	-	-	-	-	2.9	2.9	3.4	3.6	4.0	7.1	4.4	3.3	4.9	5.6	5.4	6.1	2.0	1.9	-	**5.0**
83	Mahinepua 1	-	-	-	-	-	-	-	-	3.5		2.6	4.1	3.5	2.6	2.4	2.3	3.1	7.5	6.8	4.3	4.8	4.3	7.9	8.1	2.1	2.8	-	**4.0**
84	Mahinepua 2	-	-	-	-	-	-	-	-	4.2	0.8	2.3	4.8	4.3	2.8	3.3	3.3	4.3	6.8	4.8	3.6	4.3	7.3	6.3	12.3	2.8	5.8	-	**12.5**
85	Mahinepua 3	-	-	-	-	-	-	-	-	5.6	4.8	4.0	5.5	5.4	3.3	5.9	5.3	5.3	10.3	5.0	5.9	5.4	7.3	6.4	12.5	5.8	8.1	-	**4.5**
88	Mahinepua 4	-	-	-	-	-	-	-	-	6.1	4.1	3.0	7.8	4.7	4.1	9.5	4.8	5.4	10.6	7.1	8.0	6.9	9.3	7.5	-	8.0	17.8	-	**15.0**
87	Mahinepua 5	-	-	-	-	-	-	-	-	-	-	-	-	2.4	0.9	2.0	-	-	-	-	-	-	-	-	-	-	-	-	**5.9**
86	Mahinepua 6	-	-	-	-	-	-	-	-	1.0	2.5	2.3	-	0.4	0.8	1.3	-	-	-	-	-	-	-	-	-	-	-	-	**2.0**
89	Mahinepua 7	-	-	-	-	-	-	-	-	0.9	5.9	1.8	4.8	1.9	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	**5.5**
181	Mahinepua 8	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
182	Mahinepua 9	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
183	Mahinepua 10	-	-	-	-	-	-	-	-	-	-	-	-	1.6	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
184	Mahinepua 11	-	-	-	-	-	-	-	-	-	-	-	-	2.9	1.3	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-
98	Mahinepua 12	-	-	-	-	-	-	-	-	-	3.5	2.3	3.8	2.5	3.4	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-
99	Mahinepua 13	-	-	-	-	-	-	-	-	-	3.9	3.8	7.4	7.3	5.0	9.4	7.8	9.5	16.0	9.6	6.9	11.0	10.9	9.3	-	-	22.5	-	**12.4**
92	Mahinepua 14	-	-	-	-	-	-	-	-	-	-	-	-	0.6	1.3	1.1	1.4	0.8	-	-	-	-	-	-	-	-	-	-	-
91	Mahinepua 15	-	-	-	-	-	-	-	-	-	-	-	-	1.0	1.1	1.6	1.8	3.1	-	-	-	-	-	-	-	-	-	-	-
93	Mahinepua 16	-	-	-	-	-	-	-	-	-	-	-	-	1.3	6.0	2.0	2.6	5.3	-	-	-	-	-	-	-	-	-	-	**5.5**
94	Mahinepua 17	-	-	-	-	-	-	-	-	-	-	-	-	2.5	4.9	5.0	3.4	6.9	-	-	-	-	-	-	-	-	-	-	**4.8**
95	Mahinepua 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-
334	Mahinepua 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**7.5**
													Eastern																
10	Marsden Cross	20.9	18.3	9.6	16.7	14.5	19.9	21.9	17.9	18.5	22.0	19.3	30.6	23.0	-	20.3	24.5	34.9	30.9	30.3	19.3	30.4	38.6	38.8	39.6	30.8	-	42.4	**41.5**
11	Puketotara	10.0	13.8	8.1	11.6	9.7	8.0	-	2.5	7.5	3.6	-	7.1	13.7	10.6	6.2	9.5	9.3	9.1	9.8	14.0	12.8	-	11.0	14.0	16.1	-	17.9	**17.8**
12	Rangitane	14.0	5.6	8.4	10.5	7.5	8.4	11.5	10.5	8.6	8.0	8.0	11.5	9.1	15.9	15.3	11.4	10.8	12.8	11.3	12.8	9.5	10.9	10.1	18.1	10.1	12.6	16.5	**17.5**

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
13	Waitangi No 12	7.6	7.6	6.3	8.9	5.3	7.1	11.5	15.1	18.4	13.8	11.5	15.5	6.3	-	-	-	-	6.8	7.4	3.0	4.8	7.5	11.5	6.0	5.8	4.0	8.0	**3.9**
14	Mt Bledisloe	27.1	10.9	5.5	7.9	8.8	5.1	6.4	6.8	4.9	8.9	9.1	5.5	9.6	11.3	8.3	11.4	13.7	7.4	10.8	6.8	7.9	10.9	8.3	12.8	7.6	8.0	7.3	**10.5**
15	Tikitikiore	10.8	13.5	6.1	6.1	4.5	6.5	2.9	3.3	3.1 (12.3)	6.1 (7.1)	3.4	13.0	7.9	11.0	12.25 (5.25)	12.3	13.5	17.8	14.5	12.4	15.1	25.5	20.4	24.6	7.8	18.6	16.1	**13.5**
	Puketi Forest																												
102	Bramley's Rd	-	-	-	-	-	-	-	-	-	-	-	2.5	0.5	2.0	2.0	2.8	2.8	2.5	2.0	-	3.4	2.4	2.3	3.9	1.0	-	-	**3.7**
103	Pirau Ridge	-	-	-	-	-	-	-	-	-	-	-	0.0	-	0.0	1.0	0.5	1.3	1.3	1.4	0.5	1.6	0.9	1.0	-	2.3	-	-	**2.1**
104	Pond	-	-	-	-	-	-	-	-	-	-	-	4.5	1.0	3.8	5.0	3.5	8.0	6.9	4.6	5.9	3.3	4.9	2.9	9.5	6.1	3.8	10.0	**9.0**
105	Pudding Bowl Hill	-	-	-	-	-	-	-	-	-	-	-	0.3	0.8	1.1	2.0	2.0	1.0	-	3.0	-	-	-	-	-	-	-	-	**-**
106	Takapau Track	-	-	-	-	-	-	-	-	-	-	-	0.0	1.0	0.0	2.5	3.3	2.4	2.6	1.4	-	1.1	1.9	4.9	4.5	5.4	2.3	3.5	**4.0**
107	Takapau/Pirau Rd Junction	-	-	-	-	-	-	-	-	-	-	-	0.5	-	1.0	2.8	1.4	3.5	1.5	1.1	0.9	1.6	1.5	1.4	3.6	1.6	2.6	3.3	**3.6**
108	Totara Ridge	-	-	-	-	-	-	-	-	-	-	-	5.8	-	0.8	7.1	3.5	6.1	4.6	5.9	5.0	1.8	4.1	2.4	6.8	5.4	1.1	8.1	**5.9**
109	Waihoanga Gorge	-	-	-	-	-	-	-	-	-	-	-	2.0	-	3.8	5.4	3.3	6.3	4.5	4.3	-	5.8	5.5	4.4	8.1	7.1	4.4	8.4	**4.4**
110	Waihoanga Gorge 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	2.5	1.5	-	4.5	-	-	-	-	-	-	-	-	**-**
111	Walnut	-	-	-	-	-	-	-	-	-	-	-	4.3	2.5	1.3	3.3	3.0	5.3	4.0	4.8	6.1	4.9	7.9	5.3	5.4	3.1	0.9	4.4	**-**
112	Stoat line 9 - Puketi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	4.0	3.6	1.4	4.0	1.0	3.6	3.4	4.0	0.3	2.1	**2.0**
259	Puketi Nature Trail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.1	-	3.3	-	-	-	-	-	3.3	3.8	1.3	**1.0**
	Waimate North																												
113	W1	-	-	-	-	-	-	-	-	-	23.5	15.8	24.8	-	-	25.5	25.8	23.6	23.1	23.8	27.1	30.8	34.5	31.4	26.6	-	27.4	38.3	**24.6**
114	W2	-	-	-	-	-	-	-	-	-	12.3	7.0	9.5	7.9	11.5	5.8	14.5	11.6	12.5	7.1	5.1	8.6	4.8	8.8	7.6	6.8	6.9	11.9	**7.6**
115	W3	-	-	-	-	-	-	-	-	-	14.9	-	-	-	-	-	-	1.0	0.0	1.0	1.4	2.0	1.3	1.1	-	-	-	-	**-**
116	W4	-	-	-	-	-	-	-	-	-	9.4	10.5	6.0	-	8.0	-	8.5	13.5	10.5	10.9	8.5	8.0	7.0	12.1	9.4	7.6	13.9	15.9	**11.0**
117	W5	-	-	-	-	-	-	-	-	-	5.9	1.8	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
118	W6	-	-	-	-	-	-	-	-	-	22.3	11.0	5.7	8.5	7.3	9.1	5.6	10.6	8.0	7.5	10.4	11.0	13.3	10.9	15.9	9.8	19.4	10.4	**12.6**
119	W7	-	-	-	-	-	-	-	-	-	-	5.3	6.5	-	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
120	W8	-	-	-	-	-	-	-	-	-	13.8	2.8	1.0	8.1	8.0	5.5	8.1	9.1	11.9	9.1	11.3	8.1	7.1	5.3	5.6	5.1	3.9	3.5	**1.5**
121	W9	-	-	-	-	-	-	-	-	-	5.2	3.5	2.1	2.3	3.5	-	-	-	-	1.0	5.5	2.9	7.3	2.6	-	-	4.3	3.0	**-**
122	W10	-	-	-	-	-	-	-	-	-	-	-	7.3	8.3	5.9	5.3	4.1	7.3	5.1	4.1	8.0	4.4	5.3	-	4.4	7.0	10.1	11.3	**8.1**
123	W11	-	-	-	-	-	-	-	-	-	7.1	7.8	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
124	W12	-	-	-	-	-	-	-	-	-	18.9	9.8	6.1	3.6	5.9	6.0	7.9	6.3	4.6	5.1	8.0	8.1	7.4	6.1	5.5	7.8	5.8	4.8	**1.4**

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
178	W13	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-
127	W14 Sacro Bosco	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	0.9	0.5	0.0	-	-	-	-	-	2.9	0.9	-	1.4	1.9	-
128	W16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	2.2	-	-	-	-	-	-	-	-	-	-	-	-
													Hupara																
258	Hupara Land Care 1 (Bill's Plateau)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31.3	15.1	21.4	25.0	26.4	21.4	24.8	24.1	32.4	38.3	**37.0**
245	Hupara Land Care 2 (Mike Sullivan's)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.9	11.0	16.0	-	-	-	-	-	-	-
246	Hupara Land Care 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.4	-	-	-	-	-	-	-	-	-
257	Hupara Land Care 4 (Home Orange Tree)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.6	9.0	17.1	12.1	19.9	11.3	13.9	11.6	**12.1**
294	Hupara Land Care Harrison's Property	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.3	-	-	-	38.5	-	-
													Bay of Islands																
146	Kauri Cliffs 1 (Pink Beach)	-	-	-	-	-	-	-	-	9.0	-	-	4.0	4.3	1.8	5.0	6.5	-	-	-	-	-	3.3	-	-	-	-	0.6	**2.4**
147	Kauri Cliffs 2 (Puriri)	-	-	-	-	-	-	-	-	-	-	-	1.5	3.0	2.8	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-
148	Wiwiki Beach	-	-	-	-	-	-	-	-	-	-	-	32.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
149	Mataka Stn Gate, Purerua	-	-	-	-	-	-	-	-	-	-	-	4.0	4.1	8.3	6.8	18.5	3.3	10.0	6.9	-	-	-	-	-	-	-	43.6	-
150	McKenzie Rd, Purerua	-	-	-	-	-	-	-	-	-	-	-	9.5	12.1	10.3	5.0	7.5	-	2.5	-	-	-	-	-	-	-	-	-	-
151	Mtn Landing (Lot 30) Purerua	-	-	-	-	-	-	-	-	-	-	-	12.3	10.2	18.8	12.6	25.0	22.8	20.3	-	-	-	-	-	-	-	-	-	-
152	Waitoto Block	-	-	-	-	-	-	-	-	-	-	-	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
153	Aroha Island	-	-	-	-	-	-	-	-	6.9	-	-	12.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
154	Napia Bay	-	-	-	-	-	-	-	-	-	8.7	5.5	4.6	4.0	4.5	3.3	5.6	7.5	3.6	4.0	-	-	-	-	-	-	-	-	-
155	Stirlings Quarry	-	-	-	-	-	-	-	-	7.3	9.8	13.0	12.4	10.2	8.3	4.0	8.5	-	-	-	-	-	-	-	-	-	-	-	-
97	Kurapari Rd	-	-	-	-	7.1	-	-	-	12.7	8.8	9.3	10.4	5.5	6.0	6.8	4.8	2.3	5.5	7.0	-	-	-	-	-	-	-	-	**7.7**
	Hupara	-	-	-	-	-	-	-	-	-	25.6	19.3	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
185	Akeake Reserve, Kerikeri	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	0.5	-	6.0	-	-	-	-	-	-	-	-	-	-	**3.1**
186	Cunningham Gardens, Aroha Island	-	-	-	-	-	-	-	10.8	8.6	-	-	-	-	-	-	-	8.2	-	-	-	-	-	-	-	4.8	-	8.1	**4.6**
187	Gaitens, Rangitane Rd, Kerikeri	-	-	-	-	10.0	-	12.8	6.3	6.9	10.0	12.0	12.6	14.7	10.5	8.0	7.3	7.5	4.8	-	-	-	-	-	-	-	-	-	-
188	Blacksmiths Bay (east), Kerikeri (Lex Rennes)	-	-	-	-	-	-	-	10.3	10.3	7.7	8.3	6.2	6.0	8.0	4.5	6.9	8.8	6.4	0.0	-	-	-	-	-	-	-	-	-
189	Doves Bay, Kerikeri (Lockyer)	-	-	-	-	4.2	-	-	2.0	-	3.8	2.5	-	-	4.5	7.5	15.3	18.3	-	-	-	-	-	-	-	-	-	-	-

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
190	Rangitu, Opito Bay Road, Kerikeri	-	-	-	-	-	-	-	-	-	-	-	-	9.1	16.0	15.5	15.5	-	-	-	-	-	-	-	-	-	-	-	-
191	Tikorangi Road, Opito Bay, Kerikeri	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	4.5	4.0	-	-	-	-	-	-	-	-	-	-	-	**5.1**
192	Kraus, Hansen Rd, Purerua	-	-	-	-	-	-	-	-	-	3.3	-	-	-	-	11.0		-	-	-	-	-	-	-	-	-	-	-	-
193	Mataka Beach, Mataka Station, Purerua	-	-	-	-	-	-	-	41.5	-	30.0	39.0	32.7	24.5	41.8	30.0	41.3	-	30.8	30.9	-	-	-	-	-	-	-	56.9	-
194	Mataka Station, Ninepin Track, Purerua	-	-	-	-	-	-	-		-	30.0	-	-	-	50.8	43.5	-	18.0	-	24.0	-	-	-	-	-	-	-	-	-
195	Mountain Landing (Lot 30) Wharengaere, Purerua	-	-	-	-	-	-	-	-	-	-	-	12.3	10.2	18.8	12.6	25.0	22.8	20.3	13.3	-	-	-	-	-	-	-	-	-
196	Mountain Landing, Mataka Ridgeline, Purerua	-	-	-	-	-	-	-	-	-	-	-	7.5	10.1	18.0	25.5	14.3	22.0	-	-	-	-	-	-	-	-	-	64.4	-
197	Mountain Landing, Paddle (Entrance), Purerua	-	-	-	-	-	-	-	-	-	-	-	8.5	10.2	12.5	14.3	17.0	-	-	-	-	-	-	-	-	-	-	-	-
198	Mountain Landing, Poraenui Point	-	-	-	-	-	-	-	-	-	-	-	-	7.3	14.5	16.0	13.8	-	-	-	-	-	-	-	-	-	-	36.3	-
	Top Vineyard Villa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36.9	28.9	-	-	-
	Twin Tanks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42.6	32.9	-	-	-
325	Landing vineyard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.1	-
199	Paoneone	-	-	-	-	-	-	-	16.7	-	-	-	-	-	-	-	-	37.6	-	11.3	-	-	-	-	-		-	-	-
200	Pattersons Big Hill	-	-	-	-	-	-	-	9.0	-	-	30.5	-	4.0	20.5	70.3	33.0	35.5	-	-	-	-	-	-	-	-	-	-	-
201	Pattersons, Rocky Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	16.5	19.5	17.7	11.7	-	-	-	-	-	-	-	-	-	-	-
202	Tapuaetahi	-	-	-	-	-	-	-	-	-	-	-	5.0	-	3.0	3.3	16.5		-	7.4	-	-	-	-	-	-	-	-	-
203	Wharengaere Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.5	15.5	-	-	-	-	-	-	-	-	-	-	-
204	Wiroa Station	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	6.7	-	-	-	-	-	-	-	-	-	-	-
205	Wiroa Station Hill 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-
206	Maintenance Facility, Kauri Cliffs	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	5.0	13.1	-	-	-	-	-	6.9	-	-	-	-	-	-
207	Waiaua Bay, Matauri X	-	-	-	-	-	-	-	-	2.3	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	**0.1**
208	Waterfall, Kauri Cliffs, Takou Bay	-	-	-	-	-	-	-	-	6.0	-	-	5.5	2.3	4.5	3.5	-	-	-	-	-	-	-	-	-	-	2.2	5.8	-
209	Hikurua Rd (end)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-
212	Drivers Whitehills farm	-	-	-	-	-	-	-	-	-	-	-	-	-	7.5	2.0	8.0	8.0	7.9	-	-	-	-	-	-	-	-	-	-
213	Landcorp Takou Kiwi covenant	-	-	-	-	-	-	-	-	-	-	-	-	-	8.5	0.8	3.0	-	-	-	-	-	-	-	-	-	-	-	-
214	Maori Block	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	3.5	-	-	-	-	-	-	-	3.3	-	-	-	-

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
215	Otaha Station (south end)	-	-	-	-	-	-	-	-	-	-	-	-	3.0	-	-	3.0	-	-	-	-	-	-	-	-	-	-	-	-
216	Just past Clinton's	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-
217	End of Te Ra Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-	-	-	-	-	-	-
219	Achtzhener, Bulls Gorge, Kerikeri	-	-	-	-	-	-	-	-	-	-	-	7.0	-	6.0	11.8	5.8	2.8	-	1.9	-	-	-	-	1.0	0.9	-	-	-
220	Airstrip Rd (Baigent-Mercer)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	3.3	-	-	-	-	-	-	-	-	-	-
221	Airstrip Rd (Sharp)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	-	-	-	-	-	-	-	-	-	-	-	-
222	Candy Bush, Puketi Road, middle ridge	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-
223	Candy Bush, Puketi Road, red cliffs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.5	-	-	5.8	-	-	-	-	-	-	-	-	-	-
224	Candy Bush, Puketi Road, white/yellow path	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.0	-	-	11.0	-	-	-	-	-	-	-	-	-	-
225	Kauri Hills, Totara North	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	6.3	-	-	-	-	-	-	-	-	-	-
226	Poultons, Kerikeri River, Mangaparerua Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	9.0	-	6.5	-	5.4	4.6	-	-	-	-	12.3	9.0	-	-	-
227	Puketotara Rd = 709	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.0	-	-	-	-	-	-	13.8	-	11.5	-	9.0	**13.0**
228	Puketotara Rd = Kearney	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-	-	-	12.9	-	-	-	-	-	-	-
324	Puketotara Paddock 35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.1	9.1	-	14.5	**18.6**
229	Waipapa Rd West, Kerikeri (Anne C.)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
230	Waipapa Rd West, Kerikeri (Isabella C.)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
231	Waitoto, 500m west of Rhyolitic dome, Mangaparerua	-	-	-	-	-	-	-	-	-	-	-	4.0	-	-	-	-	-	-	-	-	-	-	-	2.8	0.6	-	-	-
232	Waitoto, Rhyolitic dome, Mangaparerua Road	-	-	-	-	-	-	-	-	-	-	-	4.5	4.6	8.0	5.0	-	-	-	-	-	-	-	-	2.6	0.3	-	-	-
233	Wharau Rd, Kerikeri (Manning)	-	-	-	-	-	-	-	-	-	-	-	-	3.6	2.5	-	5.5	3.5	4.5	-	-	-	-	-	-	-	-	7.0	-
234	Wharau Rd, Kerikeri (Starr)	-	-	-	-	-	-	-	-	-	-	-	-	6.3	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lodore Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.9	-	12.0	-	-	-
	Rangihoua	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34.4	-	-	-
282	Palm Drive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-
303	Te Puke	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	9.6	7.5	**1.9**
304	Blue Penguin Drive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.1	14.4	-

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
305	Rangitane River Park	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.3	-	-
322	Cunningham Gardens Waiare Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-
323	Opua Forest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	**5.6**
326	Whangamumu Track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	**1.8**
327	Harlens Taupo Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.4	**17.0**
331	Riverstream Drive = 76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8.4**
332	Motuora Island 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**17.0**
333	Motuora Island 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**27.1**
	Russell Peninsula																												
59	Opito Farms	-	-	-	-	-	5.7	-	9.9	-	-	4.6	13.1	6.1	9.1	6.8	4.3	5.3	8.1	6.9	11.5	10.1	-	13.5	13.5	10.1	13.3	30.4	**14.8**
60	Flagstaff/Te Maiki	-	-	-	-	-	3.7	1.3	1.3	-	-	-	4.3	-	6.4	-	2.5	4.3	3.9	3.3	3.3	3.9	3.4	5.8	5.0	4.9	15.4	-	**15.4**
61	Milne Ct	-	-	-	-	-	-	-	-	-	-	-	6.3	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	Uruti Rd	-	-	-	-	-	10.8	7.6	10.5	-	-	7.6	14.4	7.9	5.0	12.8	12.3	12.8	11.5	13.9	6.9	15.0	21.6	11.1	17.1	11.9	13.8	16.6	**18.9**
156	Russell Heights	-	-	-	-	-	-	-	-	-	-	-	9.8	4.8	5.0	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-
170	Nikau Block	-	-	-	-	-	-	-	-	-	-	12.9	10.0	12.0	12.0	12.0	8.9	14.3	9.1	20.8	14.6	14.9	12.0	10.4	16.1	5.8	9.1	20.5	**36.1**
171	Mace/Farmer	-	-	-	-	-	-	-	-	-	-	-	-	-	6.6	4.8	17.6	10.4	6.3	4.0	4.0	14.3	12.8	21.6	32.2	19.4	20.5	34.5	**27.9**
172	Pipiroa Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	3.0	2.0	2.8	6.0	5.4	5.6	3.0	3.3	3.6	4.8	7.0	5.4	3.9	-
173	Shortlands	-	-	-	-	-	-	-	-	-	-	2.0	2.0	2.5	1.4	1.1	1.3	-	2.3	1.1	2.0	-	-	1.3	11.1	1.4	5.5	7.8	**5.5**
174	Johnsons	-	-	-	-	-	-	-	-	-	-	-	10.0	9.8	12.8	10.0	10.0	11.4	8.5	10.1	10.3	11.3	12.8	12.3	11.9	5.6	12.0	16.1	**14.3**
176	Jarvis	-	-	-	-	-	-	-	-	-	-	5.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
177	Soloman's Gate	-	-	-	-	-	-	-	-	-	-	11.5	6.4	-	-	-	-	5.4	6.3	4.9	14.0	9.5	-	9.3	-	5.5	7.0	14.6	**20.5**
210	Paroa Bay, Russell	-	-	-	-	-	-	-	-	-	-	-	-	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
211	Eagles Nest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	-	-	-	-	-	-	-	-	-	-	-	-
	Ngaiotonga	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.9	-	-	-
335	Beeres	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.3**
336	June Wilkinson	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8.3**
337	Lucas House	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8.9**
338	Lucas Landing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8.9**
339	Mairs Grant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**7.4**
340	Maloney	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.8**

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
341	Tapeka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8.6**
Southern																													
23	Marlow Road	22.4	13.9	14.0	17.8	19.8	21.3	22.9	-	19.8	17.6	12.1	10.0	13.3	11.1	10.3	7.3	13.1	15.4	14.0	18.4	20.1	18.8	21.1	18.4	16.4	8.3	24.4	**15.9**
24	Purua North	12.1	13.0	10.3	10.5	10.6	15.0	12.8	12.5	13.3	10.9	12.6	13.6	18.3	9.9	13.5	10.0	16.1	16.0	17.6	14.9	16.3	13.8	13.5	-	11.0	17.5	23.8	**33.8**
25	Rarewarewa –early listen	-	-	-	8.0	10.4	4.6	7.0	6.5	4.6	5.9	5.6	4.8	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
25	Rarewarewa South	7.5	8.0	8.5	6.6	8.3	6.6	7.0	5.8	6.5	6.6	5.3	6.3	6.6	6.4	8.9	4.0	7.9	6.5	4.6	7.5	7.5	9.1	11.3	10.3	12.9	13.7	15.5	**7.0**
26	Mimiwhangata	11.0	5.6	3.5	3.6	0.3	9.4	19.1	20.3	13.8	20.3	14.3	21.0	19.5	12.9	11.0	8.4	-	11.0	9.0	12.1	9.6	10.8	14.6	9.8	11.1	-	6.3	**8.6**
34	Motatau 1	-	-	-	-	8.8	-	10.0	15.0	6.8	7.5	5.6	6.5	7.5	8.8	6.0	-	4.9	2.5	-	-	4.9	-	-	-	-	-	-	**-**
35	Motatau 2								2.7	-	-	1.5	3.0	2.5	-	-	-	4.3	-	5.5	-	-	-	-	-	-	-	-	**-**
36	Motatau 3	-	-	-	-	-	-	4.8	1.5	2.8	5.5	3.5	4.6	4.0	0.9	-	-	5.5	-	-	-	-	-	-	-	-	-	-	**-**
38	Motatau 5	-	-	-	-	-	-	1.5	1.3	0.9	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
68	Motatatu 9/ Marlow 1	-	-	-	-	-	-	-	11.7	11.8	17.6	13.5	10.5	9.3	2.9	7.1	3.0	9.8	9.9	9.3	5.4	-	11.9	11.8	9.5	10.5	10.3	8.5	**-**
81	Purua South	-	-	-	-	-	-	-	-	14.8	15.9	14.4	14.1	14.6	10.5	12.5	11.1	17.5	10.8	7.3	18.6	9.5	7.3	11.5	29.8	19.5	20.0	24.6	**20.9**
82	Rarewarewa North	-	-	-	-	-	-	-	-	9.8	6.6	4.0	8.5	7.9	10.4	11.4	11.4	11.9	12.1	10.0	7.9	6.9	-	8.1	6.3	13.4	11.9	10.9	**12.0**
129	Motatau 10/ Marlow 2	-	-	-	-	-	-	-	-	-	7.1	7.5	10.9	9.0	5.8	2.2	3.4	5.0	5.4	7.8	2.3	4.5	3.9	5.9	5.2	5.9	12.0	14.0	**-**
139	Hodges Bush	-	-	-	-	-	-	-	-	-	-	9.8	13.0	16.1	17.8	15.5	16.6	9.5	13.8	28.6	22.0	23.1	11.8	16.0	15.5	12.8	10.8	14.3	**15.8**
145	Whangaruru	-	-	-	-	-	-	-	-	-	-	-	6.0	6.0	10.3	13.4	10.8	24.3	13.5	9.4	7.8	4.4	10.0	5.4	3.5	6.0	6.1	6.8	**7.1**
167	Kaikanui Rd	-	-	-	-	-	-	-	-	-	-	-	-	8.5	11.6	15.0	8.4	7.3	3.8	2.9	-	-	-	-	-	-	-	-	**2.3**
168	Worsp Rd	-	-	-	-	-	-	-	-	-	-	-	-	1.8	2.4	2.0	5.8	1.4	-	-	-	0.1	2.0	-	-	-	-	-	**-**
264	Whau Valley Dam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	**-**
342	Tanekaha 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0	-	-	-	-	**2.4**
	Tanekaha 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	-	-	-	**-**
276	Hay Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-	-	**1.8**
329	M7 Kauri Block	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**4.4**
330	Far Back Kauri Block	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.3**
Tutukaka Coast																													
125	TLC 1	-	-	-	-	-	-	-	-	9.8	5.9	7.1	8.8	10.9	11.6	8.1	8.6	12.4	12.0	12.1	9.6	7.4	11.5	13.8	17.6	12.5	8.8	14.9	**13.6**
126	TLC 2	-	-	-	-	-	-	-	-	-	8.4	7.8	9.8	10.3	6.5	-	7.4	2.8	10.0	-	6.8	10.9	9.5	16.9	14.9	-	7.5	8.8	**15.1**
142	TLC 3	-	-	-	-	-	-	-	-	-	-	3.0	4.6	3.6	3.0	-	-	9.3	8.5	7.1	5.4	4.1	8.6	-	5.6	-	2.9	-	**10.3**
28	TLC 4	-	7.3	-	-	8.0	4.4	-	-	10.7	7.3	4.4	10.0	-	-	8.2	4.5	-	-	-	6.5	-	-	-	12.0	10.1	-	5.8	**9.3**

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
143	TLC 5	-	-	-	-	-	-	-	-	-	-	4.1	6.0	3.3	7.1	4.0	2.3	3.8	-	-	3.5	-	-	-	-	-	-	-	**8.0**
144	TLC 6	-	-	-	-	-	-	-	-	-	-	9.2	-	13.0	15.2	6.5	8.8	-	-	-	-	-	-	-	-	-	-	-	-
160	TLC 7	-	-	-	-	-	-	-	-	-	-	-	4.4	-	-	4.8	4.9	-	5.5	2.1	3.0	-	-	-	-	-	-	-	-
353	TLC 8 Ngahere Crawford	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	7.8	6.8	**2.9**
100	Kaiatea 1	-	-	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Kaiatea 2	-	-	-	-	-	-	1.2	2.0	1.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	Sandy Bay 1	3.6	3.4	2.8	8.0	6.1	3.3	3.5	-	3.0	-	2.5	-	-	6.8	-	5.3	-	4.2	5.5	4.3	3.9	5.8	6.3	6.0	3.6	5.8	5.9	**3.8**
260	Sandy Bay 2	-	-	-	-	-	-	-	-	-	-	-	4.5	-	-	3.8	3.5	2.5	4.5	-	3.0	5.9	6.4	9.3	3.6	2.4	0.8	2.9	**4.3**
261	Sandy Bay 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	4.0	7.5	3.9	3.9	8.5	5.5	4.8	1.6	3.4	3.3	**4.5**
	Rayonnier Forest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	-	-	-	-	-
292	Sandy Bay Farms	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	6.1	-	4.7	**5.6**
293	Te Toiroa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.0	5.1	-	5.3	**6.6**
	Pukenui Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.1	-	-	-	-
295	Ngahere Pines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.0	-	13.6	15.4	**16.4**
306	Gunther	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.8	12.1	**11.1**
308	Otito N Reserve Matapouri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
309	Morrison Ridge Track Matapouri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
319	Kakariki	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.3	**9.6**
320	Toots Quarry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	**8.4**
354	Bluewater Heights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	**1.6**
310	North Onekainga Whananaki	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	1.4	**0.5**
311	Harman Farms Lookout Whananaki	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	0.8	**1.0**
312	Dawson's Property Whananaki	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.5	3.4	-
313	Hailes Road Whananaki	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3	2.3	**3.3**
													KiwiLink																
302	Owhiwa Road Kauri Villas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	0.0	0.0	**0.0**
	Maungatika Scenic Reserve 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	0.9	0.4	0.8	0.1	-	-	-	-
314	Kumara Pit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	**3.4**

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
315	Ohuatahi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.7	**4.3**
316	Sue's bus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	**-**
346	Mount Tiger Block - Site 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.3**
347	Whanui Block - Mussel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**7.6**
348	Whanui Block - Oyster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2.5**
349	Whanui Block - Toheroa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.8**
351	McQuoids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.1**
352	Robbies Driveway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.3**
													Glenbervie																
21	Glenbervie 7A	5.0	6.4	7.1	7.5	5.0	0.5	1.0	2.4	1.0	-	1.3	-	2.4	2.5	1.9	1.8	2.6	1.1	4.3	-	-	-	1.9	3.9	3.1	6.1	1.8	**1.5**
22	Glenbervie 9A	11.2	3.8	4.3	7.3	5.9	12.6	6.8	5.3	4.5	6.5	-	1.8	2.8	2.9	1.4	2.9	1.6	6.8	6.9	2.8	2.0	-	5.3	-	8.1	6.0	5.6	**6.0**
283	Glenbervie 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	4.0	2.2	**4.1**
284	Glenbervie 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	2.9	3.5	**3.5**
296	Glenbervie 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	1.2	**2.6**
													Pukenui																
285	Pukenui Loop Track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	1.3	2.0	**2.0**
286	Whau Valley Dam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.0	-	**-**
287	Pukenui Loop by B Line	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	3.3	-	**-**
288	Steps on Loop Line (between N and O)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	4.1	**1.8**
289	Forest Edge Smithville	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	1.0	2.1	**3.9**
297	Woods Road Quarry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	**-**
298	Stonelea Way	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.6	**0.4**
299	Clements Quarry Trig	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.3	**0.0**
300	Pukenui	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	**-**
318	Taraire Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	**1.4**
													Whangarei Heads																
39	Bream Hd 1	-	-	-	-	-	-	5.0	3.1	5.8	3.1	4.7	5.1	3.5	5.0	6.0	3.0	7.1	9.5	9.6	9.6	10.0	12.1	7.4	11.3	8.0	10.5	13.6	**7.6**
40	Bream Hd 2	-	-	-	-	-	-	1.2	2.0	1.3	2.1	2.4	2.0	2.8	2.0	-	-	1.3	-	-	-	-	-	-	-	-	-	-	**-**
41	Bream Hd 3	-	-	-	-	-	-	-	-	-	-	1.5	2.0	1.3	1.6	-	-	-	8.4	8.6	8.6	6.1	6.9	6.0	4.5	3.0	3.0	20.4	**8.9**
42	Bream Hd 4	-	-	-	-	-	-	1.2	2.0	1.3	2.1	2.4	2.0	1.5	3.1	2.0	2.0	5.4	5.3	7.6	2.1	6.3	3.8	6.8	8.5	6.8	10.0	11.4	**6.0**

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
69	Bream Hd 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	6.8	4.4	-	5.0	3.3	3.3	-	3.6	13.6	**5.7**
44	Taurikura 1	-	-	-	-	-	-	-	-	-	-	1.5	2.0	-	4.4	4.9	3.1	12.6	9.6	10.8	-	-	-	-	-	-	-	-	-
45	Taurikura 2	-	-	-	-	-	-	-	-	-	-	-	-	-	9.0	8.5	10.9	10.3	5.5	10.4	11.9	8.6	11.3	10.3	9.8	8.4	9.1	15.4	**13.1**
46	Taurikura 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	1.9	5.9	4.6	4.0	7.5	4.8	6.0	-	4.8	4.0	4.1	6.1	**12.1**
47	Manaia 1	-	-	-	-	-	-	3.5	2.5	4.3	4.0	3.3	3.9	2.1	5.1	3.9	3.3	10.3	2.9	2.8	3.6	1.5	9.4	8.8	13.5	4.5	9.4	14.5	**17.9**
48	Manaia 2	-	-	-	-	-	-	4.0	4.5	4.9	5.8	4.0	5.3	7.4	7.6	8.8	10.8	8.4	16.6	13.3	15.9	15.1	15.6	13.5	15.3	8.9	21.0	28.8	**28.8**
49	Manaia 3	-	-	-	-	-	-	3.3	3.9	2.9	-	2.1	3.0	-	4.0	3.1	3.5	6.3	3.1	5.1	3.6	7.5	7.1	9.3	6.8	-	6.8	11.9	**15.4**
71	Manaia 8	-	-	-	-	-	-	-	1.5	0.3	1.0	1.2	2.0	1.5	1.4	1.9	0.8	2.1	-	4.6	-	3.3	4.8	3.9	3.1	1.8	6.5	4.5	**6.8**
262	Manaia 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	3.6	6.9	9.1	6.0	-	10.0	-	-	-	-	-
54	Kauri Mtn 1	-	-	-	-	-	-	4.5	1.5	-	3.1	7.4	1.3	-	1.4	3.0	2.1	2.5	3.6	4.6	4.4	3.8	7.4	6.5	5.1	4.5	3.3	7.8	**8.0**
72	Kauri Mtn 2	-	-	-	-	-	-	-	5.1	3.2	4.3	2.7	2.3	0.4	2.3	3.6	2.4	3.4	5.3	5.0	6.3	6.8	9.6	7.1	5.6	4.9	3.9	7.0	**10.0**
73	Kauri Mtn 3	-	-	-	-	-	-	-	2.0	1.0	1.0	1.3	2.5	-	5.0	3.4	1.1	6.0	3.3	3.2	5.1	6.9	7.0	6.8	4.8	-	4.4	9.3	**3.9**
74	Kauri Mtn 4	-	-	-	-	-	-	-	4.8	5.9	2.6	3.0	2.9	-	2.0	2.0	3.4	3.9	3.8	3.3	4.1	4.8	5.6	6.1	5.8	4.5	6.3	6.6	**9.0**
141	Kauri Mtn 5	-	-	-	-	-	-	-	-	-	-	2.3	1.9	1.3	2.5	3.1	3.3	4.8	4.1	3.0	4.9	4.8	8.9	8.9	6.3	6.4	6.1	6.5	-
127	The Nook 1	-	-	-	-	-	-	-	-	-	1.8	1.5	0.9	-	0.7	1.4	1.3	2.3	-	0.9	-	-	-	-	-	3.0	-	3.0	**5.8**
56	The Nook 2	-	-	-	-	-	-	6.0	2.1	3.3	3.8	4.0	5.3	-	5.0	4.5	7.8	9.3	8.4	6.4	4.1	1.6	3.9	8.5	6.1	4.0	4.3	8.0	**6.9**
128	The Nook 3	-	-	-	-	-	-	-	-	-	-	-	-	-	3.4	4.8	5.0	3.4	3.4	4.6	-	-	-	-	-	-	-	-	-
58	Nook Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	-	3.7	4.6	1.5	-	-	-	-	-	-	-	-	-	-
263	Craig Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.0	14.1	12.3	9.3	13.5	12.3	10.6	14.3	7.0	11.8	14.8	**10.1**
75	McCleod Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.6	5.9	8.8	7.4	7.3	3.0	6.1	13.8	**14.4**
													Western																
16	Katui	47.6	39.4	20.4	28.2	17.5	16.1	14.4	-	14.9	13.9	-	4.0	-	0.0	-	0.3	-	-	0.0	0.0	-	-	1.5	5.0	1.0	1.3	1.3	-
17	Trounson North	8.5	17.3	12.5	19.0	16.0	14.3	16.1	-	15.3	19.9	22.2	15.4	-	13.8	22.3	5.8	15.1	12.0	10.0	5.3	7.6	9.4	11.1	13.5	9.4	-	13.0	**6.9**
18	Cathedral	2.3	3.8	5.1	5.5	5.1	1.8	2.8	5.9	5.3	4.9	4.0	4.6	4.4	3.0	1.6	2.8	4.1	2.6	4.4	5.8	7.1	7.1	6.1	6.0	5.2	2.5	5.8	**1.3**
19	Waipoua L/Out	30.9	24.4	30.8	27.7	21.4	21.8	14.6	8.4	16.9	22.8	23.0	7.9	11.8	6.0	6.0	9.3	15.6	8.9	10.0	12.5	12.4	12.0	11.6	9.6	10.0	-	13.0	-
20	Paerata	9.9	1.3	3.1	6.5	2.8	3.1	1.3	-	0.0	-	-	-	0.9	1.1	1.6	0.3	0.4	1.1	0.3	0.6	-	-	-	-	-	-	-	-
31	Te Matua Ngahere	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3	4.1	-	-	-	-	1.2	-	3.4	2.0	2.5	2.3	1.5	**2.0**
33	Trounson South	-	-	-	-	-	-	12.3	-	23.8	19.1	-	-	8.2	8.9	-	11.1	12.3	10.0	6.0	7.8	7.8	10.5	5.9	7.9	12.5	10.0	13.6	**12.2**
79	Toronui Track	-	-	-	-	-	-	-	-	1.8	2.4	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96	Kawerau Rd Cr	-	-	-	-	-	-	-	-	3.4	2.0	0.3	0.4	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
157	Opouteke CHH	-	-	-	-	-	-	-	-	-	-	-	6.6	6.1	2.8	11.3	-	-	-	-	-	-	-	-	-	-	-	-	-
158	Pipiwai CHH	-	-	-	-	-	-	-	-	-	-	-	7.3	0.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
179	Marlborough 13	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
244	Maunganui Bluff	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-
265	River Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	2.6	-	5.0	3.1	-	2.0	2.3	-
266	Wekaweka LC 1 (Alf's Cottage)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-	-	-
267	Wekaweka LC 2 (Rob's Place)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	0.1	0.1	1.0	-	0.1	-
268	Wekaweka LC 3 (Libby's track)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	1.3	1.4	0.8	-	0.1	-
	Wekaweka (The Drop)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-
	Wekaweka (1052 Wekaweka Road)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-
13b	Site 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-
14b	Site 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-
16b	Marlborough Rd Site 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	2.1	1.5	1.4	0.6	2.0	0.4	0.5	1.0	0.0	1.0	-	0.6	**1.0**
18b	Site 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
28b	Site 28 SH12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.3	8.9	3.6	4.1	5.1	-	7.6	4.5	8.4	5.1	6.5	7.2	6.5	**6.6**
30b	Site 30 SH12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	3.0	0.9	-	-	-	1.5	-	-	0.4	-	-	0.8	-
31b	Site 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
32b	Site 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-
													Piroa/Brynderwyn																
253	PBS 1 - Maranui	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	2.6	4.3	3.3	5.6	3.6	4.0	3.0	**3.4**
275	PBS 2 - Pebblebrook Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	3.0	6.9	3.5	-	-	2.4	**0.6**
317	PBS 3 - Pa Hill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	**2.1**
343	PBS 5 - Hull Hill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
344	PBS 6 - Bream Tail Farm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.4**
290	PBN 1 - Cullen Rd Trig	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	1.6	0.4	**0.1**
291	PBN 2 - Cullen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	**0.3**
321	PBN 3 - Massey Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-
													Mataia																
254	Mataia 1 - Fishing Track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	4.0	3.3	4.6	7.8	6.4	**5.6**

Stn No.	Station name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
255	Mataia 2 - Pa Track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	0.5	1.9	-	2.6	3.0	5.4	**5.3**
	Mataia 3 - Cliffs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-
280	Mataia 4 - Quarry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	3.0	2.1	4.9	**6.4**
281	Mataia 5 - Hooper's Bush	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	2.0	2.8	-
328	Mataia 6 - Bach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**5.1**
Tawharanui																													
161	TWN 1 Marine triangle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	0.5	-	1.3	2.3	2.9	2.6	4.0	4.4	4.1	0.9	1.0	3.1	**3.6**
162	TWN 2 Trig triangle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	0.7	-	3.9	1.9	1.3	2.9	6.6	5.9	10.8	7.9	8.0	8.6	**11.9**
163	TWN 3 Top ecology track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.3	-	1.6	2.0	4.6	6.0	5.0	4.5	4.4	4.9	2.5	4.4	**6.9**
164	TWN 4 Possum gully	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	-	2.8	1.4	8.0	2.8	4.6	2.4	7.0	4.8	4.0	6.8	**14.0**
165	TWN 5 Twin hills	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	0.0	-	2.3	1.9	3.3	3.5	6.8	7.3	4.8	6.4	5.0	8.4	**11.4**
166	TWN 6 South coast water tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.3	-	4.9	6.5	8.0	9.5	6.4	3.0	12.6	11.6	12.1	18.4	**19.1**
Kawau Island																													
269	Bostaquet Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	-	-	-	-	-	-	-	-	-	-
270	South Cove	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	-	-	-	-	-	-	-	-	-	-
277	Skid 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	1.1	2.3	2.4	3.5	-	-	-
278	Skid 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	1.5	2.8	2.8	2.2	-	-	-
279	Harris Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	3.1	3.5	2.8	2.3	-	-	-

APPENDIX 2. Summary of Northland brown kiwi listening data for stations listened from in 2022.

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
Northern												
7	Puketi	Dan O	4	5	6	0	9	7	3	9	**43**	**5.38**
8	Puketi SR	N & E Walker, I Wilson	15	11	9	15	19	8	13	11	**101**	**12.63**
Mangatete												
3	Lightning Hill	L Baigent	6	18	13	4	24	30	8	15	**118**	**14.75**
256	Home drive	A Baigent	15	6	15	12	12	12	22	8	**102**	**12.75**

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
Whakaangi												
29	Wha 4 - Seons	G Seon	3	3	4	1	-	-	-	-	**11**	**2.75**
133	Wha 5 - Sarahs Drive	Andrew B	3	2	3	1	-	-	-	-	**9**	**2.25**
135	Wha 7 - Jarvis Transmitter	B Jarvis	6	3	4	8	1	6	8	8	**44**	**5.50**
136	Wha 8 - TV3 Johnstons	P.L & P.J Johnston	4	3	7	7	6	3	6	6	**42**	**5.25**
247	Wha 12 - Scott's Gate	D Walsh, Class	0	2	9	9	-	-	-	-	**20**	**5.00**
250	Wha 17 - Seon's Gate	T Seon	1	0	0	4	6	8	-	-	**19**	**3.17**
Mahinepua - Radar Hill												
90	Mahinepua 0 - Noels Deck	Mary Anne S, Jo L	7	4	8	3	4	6	6	2	**40**	**5.00**
83	Mahinepua 1 - Suzanne's	Fred B, Myra L	8	6	5	5	5	2	1	0	**32**	**4.00**
84	Mahinepua 2 - Leigh Anne's	Mary Anne S, Hayward family, Lynn L et al	24	9	18	14	13	7	9	6	**100**	**12.50**
85	Mahinepua 3 - The Barracks	Laura B, Myra L	6	2	0	1	9	1	15	2	**36**	**4.50**
88	Mahinepua 4 - Naked Knoll	Mary Anne S, Jo L	19	12	14	11	20	11	13	20	**120**	**15.00**
87	Mahinepua 5 - Airstrip	Mary Anne S, Jo L	17	6	1	6	6	2	2	7	**47**	**5.88**
86	Mahinepua 6 - Vodafone	Mary Anne S, Jo L	4	3	4	0	2	1	1	1	**16**	**2.00**
89	Mahinepua 7 - Poison Shed	Mary Anne S, Jo L	14	4	2	6	3	5	7	3	**44**	**5.50**
99	Mahinepua 13 - Bull Paddock	*ALD*	21	9	13	16	13	3	8	16	**99**	**12.38**
93	Mahinepua 16 - E Beach Lower	Mary Anne S, Jo L	8	3	-	-	-	-	-	-	**11**	**5.50**
94	Mahinepua 17 - E Beach Upper	Mary Anne S, Jo L	6	0	13	6	3	5	1	4	**38**	**4.75**
334	Mahinepua 19 - Richards Bench	*ALD*	14	4	5	9	8	3	13	4	**60**	**7.50**
Eastern												
10	Marsden Cross	Catherine J	48	35	-	-	-	-	-	-	**83**	**41.50**
11	Puketotara	Ann K	15	11	21	21	25	11	21	17	**142**	**17.75**
12	Rangitane	D Bayens-Wright, F Corbett	30	13	9	5	30	23	10	20	**140**	**17.50**
13	Waitangi No. 12	Darran L	5	4	7	3	4	2	3	3	**31**	**3.88**
14	Mt Bledisloe	Hana H, Laura M	18	14	4	13	3	11	-	-	**63**	**10.50**

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
15	Tikitikikiore	L Gordon	8	10	25	12	15	10	17	11	**108**	**13.50**
Puketi Forest												
102	Bramley's Ridge	ALD	*Mean call count only provided*								**0**	**3.67**
103	Pirau Ridge	ALD	*Mean call count only provided*								**0**	**2.07**
104	Pond	I Wilson, P Magon, K McMillan et al	11	17	9	15	9	4	4	3	**72**	**9.00**
106	Takapau Track	P Hodgson	7	6	4	1	5	2	5	2	**32**	**4.00**
107	Takapau/Pirau Rd Jn	H & J Bonham, I Wilson	0	3	5	2	4	1	7	7	**29**	**3.63**
108	Totara Ridge	A Groot, P Magon, K McMillan et al	15	3	10	5	4	4	5	1	**47**	**5.88**
109	Waihoanga Gorge	C & R Robinson	2	6	3	5	3	9	4	3	**35**	**4.38**
112	Stoat line 9 - Puketi	I Wilson, B Sutton	1	4	3	1	2	5	0	0	**16**	**2.00**
259	Nature Trail	B Sutton	1	1	2	1	1	0	2	0	**8**	**1.00**
Waimate North												
113	W1 - Omatua	Not supplied	32	27	28	24	23	15	34	14	**197**	**24.63**
114	W2 - Mt Pokaka	Anne C	5	11	16	5	7	5	6	6	**61**	**7.63**
116	W4 - Okokako Rd	M Lewis, C Boniface, H Horrobin	13	10	11	5	9	13	14	13	**88**	**11.00**
118	W6 - Waitangi River Valley	K Upperton, L McGregor	9	2	21	9	4	11	31	14	**101**	**12.63**
120	W8 - Jackson Mountain	J & I Dryburgh	0	5	2	1	0	2	1	1	**12**	**1.50**
122	W10 - Montrose Road	J Little & S Rogers	4	10	4	5	6	8	16	12	**65**	**8.13**
124	W12 - Pukekiwi	D Way	2	1	3	3	1	0	0	1	**11**	**1.38**
Hupara												
258	HLC 1 (Bill's Plateau)	JA Gillanders	42	34	44	39	35	33	37	32	**296**	**37.00**
257	HLC 4 (Orange Tree)	W Atkinson	14	6	17	10	9	18	13	10	**97**	**12.13**
Bay of Islands												
58	Te Puke - Waitangi	Martin S	1	12	0	1	1	0	0	0	**15**	**1.88**
146	Kauri Cliffs 1 - Pink Beach	Blair R	1	1	2	2	7	2	2	2	**19**	**2.38**
185	Akeake Reserve	*ALD*	*Mean call count only provided*								**0**	**3.13**
186	Cunningham Gardens	*ALD*	*Mean call count only provided*								**0**	**4.57**
323	Opua Forest	Peggy B	5	1	6	4	3	4	6	3	**32**	**5.57**

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
207	Waiaua	Blair R	1	0	0	0	0	0	0	0	**1**	**0.13**
227	Puketotara Rd - 709	Ann K	13	8	18	0	15	16	23	11	**104**	**13.00**
324	Puketotara Paddock 35	Jane H	13	18	17	14	16	25	22	24	**149**	**18.63**
327	Harlen's Taupo Bay	Jodie R, Erica W	24	8	15	17	15	23	16	18	**136**	**17.00**
191	Tikorangi Road	*ALD*	*Mean call count only provided*								**0**	**5.13**
97	Kurupari Road	*ALD*	*Mean call count only provided*								**0**	**7.70**
326	Whangamumu Track	Sandra S	3	4	2	0	1	2	2	0	**14**	**1.75**
331	76 Riverstream Drive	P Kuhn	9	5	11	14	6	10	6	6	**67**	**8.38**
332	Motuora Island 1	Linda C	9	18	14	16	26	19	16	18	**136**	**17.00**
333	Motuora Island 2	Linda C	31	26	28	28	34	25	26	19	**217**	**27.13**
Russell Peninsula												
59	Opito Farms	A Izawa	15	5	9	16	21	15	17	20	**118**	**14.75**
60	Te Maiki/Flagstaff	Kristy L	24	11	23	9	33	4	17	2	**123**	**15.38**
62	Uruti Road	Chris R	24	23	20	13	19	18	24	10	**151**	**18.88**
170	Nikau Block	Nicholas M	42	29	49	21	45	28	57	18	**289**	**36.13**
171	Mace/Farmer	Mike C	31	25	48	23	37	17	28	14	**223**	**27.88**
173	Shortlands	William F	10	3	6	4	5	6	8	2	**44**	**5.50**
174	Johnsons	M Frankum	16	24	16	11	14	12	10	11	**114**	**14.25**
177	Solomons Gate	Stefan S	30	10	24	9	40	21	19	11	**164**	**20.50**
335	Beeres	Anna H	5	5	3	5	4	1	3	0	**26**	**3.25**
336	June Wilkinson	Douglas F	12	8	11	2	9	8	9	7	**66**	**8.25**
337	Lucas House	Lesley L	7	7	21	11	0	8	10	7	**71**	**8.88**
338	Lucas Landing	William F	9	3	5	5	10	10	17	12	**71**	**8.88**
339	Mairs Grant	Mike S	9	5	6	3	13	6	5	12	**59**	**7.38**
340	Maloney	Peter M, Leanne M	6	4	4	0	4	8	2	2	**30**	**3.75**
341	Tapeka	Joy C	5	10	14	9	5	10	9	7	**69**	**8.63**
Southern												
24	Purua N	Julia B, Tamra G	26	36	35	27	38	23	49	36	**270**	**33.75**

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
81	Purua S	Ayla W, Nikki H, Tamra G	28	26	19	12	11	22	22	27	**167**	**20.88**
82	Rarewarewa N	Julia & Phil B, Tamra G, Kelsie H	11	11	8	17	20	9	2	18	**96**	**12.00**
25	Rarewarewa S	Julia & Phil B, Tamra G	2	8	1	20	6	7	7	5	**56**	**7.00**
139	Hodges	Greg L	18	16	25	4	-	-	-	-	**63**	**15.75**
23	Marlow Road	Kallan M	23	10	20	8	14	22	18	12	**127**	**15.88**
145	Whangaruru	Roy & Dianne H	14	8	7	3	7	4	14	0	**57**	**7.13**
26	Mimiwhangata	Manaia A	12	2	15	5	11	9	10	5	**69**	**8.63**
342	Tanekaha Puriri	Stefan B	4	0	6	0	1	1	6	1	**19**	**2.38**
167	Kaiikanui	*ALD*	3	3	1	1	6	4	0	0	**18**	**2.25**
276	Hay rd	Geoff C	0	0	3	4	-	-	-	-	**7**	**1.75**
329	M7 Kauri Block	Tania D	2	2	5	6	4	6	4	6	**35**	**4.38**
330	Far Back Kauri Block	Jeff C	3	3	3	6	2	2	4	3	**26**	**3.25**
		Tutukaka Coast										
27	Sandy Bay 1	K Pullman	6	2	1	4	2	5	7	3	**30**	**3.75**
260	Sandy Bay 2	*ALD*	8	2	4	7	3	4	2	4	**34**	**4.25**
261	Sandy Bay 3	*ALD*	6	5	4	1	6	5	8	1	**36**	**4.50**
292	Sandy Bay farms	C Dowd	4	5	8	5	10	6	3	4	**45**	**5.63**
293	Te Toiroa	*ALD*	8	2	8	5	7	4	13	6	**53**	**6.63**
295	TLC Ngahere pines	*ALD*	15	16	22	12	14	20	23	9	**131**	**16.38**
125	TLC 1	Mike C	11	2	11	24	11	11	24	15	**109**	**13.63**
126	TLC 2	Nick D	15	22	11	13	24	12	12	12	**121**	**15.13**
142	TLC 3	*ALD*	9	11	15	10	12	7	10	8	**82**	**10.25**
28	TLC 4	Stefan S	17	11	13	10	9	5	6	3	**74**	**9.25**
143	TLC 5	*ALD*	8	7	9	6	5	4	14	11	**64**	**8.00**
353	TLC 8 Ngahere Crawford	Ian S	7	1	1	1	7	0	5	1	**23**	**2.88**
306	Gunther	*ALD*	17	14	9	11	12	11	7	8	**89**	**11.13**
319	Kakariki	*ALD*	20	6	12	2	18	3	14	2	**77**	**9.63**
320	Toots Quarry	*ALD*	4	4	9	5	9	11	13	12	**67**	**8.38**

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
354	Bluewater Heights	Maureen F	3	4	1	3	1	0	0	1	**13**	**1.63**
310	North Onekainga	Scott M	1	0	0	0	2	0	-	-	**3**	**0.50**
311	Harman Farm Lookout	Scott M	2	1	1	0	-	-	-	-	**4**	**1.00**
313	Hailes Rd	Scott M	0	6	8	0	1	5	-	-	**20**	**3.33**
KiwiLink												
302	Owhiwa Rd Kauri Villas	Not supplied	0	0	0	0	0	0	0	0	**0**	**0.00**
314	KiwiLink Kumara Pit	Carl, Derik, Graham, John, Ross	3	1	1	6	4	1	5	6	**27**	**3.38**
315	KiwiLink Ohuatahi	Jarod, Macy, Carl, Derik	5	1	5	1	5	0	9	8	**34**	**4.25**
346	Mount Tiger Block - Site 1	*ALD*	1	0	0	0	0	0	0	1	**2**	**0.25**
347	Whanui Block - Mussel	*ALD*	10	1	5	6	2	18	4	15	**61**	**7.63**
348	Whanui Block - Oyster	*ALD*	1	0	2	5	0	1	1	10	**20**	**2.50**
349	Whanui Block - Toheroa	*ALD*	0	1	1	1	1	0	1	1	**6**	**0.75**
351	McQuoids	*ALD*	3	0	1	0	1	3	0	1	**9**	**1.13**
352	Robbies Driveway	*ALD*	0	0	0	0	0	2	0	0	**2**	**0.25**
Glenbervie												
21	Glenbervie 7A - Lookout	*ALD*	2	1	2	1	4	1	1	0	**12**	**1.50**
22	Glenbervie 9A - Marua	*ALD*	5	6	7	6	5	13	4	2	**48**	**6.00**
283	Glenbervie 10 - Kaitea	*ALD*	2	3	5	5	6	2	10	0	**33**	**4.13**
284	Glenbervie 11 - Ruahine	*ALD*	1	7	0	1	7	3	8	1	**28**	**3.50**
296	Glenbervie 14 - Bush Track	*ALD*	2	2	1	2	5	3	3	3	**21**	**2.63**
Pukenui												
285	Pukenui Loop North	Trevor T, Kim G	2	1	3	1	2	2	2	3	**16**	**2.00**
298	Stonelea Way	Peter L, Bevan C	1	0	2	0	0	0	0	0	**3**	**0.38**
288	Pukenui Loop South	Bevan C, Nada, Phoebe P, Wayne W et al	1	3	5	1	0	0	4	0	**14**	**1.75**
289	Forest edge Smithville	Fiona D	6	2	7	6	2	3	1	4	**31**	**3.88**
299	Clements Quarry Trig	B Lovell & Simon C	0	0	0	0	0	0	0	0	**0**	**0.00**
318	Taraire Ridge	Peter L, Kolby A	1	0	3	4	2	0	0	1	**11**	**1.38**
Whangarei Heads												

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
39	Bream Head 1	R Edwards, G Dewhurst, Shani	10	10	7	11	14	5	1	3	**61**	**7.63**
41	Bream Head 3	J Kim & Z Coffin	6	12	15	17	2	3	10	6	**71**	**8.88**
42	Bream Head 4	J Kim & Z Coffin	12	8	6	5	6	5	2	4	**48**	**6.00**
69	Bream Head 6	R Edwards & G Dewhurst	6	7	3	12	1	5	-	-	**34**	**5.67**
54	Kauri Mt 1	A Willetts	11	5	-	-	-	-	-	-	**16**	**8.00**
72	Kauri Mt 2	S Sinclair, H O'Brien	12	11	11	6	10	7	14	9	**80**	**10.00**
73	Kauri Mt 3	P Olsen, S Olsen	5	7	6	5	4	0	2	2	**31**	**3.88**
74	Kauri Mt 4	G & R Faber	15	13	16	3	8	2	7	8	**72**	**9.00**
47	Manaia 1	L W Ogle	19	14	13	22	16	16	23	20	**143**	**17.88**
48	Manaia 2	F Evans	33	29	41	21	20	26	36	24	**230**	**28.75**
49	Manaia 3	P Richards	12	12	30	12	16	9	17	15	**123**	**15.38**
71	Manaia 8	W Fieldhouse, L Penney	9	3	2	6	8	8	7	11	**54**	**6.75**
127	Nook 1	*ALD*	6	3	11	3	9	3	7	4	**46**	**5.75**
56	Nook 2	C Brown	8	8	6	5	7	9	8	4	**55**	**6.88**
45	Taurikura 2	G Pike	17	10	12	8	19	0	26	13	**105**	**13.13**
46	Taurikura 3	*ALD*	6	11	21	14	17	8	15	5	**97**	**12.13**
263	Craig Rd	T Hamilton, K Maxwell	7	5	18	8	6	8	24	5	**81**	**10.13**
75	McLeod Bay	W & V Biddle	23	12	22	14	17	8	13	6	**115**	**14.38**
Western												
17	Trounson Nth	Anja M, *ALD*	13	11	7	4	8	8	3	1	**55**	**6.88**
18	Cathedral	*ALD*	2	0	1	4	1	1	1	0	**10**	**1.25**
31	Te Matua Ngahere	K & T Donovan	2	2	4	2	1	1	1	3	**16**	**2.00**
33	Trounson Sth	Tom F	15	15	8	13	14	8	-	-	**73**	**12.17**
16b	Marlborough Rd Site 16	*ALD*	4	0	0	3	0	0	1	0	**8**	**1.00**
28b	Site 28 SH12	Megan T	8	5	10	2	11	4	10	3	**53**	**6.63**
Piroa/Brynderwyn												
253	PBS 1 - Maranui	J Hawley	0	7	2	5	1	5	3	4	**27**	**3.38**
275	PBS 2 - Pebblebrook Rd	*ALD*	0	0	1	1	1	1	0	1	**5**	**0.63**

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	*2*	*1*	*2*	*1*	*2*	*1*	*2*		
317	PBS 3 - Pa Hill	*ALD*	5	7	2	0	2	1	0	0	**17**	**2.13**
344	PBS 6 - Bream Tail Farm	Adele M, Donovan B	6	0	0	2	0	1	2	0	**11**	**1.38**
290	PBN 1 - Cullen Rd Trig	Kathryn C	0	0	0	0	0	1	0	0	**1**	**0.13**
291	PBN 2 - Cullen	*ALD*	0	1	0	1	0	0	0	0	**2**	**0.25**
Mataia												
254	Mataia 1 - Fishing Track	*ALD*	9	7	7	7	3	1	4	7	**45**	**5.63**
255	Mataia 2 - Pa Track	*ALD*	4	5	9	10	2	9	3	0	**42**	**5.25**
280	Mataia 4 - Quarry	*ALD*	9	4	11	4	3	9	8	3	**51**	**6.38**
328	Bach	*ALD*	2	3	1	10	11	5	3	6	**41**	**5.13**
Tawharanui												
161	TWN 1 Marine Triangle	K Hoksbergan & N Wallen, et al	5	2	5	8	0	0	8	1	**29**	**3.63**
162	TWN 2 Trig Triangle	G Dallimore, L Hamilton-Hunter, et al	12	18	12	9	12	9	5	18	**95**	**11.88**
163	TWN 3 Ecology Bush	A Bourke, J Enderby & K Ellis et al	7	8	6	10	3	4	5	12	**55**	**6.88**
164	TWN 4 Possum gully	S Lee, S Gary & Sarah, J Monk et al	16	18	5	10	15	21	12	15	**112**	**14.00**
165	TWN 5 Twin Hills	E & S Richardson, J Parker, R Blackburn et al	13	6	9	14	0	12	18	19	**91**	**11.38**
166	TWN 6 South Coast Water Tank	R Williams & T Crocker, R Williams et al	11	11	23	30	21	22	14	21	**153**	**19.13**

APPENDIX 3. Trends in mean kiwi call count rates from annual monitoring at selected stations of managed Northland brown kiwi populations in 2022.

Area	No. Stn	Station No.	2022 Station No.	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Mangatete	2	3, 256	3, 256	-	-	-	-	-	-	-	-	-	-	-	11.0	15.9	17.9	15.9	17.6	13.2	9.1	12.9	**13.8**
Honeymoon Valley	4	271-274	No data	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-

Area	No. Stn	Station No.	2022 Station No.	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Whakaangi	7-9	29, 130-137	29, 133, 135, 136	-	-	11.8	10.7	10.1	10.8	11.7	12.2	10.9	9.9	7.3	6.5	8.1	4.7	4.0	4.0	2.1	4.5	4.8	**3.9**
Mahinepua-Radar Hill	8	83-85,87-89,98,99	83-85,87-89,98,99	-	3.6	2.8	4.9	2.7	1.9	2.5	4.7	5.5	10.2	6.7	5.7	6.5	7.8	7.5	11.0	4.7	11.4	-	**8.5**
Puketi Forest	6	102, 104-106, 108, 111	102, 104, 106, 108	-	-	-	2.9	1.2	1.5	3.7	3.0	4.3	4.1	3.6	5.7	2.9	4.2	3.5	6.0	4.2	2.0	6.5	**5.6**
Waimate North	6	113, 114, 118, 120, 122, 124	113, 114, 118, 120, 122, 124	-	10.5	4.3	-	6.8	6.5	4.7	8.1	9.0	8.4	6.6	8.6	8.1	7.6	7.8	10.9	7.3	12.2	13.3	**9.3**
Hupara	3-4	245, 246, 257, 258	257, 258	-	-	-	-	-	-	-	-	-	-	18.5	14.7	16.7	21.8	16.8	22.3	17.7	23.1	24.9	**24.6**
Russell Peninsula	5	15, 59, 62, 170, 173	15, 59, 62, 170, 173	-	-	4.5	4.0	7.0	5.4	4.6	5.5	11.4	9.8	11.4	12.8	13.8	19.7	11.3	16.5	7.4	12.1	18.8	**17.8**
Motatau-Marlow	6	23,34-36,68,129	insufficient data	-	-	7.3	7.6	7.5	4.9	6.4	4.5	7.1	8.3	9.1	8.7	9.8	11.5	12.9	11.0	10.9	10.2	15.6	**-**
Purua-Rarewarewa	5	24,25,81,82, 139	24,25,81,82, 139	-	-	9.2	11.1	12.7	10.9	12.4	10.6	12.6	11.8	13.6	14.2	12.7	10.5	12.1	15.4	13.9	14.8	17.8	**17.9**
Tutukaka Coast	9	27, 28, 125, 126, 142-144, 260, 260	27, 28, 125, 126, 142, 143, 260, 260	7.8	7.2	5.4	7.3	8.2	8.4	6.1	5.2	6.1	7.2	8.1	5.4	6.0	8.4	10.3	9.2	6.1	4.9	6.9	**9.0**
Glenbervie	5	21, 22, 283, 284, 296	21, 22, 283, 284, 296	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	4.0	2.9	**3.6**
Pukenui	3	285, 288, 289	285, 288, 289	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.9	2.1	**2.5**
Whangarei Heads	14	39, 41-42, 47-49, 54, 56, 69, 71-74, 141	39, 41-42, 47-49, 54, 56, 69, 71-74	2.3	2.2	2.9	2.8	1.4	3.3	3.2	3.1	4.9	5.5	6.0	5.5	5.6	7.6	7.3	7.1	4.1	7.1	11.7	**10.4**
Piroa/ Brynderwyn	3	253, 275, 290	253, 275, 290	-	-	-	-	-	-	-	-	-	-	-	1.1	2.2	3.6	5.1	4.6	2.6	2.8	1.9	**1.4**
Mataia	5	254, 255	254, 255	-	-	-	-	-	-	-	-	-	-	-	1.3	-	1.1	2.9	-	3.6	5.4	5.9	**5.4**
Tawharanui	6	161-166	161-166	-	-	-	-	-	-	2.3	0.3	-	2.8	2.7	4.7	4.5	5.6	4.6	7.3	6.1	5.4	8.3	**11.1**
Kawau	3	277, 278, 279	No data	-	-	-	-	-	-	-	-	-	-	-	-	1.9	1.9	2.9	2.7	2.7	-	-	**-**

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 (as identified in column 4). If only one stations is listened from no mean is given for that cluster.

APPENDIX 4. Kiwi call survey methods (from the Kiwi Best Practice Manual, Colbourne *et al.* 2020)

METHOD:

1. Before heading into the field, get all listeners to synchronise their watches, review the survey methods, familiarise themselves with reading compass bearings and listen to the playback of kiwi calls so that everyone is confident about correctly identifying kiwi.
2. If practical, rotate observers between listening stations each night, especially if call counts are being carried out as part of an expedition, as there is always the risk that a change in call rates detected at a station may be due to a difference in the listening acuity of observers rather than real changes in the call rate.
3. Mark or re-mark the listening site so that future counts can be made at the same place and check the GPS position of the listening station. Preferably take a photograph of the marked listening station and store this with the count data. Kiwi Best Practice Manual 2019 65
4. Aim to arrive at the listening station with enough time to get ready for recording. Have all your clothing and gear handy that you will need during the listening period.
5. Do not solicit calls from kiwi during Nationwide Call Count Monitoring, because broadcast calls will not be repeatable over time due to changes in technology, which may bias the results.
6. Start to listen at the standard time used for that particular listening station (usually c. 30 minutes after sunset).
7. Record the gender, time, compass bearing and estimated distance to each kiwi heard calling. Where a call is interrupted mid-sequence (as often occurs during great spotted kiwi duets), record as one call if one of the birds resumes calling mid-sequence after their partner has finished, but as two calls if they (very rarely) restart their call sequence from the beginning. Bracket calls that you think are duets with the initiator's call shown first and the response second.
8. Listen for 2 hours. Also record the details of any birds heard calling before or after the official counting period, but do not include these in the main count.
9. Fill in a separate card for each 1-hour period because weather conditions can change whilst listening. It is best to record weather conditions at the end of each hour by recording the average or modal conditions during the whole hour.
10. After each hour, estimate the number of individuals heard during the hour, and at the end of the second hour, estimate the total number of individuals heard during the 2-hour period.
11. Only record complete hours of listening. If a count is halted part-way through an hour (e.g. if heavy rain starts), that complete hour should be re-counted on another night to bring the sample up to the appropriate number of hours.
12. Nationwide call count data should be sent to Hugh Robertson, Biodiversity Group, DOC National Office, PO Box 10420, Wellington. These data are stored separately from the usual Kiwi Call Scheme

data because inclusion of data from these sites would give a bias in mean call rates towards these especially productive calling sites.

13. If the call rates are found to have decreased significantly at any listening station during the repeat surveys, consider repeating the counts the following year rather than waiting 5 years to determine whether the result was an anomaly or the result of real population changes.