WINDY HILL ROSALIE BAY CATCHMENT TRUST

BIRD COUNTS

DECEMBER 2009

REPORT JO 3. JANUARY 2010.

JOHN OGDEN.

INTRODUCTION

Previous reports: This report is the third in the new series. It describes the monitoring results for December 2009. Previous reports were by ECoRAP (Dr S. Ferreira and Anne-Marie Smit) and cover the period from the commencement of monitoring in 2000 to June 2008. The overall conclusions to be drawn from these earlier reports are summarised in Ogden, J. 2009. *WHRBCT Bird Counts December 2008*, and EcoRAP report: EC0006/12-8. *Bird Counts June 2008.* September 2008.

The total number of birds increased following the introduction of pest management, and these higher bird numbers were maintained for at least four years. Subsequently the trends are less clear, although the proportion of introduced bird species has declined. The control area (neither trapped nor poisoned) has significantly fewer birds, and lesser diversity of species, than most of the managed area, The Robin nesting area is predominantly low kanuka forest, and is also low in bird numbers and diversity. This presumably reflects low food availability for fruit and nectar feeding species in this vegetation type.

Pest management at Little Windy Hill Rosalie Bay Catchment Trust and Benthorn Farm: The Little Windy Hill Trust (WHT) is a private conservation organisation concerned with pest eradication and ecosystem restoration on several properties in south-east Great Barrier Island. The managed area increased in 2009, and now covers c. 620ha. The trust employs a small staff, mainly engaged in pest eradication, but also monitoring birds and other organisms.

A Report on the success of rat eradication was prepared in 2005 (Ogden, J. & Gilbert, J. 2005. *Rodent trapping results from Windy Hill and Benthorn farm, Great Barrier Island: 1999-2004*.). The conclusions from that report, the imperative to protect newly introduced robins, and marked improvements in the technology for effectively controlling rats with poisons, led to the commencement of pulsed toxin applications in 2005. The initial success of this regime of trapping with pulsed toxins, and the need to manage a larger area with fewer resources, suggested a change to fully toxin-based control. This was implemented in 2009, with c. 5000 bait stations.

Various studies of the Windy Hill ecosystem indicate improvements in vegetation (seedling density), and greater numbers of wetas, other large invertebrates and skinks compared to the control site (Ogden, J. & Gilbert, J. 2009. *Prospects for the eradication of rats from a large inhabited island: community based ecosystem studies on Great Barrier Island, New Zealand*. Biological Invasions: 11: 1705-1717*).*

Vegetation at Little Windy Hill: The vegetation of most of the Windy Hill area comprises tall 'scrub' – relatively young forest dominated by kanuka (*Kunzea ericoides*). This mostly dates from the abandonment of farming in the 1940s. Manuka (*Leptospermum scoparium*) was the first forest cover to establish, and is now predominantly on the ridges. Kanuka tends to invade later and live longer, and is now the dominant canopy over most of the landscape. Remnants of broadleaf (mostly Taraire *Beilschmeidia tarairi*, Kohekohe *Dysoxylum spectabile* and Puriri *Vitex lucens*) and podocarp (mostly

Kahikatea *Dacrycarpus dacrydioides*) forest survived the farming on some upper slopes and in gullies. These species, and other successional trees such as *Coprosma arborea,* are currently establishing populations within the mature kanuka. Thus, as a first approximation, we can describe the vegetation as forest, forming a continuum from manuka dominance on ridges, through kanuka, to progressively richer and taller forest, especially in the valleys (Davy, unpublished thesis 2008; Perry, Davy & Ogden, in preparation). However, the composition and structure of all the forest types is changing as succession towards more mature canopies continues, and this needs to be kept in mind when assessing changing bird abundances.

Bird monitoring: Bird monitoring has played an important part in evaluating the management actions of the WH Trust since 2000. Monitoring has been carried out over (some of) the same transects over this whole period. Although some additions to the sample transects have been made through time, the necessity to compare different areas and vegetation types, and to replicate bird counts both spatially within a locality (eg ridge or valley) and at different seasons, has been recognised throughout the study, making this one of the longest and most comprehensive bird monitoring studies on private land in New Zealand.

METHODS

Data collection

The eighteen bird transects are each 150m in length, with four counting stations (points marked by a stake) separated by 50m. The stations are counted at least twice per year (June and December)[1]. At each counting station in each season, six repeats are made over a period of c. one week (Table 1). The control sample was increased from 1 to 2 transects in 12/09.

Table 1. Summary of sample arrangement and numbers (2009)

Location	Number of transects	Number of stations	Total number of Counts per seasonal sample	Notes
Windy Hill, ridges	6	24	144	3 transects each in two catchments
Windy Hill, valleys	6	24	144	3 transects each in two catchments
Benthorn farm	2	8	48	One ridge, one valley
Robin area	2	8	48	Replicate transects
Control	2	8	48	Replicate transects
Totals	18	72	432	Total = 18 transects x 4 stations x 6 times

The survey technique is as follows:

[1] Stations were surveyed more frequently early in the study (2000 – 2002).

- At each station, birds are counted for 3 minutes.
- Individuals heard and seen are recorded, with care taken to ensure that each individual is recorded once only.
- For each bird recorded, the distance from the station to the bird is estimated in 5m classes as follows: 0 -5m, <5-10m, <10-15m, <15-20m, <20-25m.

In past surveys, no birds were recorded if beyond 25m, nor were birds recorded between stations. However in this survey (12/09) recorders noted birds calling > 25m from the point in the margins of the data sheet. This was done to make the counts more comparable with those carried out between 2006 – 2008 by the Great Barrier Island Charitable Trust (Biodiversity Advice Fund AV 207; Final Report).

Disregarding these 'additional' birds, bearing in mind the difficulty of visually or audibly assessing station-bird distances, each station surveys an area of approximately 2000m^2, and the four stations on transect cover approximately one hectare (actually 0.78 ha.). Counts per station are converted into per ha values by multiplying by 5.09296.

Sample dates

The transects were sampled by three observers, mostly over the period 15/06/09 to 17/06/09, although the control stations were not sampled until a week later.

Table 2. Sampling dates and observers for the winter sample 2009.

Location	Start date	End date	Observers
Ridges (R1 – R6)	30/11/09	8/12/09	Kevin, Rachel, Dean
Valleys (V1 – V6)	30/11/09	8/12/09	Kevin, Rachel, Dean
Benthorn (8 stations)	30/11/09	1/12/09	Kevin, Rachel
Robin area (8 stations)	2/12/09	8/12/09	Rachel, Kevin
Control (stations 21-24)	30/11/09	2/12/09	Rachel, Kevin

Data analysis

In the previous ECORAP reports, various statistical tests were applied in an attempt to draw rigorous conclusions. However, those reports also emphasised the variability and non-normality inherent in the data. Generally only tentative conclusions were reached. The tendency was to rely more on consistency of trends, both in comparing changes following pest treatments, and in comparisons between locations and with the 'control' (un-pest-managed) area. Consistent trends over time might have ecological meaning even when high sample variances rule out strict statistical significance. This approach is followed in this report.

One important reason for adopting a simplified approach to data analysis and presentation is that there are serious doubts as to how reliable the data are for

estimating 'true' density (numbers per ha.). This is because what is really being measured is the 'conspicuousness' of the different species.

Conspicuousness can vary with season, for example many birds sing in spring but not in late summer, so that even relative values between species, or between counts of the same species at different times of year, are often difficult to interpret: they do not usually reflect the *actual number* of birds present. Also, there is quite a big element of chance in what is present at any site for the three minutes counted, which varies with time of day, weather conditions etc. Consequently it is important to replicate counts and to be cautious in interpretation. Ideally counts should all be made by the same observer, and replication should be at the same time of day.

In the WH study a total survey sample comprises 432 three-minute counts, representing a total of 21.6 hours of actual observation. Getting to and from the transects, and between the stations, doubles or trebles the person-hours actually involved in each survey. Spreading the work between three or four observers over a week has the advantage of 'averaging out' differences due to weather and possible differences in observer ability[2].

For assessing trends over years, the counts should all be made at the same stations and season. Although additional transects have been added, this protocol has been followed, with some counts made in June and December at the same stations in each year since 2001.

Two ways of summarizing the data are possible:

1) *Count frequency:* frequency for a species based on the number of times a species was recorded as present at a site, divided by the total number of site-counts (eg, if a bird was seen or heard on 25 occasions at the 144 station counts on Windy Hill ridges, it would have a frequency (on WH ridges) of 25/144 = 17.4%)
2) *Density(estimated number per hectare)*: based on the sum of the numbers counted on transect lines at any one time (rather than simply 'present'). Because each transect of four stations samples .78 hectare and is replicated six times at each sample period, a crude estimate of the mean and standard deviation of the density is possible[3]. The mean is the average of the six counts and the standard deviation measures the variation between the six samples.

The first measure (count frequency) cannot exceed 1.0 (100%) for any species. It is simple and easy to interpret. When based on a large sample size (as here) the percentage value relates directly to the *probability* of recording the species at a site. Moreover, it is an easier measure to compare between sites and times, and is robust

[2] Assuming that observers are allocated 'at random' to different transect lines – which is not strictly the case, see Table 2.

[3] It is not clear *exactly* how Smit & Ferriera estimated density. They used a 'modified distance sampling analysis' and refer to Buckland, S. T. et al. 1993. *Distance Sampling: Estimating abundance of biological populations.* Chapman & Hall, New York.

when carried out by different observers. Of course it still suffers from the problems of conspicuousness already mentioned.

Density is influenced by differences in conspicuousness and, when most data sets contain many zero entries, is likely to have a wide variance. Density is estimated for each species in each location by: (1) assuming that the number counted for a species at a station in the field data represent the number of individuals < 25m from the station, and (2) converting the number of birds in the circle represented by 25m radius to a hectare sample by multiplying by 5.0929. This method takes no account of the detailed 'distance' measures (other than 'within 25m') and as such it may underestimate small inconspicuous birds compared to the previous (Smit & Ferriera) analyses. It gives equal weight to a sighting or hearing at 5m as to one at 25m.

RESULTS

Total bird density

The results in Fig 1 give the average total number of birds (density) per hectare at three dates. The 95% Confidence limits (95% CL) are a measure of the variability of the average estimate in the repeated counts. Where confidence limits overlap, as, for example between WH Ridges in Summer and Winter in Fig 1, we can generally say that there is no statistically significant difference between them. Where 95% CLs *do not* overlap, as between WH Ridges and Controls in Fig 1, there is likely to be a real (significant) difference in numbers.

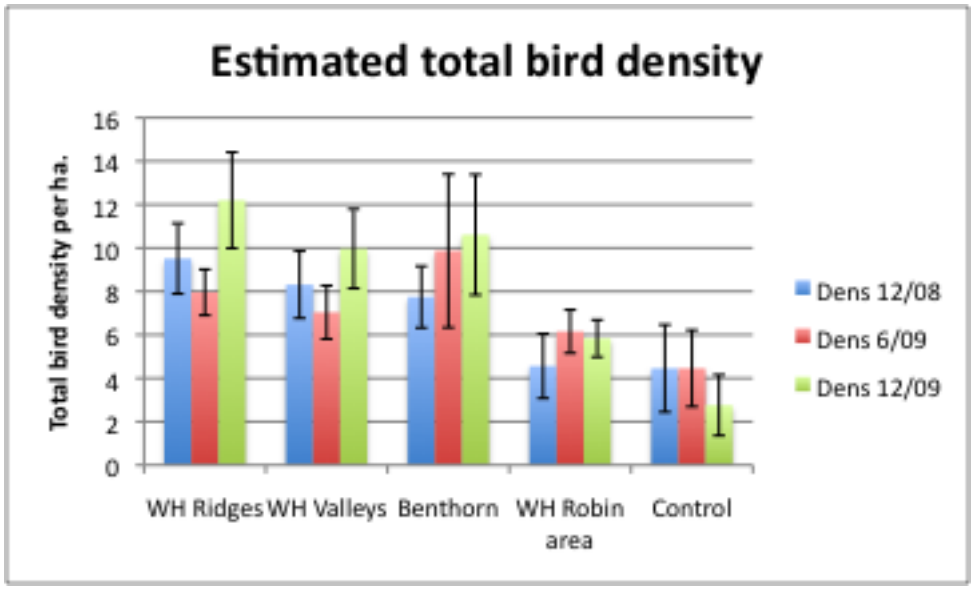

Fig. 1. Overall average density of all bird species in the five locations, summer 2008, winter 2009 and Summer 2009, with 95% Confidence Intervals (vertical lines above and below the average).

Although trends are not statistically significant in any one of the five data sets in Fig 1, nevertheless there is a consistent pattern of increased bird density from summer 08 to summer 09 in all the managed sites (Fig 2). In contrast, the unmanaged site shows a decline in bird density. Lack of statistical significance is due to the inherently high variability in these sorts of data, but the consistent trend, especially contrasted with the control area, is suggestive of a real effect overall. This is emphasised by looking at the percentage changes (Table 1). Overall, the managed areas increased in bird density by 28%, while the control decreased by (-) 38%.

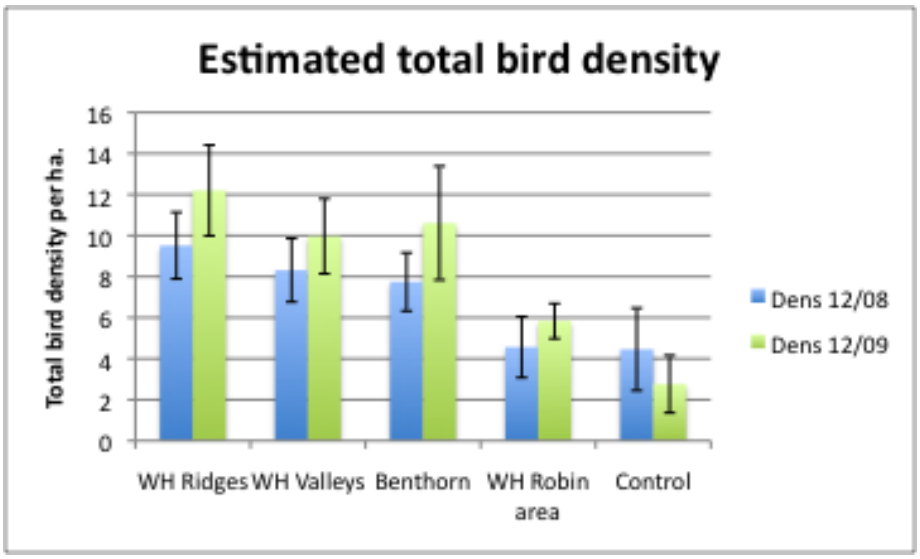

Fig 2. Overall average bird densities of all bird species, with winter 2009 data removed to show summer 08 to summer 09 trends more clearly.

Table 1. Percentage changes in total bird density summer 08 – summer 09.

	Ridges	Valleys	Benthorn	Robin area	Control
% change in density, summer 08 - summer 09	+28%	+20%	+37%	+28%	-38%

The results shown in Figs 1 and 2 and Table 2 are based on the observations at distances of less than 25m from the observer, as in all previous years. If all additional birds (heard or seen at distances greater than 25m from the point) are added to the sample, the overall picture is not changed. The average 'density' in the control area increases from 2.75 birds/ha, to 4.03 (ie to the upper limit of the confidence interval in Fig 2). However, even this higher estimate is still the lowest density recorded in summer 2009, and is still significantly lower than all other areas at that time.

Densities of selected common bird species

Kaka, kereru and tui are all large active birds, feeding on fruit and nectar and generally characteristic of more mature forest. All three are present throughout the year, although probably c. 50% of the total kaka population move from Great Barrier to the mainland during the winter (Great Barrier Island Charitable Trust Survey results).

In contrast, grey warbler and fantail, and to a lesser extent silvereye, are small insectivorous species, capable of gleaning food from stands of manuka and kanuka. Again all are present throughout the year, although they differ in conspicuousness at different seasons (ie singing/not singing) and real population sizes also appear to vary seasonally. This latter however is confused by flocking behaviour in winter.

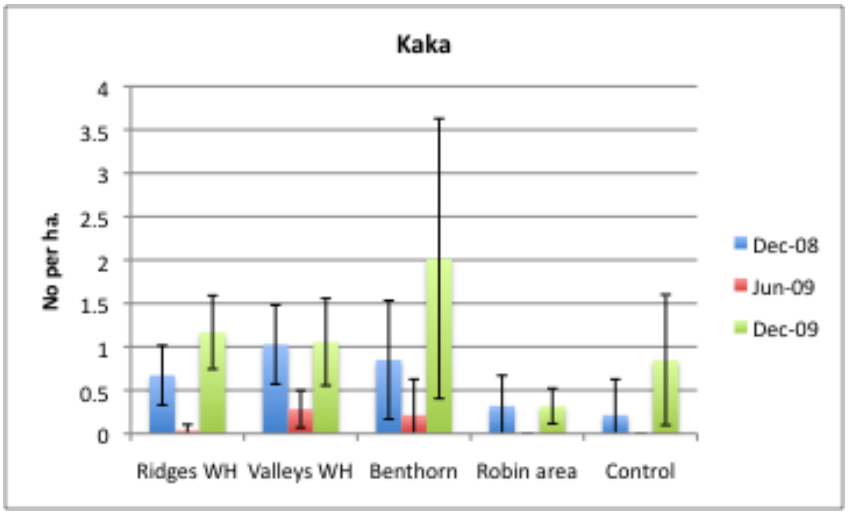

Fig 3. Kaka densities over three counts summer 2008 – summer 2009.

Kaka was recorded at slightly higher levels in 2009 compared with the previous summer, especially at Benthorn farm. There is no statistically significant difference between summers, but the winter decline is significant.

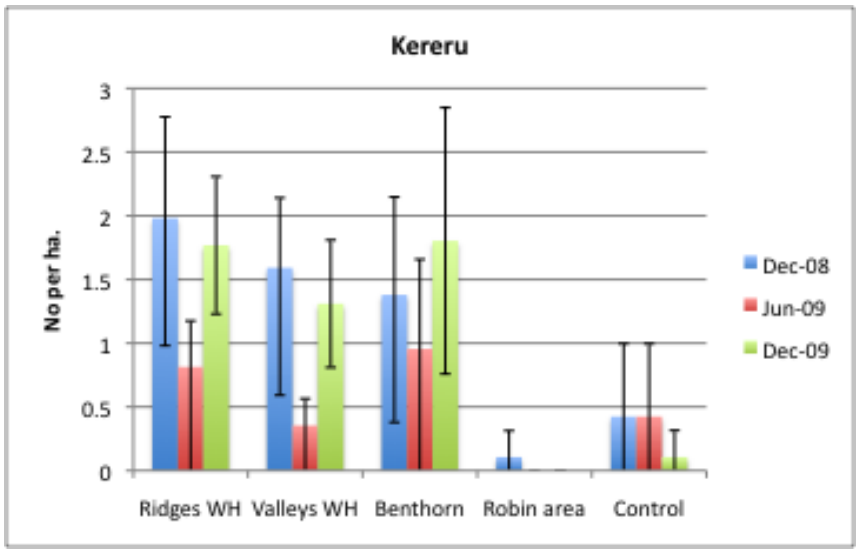

Fig 4. Kereru densities over three counts summer 2008 – summer 2009.

Due to the wide confidence intervals, there are no significant trends in kereru density between the two years. A possible increase at Benthorn could be due to a few birds spending the winter there.

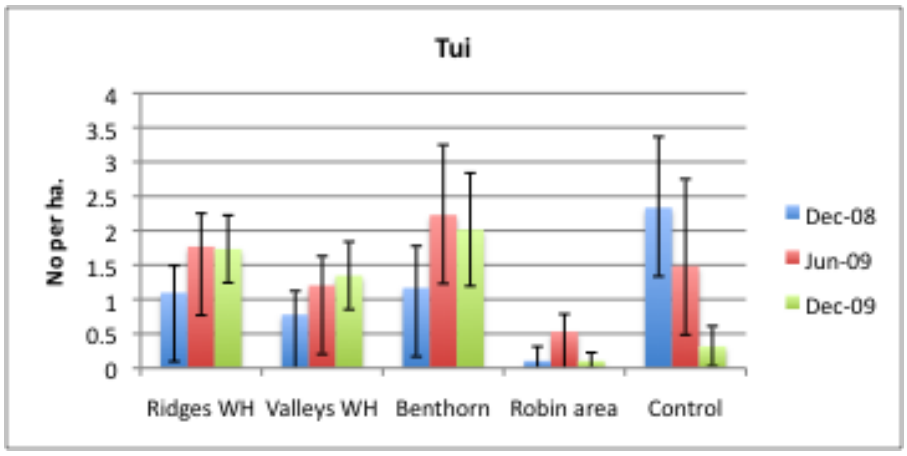

Fig 5. Tui densities over three counts summer 2008 – summer 2009.

Excepting the control area (where tui were remarkably conspicuous in summer 2008) all locations show an increase in tui in summer 2009. Anecdotally this was observed elsewhere on Great Barrier, so it may not be a response to rat control. It is perhaps a reflection of good winter survival or abundant food resources.

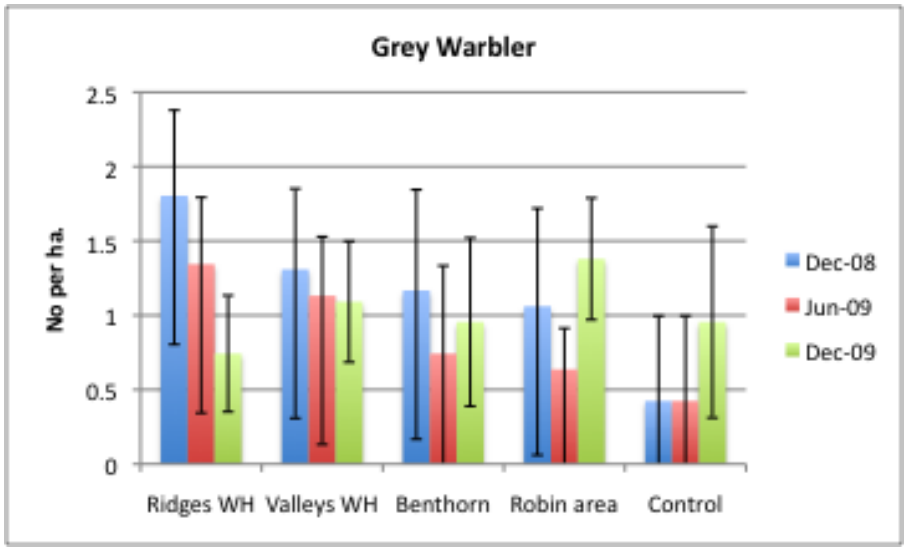

Fig 6. Grey warbler densities over three counts summer 2008 – summer 2009.

Different locations show both apparent declines and increases in grey warblers over the two summers, but given the high variability in the data it would be unwise to draw any conclusions. The apparent increases in both the Robin Area, and the Control – with contrasting rodent management – again suggests that the factors other than rat control are determining the population size estimates.

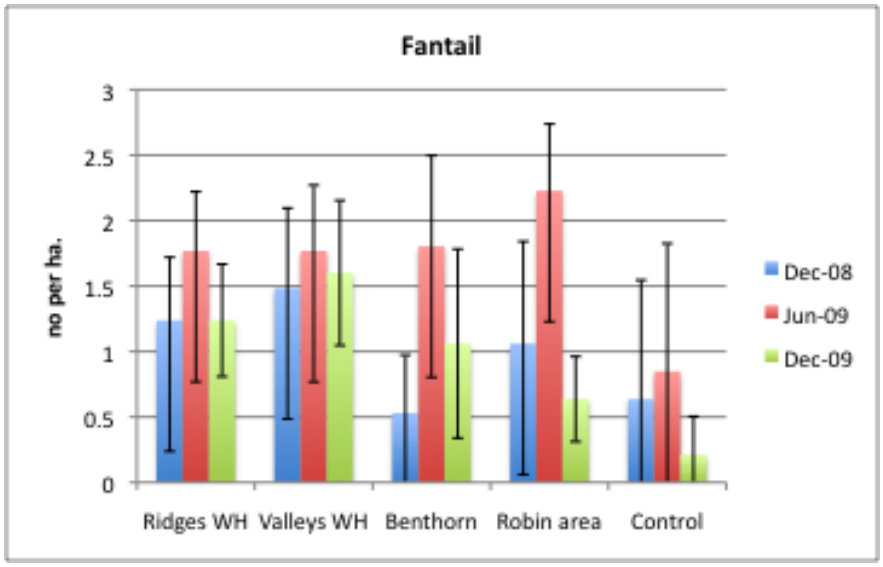

Fig 7. Fantail densities over three counts summer 2008 – summer 2009.

Fantails were again not significantly different between years, though the seasonal difference in conspicuousness is apparent at all sites. A possible decline in the both the Robin Area and the Control contrasts with the increase for grey warbler in these areas, but again, because it occurs in both places it is unlikely to be due to management.

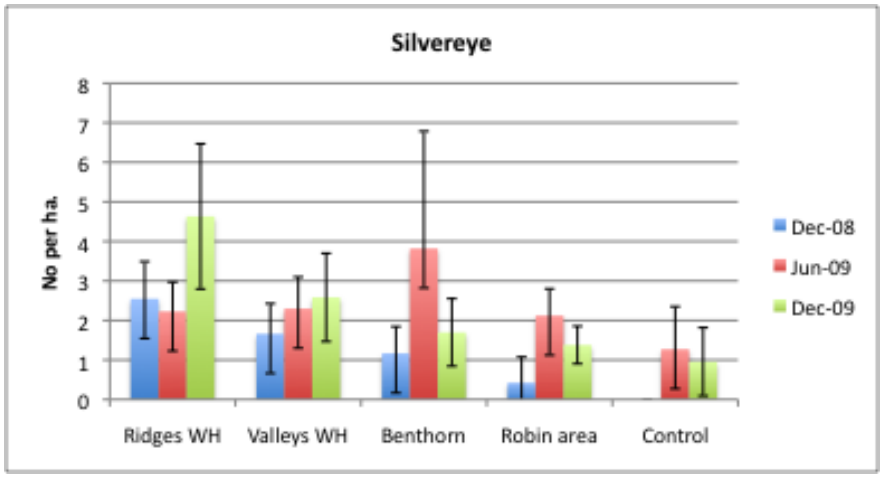

Fig 8. Silvereye densities over three counts summer 2008 – summer 2009.

Silvereyes are the most numerically abundant bird at Windy Hill. Numbers clearly fluctuate considerably seasonally and by chance if a flock is recorded, but there is a consistent pattern of increase between the summers at all sites for this species, suggesting greater overall abundance this year.

Other species

Kingfishers move out of the study area to the coast (or possibly off-island) in the winter. Likewise shining cuckoos are summer visitors only. Both species are conspicuous, especially in spring, by their calls. Table 2 suggests that shining cuckoos were more

frequent in 2009, but the pattern for kingfisher is not clear. 'Other species' were blackbird, thrush, yellowhammer and (one) morepork. While the introduced passerines are not common at Windy Hill, they seem to have increased in abundance since 2008. This trend was present in all sites except the control

Table 2. Mean densities for shining cuckoo, kingfisher and 'other species' in summer 2008 and 2009. Increases are indicated by bold type.

	Ridges		Valleys		Benthorn		Robin area		Control	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Shining Cuckoo	0	**0.07**	0	0	0	**0.11**	0	**0.21**	0	0
KingFisher	0.14	**0.50**	0.46	0.84	0.95	0.42	0.42	0.42	0.42	0.21
Other	0	**0.4**	0	**0.1**	0.21	**0.53**	0.11	**0.3**	0	0

Robins

As in the previous summer, robins were recorded only in the Robin Area, where they had an estimated density of one bird per hectare in both years. Robins were seen or heard at 14.6% of counts in both summers, but only 10.4% in winter (2009).

Overall frequencies

The overall frequencies given in Table 3 can be interpreted as the % probability of seeing or hearing a bird (of any species) within 25m in a three-minute period. This probability appears to be considerably lower in the rat-infested control area at all times. The low overall frequency of birds in the control area is also reflected in lower species diversity (never more than 6 species) compared to other areas, in both seasons.

Highest frequencies were recorded at Benthorn farm on all occasions, perhaps reflecting greater heterogeneity of vegetation types in these samples.

Table 3. Overall frequencies (all species) in all five locations over three counts

Transect	Dec-08	Jun-09	Dec-09
Ridges	72	78	80
Valleys	73	63	73
Benthorn	88	81	81
Robin	60	71	69
Control	58	58	29

Species frequencies in different locations

The values in Table 4 can be interpreted as the probability (%) of hearing or seeing the species in question on a 3 minute stop in the various locations.

Table 4. Relative frequency: times recorded as a % of the possible times. Colour shows most frequent species at locations.

(a) Frequencies in June 2009

Location	Ridges	Valleys	Benthorn	Robin	Control
Kaka	0.7	4.9	2.1	0.0	0.0
Silvereye	22.9	22.2	25.0	22.9	20.8
Tui	29.9	19.4	33.3	10.4	20.8
Shining Cuckoo	0.0	0.0	0.0	0.0	0.0
Grey Warbler	21.5	19.4	12.5	12.5	8.3
Fantail	31.3	27.8	35.4	39.6	12.5
KingFisher	0.0	0.0	0.0	0.0	0.0
Kereru	13.2	6.9	14.6	0.0	8.3
Robin	0.0	0.0	0.0	10.4	0.0
Other	0.0	0.0	2.1	2.1	0.0

(b) Frequencies in December 2008

Kaka	10.4	14.6	12.5	6.3	4.2
Silvereye	20.8	15.3	20.8	4.2	0.0
Tui	19.4	13.2	22.9	2.1	45.8
Shining Cuckoo	0.7	0.0	6.3	0.0	0.0
Grey Warbler	26.4	18.8	20.8	18.8	8.3
Fantail	18.8	19.4	10.4	16.7	8.3
KingFisher	2.8	9.0	14.6	8.3	8.3
Kereru	22.9	22.2	22.9	2.1	8.3
Robin	0.0	0.0	0.0	14.6	0.0
Other	0.0	0.0	4.2	2.1	0.0

(c) Frequencies in December 2009

	Ridges	Valleys	Benthorn	Robin	Control
Kaka	18.7	14.3	20.8	6.3	10.4
Silvereye	29.2	22.1	27.1	20.8	10.4
Tui	27.8	20.7	35.4	2.1	6.3
Shine Cuckoo	1.4	0	2.1	4.2	0
Grey Warbler	11.8	17.9	18.7	25.0	16.7
Fantail	20.1	22.1	16.7	10.4	4.2
KingFisher	9.0	11.4	8.3	8.3	4.2
Kereru	26.4	19.3	27.1	0	2.1
Robin	0	0	0	14.6	0
Other	5.6	2.1	8.3	4.2	0

Thus, in June 2009 we would expect to hear or see grey warbler on c. 21.5% of stops on ridges at Windy Hill, but only on 8.3% of stops in the control area. As in the previous

Report, the frequency results mirror the density estimates. Shifts in frequencies between different species appear more marked, but these frequencies have no 'error' estimates (95% Confidence Limits). In winter 2009 fantail was the most frequently encountered bird at all locations except the control area. The summers appear to differ slightly in the conspicuous of different species, but this is probably random variation rather than real changes in species composition. Note that, while kereru was not the most frequent species in Windy Hill Valleys or at Benthorn farm in 2009, nevertheless, it was more frequent there than was the case in the previous year.

Overall species diversity appears slightly higher than summer 2008 (Table 5), due to the inclusion of blackbirds, thrushes and a yellowhammer. If species heard or seen outside the 25m sample area are included, the Control diversity increases to 9.

Table 5. Number of different bird species recorded: Summer 2008, Winter 2009 and Summer 2009.

Location	Ridges	Valleys	Benthorn	Robin	Control
Dec-08	8	7	9	9	6
Jun-09	6	6	7	6	5
Dec-09	10	8	10	10	7

DISCUSSION

Comparison of densities per ha. with earlier counts at Windy Hill

The analyses presented here are not strictly comparable with those presented in the earlier ECORAP reports. It is hoped to rectify this in subsequent reports. The results are however comparable with Reports 1 and 2 in this series (Windy Hill Rosalie Bay Catchment Trust. Bird Counts December 2008. Report John Ogden 1. February 2009).

The results indicate an increase in overall bird density and species diversity between Summer 2008 and Summer 2009. The results in Fig. 2 and Table 1 are encouraging. Although it might be tempting to relate the increase in bird numbers directly to the shift to toxin-based rodent control, such a conclusion can be only tentative at present. For a start, the increase does not apply equally to all species or to all areas, and most changes are statistically non-significant. Moreover, although the Control Area has shown a decrease in bird density over the same period, some species appear to have increased there, while declining elsewhere (e.g. grey warbler).

Comparisons between locations at Windy Hill

Bird density and diversity was highest on the Windy Hill and Benthorn transects, and lowest in the Robin and Control (unmanaged) Areas. This difference is statistically

significant. Ferreira (2008) also noted the lower bird density in the control area, and it was additionally confirmed by an independent survey in September 2008. Thus there is little doubt that the control area has a lesser bird density than the ridges and valleys of Windy Hill and Benthorn farm; but whether this difference is due to the differences in rodent management or a result of other relatively small habitat differences is not so clear (Stacey Lockie 2008, *Unpublished Report;* Perry & Ogden *in prep.)*. The robin area is intensely managed, but never-the-less has low bird density and diversity like the control. The reasons for these differences between areas warrant further study.

Comparison with other bird counts on Great Barrier

As explained in the last Report (2), comparison with other bird counts on Great Barrier presents difficulties due to methodological differences. The only species apparently more frequent at Windy Hill than elsewhere is Kereru. This is a significant finding, because kereru is the characteristic species of the mature forest on Great Barrier Island. Because it disperses large numbers of viable seeds of nikau palm and canopy trees, kereru is a 'keystone' species in the transition from scrub to forest.

Other influences on the bird count numbers

Gradual vegetation change, changes in the abundance of introduced birds which are possible competitors for limited food supplies, and rodent control, all act to influence the results obtained from the bi-annual bird counts. Superimposed too are seasonal fluctuations, and possible effects of extreme climatic events, such as the big storms in the winter of 2008. However, in assessing the results from year to year, and in comparison with other areas, differences in methodological and analytical techniques are of primary importance. It is essential to maintain these techniques, or, if changes are deemed necessary, to critically assess the effect of the change on the interpretation of the data.

? Competitive interactions or site differences

The data suggest relationships between species abundances, which can be explored further as more data accumulate. Some selected results are given in Fig 9 simply to illustrate the possibilities. The data in Fig 9 were chosen from the summer counts only (2008,2009) to avoid the confounding influences of seasonal movements in some species more than others.

There are generally positive relationships between the abundances of kereru and kaka, and kereru and tui. Presumably the low values on the left of the graphs represent those locations unfavourable for both species. However, the polynomial (2^{nd} order) curve (which is statistically highly significant in the case of kereru and tui) seems to suggest that, at high levels of kaka and tui, kereru will be less conspicuous (leave the area?). A similar relationship occurs between grey warbler and silvereye. Possibly, although these species pairs generally cooperate well together, high densities of tui will drive out kereru, and high numbers of silvereyes will drive out grey warblers. These highly speculative comments are made mainly to emphasise the way these sorts of data can be

used to generate hypotheses for further testing, which might help to explain some of the variability in the data, and suggest how food resources could limit bird numbers (via competitive hierarchies) if predation ceased to be the main factor.

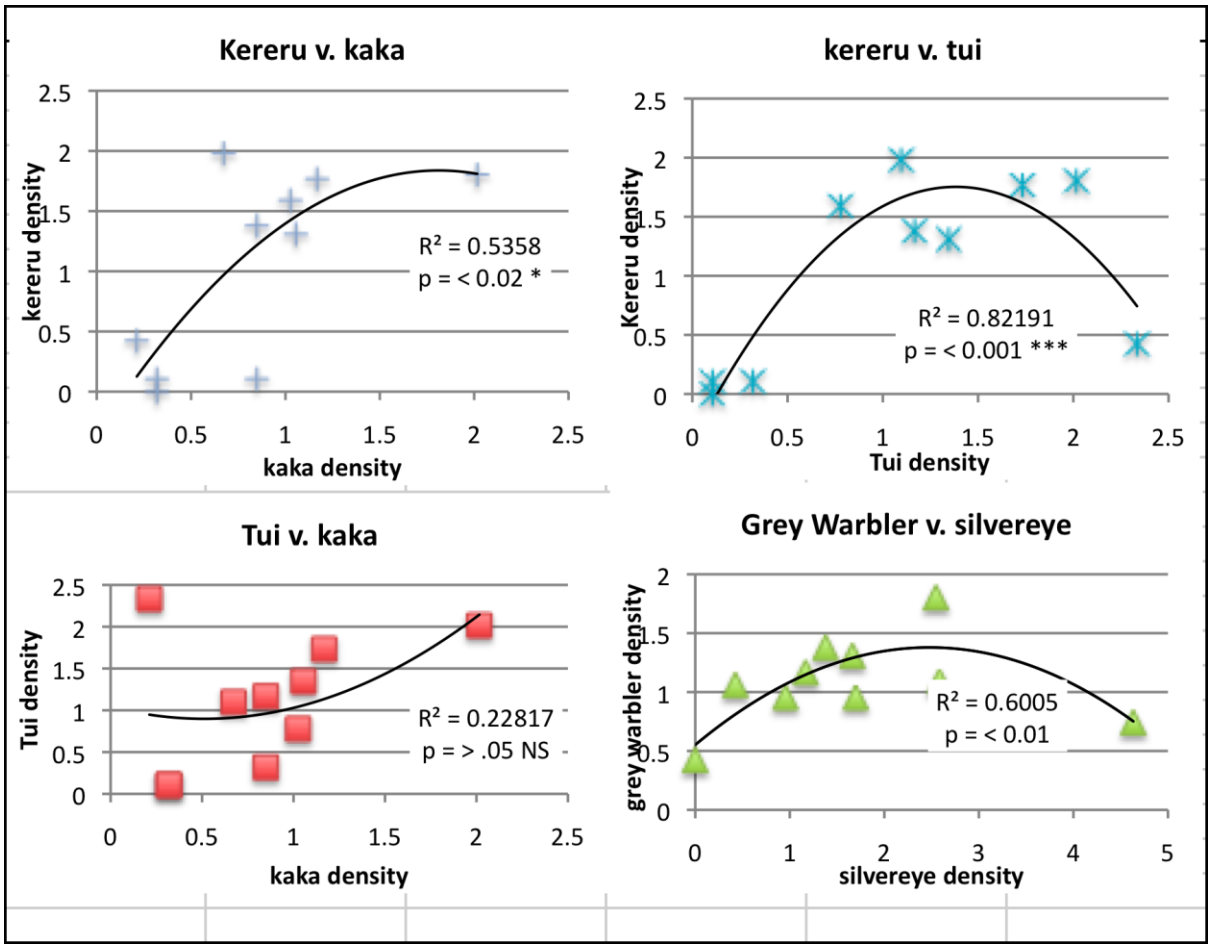

Fig 9. Relationships between species densities on the five study areas over two summers (n = 10). R^2 represents the variance explained by the curve (e.g. 53.58% for kereu and kaka); p represents the likelihood of getting such a value by chance (e.g. less than 0.1% in the case of kereru and tui).

CONCLUSIONS

° The Summer 2009 counts are higher than those made in the previous winter, as expected. However, they also show consistent increases (except in the Control) over the counts made in the previous summer. These trends are not statistically significantly, but their consistency in all four managed areas suggests they are real.
° The consistent differences in bird density, frequency and diversity, between the unmanaged control site and the remainder of Windy Hill, noted in the last report, are confirmed. These differences are even more marked than they were in 2008 and are statistically significant overall, though not for all species.

The increased sample size in the Control has assisted in this respect. The difference between the managed and unmanaged areas is consistent with, but not necessarily caused by, the presence of rodents in the unmanaged (control) area. There are also subtle vegetation differences to consider.

° There are some differences in the bird density etc between the 'robin area' and the remainder. Again, there are vegetation differences, but the reduced bird numbers in the robin area could be a reason why it was originally chosen by the robins.

° Trends for 'indicator species' such as a possible increase for kereru (in mature forest) may reflect the subtle changes in forest structure occurring at Windy hill as the forest cover matures. (Kereru is likely to be in competition with tui for some food resources, and at high densities of the latter it might move elsewhere).

RECOMMENDATIONS

1. The bi-annual recording should be continued. If it is necessary to curtail it, then the winter count could be cut out.
2. The additional transect in the Control should continue to be monitored. Doubling the sample size in the Control improves the estimate of Confidence Limits (which rely on 'n') and hence the statistical comparison with other places.
3. The field recording sheets could be restructured slightly to allow for recording species seen/heard outside the 25m radius.

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