

# Night Survey Monitoring report for the Stewart Island Rakiura Community and Environment Trust (SIRCET)

May 24<sup>th</sup> – July 3<sup>rd</sup> 2021

Report by

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## **SUMMARY**

Since 2011, call count monitoring of night birds (kiwi, weka, and ruru) has taken place regularly at four sites within Stewart Island Rakiura Community and Environment Trust's Halfmoon Bay Habitat Restoration Project area and at four sites nearby but outside the Restoration Project area. The aim of this 2021 survey was to repeat the call count monitoring at these eight sites to continue building a picture of kiwi, weka, and ruru population trends in the area. During late May and June 2021, a total of 42 hours of night-time bird surveys were undertaken across seven sites in the Halfmoon Bay inhabited areas of Rakiura.

The intended four survey sessions in the first two hours of darkness for each site, was only completed for four of the eight sites. Data reported in this study is therefore from these four completed sites. At these four sites, 85 kiwi calls, 71 ruru calls, and zero weka calls were heard over 30.2 hours of surveying. The 85 kiwi calls heard at these four sites is higher than the number reported from these four sites in the last call count survey in 2019, where 56 kiwi calls were heard. It was difficult to make definitely valid comparisons with previous years' studies however, because we don't know if the number of hours surveyed was the same. Looking at what data was available for previous years, and taking into account the current year's data, it becomes apparent that there is much variability among the eight sites in number of kiwi calls, with one site in particular having recorded more calls than others across most years, and three sites having consistently low numbers of calls. The average number of kiwi calls across all sites, also seems to have gradually increased over the years, with a particular increase noted from 2013 to 2014, possibly precipitated by the transfer of eleven tokoeka kiwi into the Halfmoon Bay area from Ulva Island. Continuing with the call counts regularly is recommended, along with some refinement of the survey, recording and analysis techniques. Over time it may become clearer what causes variability in the call rates across sites, and the study may help to identify some of the main threats to Rakiura tokoeka across their whole range.

## **INTRODUCTION**

### **SIRCET Management Area**

The Stewart Island Rakiura Community & Environment Trust (SIRCET) is a non-profit organisation founded in 2003 to promote projects that benefit the Stewart Island / Rakiura community and its environment. The focus is predominantly ecological restoration through control of animal and plant pests. SIRCET's main project is the Halfmoon Bay Habitat Restoration Project (HMBHRP), which since 2003, has grown to protect 210 Hectares in the area from Ackers Point to Golden Bay Road. Animal pests controlled are rats, possums, and feral cats. HMBHRP also carries out bird monitoring, plant pest control, and re-vegetation; and much of the work is done by volunteers from the community. Eleven Southern tokoeka kiwi were also translocated to the area from Ulva Island in 2013.

### **Call Count Monitoring**

Call count monitoring is a tool that has been used for decades to detect the presence and absence of kiwi (and other night birds) and measure changes and trends in their populations over time.

Kiwi have very loud, distinctive calls that are sexually dimorphic, and territorial birds will call regularly during the night.

Survey techniques based on calls will only allow an estimation of relative abundance as not all kiwi call at the same frequency or volume. For example, males generally call about 2-3 times more frequently than females. In addition, the lower pitched calls of females do not carry as far as the whistle like calls of the males. Juveniles are normally silent in their first year and some non-territorial adults or sub-adult birds rarely call.

Although Call Count Monitoring will not account for all kiwi in an area, it is a fairly good way to determine distribution of territorial birds, especially if the survey is done outside of the kiwi breeding season (July-February). If surveying is repeated often enough it is possible to estimate population density and measure changes over time.

It is of critical importance when using this method to determine changes in a kiwi population over time, that survey methodology is replicated as closely as possible from year to year.

This method is the easiest, most inclusive, and least costly of all bird monitoring techniques, and is an excellent way of involving volunteers, young people and anyone wanting to learn about creatures of the night.

### **Previous Call Count Surveys in Halfmoon Bay Area**

Since 2011, call count monitoring of night birds has taken place (yearly from 2011 till 2015, and then in 2019) at eight sites (four within the HMBHRP area and four outside of it).

When the number of kiwi calls at each of the eight sites is averaged across these years, it can be seen that some sites have a considerably higher number of calls than other sites: Mapau Rd (in the non-treatment zone) had a relatively high number of calls while Trail Rd and Deep Bay (both in the treatment zone), and Ryans Creek (non-treatment zone) had relatively low numbers of calls (Figure 1). When all the sites were averaged for each year, it could also be seen that there was variation across years, with 2011 to 2013 having generally fewer kiwi calls than 2014 to 2019 (Figure 2). The translocation of 11 kiwi from Ulva Island in 2013 is likely to have contributed to this difference between year groups.

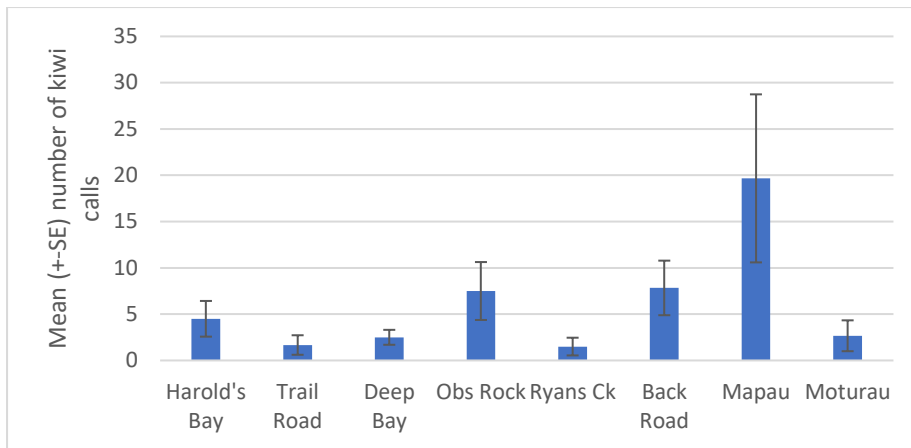


Figure 1. Number of kiwi calls at each site, averaged over the years 2011-2019<sup>1</sup>

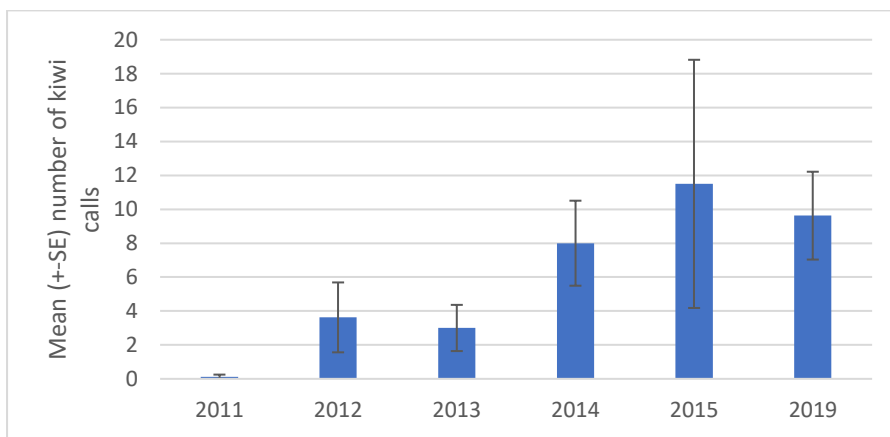


Figure 2. Number of kiwi calls each year, averaged across sites.<sup>1</sup>

Number of weka calls showed few consistent differences between years or between areas, apart from the Moturau site having no weka calls at all (Figure 3), and 2011 having relatively few calls compared to most other years (Figure 4).

<sup>1</sup> Graph compiled from data presented in King, 2019

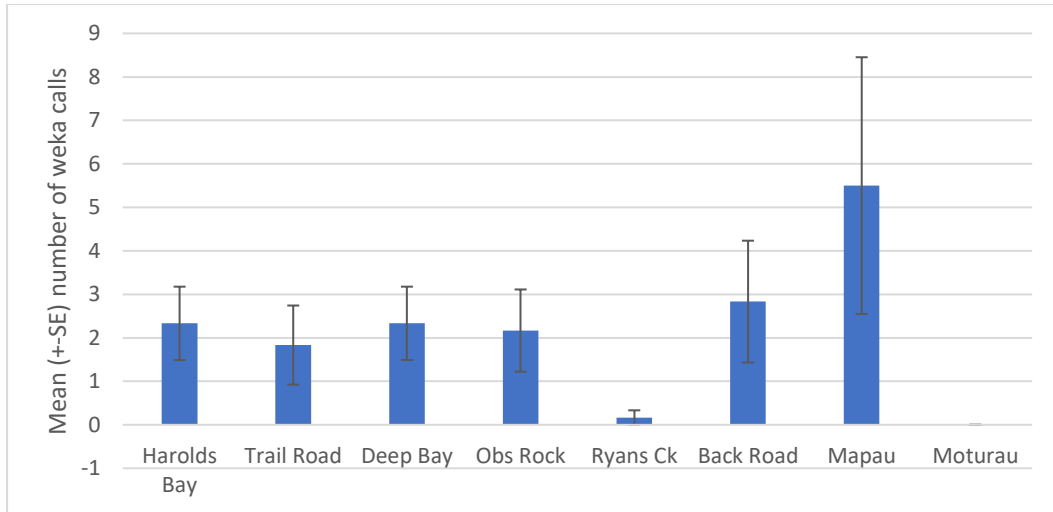


Figure 3. Number of weka calls at each site, averaged over the years 2011-2019<sup>1</sup>

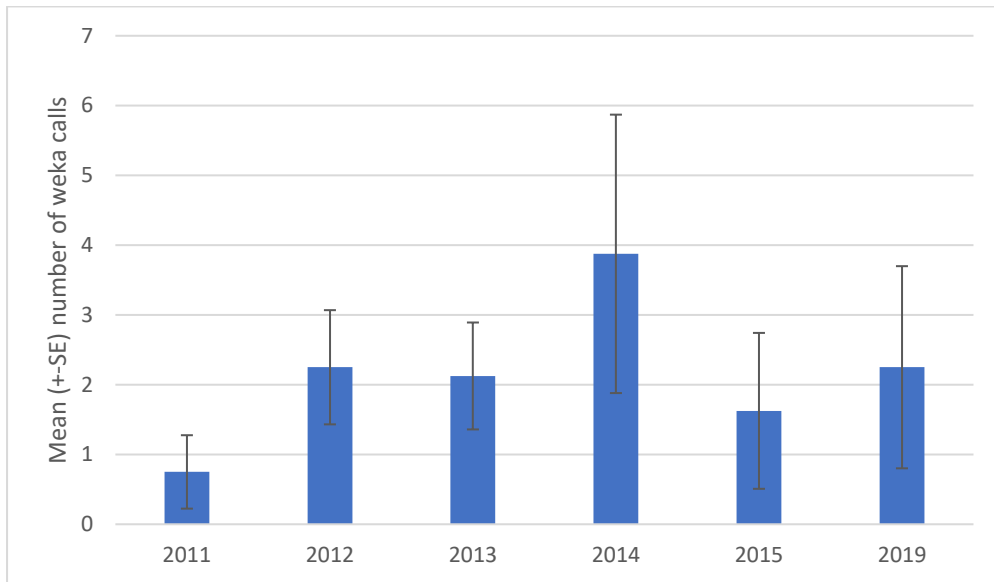


Figure 4. Number of weka calls each year, averaged across sites<sup>1</sup>.

The most ruru calls have been heard at the Moturau site and the fewest at Trail Rd (Figure 5), while the year by year comparison of ruru calls showed fewer in 2011 than other years (Figure 6).

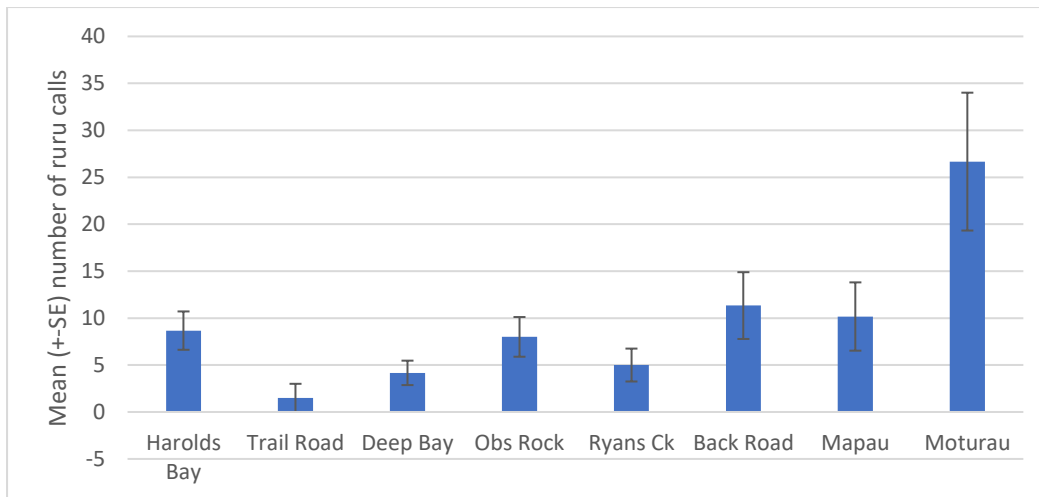


Figure 5. Number of ruru calls at each site, averaged over the years 2011-2019<sup>1</sup>

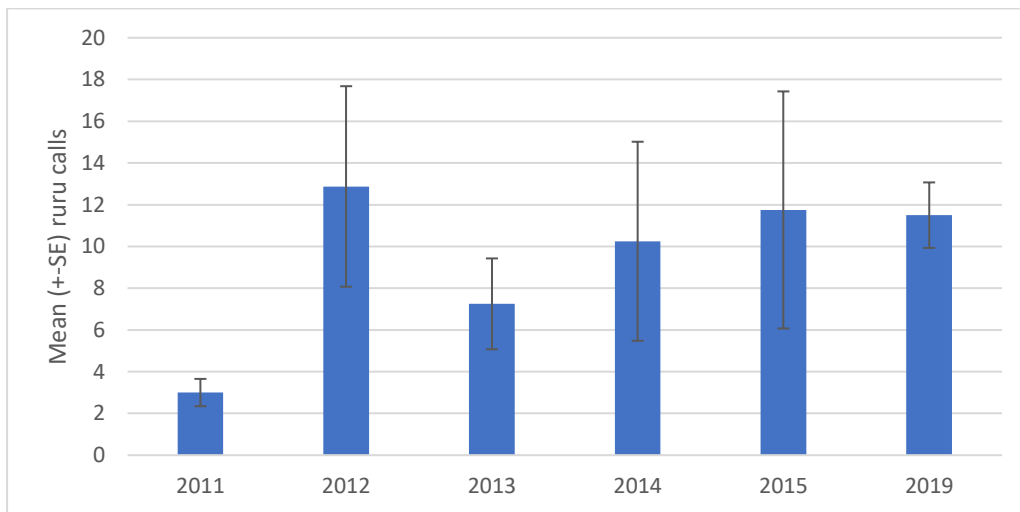


Figure 6. Number of ruru calls each year, averaged across sites<sup>1</sup>

### Aim of this year's Call Count Survey

The aim of this year's (2021) call count survey was to undertake kiwi, weka, and ruru call counts at the eight long-term monitoring sites, and report on the findings.

### METHODS

Seven from an original eight bird stations were surveyed between the 24<sup>th</sup> May and 3<sup>rd</sup> July as part of SIRCETS long term Tokoeka monitoring. Four of these sites were within the 210ha Halfmoon Bay Habitat Restoration Project on Ackers Peninsula ('Treatment Sites') and four were outside this area at road ends or similar easy to get to locations ('Non-Treatment' (previously referred to as 'Control Sites')). Due to safety concerns raised at one of the usual Non-Treatment sites (Fern Gully), this one was abandoned after one night, leaving just three non-Treatment Sites.



Map 1. Map of Halfmoon Bay area on Rakiura/Stewart Island, showing the eight survey sites.

Of the remaining seven sites, each was surveyed between one and four times, starting when civil twilight ends (45 minutes after sunset), as per recommendations (Colbourne and Digby, 2016).

Data was collected as listed on the Kiwi Call Scheme Cards outlined in the Kiwi Best Practice Manual (Robertson and Colbourne, 2017). The survey method is to simply sit or stand quietly recording all calls heard within that period. The sex, time, direction bearing and estimated distance of birds calling is noted and is later plotted onto a topographical map to get an estimate of number of birds within a specific area.

Data was entered onto an excel spreadsheet. Hourly call rates of each listen were calculated by adding up the total number of calls heard on that listen and dividing by number of hours surveyed.

The estimated number of individual kiwi at each site (based on direction, distance, and sex of each kiwi call) was noted where possible.

## **RESULTS**

### **Survey Effort**

A total of 21, two-hour call surveys were carried out over 12 nights by 9 volunteers, seven of whom are permanent residents of Rakiura Stewart Island. One survey was done per night per person and when possible for the first two hours of actual darkness. All surveys were done in optimal weather conditions (calm with little to no wind) except for the last surveys at both Observation Rock and Back Road which were done in light drizzle. At both latterly mentioned sites the call count was low which was probably attributable to the sub-optimal weather conditions (see Table 1).

As the project didn't start until the end of May, rather than the optimal starting time of April, and there was less volunteer availability during the remaining time, the intended four surveys of two hours each (ie eight hours of total survey time) was achieved at only four of the eight sites. Reported data from 2021 therefore relates only to these four sites. Two of these sites were in the Treatment Area: Observation Rock and Deep Bay, and two in the Non-Treatment Area: Back Road and Mapau Road.

### **Call Counts and Rates**

In 2021, when counting the four sites which had four surveys completed, there were 85 kiwi calls in 30.2 hours of listening. This gives an average call rate across the four sites of 2.81 calls / hour in 2021.

When separating data into each site, the average call rate ranged from 1.89 and 1.75 calls / hr at Observation Rock and Deep Bay, in the HMBHRP Treatment area, to 3.25 and 4.79 calls per hour at Back Road and Mapau Road in the non-Treatment area.

**Table 1.** Number of kiwi calls heard in each survey at 4 sites, and the mean hourly call rate for each site (averaged across the 3 or 4 surveys per site).

Site	Designation	Survey #				Total	Mean - Calls / hr
		1	2	3	4		
Obs Rock	HMBHRP: Treatment	9	2	4	1	16	1.89
Deep Bay	HMBHRP: Treatment	2	6	4	2	14	1.75
Back Rd	Non-Treatment	5	7	12	2	26	3.25
Mapau Rd	Non-Treatment	?	10	6	13	29	4.79

All of these four sites had more kiwi calls recorded in 2021 than in 2019 (Figure 7) and had the highest mean call rate since surveying first began in 2011.

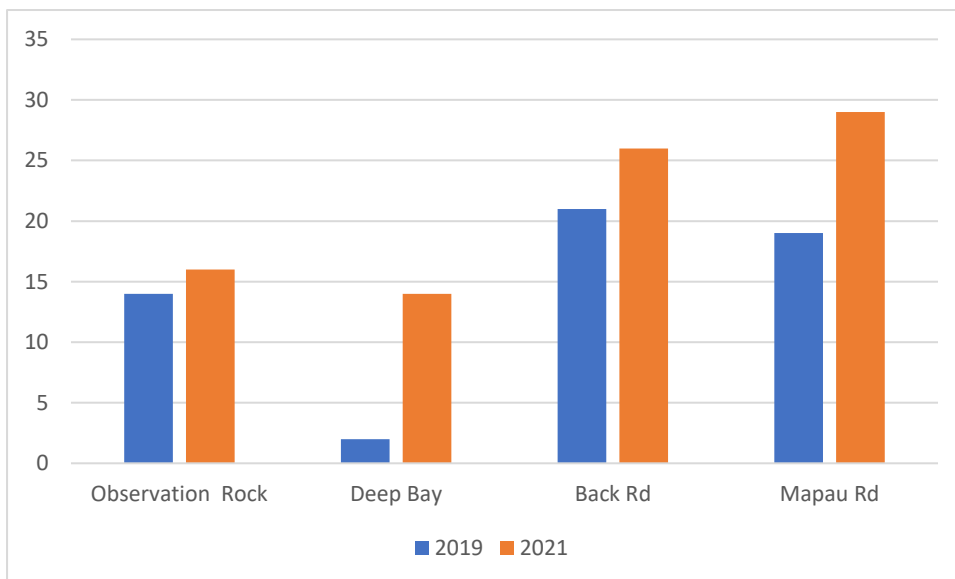


Figure 7. Comparison between 2019 and 2021 in total kiwi calls recorded at four sites.

### Estimates of Kiwi Numbers

When analysing data, it is useful to estimate number of paired or individual kiwi calling, based on direction of calls, time and bearing. This data can be plotted onto a map for giving general estimates of territory size. It is also useful to get an idea of how many birds are making the calls so as not to get an over inflated or under inflated idea of number of actual birds as opposed to number of calls or call rate.



But this is an option for people who are skilled and confident with the call count monitoring method and is not standard practice for most volunteer surveys.

An assessment was made of individual number of birds or paired kiwi heard at the four sites (see Table 2).

**Table 2.** Number of individual kiwi or kiwi pairs counted whilst doing surveys.

Site	Designation	No. of kiwi
Observation Rock	HMBHRP	2 pairs
Deep Bay	HMBHRP	2 pairs
Back Road	Control	3-4 pairs
Mapau Road	Control	4-5 pairs

### **Comparison of 2021 Kiwi call records to numbers recorded since surveying began.**

Comparing call rates since surveying first began in 2011 is difficult because the author did not have access to any previous data and so it's impossible to tell how each survey was conducted, and number comparisons are only completely valid if we know that the data was collected in the same way each year. The only information obtained was the 2019 report and this only gave reference to total calls heard at each site. Therefore, I have made a simple table and graph comparing the total calls heard at each site between years. (Table 3, Figure 8). It can be seen that at Deep Bay and Back Rd, more kiwi calls were recorded in 2021 than in all previous years, while Mapau Rd and Observation Rock each had just one previous year where a higher number of kiwi calls had been recorded (with 2015 being higher for Mapau Rd and 2014 being higher for Observation Rock).

**Table 3.** Comparison of total kiwi calls heard at four sites since surveying began in 2011.

	2011	2012	2013	2014	2015	2019	2021
Observation Rock	0	5	0	19	7	14	16
Deep Bay	0	2	3	2	6	2	14
Back Road	1	5	11	4	5	21	26
Mapau Road	0	17	3	17	62	19	29
	2	29	17	40	80	56	85

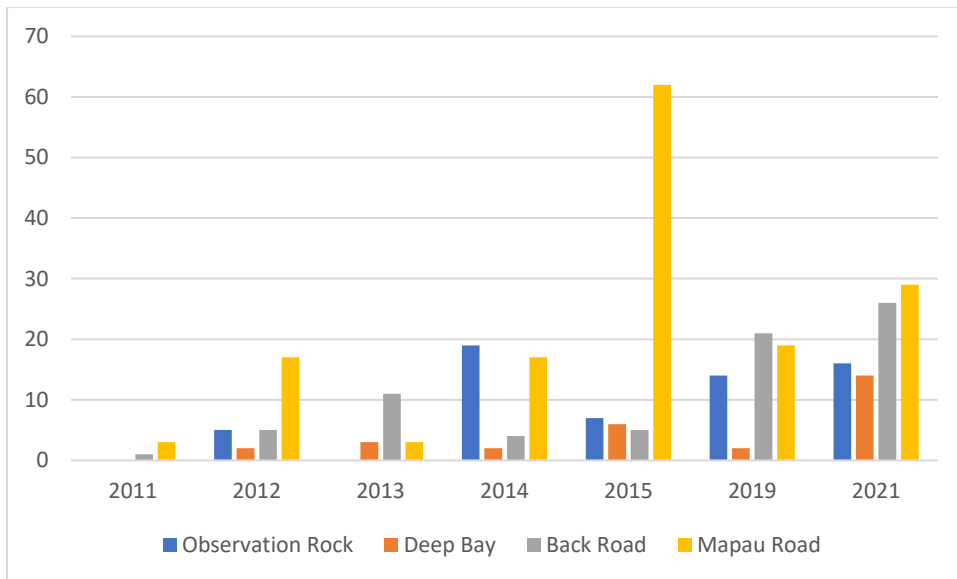


Figure 8. Comparison of total kiwi calls heard per site per year.

### Ruru Calls

Morepork or ruru were present at all sites and call rates varied between 1.9 and 4.5 calls/hour.

The only site that had reasonably good call numbers of ruru was Observation Rock and from the 12 calls heard the surveyors ascertained that there were three pairs responsible for the 12 calls heard on the first night. Ruru call numbers were higher at Observation Rock and Deep Bay (both in the Treatment Area) than in all previous survey years, while Mapau Rd and Back Road in the Non-Treatment Area had call numbers similar to the average of previous surveys (Figure 9, Table 5).

**Table 4.** Ruru calls per hour at each of the 4 sites that were counted in analysis (averaged across the 3 or 4 surveys per site).

Site	Designation	Survey #				Total	Mean - Calls / hr
		1	2	3	4		
Obs Rock	HBHPP	12	5	9	10	36	4.5
Deep Bay	HBHPP	5	5	2	3	15	1.9
Back Rd	Outside	4	2	4	2	12	3
Mapau Rd	Outside	?	2	n/a	6	8	2
Trail Road	HBHPP	1	1	n/a	n/a	2	n/a
Harold's Bay	HBHPP	0	n/a	n/a	n/a	n/a	n/a
Motarau	Outside	3	2	n/a	n/a	5	1.25

**Table 5.** Ruru calls by site, years 2011 - 2021

	2011	2012	2013	2014	2015	2019	2021
Deep Bay	1	8	3	4	1	8	15
Observation Rock	2	8	5	10	6	17	36
Back Road	5	5	18	2	24	14	12
Mapau Road	2	24	12	0	5	16	8

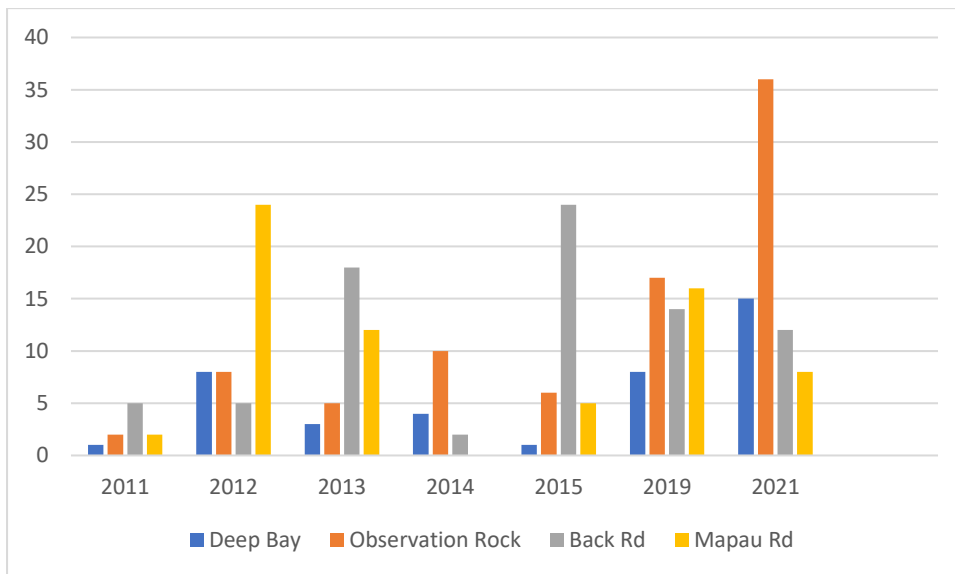


Figure 9. Total ruru calls heard at surveyed sites between 2011 and 2021

## Weka

No weka calls were heard at any of the sites surveyed.

## DISCUSSION

Kiwi and ruru calls recorded within four SIRCET monitored sites on Stewart Island / Rakiura have increased since monitoring first began in 2011. Weka calls on the other hand have decreased, with zero weka calls heard this year.

## Kiwi

Between 2011 and 2015, call counts were conducted annually and within that time, (February 2013) eleven kiwi (age unknown) were translocated into the 120 ha Halfmoon Bay Habitat protection area (HMBHRP) from Ulva Island. The initial increase in kiwi calls heard at many of the sites in both the Treatment and Non-Treatment Areas could be at least partly due to this translocation. We don't

know the exact locations where the kiwi were released, but many previous translocations of adult and sub-adult kiwi of other taxa, have shown that some individuals can disperse several kilometres from their release site.

Since 2015, additional call count surveys conducted in 2019 and 2021 have shown further increases across all sites, including the non-protected sites, and this is encouraging. 😊

Rather than just recording number of calls heard, it is standard practice to establish the kiwi call rate (kiwi calls/hour) for this type of survey. In 2021 the average kiwi call rate for each of the 4 surveyed sites was calculated as well as the average number of calls per hour overall. The average kiwi call rate in 2021 across the four sites surveyed appears to have increased from 1.7 to 2.8 calls per hour (assuming that the number of hours surveyed was the same in previous surveys).

The apparent increase in call rates at these four sites are not necessarily indicative of a population increase, as there is year to year variation in many factors that may influence call rates. Only when a consistent trend is seen over a number of successive years can it be concluded that a change in call rate indicates a true change in population. It's also worth noting that the increase in call rates was seen in both Treatment and Non-Treatment sites, so if there was indeed an increase in population, these results don't help us identify the cause of the increase (apart from the 2013 kiwi release, which could have helped increase populations at any of these sites).

Rakiura tokoeka are thought to be the most abundant of the four tokoeka taxa (Haast Tokoeka, Northern Fiordland tokoeka, Southern Fiordland tokoeka, Rakiura tokoeka) with an estimated population of 13 000. However according to New Zealand's Threat Classification System, they are still considered Threatened: Nationally Endangered, largely due to an observed decline of greater than 70% in the main studied population at Mason Bay (Robertson et al, 2016) between 1993 and 2008 (Robertson et al 2019). In addition to the observed decline, they are also considered Data Poor (eg it is not known what the major threats are to their population). The reason they are in better numbers than other mainland taxa is likely to be due to the island having no mustelids, as much research has shown that the number one threat to North and South Island kiwi taxa is predation of the young by stoats. It is imperative that the island's mustelid-free status continues. It was hypothesized that the large decline seen in the Mason Bay population, was due to cat predation on young kiwi, and a further long-term study site at Port Adventure was started in 2011, to determine whether this population was showing similar trends. Happily, this study site has shown signs of good survival of young kiwi, despite reports of cat presence, and it is now hypothesized that the Mason Bay decline may be related to habitat changes as grassland is reverting to flax, tussock and scrub (Robertson et al 2019).

In the Rakiura inhabited area kiwi are frequently heard and often seen, out and about, on the playing fields or along the road verges at night. Despite this and even though calls recorded have been increasing, a call rate of 2.8% is comparatively low (although some of the survey sites do not have very good coverage and this could be partially to blame). In this 2021 call survey, the two Non-Treatment sites that we got had sufficient data for, had higher call rates than the two Treatment sites. It is worth noting here that these two Non-treatment sites have historically had the highest numbers of calls of all the Non-treatment sites (and in the case of Mapau Road, the highest call

numbers of all eight sites), so it is unwise to read much into this as all the sites have always been quite variable in kiwi calls regardless of whether they are in the Treatment or Non-Treatment zone (Figure 1). Mapau Road and Back Road have the most contiguous forest habitat (uninterrupted by housing development) around them of all the sites, and this may be relevant to the higher kiwi call rates. When analysing future surveys (and if possible looking at past records) it may also be worth overlaying call data from Treatment sites, with trapping and tracking tunnel data, to see if presence/density of mammals can be correlated with call rates.

## **Weka**

There were no weka recorded during this survey.

## **RECOMMENDATIONS**

It is imperative that call count monitoring is continued at least every three years and ideally at all seven or eight sites. If possible, site locations could be tweaked slightly to improve coverage.

All volunteers should record their calls on the same form and the data entered onto an excel spreadsheet. Results can then be averaged per site and overall for the year.

When doing the surveys using volunteers, it would be ideal to standardise the methods; i.e. counts should be started at the same time of night (first part of the night or 45 min after sunset) and the same forms used. One person adopting a site in order for that person to build a picture of kiwi presence in that area.

Training would ideally be given with all volunteers together prior to surveying commencing and some ground truthing of the way distance is recorded may need to be investigated. This could be simply a matter of having two people do the listen together so that they could accurately deduce the distance they are likely to have heard in relation to topography.

Counts should also be started earlier, in April so that there is more time to get through the sites if there are not as many volunteers available.

## **ACKNOWLEDGEMENTS**

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