



# Kiwi call count monitoring of Northland brown kiwi

2011



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Cover image Emma Craig

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# Contents

1	Introduction.....	4
2	Methods.....	5
2.1	2011 Kiwi listening data.....	5
3	General patterns .....	9
3.1	Northland monitoring trends since 1995.....	9
3.2	Future of monitoring trends.....	10
4	Trends at managed populations .....	10
4.1	Summary of sites.....	11
4.1.1	Whakaangi.....	11
4.1.2	Mahinepua-Radar Hill.....	12
4.1.3	Waimate North.....	12
4.1.4	Puketī Forest.....	13
4.1.5	Russell Peninsula.....	14
4.1.6	Waipoua.....	14
4.1.7	Motatau-Marlow .....	15
4.1.8	Purua-Rarewarewa .....	16
4.1.9	Tutukaka.....	16
4.1.10	Manaia-The Nook.....	17
4.1.11	Kauri Mountain .....	18
4.1.12	Bream Head .....	18
4.1.13	Tawharanui .....	19
5	Discussion and general recommendations.....	19
5.1	Other recommendations .....	20
5.2	Kiwi listening 2012 .....	20
6	Acknowledgements .....	20
7	References .....	21
8	Appendices .....	22
8.1	<b>APPENDIX 1</b> Mean call counts for original selections of Northland areas 1995-2011 plus additional sites that have been added.....	22
8.2	<b>APPENDIX 2.</b> Summary of Northland kiwi listening data for stations listened from in 2011.....	29

# 1 Introduction

## 1.1 Objective

The objective of this report is to summarise the results of the 2011 call count monitoring of Northland brown kiwi (*Apteryx mantelli*).

## 1.2 Background

There are approximately 25 population clusters of Northland brown kiwi remaining, extending across public and private lands (Figure 1). Northland populations of kiwi have declined mainly due to predation by stoats (*Mustela erminea*), ferrets (*M. furo*), dogs (*Canis familiaris*) and cats (*Felis catus*), and increasing land development pressures throughout the region (Pierce *et al.* 2006).

- Population trends of Northland brown kiwi have been monitored annually since 1993 using a call count survey method. This monitoring is part of a nationwide kiwi monitoring and recovery programme (McLennan 1992; Robertson 2003). Currently call counts are the main tool used for assessing trends in kiwi populations and are used in the following Northland scenarios:
- Monitoring the trends in call counts and population size(s) over time at the original 1995 sites (Northern, Eastern, Western, Southern) comprising 24 stations.
- Monitoring the trends in kiwi call counts and populations at the growing number of kiwi management sites throughout Northland.

## 1.3 Northland listening sites

The 24 original kiwi listening stations that were established at the four geographic areas in 1995 (Pierce & Westbrooke, 2003) are listed below (Gartons was added in 1995, the other 23 stations have been listened from since 1993);

<b>Northern</b>	<b>Eastern</b>	<b>Western</b>	<b>Southern</b>
Diggers Valley	Marsden Cross	Katui	Glenbervie 7A
Takahue	Puketotara	Trounson	Glenbervie 9A
Kaiaka Rangitane	Cathedral		Marlow Road
Puketi Forest	Waitangi No 12	Waipoua L/Out	Purua N
Puketi Scenic Reserve	Mt Bledisloe	Paerata	Rarewarewa S
Gartons Tikitikiore		Mimiwhangata	
	Sandy Bay		

Kiwi protection now happens at many sites throughout Northland (Figure 2; Table 1), and many additional stations have been added to the kiwi listening network (see Appendix 1).

## 2 Methods

Kiwi listening was carried out during the dark phase of the moon, 20 May – 9 June 2011, with a back-up window 18 June – 8 July 2011, and generally followed the methods outlined in the Kiwi Best Practice Manual (Robertson & Colbourne 2003). The best practice manual can be accessed on the BNZ Save the Kiwi Trust website [www.savethekiwi.org.nz](http://www.savethekiwi.org.nz) under Resources to Save Kiwi.

### 2.1 2011 Kiwi listening data

Call-count data from 2011 were received from the following management areas:

Whaakangi

Mahinepua – Radar Hill

Waimate North

Bay of Islands

Russell Peninsula

Puketi Forest

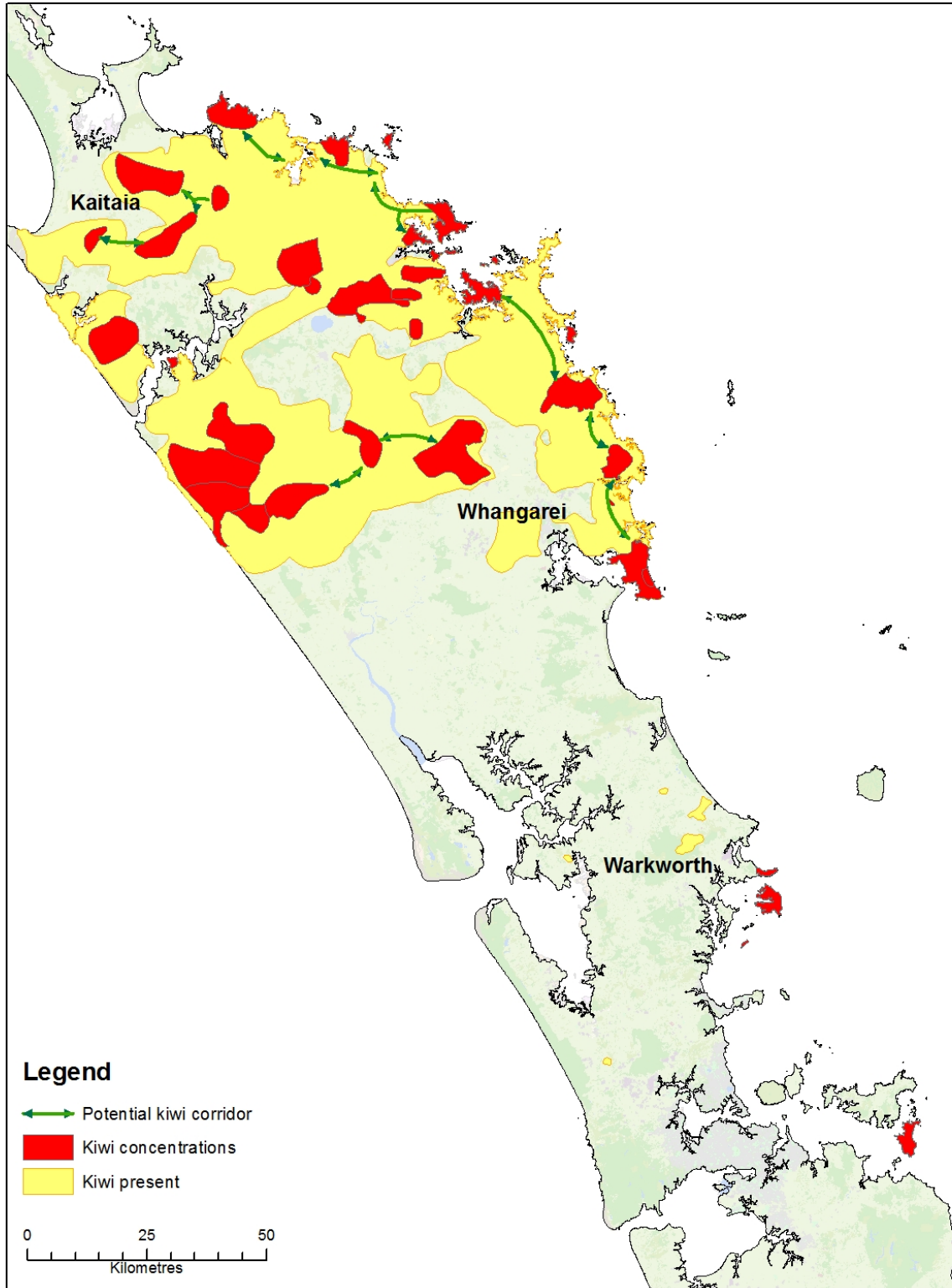
Waipoua Forest complex

Motatau-Marlow

Purua-Rarewarewa

Tutukaka

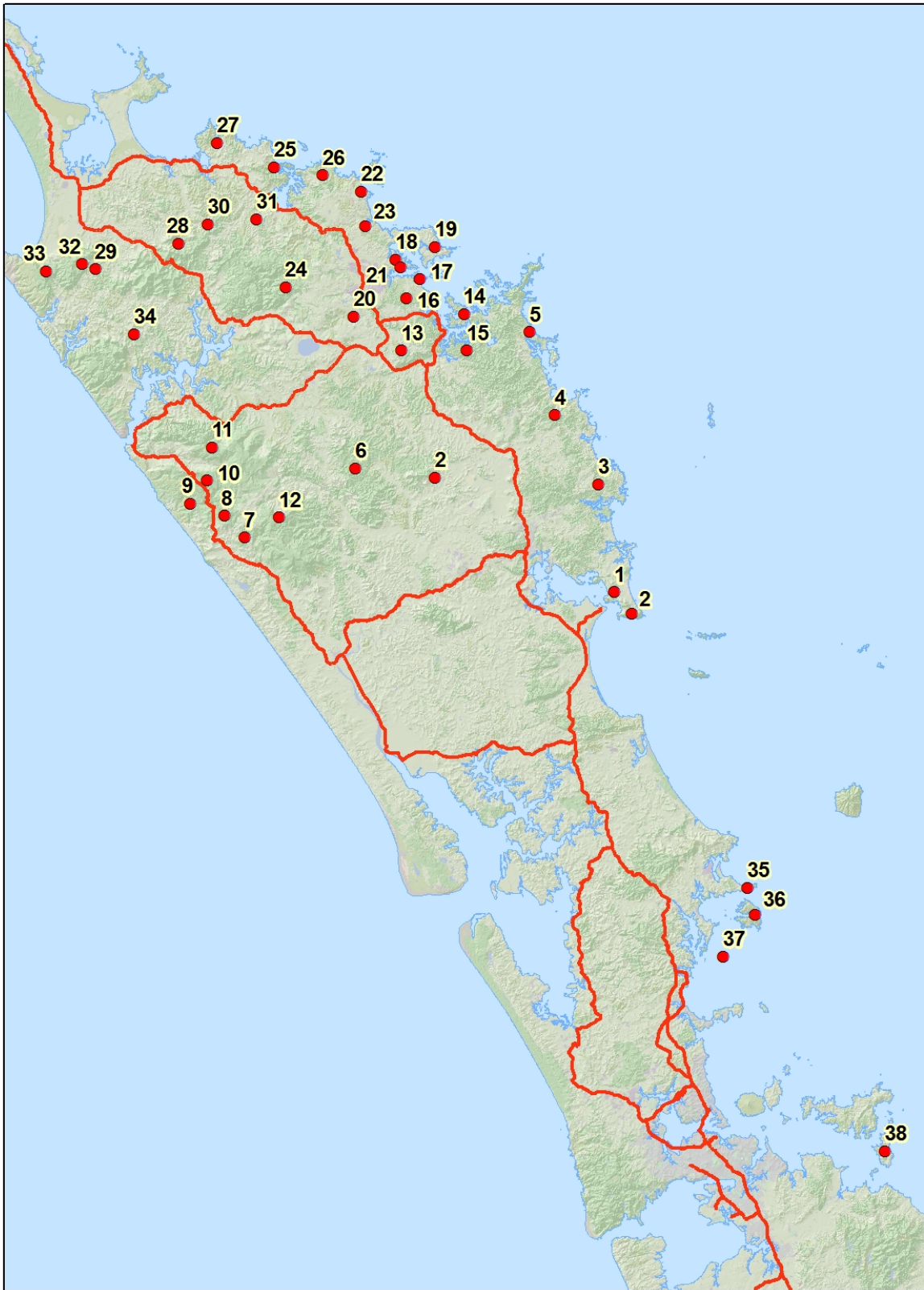
Whangarei Heads-Bream Head (3 clusters)



Approximate Kiwi distribution and relative abundance as known in 2009

Map prepared: Jan 2011

Figure 1. Approximate kiwi distribution and relative abundance as known in 2009.



**Northland Kiwi Recovery Project Locations** 0 25 50  
Kilometers

Figure 2. Northland kiwi recovery project locations as known in 2009.

**Table 1.** Key for Northland kiwi recovery projects.

1	Whangarei Heads Landcare Forum
2	Department of Conservation – Whangarei Kiwi Sanctuary
3	Ngunguru – Tutukaka Landcare Coalition
4	Department of Conservation – Mimiwhangata
5	Taupiri and Elliots Bay – NZ Kiwi Foundation
6	Pipiwai – Hancocks Forest
7	Department of Conservation – Trounson Kauri Park
8	Waipoua Forest Trust
9	Department of Conservation – Waipoua
10	Wekaweka Landcare Group
11	Te Mahurehure Roopu Whenua Taonga Trust
12	Opouteke – Hancocks Forest
13	Hupara Landcare Group
14	Department of Conservation, Russell Landcare Group and NZ Kiwi Foundation
15	Waikino Landcare Group
16	Department of Conservation – Waitangi Forest
17	Wharau Road – NZ Kiwi Foundation
18	Kerikeri Peninsular – NZ Kiwi Foundation
19	Purerua Peninsular – NZ Kiwi Foundation
20	Waimate North Landcare
21	Aroha Island Charitable Trust
22	Kauri Cliffs – NZ Kiwi Foundation
23	Takou Were to Mokai Trust/NZ Landcare Foundation
24	Puketi Forest Trust
25	Taupo Bay Landcare
26	Mahinepua, Radar Hill Landcare
27	Whakaangi Landcare Trust
28	Wells Road - Higginson/Khaine
29	Herekino – Sporle/Renwick
30	Honeymoon Valley and Puhoi (Native Forest Restoration Trust)
31	Kohumaru
32	East Herekino – NZ Landcare Foundation
33	Herekino Landcare
34	Humphries Road - Blunden
35	Tawharanui Open Sanctuary (ARC TOSSI)
36	Kawau Island
37	Motuora Island (Department of Conservation and Motuora Restoration Society)
38	Ponui Island – Massey University



## 3 General patterns

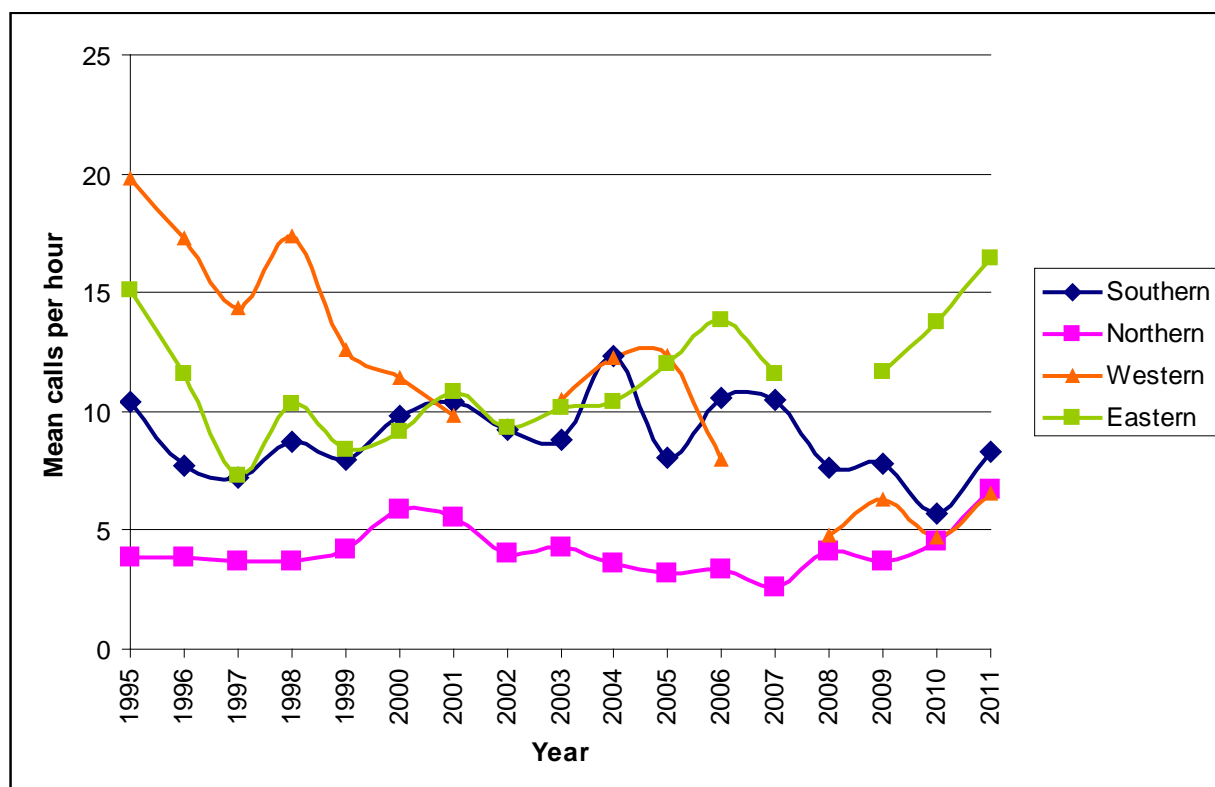
### 3.1 Northland monitoring trends since 1995

Trends in call count data collected since 1995 at the 24 original listening stations (see under heading 1.3 for list of stations) in the Northern, Eastern, Western and Southern survey areas are graphed in Chart 1 and summary data are presented in Appendix 2.

Kiwi call count rates (and presumably kiwi numbers) have trended up in all four clusters for the 2011 listening period. This is a very positive observation, and the first time that this has been observed since listening records began (Chart 1).

The Eastern cluster has now passed the original 1995 mean call rate of 15 calls per hour, and is the highest mean rate for this cluster since call counts began. The Northern cluster is also at a peak since call counts began, and is now more than 5 kiwi calls per hour. The Southern cluster has recovered the loss observed in the 2010 kiwi listening data, and is back at a similar rate as that observed in 2005, 2008 and 2009. The Western cluster is still much lower than the 1995 mean (almost 20 calls per hour), but it is very positive to see some increase for this area (Chart 1).

The increases observed for the 2011 listening period are undoubtedly a response to the continued kiwi protection measures that are occurring throughout Northland.



**Chart 1.** Mean annual kiwi call rates per hour for each of the original four Northland monitoring areas 1995 - 2011. The mean for the Western cluster was estimated using data from 2010 for one station; the mean for the Southern cluster was estimated using data from 2010 for one station, and with one station missing; and the mean for the Eastern cluster was estimated with one station missing).

## 3.2 Future of monitoring trends

There is great value in having data since 1995 from the original 24 listening stations in the four different areas. Repeated listening at stations over time provides an indication as to whether a population is stable, increasing or declining (Robertson & Colbourne 2003) and is important information to base management decisions on. It is just as important to monitor those sites where call counts are dwindling or are absent, as those that are growing. The Department of Conservation (DOC) offices that have stations in their areas should make it a priority to organise each of the original stations to be listened at so the monitoring of these trends can continue. Below are the stations within each of the four areas that have not been listened at in 2011;

### Southern

Mimiwhangata (last listened from in 2010)

Sandy Bay (last listened from in 2005)

### Eastern

Waitangi No. 12 (last listened from in 2007)

### Western

Katui (last listened from in 2010)

## 4 Trends at managed populations

Trends in call counts at managed populations are summarised in Table 2 and graphed in Charts 2 -13. Comments on the trends and recommendations for future listening at each management site are provided below.

Table 2. Mean kiwi call count rates from annual monitoring of managed Northland kiwi populations

Area	No. Stn	Station No	2011 Station No.#	2003 mean	2004 mean	2005 mean	2006 mean	2007 mean	2008 mean	2009 mean	2010 mean	2011 mean
Whakaangi	7-9	29,130-137	29,131-133,135-137	-	-	11.80	10.70	10.10	10.80	11.68	12.23	10.88
Mahinepua	8	83-85,87-89,98,99	83-85, 88, 99	-	3.60	2.80	4.90	2.70	1.90	2.46	4.65	5.50
Waimate North	5	114,118,120,122,124	114, 118, 120, 122, 124	-	10.46	4.28	-	6.80	6.48	4.68	8.05	8.98
Puketi	6	102,104-106,108,111	102, 104-106, 108, 111	-	-	-	2.88	1.15	1.48	3.66	3.00	4.25
Russell Peninsula	5	15, 59, 62, 170, 173	15, 59, 62, 170	-	-	4.53	4.01	7.04	5.35	4.61	5.54	11.44

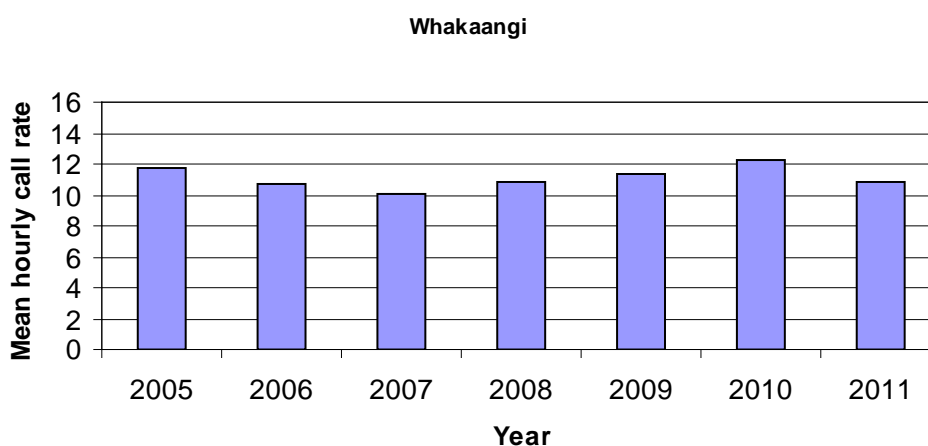
<b>Waipoua</b>	4	16-19, 33 (33 added in 2010)	17-19, 33	13.08	15.36	15.78	7.98	8.90	5.69	7.49	4.50	11.80
<b>Motatau-Marlow</b>	6	23,34- 36,68,129	23,34- 36,68,129	-	-	7.30	7.60	7.50	4.90	6.39	4.54	7.08
<b>Purua-Rarewarewa</b>	5	24,25,81,82, 139	24,25,81,82, 139	-	-	9.20	11.10	12.70	10.90	12.35	10.63	12.58
<b>Tutukaka</b>	5	125, 126, 142, 143, 144	125, 126, 143, 144	-	-	6.24	7.30	8.21	8.68	5.67	6.77	7.05
<b>Bream Head</b>	5	39, 40, 41, 42, (44 added in 2009)	39,40,42,44	-	-	2.50	2.60	2.20	3.20	4.29	2.70	6.59
<b>Manaia-Nook</b>	5	47-49,56,71	47-49,56,71	3.10	3.50	2.90	3.90	-	4.60	4.43	6.31	7.25
<b>Kauri Mountain</b>	5	54,72- 74,141	54,72- 74,141	-	-	3.30	2.20	-	2.60	3.02	2.45	4.10

**#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 2010 data were calculated only from the relevant stations listened from for that year.

## 4.1 Summary of sites

### 4.1.1 Whakaangi

Whakaangi has continued to have high and relatively stable call count results, although the pattern of increase observed from 2007 - 2010 was not seen in the 2011 data (Chart 2). This slight decrease should not be seen as a problem, and is probably due to methods used rather than any real decrease in the population. Nine stations were listened from in 2011, but only five of these had full four nights of listening completed (one had three nights only, one had two nights only, and two had one night only).



**Chart 2.** Trends in mean call counts at Whakaangi management site

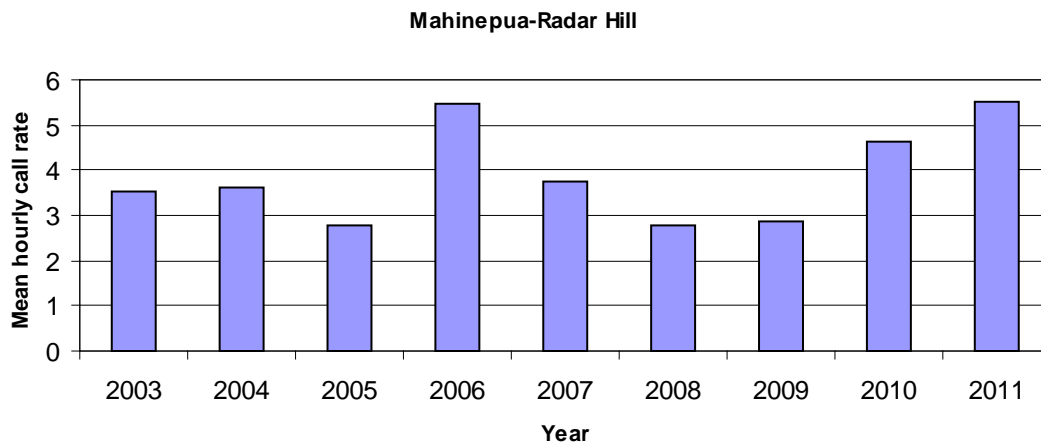
#### Recommendations

- Reduce the core number of stations to six representative stations and ensure that all four nights of listening are completed. Complete the other four in the years when there are enough listeners available.

- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.2 Mahinepua-Radar Hill

The Mahinepua-Radar Hill area generated fantastic kiwi listening data for 2011; ten listening stations each with four full nights of listening completed. The increase in call counts observed between 2009 and 2010 has continued for 2011, and the call rates now equal the previous peak (5.5 calls per hour, as observed in 2005; Chart 3). This is an excellent result for this area.



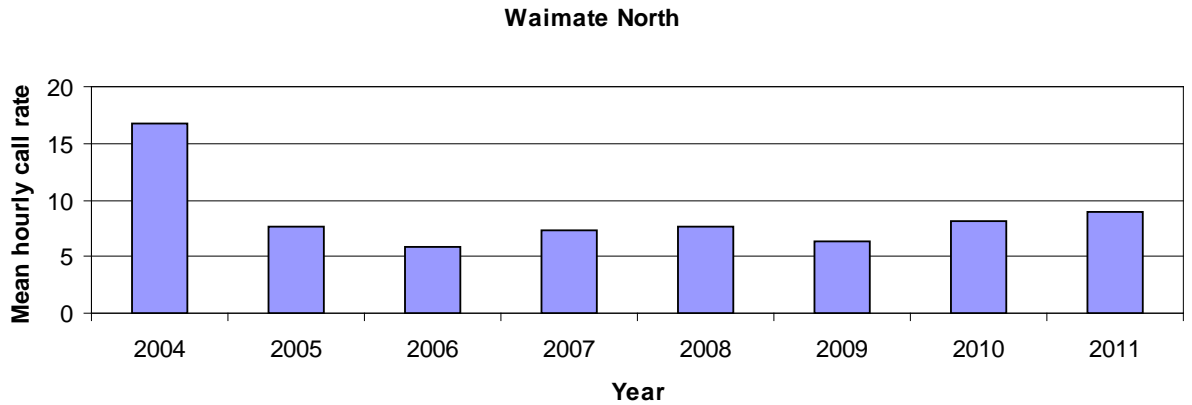
**Chart 3.** Trends in mean call counts at Mahinepua-Radar Hill management site

#### Recommendations

- Continue to monitor a smaller number (8-10) core stations each year, including stations 83-85, 87-89, 98, 99. Use additional stations only if there are enough listeners available.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.3 Waimate North

Waimate North has continued to see an increase in kiwi call count rates, up from a mean of 8 per hour in 2010 to 9 per hour in 2011 (Chart 4). Nine stations were listened from for this site, of which eight had four full nights of listening completed, and one had one night only. Having relatively stable call counts for the last seven years from this site is a positive sign for kiwi in the area.



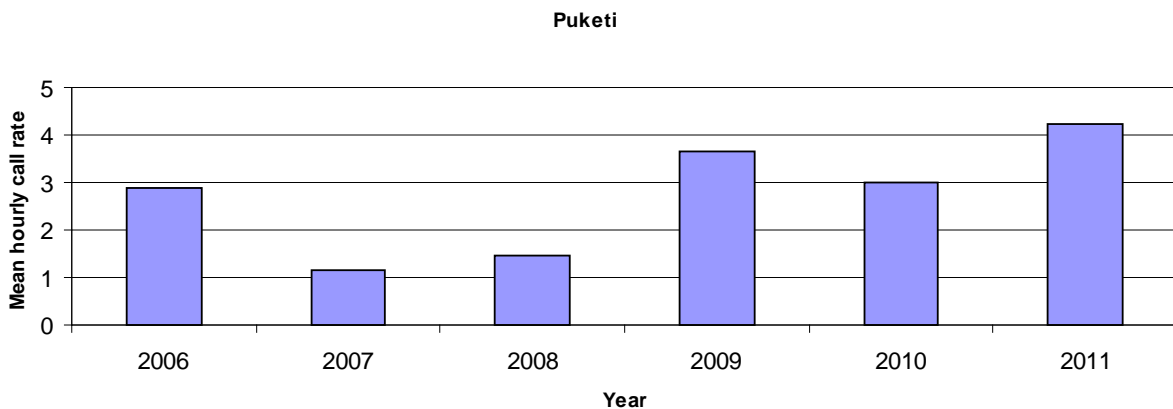
**Chart 4.** Trends in mean call counts at Waimate North management site

Recommendations

- Continue to monitor stations 114, 118, 120, 122, and 124 with extra stations listened from if there are enough listeners available.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

**4.1.4 Puketi Forest**

The call count rates for Puketi Forest have increased from a mean of 3 calls per hour in 2010, to 4.25 calls per hour in 2011 (Chart 5). A total of 12 stations were listened from, of which nine had four full nights of listening, and three had two nights only. This is a large amount of quality data to be generated from one site, especially given that all of the core stations were covered (although one was for two nights only). There were two new stations added to this cluster in 2011; 112 and 188.



**Chart 5.** Trends in mean call counts at Puketi management site

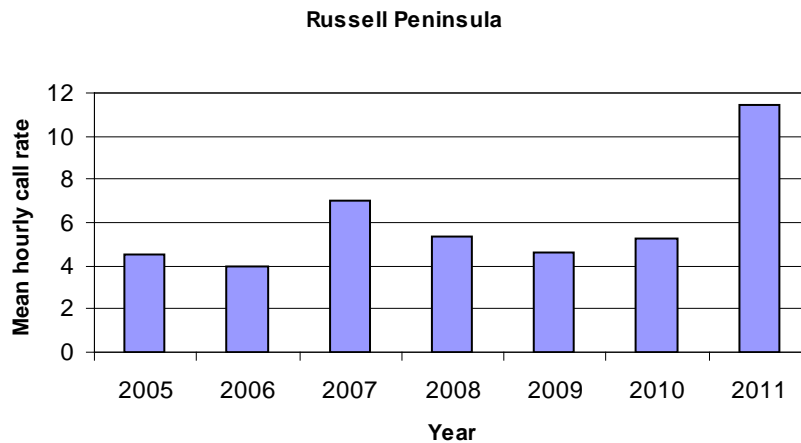
Recommendations

- Reduce listening stations to a core of six (102, 104 -106, 108, 111). Ensure that these stations are listened from for a full four nights.
- Only add extra stations if there are extra people that are available.

- Try to have the same person listening from the same station consistently for each night, and ideally over each year.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.5 Russell Peninsula

There was a sharp increase in the call count rate for the Russell cluster; from 5.23 mean calls per hour in 2010, to 11.44 in 2011 (Chart 6). This is a fantastic result, but it should be noted that this observed increase is at least in part due to the absence of data from station 173 (Shortlands), which usually has a low call count rate. Station 170 (Nikau Block) increased from 8.88 calls per hour in 2010 to 14.25 in 2011. Nine stations were listened from in this cluster, all for four full nights. One listener should be acknowledged for an exceptional effort: L. Gordon completed ten full nights of listening. Well done!



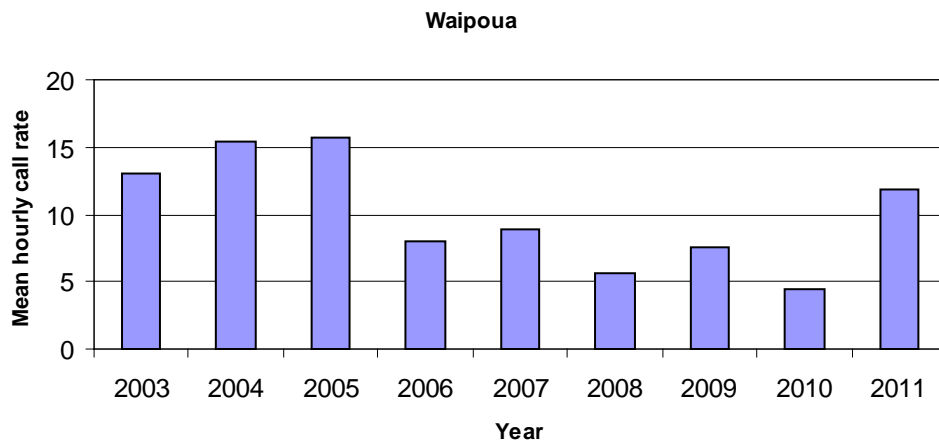
**Chart 6.** Trends in mean call counts at Russell Peninsula management site

#### Recommendations

- Continue to monitor stations 15, 59, 62, 170, and 173, with extra stations listened from if there are enough listeners available.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.6 Waipoua

There was an increase in call count rates from 2010 to 2011 for this site (Chart 7). Although this is good news, it should be noted that the 2011 increase is in part due to the absence of data from station 16 – Katui (this station has had low call counts rates in recent years). One station (Trounson South – station 33) was included in the analyses for this site in 2010 and 2011, as there would otherwise be only three regular stations used to derive the mean for this site. There were two new stations added in 2011, Alf's Cottage (station 189) and River Road (station 190). There were ten stations listened from in this cluster; eight for four nights and two for three nights.



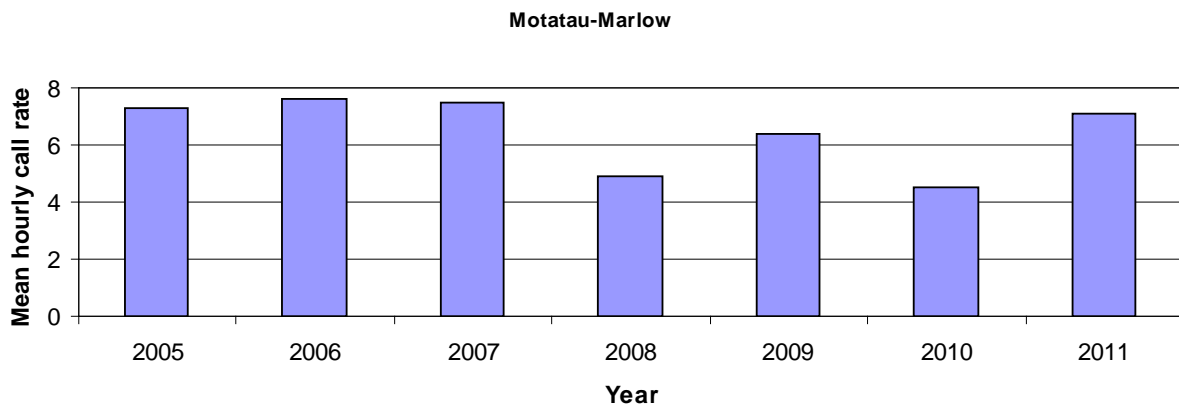
**Chart 7.** Trends in mean call counts at Waipoua management site

Recommendations

- Maintain annual kiwi listening in the Western area at all the original 1995 stations 16-19. Katui (station 16) should continue to be monitored despite low call counts.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

**4.1.7 Motatau-Marlow**

The mean number of kiwi calls per hours for Motatau-Marlow in 2011 was derived from six stations, five with four nights of listening, and one with two nights of listening. This was a big improvement on 2010, when only three stations were used to calculate the mean number of calls per hour. The results also showed a big improvement; up from 4.5 calls per hour in 2010 to 7.1 calls per hour in 2011 (Chart 8). The 2011 result was similar to the call rates observed from 2005-2007.



**Chart 8.** Trends in mean call counts at Motatau-Marlow management site

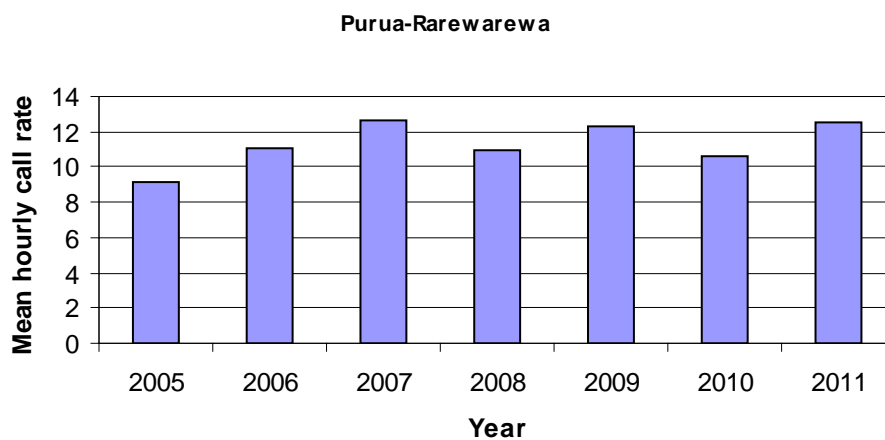
Recommendations

- Maintain annual kiwi listening at stations 23, 34-36, 68, 129.

- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.8 Purua-Rarewarewa

The kiwi call count rates for this cluster have improved, increasing from 10.6 calls per hour in 2010 to 12.6 calls per hour in 2011 (Chart 9). This is a similar figure to the two previous peaks seen in 2007 (12.7 calls per hour) and 2009 (12.35 calls per hour). The consistently high and stable call count rates for this cluster are a positive sign, and indicate that this population is coping despite the ongoing dog threat. Hopefully the dog campaign will see these call count rates grow in years to come. The 2011 data was derived from five listening stations, and each station was listened from for four nights



**Chart 9.** Trends in mean call count rates at Purua-Rarewarewa management site

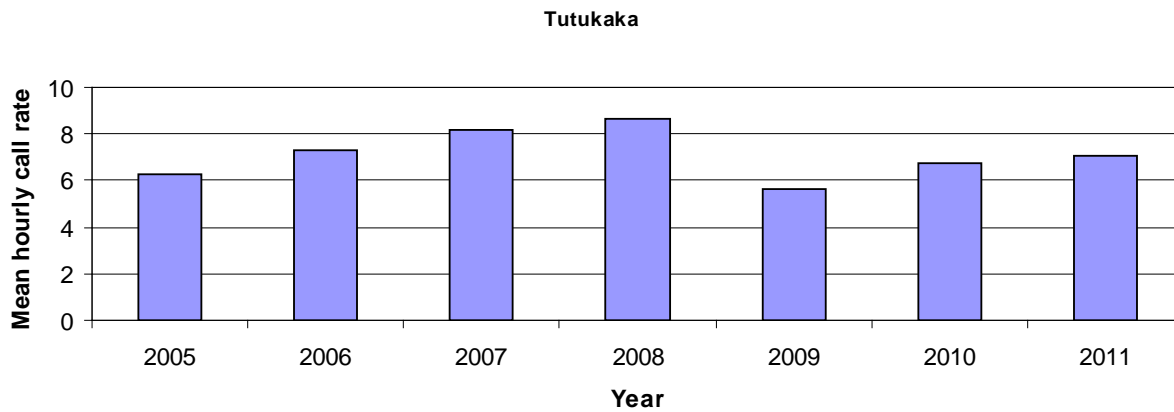
#### Recommendations

- Continue to monitor all five stations, especially those where dog predation has occurred.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.9 Tutukaka

The mean kiwi call rate for this cluster has continued to increase slightly after the decrease observed in 2009, and is now at 7.0 calls per hour (Chart 10). The 2011 data were derived from four stations. Two of these were listened from for four nights, one for three nights, and one for two nights only. The relatively small amount of data will make it more difficult to pick up trends in this cluster, so the number of stations and nights of listening should be increased.





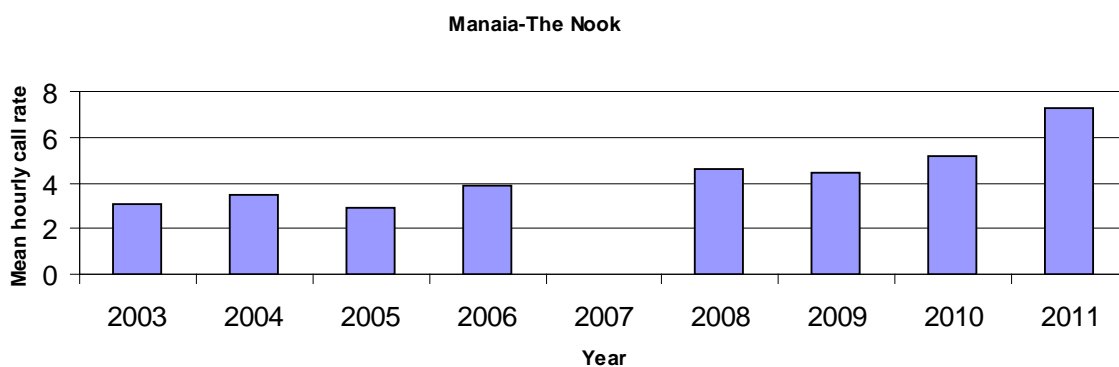
**Chart 10.** Trends in mean call count rates at Tutukaka management site

Recommendations

- Ensure the main listening stations (125, 126, 142, 143, 144) are listened from each year, for the full four nights.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

**4.1.10 Manaia-The Nook**

This cluster has shown an increase of almost 50%, from 5.2 calls per hour in 2010, to 7.25 calls per hour in 2011 (Chart 11). This is the best result for this area to date, and is probably an indication that all the hard work that has gone into protecting kiwi is really starting to pay off. The 2011 results are derived from five stations; each listened from for four nights. One station (47, Manaia 1) had a particularly promising result; a mean of 10.25 calls per hour, which was double the previous maximum mean of 5.1 calls per hour (heard in 2008).



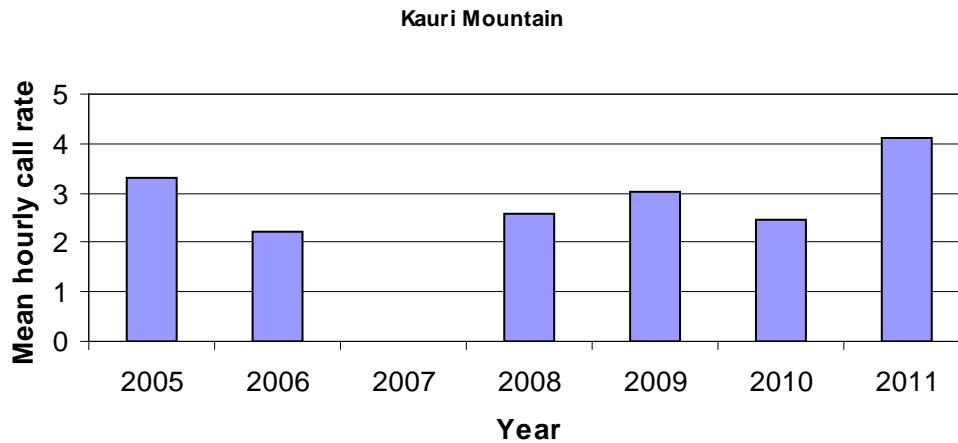
**Chart 11.** Trends in mean call count at Manaia-Nook management site

Recommendations

- Maintain annual kiwi listening at stations 47-49, 56, 71.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.11 Kauri Mountain

This site showed a good increase in kiwi call counts for 2011 (Chart 12). The data for this site was derived from five stations, four listened from for four nights and one (station 141, Kauri Mountain 5) listened from for two nights. All five stations had higher mean call rates in 2011 than 2010, and two stations (73, Kauri Mountain 3; and 141, Kauri Mountain 5) had their highest results to date. This is an excellent positive result for this cluster.



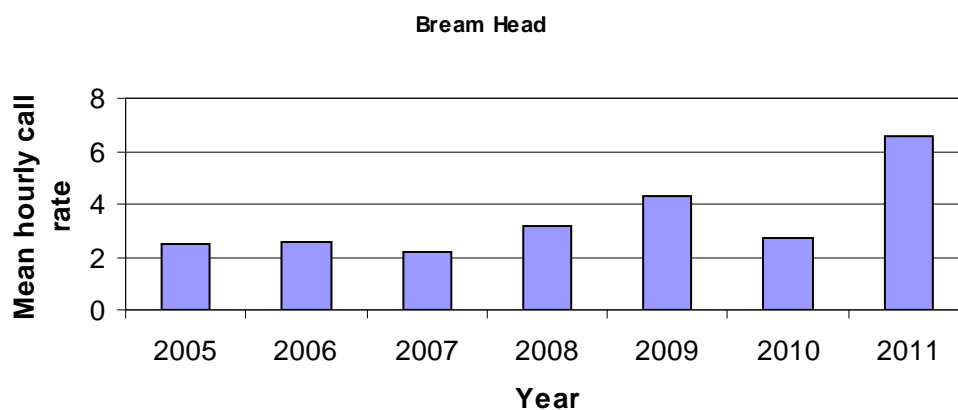
**Chart 12.** Trends in mean call counts at Kauri Mountain management site

#### Recommendations

- Maintain annual kiwi listening at stations 54, 72-74, 141.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

#### 4.1.12 Bream Head

After the decrease observed between 2009 and 2010, this cluster has seen a huge increase for 2011; 6.6 calls per hour, up from 2.7 calls per hour in 2010 (Chart 13). The previous maximum mean for this cluster was 4.3 calls per hour, heard in 2009. The 2011 mean was derived from four stations; each listened from for four nights. One station (44; Taurikura 1) recorded a mean of 12.63 calls per hour, after a previous maximum mean of 4.88 calls per hour. The positive results for this cluster should be a real boost for all those who have contributed to kiwi conservation in the area.



**Chart 13.** Trends in mean call counts at Bream Head management site

## Recommendations

- Maintain annual kiwi listening at stations 39, 40, 41, 42 and 44.
- Refer to each station by the consistent station number as well as by name.
- Ensure that all kiwi call count data sheets are filled out fully and accurately.

### 4.1.13 Tawharanui

The kiwi call count survey for this cluster was completed earlier in the year for 2011. These data are therefore not comparable with previous years, so are not included in this report.

## 5 Discussion and general recommendations

Overall, the 2011 kiwi listening results are the best since Northland kiwi listening records began. The mean number of calls per hour has increased for all clusters except one, and there have been some exceptional call rates for individual stations. Station 135 (Whakaangi 7) and station 113 (W1) continue to have mean rates of over 20 calls per hour; station 10 (Marsden Cross) recorded the highest mean to date, 34.88 calls per hour; and stations 145 (Whangaruru) recorded a mean of 24.29 calls per hour, with 54 calls recorded for one single hour. There is exceptional effort in our region going towards protecting and growing our kiwi population, and everyone involved should take a moment to celebrate the fantastic results seen in 2011.

It is critical that the kiwi listening data provided is as accurate as possible. This will ensure that the data and trends derived from it will give a realistic picture of what is happening in your area, and throughout Northland.

Kiwi listening data should have the following:

- The station is identifiable to those who enter and analyse the data for this report, and to future listeners who will repeat listening at the same station. This means that each and every kiwi listening card must include the **individual station number**, and this number must not be changed. Each card must also include an up-to-date GPS reference for the site. Both the stations number and GPS reference need to be written on every card, every night;
- There is consistency in kiwi listeners. Ideally this will mean the same person will listen from the same station for each of the four nights, and in subsequent years. If this is not practical, aim for at least having the same person covering the same stations for all four nights;
- Each station needs to be covered for four nights if at all possible. If this can not be finished in the first kiwi listening window it is possible to use the second window. **It is more important that fewer stations are listened from for four nights than more stations for only one or two nights.** This will produce more robust data and will give a more accurate measure of kiwi in your area;

- **Kiwi call cards need to be filled out in full, including all the fields, each night.** If fields are missing or data is not legible it will not be used;
- Kiwi data needs to be returned to the Whangarei Area Office, in electronic or paper form, **no later than the 31<sup>st</sup> of August in the year in which it was collected.** This should include recording if regular stations are not listened from. Historically, data has been submitted up to a year after listening occurs. This holds up the process of compiling the report, and it not fair to those who handed data in on time. A reduced capacity in the Whangarei Kiwi Sanctuary team means there is no time for someone to chase up missing or incomplete data. If it is not submitted by the 31<sup>st</sup> of August it will not be included in the report.

## 5.1 Other recommendations

- Provide new listeners with adequate training. This not only includes how to identify the difference between male/female kiwi calls; other species calls that may be mistaken as kiwi; compass use and judging distances but also **how to fill out the forms fully, correctly, and legibly.**
- Try to map the location of calling birds during the four nights of listening. This will help to identify the minimum number of individuals and pairs heard from each station.
- If you add a new station in your area, please identify it very clearly as a new station so that it can be allocated a consistent station number. Please make sure you also provide GPS co-ordinates for the station, a name that will make sense to everyone, and any other identifying or necessary information about the station.
- Please check the station numbers listed in appendix 1. If any of these numbers are not accurate, please let Emma Craig (DOC Whangarei Area Office, ph. 09 4703386, [ecraig@doc.govt.nz](mailto:ecraig@doc.govt.nz)) know as soon as possible.

## 5.2 Kiwi listening 2012

Kiwi listening for 2012 should be carried out from 7 June – 27 June, with a back-up window 6 July – 26 July. These listening windows are later than usual, as the listening period usually begins mid-late May. Late listening periods were also used in 2004 (listening started 6<sup>th</sup> June), and 2008 (listening started 8<sup>th</sup> June). The difference in the listening period is due to the timing of the full moon.

# 6 Acknowledgements

Thank you to all the people who carried out kiwi listening in 2011. Participants are listed by station in Appendix 2. Your time and effort in obtaining information about kiwi in your area on those cold winter nights is very much appreciated. Thanks also to local co-ordinators Irene Petrove, Monte Woodworth, Phillip Saunders, Daryl Way, Jeff Hall, Angela Newport, Wendy Sporle, Todd Hamilton, Mike Camm, Ursula Buckingham, Ian Wilson, and Keith Russell. A big thank you to Hilary Gardiner who spent many hours entering kiwi listening data from all over Northland.

## 7 References

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

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

Pierce, R.J., Gardiner, C., Moodie, H., Robertson, H.A., Sporle, W. 2006. Sustainable management of brown kiwi and other threatened birds in Northland. *Wildland Consultants Ltd Contract Report No. 1193*. Prepared for Department of Conservation and New Zealand Landcare Trust, Whangarei.

Robertson, H.A. 2003. Kiwi Recovery Plan 1996-2006. Wellington, Department of Conservation.

Robertson, H.A., Colbourne, R. 2003. Kiwi (*Apteryx* spp.) Best Practice Manual. Wellington, Department of Conservation.

## 8 Appendices

### 8.1 APPENDIX 1. Mean call counts for original selections of Northland areas 1995-2011 plus additional sites that have been added

Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
<b>Northern</b>																		
1	Diggers Valley	1.1	2.4	4.1	2.5	2.1	3.3	4.1	3.75	3	3.9	3.9	2.7	1.3	2	1.67	-	2.5
2	Takahue	4.3	3.5	5.5	5.4	6.3	8.4	7.9	4.5	3.3	4.75	5.3	5	3.6	4.9	3.13	4.75	11.38
4	Gartons	5.6	5	1.2	-	0.8	2	8.6	-	1.5	4.1	4.9	7.1	1.5	1.25	0	0.13	0.25
5	Kaiaka	1.7	1.3	2.4	3.4	1.6	3.5	3	2.1	1.9	3.75	2.8	1.5	0	0.75	-	1.63	1.13
7	Puketi	6.6	5.4	2.1	3	6	7.6	6.4	3.5	5	3.4	1.5	2.3	0.8	3.9	4	6.88	9.38
8	Puketi SR	5.4	6.5	4.4	4	5.1	6.5	6.1	6.4	8.25	9.4	2.3	5.1	7.4	8.9	9	7.88	9
<b>Whakaangi</b>																		
130	Whakaangi 1	-	-	-	-	-	-	-	-	-	-	9	10.4	4.6	7.6	6.33	-	-
131	Whakaangi 2	-	-	-	-	-	-	-	-	-	-	14.9	25	15.3	20.75	17.13	16.13	9.38
132	Whakaangi 3	-	-	-	-	-	-	-	-	-	-	13.5	14.6	9	10.75	12.17	12.17	5.5
29	Whakaangi 4	-	-	4.5	-	2.9	1.9	6.25	3.75	4.9	6.6	2.3	6.8	6.3	4.9	5.75	9.83	5
133	Whakaangi 5	-	-	-	-	-	-	-	-	-	-	9.8	13.8	10.1	-	8.25	-	7.88
134	Whakaangi 6	-	-	-	-	-	-	-	-	-	-	6	7.3	3.9	-	9.5	7	-
135	Whakaangi 7	-	-	-	-	-	-	-	-	-	-	21.9	28	24.5	27	25.88	21.88	23.38
136	Whakaangi 8	-	-	-	-	-	-	-	-	-	-	14.1	29	11.8	18.8	15.25	10.5	20
137	Whakaangi 9	-	-	-	-	-	-	-	-	-	-	4.8	8.4	5.6	6.5	4.88	8.13	5
138	Whakaangi 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.75	4	5.83
140	Langridge House	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.63
<b>Mahinepua</b>																		
90	Mahinepua 0	-	-	-	-	-	-	-	-	-	-	-	-	2.9	2.9	3.38	3.63	4

Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
83	Mahinepua 1	-	-	-	-	-	-	-	-	3.5		2.6	4.1	3.5	2.6	2.38	2.25	<b>3.13</b>
84	Mahinepua 2	-	-	-	-	-	-	-	-	4.2	0.8	2.3	4.8	4.3	2.75	3.25	3.25	<b>4.25</b>
85	Mahinepua 3	-	-	-	-	-	-	-	-	5.6	4.75	4	5.5	5.4	3.25	5.88	5.25	<b>5.25</b>
88	Mahinepua 4	-	-	-	-	-	-	-	-	6.1	4.1	3	7.8	4.7	4.1	9.5	4.75	<b>5.38</b>
87	Mahinepua 5	-	-	-	-	-	-	-	-	-	-	-	-	2.4	0.9	2	-	-
86	Mahinepua 6	-	-	-	-	-	-	-	-	1	2.5	2.3	-	0.4	0.75	1.25	-	-
89	Mahinepua 7	-	-	-	-	-	-	-	-	0.9	5.9	1.8	4.8	1.9	0.4	-	-	-
181	Mahinepua 8	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.4	-	-	-
182	Mahinepua 9	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	-	-
183	Mahinepua 10	-	-	-	-	-	-	-	-	-	-	-	-	1.6	1.25	-	-	-
184	Mahinepua 11	-	-	-	-	-	-	-	-	-	-	-	-	2.9	1.25	1.25	-	-
98	Mahinepua 12	-	-	-	-	-	-	-	-	-	3.5	2.3	3.8	2.5	3.4	2.88	-	-
99	Mahinepua 13	-	-	-	-	-	-	-	-	-	3.9	3.8	7.4	7.3	5	9.38	7.75	<b>9.5</b>
92	Mahinepua 14	-	-	-	-	-	-	-	-	-	-	-	-	0.6	1.25	1.13	1.38	<b>0.75</b>
91	Mahinepua 15	-	-	-	-	-	-	-	-	-	-	-	-	1	1.1	1.63	1.75	<b>3.13</b>
93	Mahinepua 16	-	-	-	-	-	-	-	-	-	-	-	-	1.3	6	2	2.63	<b>5.25</b>
94	Mahinepua 17	-	-	-	-	-	-	-	-	-	-	-	-	2.5	4.9	5	3.38	<b>6.88</b>
95	Mahinepua 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.75	-	-
<b>Bay of Islands</b>																		
146	Kauri Cliffs 1	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
147	Kauri Cliffs 2	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-
10	Marsden Cross	20.9	18.3	9.6	16.7	14.5	19.9	21.9	17.9	18.5	22	19.3	30.6	23	-	20.25	24.5	<b>34.88</b>
148	Wiwiki Beach	-	-	-	-	-	-	-	-	-	-	-	32.1	-	-	-	-	-
149	Mataka Stn, Purerua	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
150	McKenzie Rd, Purerua	-	-	-	-	-	-	-	-	-	-	-	9.5	-	-	5	-	-
151	Mtn Landing Purerua	-	-	-	-	-	-	-	-	-	-	-	12.3	10.2	-	12.6	-	-
11	Puketotara	10	13.8	8.1	11.6	9.7	8	-	2.5	7.5	3.6	-	7.1	13.7	10.6	6.17	9.5	<b>9.25</b>

Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
152	Waitoto Block	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
12	Rangitane	14	5.6	8.4	10.5	7.5	8.4	11.5	10.5	8.6	8	8	11.5	9.1	15.9	15.25	11.38	<b>10.75</b>
153	Aroha Island	-	-	-	-	-	-	-	-	6.88	-	-	12.6	-	-	-	-	-
154	Napia Bay	-	-	-	-	-	-	-	-	-	-	-	4.6	-	-	-	-	-
155	Stirlings Quarry	-	-	-	-	-	-	-	-	-	-	-	12.4	10.2	-	4	-	-
97	Kurapari Rd	-	-	-	-	7.1	-	-	-	12.7	-	-	10.4	-	-	-	-	-
13	Waitangi No 12	7.6	7.6	6.3	8.9	5.3	7.1	11.5	15.1	18.4	13.75	11.5	15.5	6.3	-	-	-	-
14	Mt Bledisloe	27.1	10.9	5.5	7.9	8.8	5.1	6.4	6.75	4.9	8.9	9.1	5.5	9.6	11.25	8.25	11.38	<b>13.71</b>
138	Hupara	-	-	-	-	-	-	-	-	-	25.6	19.3	27.8	-	-	-	-	-
<b>Puketi Forest</b>																		
102	Bramley's Rd	-	-	-	-	-	-	-	-	-	-	-	2.5	0.5	2	2	2.75	<b>2.75</b>
103	Pirau Ridge	-	-	-	-	-	-	-	-	-	-	-	0	-	0	1	0.5	<b>1.25</b>
104	Pond	-	-	-	-	-	-	-	-	-	-	-	4.5	1	3.75	5	3.5	<b>8</b>
105	Pudding Bowl Hill	-	-	-	-	-	-	-	-	-	-	-	0.3	0.75	1.125	2.04	2	<b>1</b>
106	Takapau Track	-	-	-	-	-	-	-	-	-	-	-	0	1	0	2.5	3.25	<b>2.38</b>
107	Takapau/Pirau Rd Junction	-	-	-	-	-	-	-	-	-	-	-	0.5	-	1	2.75	1.38	<b>3.5</b>
108	Totara Ridge	-	-	-	-	-	-	-	-	-	-	-	5.75	-	0.75	7.13	3.5	<b>6.13</b>
109	Waihoanga Gorge	-	-	-	-	-	-	-	-	-	-	-	2	-	3.75	5.38	3.25	<b>6.25</b>
110	Waihoanga Gorge 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	2.5	<b>1.5</b>
111	Walnut	-	-	-	-	-	-	-	-	-	-	-	4.25	2.5	1.25	3.29	3	<b>5.25</b>
112	Stoat line 9 - Puketi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<b>5.13</b>
188	Puketi Nature Trail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<b>3.13</b>
<b>Russell Peninsula</b>																		
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)	3.38	13	7.9	-	5.25	12.25	<b>13.5</b>



Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
59	Opito Farms	-	-	-	-	-	5.7	-	9.9	-	-	4.63	13.1	6.1	9.13	6.75	4.25	5.25
60	Flagstaff/Te Maiki	-	-	-	-	-	3.7	1.3	1.3	-	-	-	4.3	-	6.38	-	2.5	4.25
62	Uruti Rd	-	-	-	-	-	10.8	7.6	10.5	-	-	7.63	14.4	7.9	5	12.75	12.25	12.75
61	Milne Ct	-	-	-	-	-	-	-	-	-	-	-	6.3	5.8	-	-	-	-
156	Russell Heights	-	-	-	-	-	-	-	-	-	-	-	9.8	-	-	-	-	-
171	Mace/Farmer	-	-	-	-	-	-	-	-	-	-	-	-	-	6.63	4.75	17.63	10.38
172	Pipiroa Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	2	2.75
173	Shortlands	-	-	-	-	-	-	-	-	-	-	2	-	2.5	1.38	1.13	1.25	
170	Nikau Block	-	-	-	-	-	-	-	-	-	-	12.88	10	-	1	3	8.88	14.25
174	Johnsons	-	-	-	-	-	-	-	-	-	-	-	-	9.75	12.75	-	1.63	11.38
176	Jarvis	-	-	-	-	-	-	-	-	-	-	5.38	4.3	-	-	-	-	-
177	Soloman's Gate	-	-	-	-	-	-	-	-	-	-	11.5	6.38	-	-	-	-	5.38
<b>Waimate North</b>																		
113	W1	-	-	-	-	-	-	-	-	-	23.5	15.8	24.75	-	-	25.5	25.75	23.63
114	W2	-	-	-	-	-	-	-	-	-	12.25	7	9.5	7.9	11.5	5.75	14.5	11.63
115	W3	-	-	-	-	-	-	-	-	-	14.9	-	-	-	-	-	-	1
116	W4	-	-	-	-	-	-	-	-	-	9.4	10.5	6	-	8	-	8.5	13.5
117	W5	-	-	-	-	-	-	-	-	-	5.9	1.83	3	-	-	-	-	-
118	W6	-	-	-	-	-	-	-	-	-	22.3	11	5.7	8.5	7.3	9.13	5.63	10.63
119	W7	-	-	-	-	-	-	-	-	-	-	5.3	6.5	-	3.1	-	-	-
120	W8	-	-	-	-	-	-	-	-	-	13.75	2.83	1	8.1	8	5.5	8.13	9.13
121	W9	-	-	-	-	-	-	-	-	-	5.2	3.5	2.125	2.3	3.5	-	-	-
122	W10	-	-	-	-	-	-	-	-	-	-	-	7.33	8.3	5.9	5.25	4.13	7.25
123	W11	-	-	-	-	-	-	-	-	-	7.07	7.75	2	-	-	-	-	-
124	W12	-	-	-	-	-	-	-	-	-	18.9	9.75	6.1	3.6	5.9	6	7.88	6.25
178	W13	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	2.8	-	-
127	W14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.88	0.5	0
128	W16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	2.17	-

Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
<b>Western</b>																		
16	Katui	47.6	39.4	20.4	28.2	17.5	16.1	14.4	-	14.9	13.9	-	4	-	0	-	0.25	-
17	Trounson North	8.5	17.3	12.5	19	16	14.3	16.1	-	15.25	19.9	22.2	15.4	-	13.75	22.33	5.75	<b>15.13</b>
33	Trounson South	-	-	-	-	-	-	12.25	-	23.75	19.1	-	-	8.2	8.9	-	11.13	<b>12.33</b>
18	Cathedral	2.3	3.8	5.1	5.5	5.1	1.8	2.75	5.9	5.25	4.9	4	4.6	4.4	3	1.63	2.75	<b>4.13</b>
19	Waipoua L/Out	30.9	24.4	30.8	27.7	21.4	21.8	14.6	8.4	16.9	22.75	23	-7.9	11.8	6	6	9.25	<b>15.63</b>
79	Toronui Track	-	-	-	-	-	-	-	-	1.75	2.4	-	-	-	-	-	-	-
96	Kawerau Rd Cr	-	-	-	-	-	-	-	-	3.4	2	0.3	0.4	1	-	-	-	-
179	Marlborough 13	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	-	-	-
20	Paerata	9.9	1.3	3.1	6.5	2.8	3.1	1.25	-	0	-	-	-	0.9	1.1	1.63	0.25	<b>0.38</b>
31	Te Matua Ngahere	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.25	4.13	-
13b	Site 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.13	-	-
14b	Site 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
16b	Site 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.38	2.13	<b>1.5</b>
18b	Site 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-
28b	Site 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.25	8.88	<b>3.63</b>
30b	Site 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	<b>0.88</b>
31b	Site 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-
32b	Site 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.88	-	-
157	Opouteke CHH	-	-	-	-	-	-	-	-	-	-	-	6.6	6.1	2.8	11.25	-	-
158	Pipiwai CHH	-	-	-	-	-	-	-	-	-	-	-	7.3	0.5	1.5	-	-	-
189	Alf's Cottage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<b>2.2</b>
190	River Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<b>2</b>
<b>Southern</b>																		
21	Glenbervie 7A	5	6.4	7.1	7.5	5	0.5	1	2.4	1	-	1.3	-	2.4	2.5	1.88	1.75	<b>2.63</b>
22	Glenbervie 9A	11.2	3.8	4.3	7.3	5.9	12.6	6.75	5.25	4.5	6.5	-	1.8	2.8	2.9	1.38	2.88	<b>1.63</b>
23	Marlow Road	22.4	13.9	14	17.8	19.8	21.3	22.9	-	19.8	17.6	12.1	10	13.3	11.1	10.25	7.25	<b>13.13</b>
24	Purua North	12.1	13	10.3	10.5	10.6	15	12.75	12.5	13.25	10.9	12.6	13.6	18.3	9.9	13.5	10	<b>16.13</b>

Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
81	Purua South	-	-	-	-	-	-	-	-	14.75	15.9	14.4	14.1	14.6	10.5	12.5	11.13	17.5
25	Rarewarewa – early listen	-	-	-	8	10.4	4.6	7	6.5	4.6	5.9	5.6	4.8	6	-	-	-	-
25	Rarewarewa South	7.5	8	8.5	6.6	8.3	6.6	7	5.8	6.5	6.6	5.3	6.3	6.6	6.4	8.88	4	7.88
82	Rarewarewa North	-	-	-	-	-	-	-	-	9.75	6.6	4	8.5	7.9	10.4	11.38	11.38	11.88
139	Hodges Bush	-	-	-	-	-	-	-	-	-	-	9.8	13	16.1	17.75	15.5	16.63	9.5
145	Whangaruru	-	-	-	-	-	-	-	-	-	-	-	6	6	10.25	13.38	10.75	24.29
26	Mimiwhangata	11	5.6	3.5	3.6	0.3	9.4	19.1	20.3	13.8	20.25	14.3	21	19.5	12.9	11	8.38	-
167	Kaikanui Rd	-	-	-	-	-	-	-	-	-	-	-	-	8.5	11.6	15	8.38	7.25
27	Sandy Bay	3.6	3.4	2.8	8	6.1	3.3	3.5	-	3	-	2.5	-	-	-	-	-	-
34	Motatau 1	-	-	-	-	8.8	-	10	15	6.75	7.5	5.6	6.5	7.5	8.75	6	-	4.88
35	Motatau 2	-	-	-	-	-	-	-	2.7	-	-	1.5	3	2.5	-	-	-	4.25
36	Motatau 3	-	-	-	-	-	-	4.8	1.5	2.75	5.5	3.5	4.6	4	0.9	-	-	5.5
38	Motatau 5	-	-	-	-	-	-	1.5	1.25	0.9	1	-	-	-	-	-	-	-
68	Motatatu 9/ Marlow 1	-	-	-	-	-	-	-	11.7	11.75	17.6	13.5	10.5	9.3	2.9	7.13	3	9.75
129	Motatau 10/ Marlow 2	-	-	-	-	-	-	-	-	-	7.1	7.5	10.9	9	5.75	2.17	3.38	5
168	Worsp Rd	-	-	-	-	-	-	-	-	-	-	-	-	1.8	2.4	2	5.75	1.38
185	Whau Valley Dam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
<b>Whangarei Heads</b>																		
39	Bream Hd 1	-	-	-	-	-	-	5	3.1	5.75	3.1	4.7	5.1	3.5	5	6	3	7.13
40	Bream Hd 2	-	-	-	-	-	-	1.2	2	1.25	2.1	2.4	2	2.8	2	-	-	1.25
41	Bream Hd 3	-	-	-	-	-	-	-	-	-	-	1.5	2	1.3	1.6	-	-	-
42	Bream Hd 4	-	-	-	-	-	-	1.2	2	1.25	2.1	2.4	2	1.5	3.1	2	2	5.38
44	Taurikura 1	-	-	-	-	-	-	-	-	-	-	1.5	2	-	4.4	4.88	3.13	12.63
45	Taurikura 2	-	-	-	-	-	-	-	-	-	-	-	-	-	9	8.5	10.88	10.25
46	Taurikura 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	1.88	5.88

Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
47	Manaia 1	-	-	-	-	-	-	3.5	2.5	4.25	4	3.3	3.9	2.1	5.1	3.88	3.25	10.25
48	Manaia 2	-	-	-	-	-	-	4	4.5	4.9	5.75	4	5.3	7.4	7.6	8.75	10.75	8.38
49	Manaia 3	-	-	-	-	-	-	3.25	3.9	2.9	-	2.1	3	-	4	3.13	3.5	6.25
71	Manaia 8	-	-	-	-	-	-	-	1.5	0.25	1	1.2	2	1.5	1.4	1.88	0.75	2.13
186	Manaia 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.75
54	Kauri Mtn 1	-	-	-	-	-	-	4.5	1.5	-	3.1	7.4	1.3	-	1.4	3	2.13	2.5
72	Kauri Mtn 2	-	-	-	-	-	-	-	5.1	3.2	4.3	2.7	2.3	0.4	2.25	3.6	2.38	3.38
73	Kauri Mtn 3	-	-	-	-	-	-	-	2	1	1	1.3	2.5	-	5	3.38	1.13	6
74	Kauri Mtn 4	-	-	-	-	-	-	-	4.8	5.9	2.6	3	2.9	-	2	2	3.38	3.88
141	Kauri Mtn 5	-	-	-	-	-	-	-	-	-	-	2.3	1.9	1.25	2.5	3.13	3.25	4.75
127	The Nook 1	-	-	-	-	-	-	-	-	-	1.8	1.5	0.9	-	0.7	1.38	1.25	2.25
56	The Nook 2	-	-	-	-	-	-	6	2.1	3.25	3.8	4	5.3	-	5	4.5	7.75	9.25
128	The Nook 3	-	-	-	-	-	-	-	-	-	-	-	-	-	3.4	4.75	5	3.38
58	Nook Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	3.75	-	3.67	4.63
187	McNamaras	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
<b>Tutukaka</b>																		
125	TLC 1	-	-	-	-	-	-	-	-	9.75	5.9	7.1	8.8	10.9	11.6	8.13	8.63	12.38
126	TLC 2	-	-	-	-	-	-	-	-	-	8.4	7.8	9.8	10.25	6.5	-	7.38	2.75
142	TLC 3	-	-	-	-	-	-	-	-	-	-	3	4.6	3.6	3	-	-	9.25
28	TLC 4	-	7.3	-	-	8	4.4	-	-	10.7	7.25	4.4	10	-	-	8.17	4.5	-
143	TLC 5	-	-	-	-	-	-	-	-	-	-	4.1	6	3.3	7.1	4	2.33	3.83
144	TLC 6	-	-	-	-	-	-	-	-	-	-	9.2	-	13	15.2	6.5	8.75	-
160	TLC 7	-	-	-	-	-	-	-	-	-	-	-	4.4	-	-	4.75	4.88	-
100	Kaiatea 1	-	-	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-
101	Kaiatea 2	-	-	-	-	-	-	1.2	2	1.25	2.1	-	-	-	-	-	-	-
<b>Tawharanui</b>																		
161	TWN 1 Marine triangle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.16	0.5	-

Stn No.	Station name	1995 Mean	1996 Mean	1997 Mean	1998 Mean	1999 Mean	2000 Mean	2001 Mean	2002 Mean	2003 Mean	2004 Mean	2005 Mean	2006 Mean	2007 Mean	2008 Mean	2009 Mean	2010 Mean	2011 Mean
162	TWN 2 Trig triangle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.16	0.67	-
163	TWN 3 Top ecology track	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.33	-
164	TWN 4 Possum gully	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-
165	TWN 5 Twin hills	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.16	0	-
166	TWN 6 South coast water tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.83	0.33	-

**8.2 APPENDIX 2. Summary of Northland kiwi listening data for stations listened from in 2011.**

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	2	1	2	1	2	1	2		
<b>Whakaangi</b>												
29	Whakaangi 4	G. Seon	9	1							10	5.00
131	Whakaangi 2	T & L Baigent	9	6	6	6	11	13	13	11	75	9.38
132	Whakaangi 3	R. Renwick	7	7	2	6					22	5.50
133	Whakaangi 5	J. Dymack/B. Smith	10	20	8	10	1	3	9	2	63	7.88
135	Whakaangi 7	W. Sporle	31	10	31	14	25	28	26	22	187	23.38
136	Whakaangi 8	Johnston	21	16	20	22	18	16	29	18	160	20.00
137	Whakaangi 9	S. Smith	2	8							10	5.00
138	Whakaangi 10	J. Salt	10	7	2	7	4	5			35	5.83
140	Langridge House	M. Langridge	34	20	5	9	13	7	22	23	133	16.63
<b>Western</b>												
17	Trounson North	M. Leach	13	14	17	16	21	16	8	16	121	15.13
18	Cathedral	J. Hall	5	6	4	2	7	2	3	4	33	4.13
19	Waipoua Lookout	B. Searle	9	14	27	23	20	12	11	9	125	15.63

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	2	1	2	1	2	1	2		
20	Paerata	G. Coulston	0	2	0	1	0	0	0	0	3	0.38
33	Trounson South	J. Mclaughlin	12	20	17	16	2	7			74	12.33
189	Alf's Cottage	A. Nagels	5		2	1	1	2			11	2.20
190	River Rd	J. Mathews	4	0	4	1	3	0	4	0	16	2.00
16b	Site 16 Marlborough Rd	M. Calder	0	0	2	0	3	0	6	1	12	1.50
28b	Site 28	W. Morunga	1	7	5	3	1	3	1	8	29	3.63
30b	Site 30	A. Meduna	0	1	4	0	1	0	0	1	7	0.88
<b>Southern</b>												
21	Glenbervie 7A	S. Wairau	5	2	6	1	1	3	2	1	21	2.63
22	Glenbervie 9A	G. Brackenbury	0	2	1	1	5	1	1	2	13	1.63
23	Marlow Rd	G. Coulston	13	22	15	16	7	13	11	8	105	13.13
24	Purua North	P. Cornille	14	15	16	19	14	24	11	16	129	16.13
25	Rarewarewa South	P. Davis	11	6	10	3	11	8	11	3	63	7.88
34	Motatau 1	K. Prime <i>et al.</i>	2	0	8	5	0	15	6	3	39	4.88
35	Motatau 2	B. Critchfield/T. Grant	2	2	10	18	0	2	0	0	34	4.25
36	Motatau 3	T. Grant	1	8	5	8					22	5.50
68	Motatau 9/Marlow 1	M. Ritchie	5	7	10	17	13	13	8	5	78	9.75
81	Purua South	M. Valdes	18	13	16	12	32	18	13	18	140	17.50
82	Rarewarewa North	G. Pilon	14	17	9	13	13	5	17	7	95	11.88
129	Motatau 10/Marlow 2	P. MacDonald	5	3	10	5	6	3	7	1	40	5.00
139	Hodges	P. Graham/D. Kervall	17	8	16	15	9	8	1	2	76	9.50
145	Whangaruru	B. Thompson	54	33	15	14	17	27	10		170	24.29
167	Kaikanui Rd	T. Browne/R. Taylor	5	11	2	13	6	6	11	4	58	7.25
168	Worsp Rd	J & D Macky	2	1	0	5	0	3	0	0	11	1.38
185	Whau Valley Dam	G. Brackenbury/M. Hutchings	0	0	0	0	0	0	0	0	0	0.00
<b>Mahinepua</b>												
83	Mahinepua 1	J. Hill <i>et al.</i>	2	4	3	3	3	1	4	5	25	3.13
84	Mahinepua 2	W & S Hall	1	1	6	6	3	1	8	8	34	4.25

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	2	1	2	1	2	1	2		
85	Mahinepua 3	L. Barnes, C & D Brown <i>et al.</i>	7	9	7	2	6	5	4	2	42	5.25
88	Mahinepua 4	P. Williams/H. Shepherd	6	10	4	5	9	5	1	3	43	5.38
90	Mahinepua 0	M. Woodworth <i>et al.</i>	1	4	3	2	4	2	10	6	32	4.00
91	Mahinepua 15	F. Barnes <i>et al.</i>	5	3	5	3	4	3	1	1	25	3.13
92	Mahinepua 14	C. Reid/J. Browne	1	0	1	1	0	0	3	0	6	0.75
93	Mahinepua 16	M. Schaab <i>et al.</i>	3	12	1	11	7	5	1	2	42	5.25
94	Mahinepua 17	V. Corbin/S. Shepherd	6	10	8	10	8	5	3	5	55	6.88
99	Mahinepua 13	Kay/Craig/Petrie/Edwards	13	13	11	6	10	5	10	8	76	9.50
<b>Waimate North</b>												
113	W1	D. Way	32	20	28	11	30	27	22	19	189	23.63
114	W2	B. M. Words/L. Mountain	14	17	7	13	9	5	11	17	93	11.63
115	W3	A. & K. Taylor	2	3	1	2	0	0	0	0	8	1.00
116	W4	Le Heron	14	13							27	13.50
118	W6	D. S. Henderson/Saunders	12	3	14	20	11	8	7	10	85	10.63
120	W8	D. Way	12	9	8	3	8	13	11	9	73	9.13
122	W10	D. J. Liebert/J. Morgan	8	6	8	13	9	5	5	4	58	7.25
124	W12	J. W. Shaw	8	4	10	5	5	9	4	5	50	6.25
127	W14	A. Renton	0	0	0	0	0	0	0	0	0	0.00
<b>Whangarei Heads</b>												
39	Bream Head 1	R & W Newbold	12	4	13	4	4	8	3	9	57	7.13
40	Bream Head 2	C Cook	1	2	2	0	1	2	1	1	10	1.25
42	Bream Head 4	D Capey	5	6	3	4	0	9	4	12	43	5.38
54	Kauri Mt 1	J Nairn	5	1	4	1	0	4	1	4	20	2.50
72	Kauri Mt 2	M Barteldres	2	9	3	2	4	4	3	0	27	3.38
73	Kauri Mt 3	N Tyson	2	1	5	7	8	6	5	14	48	6.00
74	Kauri Mt 4	R & G Faber	5	7	7	0	4	0	8	0	31	3.88
141	Kauri Mt 5	L Brown	7	6	5	1					19	4.75
47	Manaia 1	H. Moodie/U. Schmid	16	8	8	10	12	10	12	6	82	10.25
48	Manaia 2	T. Hamilton <i>et al.</i>	17	3	7	2	9	6	13	10	67	8.38
49	Manaia 3	P Richards	7	4	8	9	7	7	5	3	50	6.25

Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	2	1	2	1	2	1	2		
71	Manaia 8	S. Adams	6	1	0	2	1	2	3	2	17	2.13
44	Taurikura 1	C. Mitchell	12	13	18	13	8	10	14	13	101	12.63
45	Taurikura 2	G Pike	8	12	6	8	9	3	14	22	82	10.25
46	Taurikura 3	K. Lange	11	3	8	8	7	1	4	5	47	5.88
127	The Nook 1	V. Oxborrow	3	1	0	5					9	2.25
56	The Nook 2	P. Coates/P. King	12	4	9	9	11	10	16	3	74	9.25
57	The Nook 3	L. Sutcliffe	4	3	4	4	6	0	4	2	27	3.38
58	Nook Rd	L. Brown	8	1	0	7	6	9	3	3	37	4.63
186	Manaia 9	K Lange	5	6	11	9					31	7.75
187	McNamaras	C & J McNamara	6	4	6	6	7	8	7	4	48	6.00
<b>Tutukaka</b>												
125	TLC 1 Camm Lookout	M. Camm	6	6	12	12	15	21	23	4	99	12.38
126	TLC 2	Bazeley	4	4	2	1					11	2.75
143	TLC 5 Soda Springs	K. Watzig	3	2	8	1	6	3			23	3.83
144	TLC 3	A & J Gilbert	8	9	12	12	5	14	6	8	74	9.25
<b>Eastern</b>												
10	Marsden Cross	K. Upperton	30	33	43	28	40	34	43	28	279	34.88
11	Puketotara	A. Newport	8	10	9	6	13	10	10	8	74	9.25
12	Rangitane	A. Walker	14	7	20	7	16	5	14	3	86	10.75
14	Mt Bledisloe	S. McManus	4	9	21	17	11	24	10		96	13.71
<b>Puketi Forest</b>												
102	Bramley's Rd	D. Poulton & A Linton <i>et al.</i>	2	7	2	0	1	2	4	4	22	2.75
103	Pirau Ridge	I. Wilson	0	0	5	0					5	1.25
104	Pond	N & E Walker <i>et al.</i>	16	14	18	5	4	3	2	2	64	8.00
105	Pudding Bowl Hill	R. Clay, I. Buddell, A. Linton	0	1	1	2					4	1.00
106	Takapau Track	P & J Hodgson	1	5	2	3	1	2	4	1	19	2.38
107	Takapua/Pirau Rd Jn	A & S Mentor <i>et al.</i>	3	2	4	3	2	1	4	9	28	3.50
108	Totara Ridge	I. Wilson <i>et al.</i>	15	15	3	7	2	1	5	1	49	6.13
109	Waihoanga Gorge	C & R Robinson	6	11	2	4	9	4	9	5	50	6.25



Stn. No.	Station name	Listener	1		2		3		4		Total	Mean
			1	2	1	2	1	2	1	2		
110	Waihoanga Gorge 2	S. Field, A. Dowdle, I. Wilson	0	3	2	1					6	1.50
111	Walnut	G. Salt <i>et al.</i>	3	6	4	10	4	5	7	3	42	5.25
112	Stoat line 9 - Puketi	L. Moller/D. O'Halloran	8	4	4	3	7	3	10	2	41	5.13
188	Puketi Nature Trail	A & S Kusanic	5	2	6	1	1	0	7	3	25	3.13
<b>Northern</b>												
1	Diggers Valley	R. Renwick	3	4	5	1	2	5	0	0	20	2.50
2	Takahue	F. Schou	6	12	4	20	9	8	19	13	91	11.38
4	Gartons	I. Petrove	0	0	0	2	0	0	0	0	2	0.25
5	Kaiaka	T. Higginson & K. Khaine	1	3	0	1	1	0	0	3	9	1.13
7	Puketi (rain gauge)	D. O'Halloran	11	9	14	12	13	6	8	2	75	9.38
8	Puketi SR	A & S Mentor <i>et al.</i>	7	7	3	10	12	7	22	4	72	9.00
<b>Russell</b>												
15	Tikitikiore	L. Gordon	18	10	16	14	7	21	12	10	108	13.50
59	Opito Farms	K. Russell	4	6	8	4	4	3	9	4	42	5.25
60	Flagstaff/Te Maiki	H. Lindauer, D. McKenzie	4	1	4	4	4	6	7	4	34	4.25
62	Uriti Rd	C. Richmond	27	9	14	10	13	3	16	10	102	12.75
170	Nikau Block	L. Gordon	13	3	19	15	16	11	29	8	114	14.25
171	Mace/Farmer	L. Gordon, K. Russell	13	18	27	9	8	0	4	4	83	10.38
172	Pipiroa	T & M Pasco	3	0	3	4	4	0	3	5	22	2.75
174	Johnsons	M. Frankum	10	9	8	16	17	11	10	10	91	11.38
177	Solomon's Gate	D & R Frater	5	11	3	6	5	2	5	6	43	5.38
<b>Tawharanui (not completed 2011 - earlier window used instead)</b>												