



# Native Bird Monitoring

## Regional Report for Greater Wellington and Upper Hutt City Council

Monitoring and Investigations, Greater Wellington Regional Council  
July 2008

Quality for Life



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# **Native bird monitoring report**

July 2008

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## 1. Executive summary

Five minute bird counts are conducted in the Wellington region to determine:

1. Relative abundance of native birds
2. Distribution of native bird species
3. Presence of rare species
4. Changes in native bird populations over time
5. The response of native bird populations to predator control.

Five minute bird count monitoring was conducted in 14 reserves in the greater Wellington region in February and March 2008, with seven of these reserves selected by the Upper Hutt City Council (UHCC). Nine native forest bird species were monitored for long-term trends with rare species discussed separately.

For all reserves combined, the most abundant bird species were the silvereye. Tui were the next most abundant with fantail and grey warbler respectively the third and fourth. Woodpigeon were more abundant than bellbirds, kākāriki, tomtits and whitehead but all species were consistently recorded in the surveys from 2006 to 2008.

In terms of the presence and absence of species during these five minute counts, fantail, silvereye and tui were present in all reserves in 2008. Grey warbler were consistently detected in most reserves each year (e.g. 13 out of 14 reserves for 2008), and also woodpigeon (e.g. 12 out of 14 reserves for 2008). Bellbird were present in about half of all the reserves monitored. Kākāriki, tomtit and whitehead were normally encountered in one or two reserves each year.

For Upper Hutt sites tui were the most abundant bird species, with silvereye the second most abundant. Woodpigeon and grey warbler were a close third and fourth respectively, with fantail and bellbird similar in numbers. Tomtit and whitehead were detected in Keith George Memorial Reserve. No kākāriki were detected in the Upper Hutt sites this year.

In 2008 fantail, woodpigeon, silvereye and tui were present in all seven of the Upper Hutt reserves. Bellbird, grey warbler, tomtit and whitehead exhibit similar presence/absence trends as for all Wellington reserves combined this year.

No particularly rare birds were detected in the sites monitored in this summer programme. Findings from this bird monitoring programme are discussed in relation to bird monitoring in Wellington performed by other agencies.

## 2. Introduction

The objective of the Greater Wellington native bird monitoring programme is to determine the outcomes of the Regional Pest Management Strategy (RPMS) on native bird populations. In the RPMS Operational Plan 2007-2008, section 3.6 “Site Lead - Key Native Ecosystem Management”, the primary objective is “to achieve a measurable improvement in the ecological health and diversity of Key Native Ecosystems (KNE) using a range of suitable indicators”.

The Greater Wellington Monitoring and Investigations Section are monitoring birds in selected KNEs throughout the Wellington and Wairarapa regions. KNEs are areas of high ecological value. Additionally the Upper Hutt City Council has requested bird monitoring in some of the Upper Hutt reserves. Bird counts in the Upper Hutt sites are performed at the same time as the Greater Wellington counts, and these data are pooled with Greater Wellington annual results.

The presence and absence of native birds in these reserves and the relative change of abundances over time provide effective indicators of ecological health. The aim is to detect major changes in native forest bird populations over time and relate these to management programmes in place. Native bird populations have higher nesting success and lower adult mortality following effective rodent, possum and stoat control (e.g. the woodpigeon case study in Motatau Forest, Northland, and the North Island robin's research in the Waipapa Ecological Area, Waikato). Native bird outcomes can be of interest to care groups, local authorities, landowners, the scientific community, the general public and other stake holders and is an invaluable tool for decision making.

Miskelly et al (2005) state “*that it is important to document the rate of re-colonisation by native forest birds into and between fragmented forest reserves, as the response of these birds to animal pest control may be applicable to restoration projects in many other parts of New Zealand*”. Bird monitoring is useful in tracking the emergence of rare species in Wellington reserves and determining the stability of species detected.

Native bird monitoring is performed using the five minute bird count method (Dawson and Bull, 1975). Although five minute bird counts measure population changes over time, they are not designed to determine absolute abundance. Bird populations are temporally variable due to environmental factors, and therefore long term trend data is necessary to distinguish any real management induced population change. Behavioural factors can also affect the count index, and that is alleviated to some extent by large sample size. Five minute bird counts are a well-established monitoring method allowing sites from diverse locations to be compared.

This report presents data from 14 reserves, with a total of 82 bird count stations. Data is pooled from all of these reserves for a regional picture of the status of native birds in Wellington reserves. The data for UHCC sites are also presented separately to show native bird trends in these reserves. The pest control in place is similar between UHCC reserves and the Greater Wellington

KNE sites and we have combined these data for a fuller picture of native bird populations in Wellington.

### 3. Methods

Monitoring sites are chosen because they have been assigned “high priority” status using an ecological prioritisation model (the “Top 100 KNEs”), or because there is interest from volunteer groups or Territorial Authorities. Because they are sites that house significant native biota, Greater Wellington Biosecurity staff, sub-contractors and volunteer groups conduct pest control programmes within the majority of these reserves. Reserves in the Wairarapa also receive possum control under the Animal Health Board (AHB) Tb vector management programme.

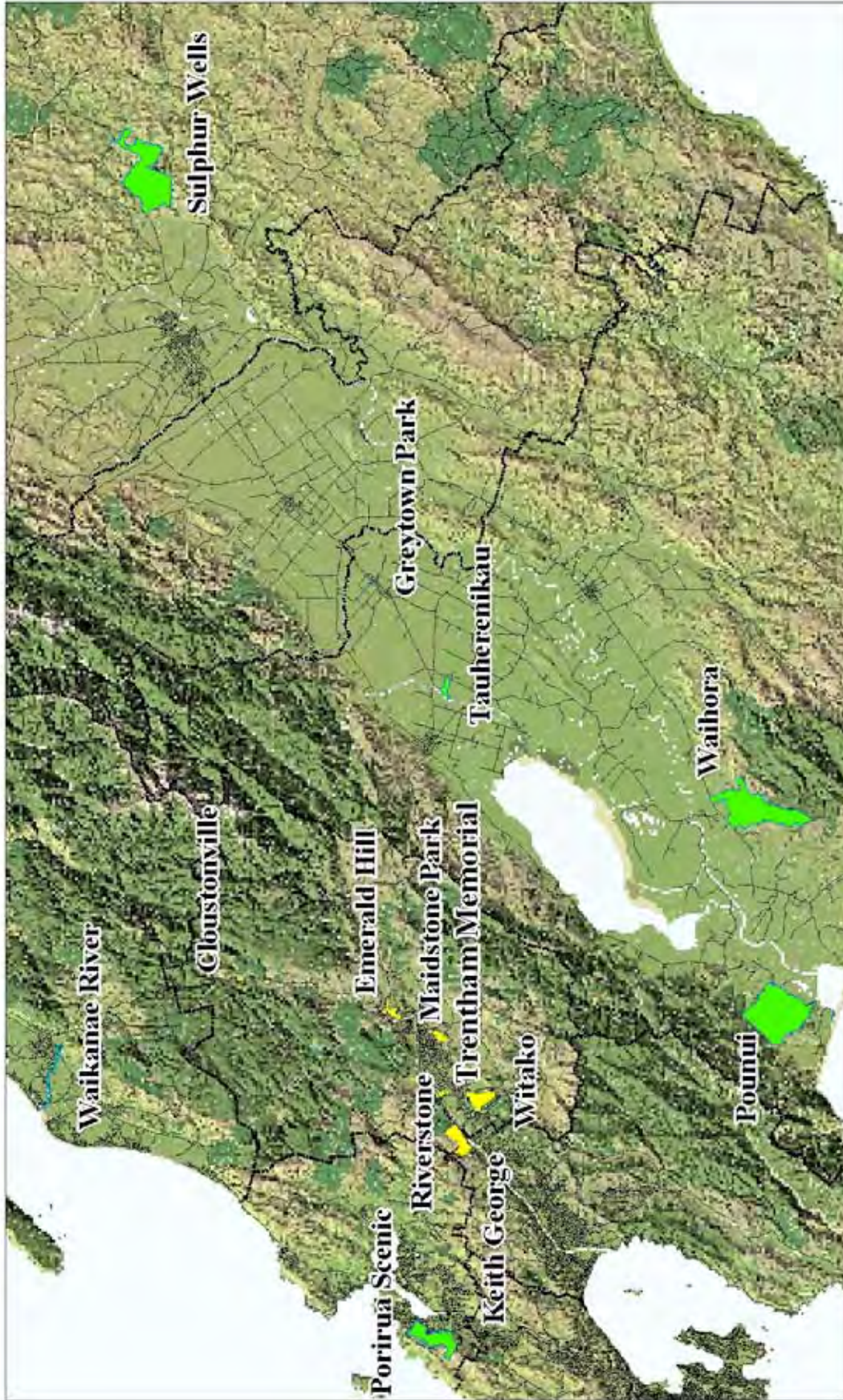
Table 1: Sites of bird count stations

	Started	Managed by	Hectares
Cloustonville	2007	Upper Hutt City Council	8
Emerald Hill	2006	Upper Hutt City Council	46
Greytown Park	2007	South Wairarapa District Council	4
Keith George	2005	Upper Hutt City Council	168
Maidstone Park	2006	Upper Hutt City Council	37
Porirua Scenic	2005	Porirua City Council	298
Pounui	2005	South Wairarapa District Council	1223
Riverstone	2007	Upper Hutt City Council	6
Sulphur Wells	2006	Masterton District Council	1206
Tauherenikau	2005	South Wairarapa District Council	53
Trentham Memorial	2007	Upper Hutt City Council	15
Waihora	2006	South Wairarapa District Council	1056
Waikanae River	2007	Kapiti Coast District Council	70
Wi Tako	2006	Upper Hutt City Council	147
		<b>Total</b>	4337

A pilot study was established during the spring/summer period of 2002 to compare the advantages of using an absolute density sampling technique incorporating distance measures over a relative abundance measure without the distance factor. Distance sampling requires a large number of samples within sites with high bird densities in order to accurately estimate density. This initial bird study led to Greater Wellington choosing a non-distance sampling (relative abundance) technique for their annual bird counts which follows protocols adopted by other local authorities (e.g. Wellington City Council).

A preliminary point-transect trial was run with four sites in February 2005 and the programme officially started in February 2006 with nine sites. In 2007 UHCC joined the programme with the addition of four new sites and an extra bird count station in the Brown Owl Reserve which is grouped within the Emerald Hill site. The Friends of Waikanae River volunteer group kindly donated their five minute bird count data for March 2008 which was incorporated into the regional picture this year. Map 1 shows all the reserves monitored this year.

Map 1: Greater Wellington and Upper Hutt City Council bird monitoring sites for 2008



**GREATER WELLINGTON KNE BIRD MONITORING SITES 2008**

Upper Hutt sites are shown in yellow

**1:250,000**



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The rodent and possum control within these 14 reserves is generally based on a brodifacoum/pindone baiting regime with bait stations spaced about 150m apart in grids throughout the reserves. There are two UHCC sites that do not receive pest animal control (Cloustonville and Riverstone), and two Greater Wellington sites with limited rodent control (Greytown Park and Pounui). However, these latter two sites receive possum control under the AHB Tb vector management programme. There is only mustelid control in the Waikanae River Reserve. Keith George, Porirua Scenic, Sulphur Wells, Tauherenikau and Waihora all additionally receive mustelid control.

Data was collected using either point-transect or random point sampling five minute bird counts. Transect lines had three bird monitoring points, each spaced at 200m intervals. Random points at least 200m apart were used in small reserves where transects could not be fitted. This distance is to reduce the risk of recording individual birds in more than one station. The number of bird count stations in each reserve was allocated according to reserve size and a weighting system to ensure small reserves were not over-represented in the study.

For each count the observer walked towards the station cautiously and observed any birds that were disturbed on the approach. They then waited for a period of two minutes before the five minute count officially began. During this period the observer prepared for the five minute count recording habitat and weather information and also any birds seen or heard calling during the wait. For the five minute bird count any birds seen or heard were recorded. Those seen flying through the area without landing were recorded but excluded from the final tally. An individual bird was only recorded once in each five minute period either as seen or heard depending on which was first observed.

All species of both exotic and native species were recorded. The counts were performed three times at each station over three different days (total of 246 counts). They were performed at least one hour after sunrise and finished before midday in the months of February and March. The counts were conducted only on days with minimal wind disturbance, no rain or mist and the entire survey for each site was completed in as few days as possible.

The monitoring was performed by Steve Playle and Nyree Fea in Pounui, Sulphur Wells and Waihora. Claudia Duncan (a sub-contractor to Greater Wellington) counted the birds in Greytown Park, Keith George, Porirua Scenic, Tauherenikau and Waikanae River (as the volunteer). Forest and Bird Society members Alan and Glennis Sheppard and Lynne and Leo Smith surveyed the Cloustonville, Emerald Hill, Maidstone Park, Riverstone, Trentham Memorial and Wi Tako reserves as volunteers.

For analysis we focussed on the species of birds that primarily inhabit forest habitat. These species are the bellbird, grey warbler, fantail, kākārīki, silvereye, tomtit, tui, whitehead and woodpigeon (nine species in total). We excluded birds that are; nocturnal (morepork), typically observed more than 50m away (New Zealand falcon, Australasian harrier), are normally near waterways or open fields (kingfisher, white-faced heron, paradise duck, pukeko, seagull), and those not present throughout the entire year (shining cuckoo, long-tailed cuckoo). We have also presented results from three introduced bird species (blackbird, starling, eastern rosella) in order to track the



effects of pest management and pest control on exotic species. These species were three of the most abundant introduced bird species over the last three years.

Our analysis concentrate on the comparison of bird numbers between the three annual counts since February 2006 and for the UHCC sites separately.

Data were analysed using Excel spreadsheets. The number of birds of each species counted at the stations is represented as a mean (with the standard error). This number is calculated from the number of each bird species counted within each reserve divided by the number of counts (i.e. the number of stations x 3). This is then divided by the total number of reserves monitored to show the number of birds per station on average in reserves in the greater Wellington region.

Results are also presented for the individual reserves where particularly interesting observations were made. As there are only two to five bird count stations in these reserves, there are not enough data to analyse relative abundance, however any particularly interesting occurrences are detailed within the presence/absence section. If a particularly rare bird is detected (e.g. robin, rifleman, stitchbird, kaka, saddleback, kiwi, kokako) then the results will be presented in the presence/absence section, however, none of these species have yet been recorded in the Greater Wellington summer monitoring programme.

## **4. Result**

### **4.1 All Wellington reserves**

The average number per count station per day for the nine native forest birds and three most common exotic birds are listed in Table 2. For all reserves combined in this programme, silvereye was the most abundant species and has consistently been so for the last three years. Tui, fantail, grey warbler, and woodpigeon were the next most common birds respectively since 2006. Bellbirds are present at low levels with tomtit, whitehead and kākāriki present in at least one or two reserves each year. During the walk between count stations and the two minute wait before the actual five-minute count no particularly rare birds were detected.

Table 5 presents presence/absence only data (i.e. not actual numbers counted but simply presence, 1, or absence, 0). This table shows that for all Wellington reserves combined, silvereye, tui and woodpigeon have been consistently recorded in all of the reserves over the years and bellbird present normally in at least half. For 2008 fantail, silvereye and tui were observed in all reserves, grey warbler were found in all but one and woodpigeon in all but two reserves. Kakariki, tomtit and whitehead consistently appear in these counts in one or two reserves each year.

Table 2: The average number of native forest and exotic birds in count stations in Wellington

	2006	2007	2008
<b>Natives</b>			
bellbird	0.21	0.16	0.19
grey warbler	0.51	0.87	0.62
fantail	0.78	0.80	0.66
kākāriki	0.01	0.00	0.01
woodpigeon	0.47	0.50	0.39
silveryeye	1.27	1.50	1.39
tomtit	0.02	0.06	0.01
tui	1.00	1.03	0.80
whitehead	0.15	0.15	0.02
<b>Exotics</b>			
blackbird	0.06	0.67	0.54
starling	0.23	1.08	1.20
eastern rosella	0.03	0.27	0.26

Chart 1: Mean number of native forest birds in Wellington reserves

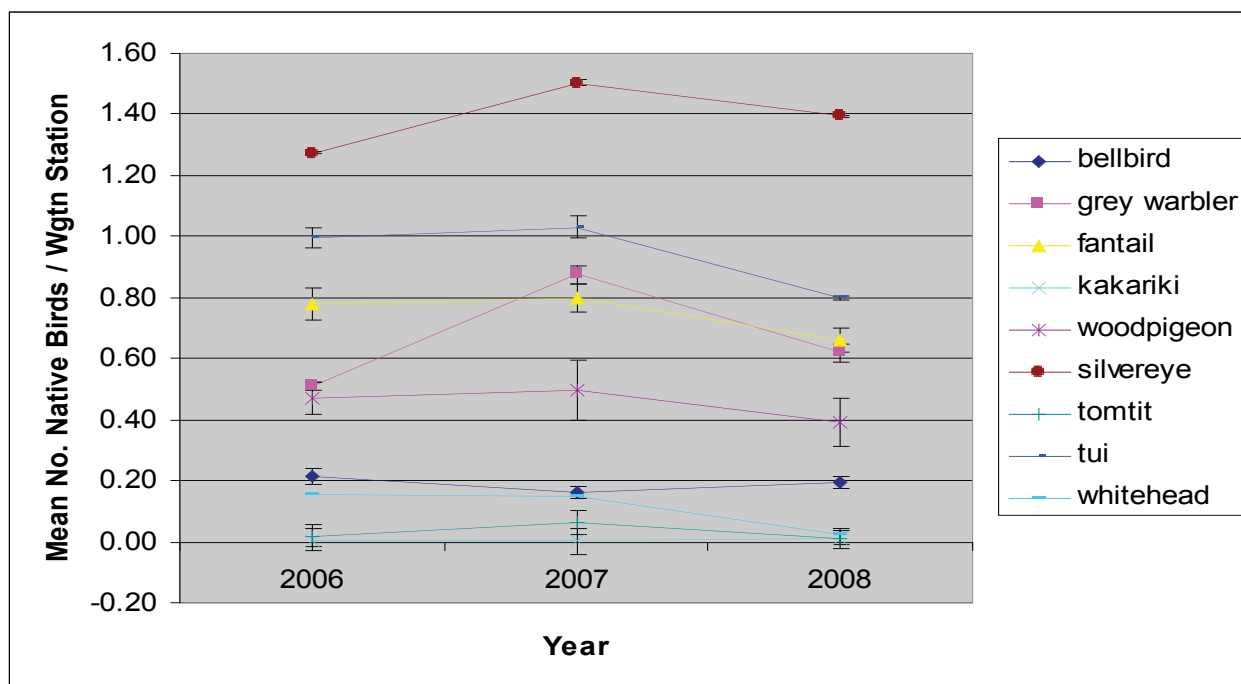
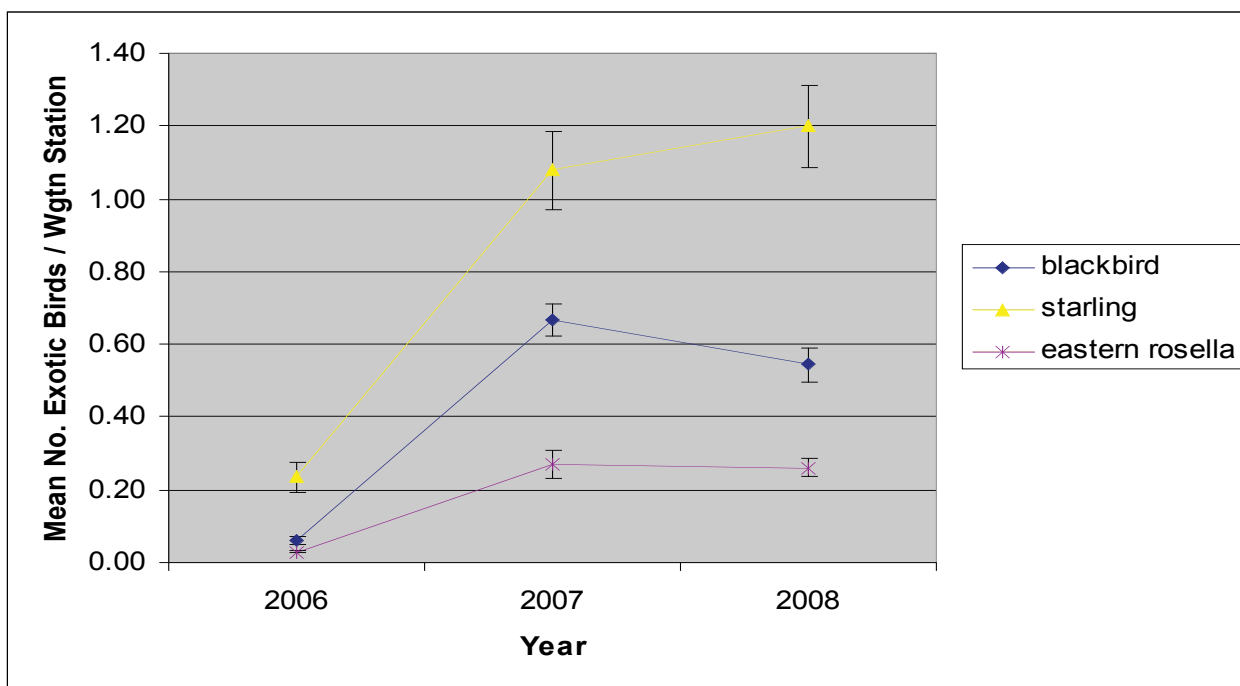


Chart 2: Mean number of exotic birds in the Wellington region



#### 4.2 Upper Hutt sites

Table 3 lists the average number of birds in Upper Hutt bird count stations per day. The seven Upper Hutt sites (Cloustoneville, Emerald Hill, Keith George, Maidstone Park, Riverstone, Trentham Memorial and Wi Tako) are depicted separately in Chart 5 for native species and Chart 6 for exotic. In 2007, grey warbler were the most abundant with tui, silvereye and fantail close behind. This year tui were the most abundant bird in UHCC reserves with silvereye, woodpigeon and grey warbler similar in numbers. The three exotic species fluctuate widely in their year to year numbers.

Table 6 shows the presence or absence for each native bird species in Upper Hutt. Fantail, woodpigeon, silvereye and tui were detected in all Upper Hutt reserves this year with grey warbler in all but one reserve. Tomtit and whitehead are present in consistently low numbers over the years with no kākāriki detected in Upper Hutt sites in 2008. As was similar for the Wellington reserves combined, bellbird are generally present over the three years in about half of the Upper Hutt sites.

Table 3: The average number of native forest and exotic birds in count stations in Upper Hutt

	2006	2007	2008
<b>Natives</b>			
bellbird	0.31	0.13	0.20
grey warbler	0.46	0.71	0.33
fantail	0.36	0.54	0.25
kākāriki	0.01	0.00	0.00
woodpigeon	0.17	0.14	0.35
silvereve	0.74	0.56	0.42
tomtit	0.01	0.10	0.02
tui	1.03	0.64	0.62
whitehead	0.35	0.25	0.05
<b>Exotics</b>			
blackbird	0.01	0.37	0.10
starling	0.00	0.23	0.17
eastern rosella	0.06	0.15	0.12

Chart 5: Mean number of native forest birds in the Upper Hutt region

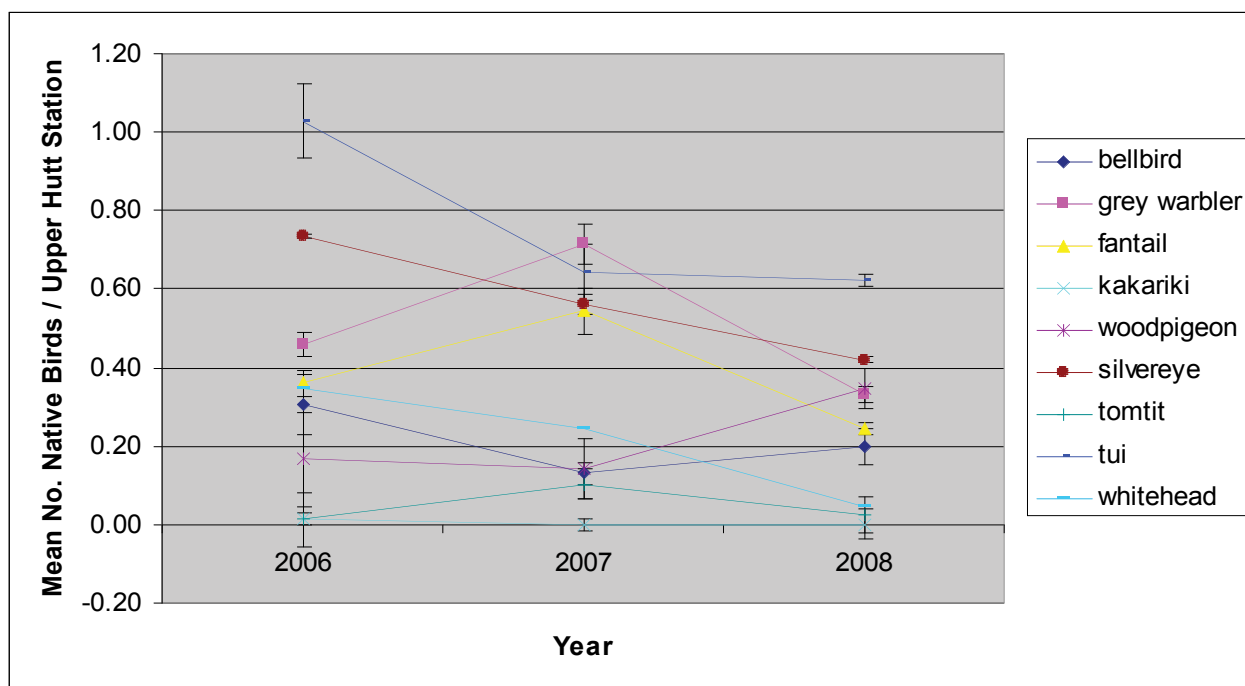
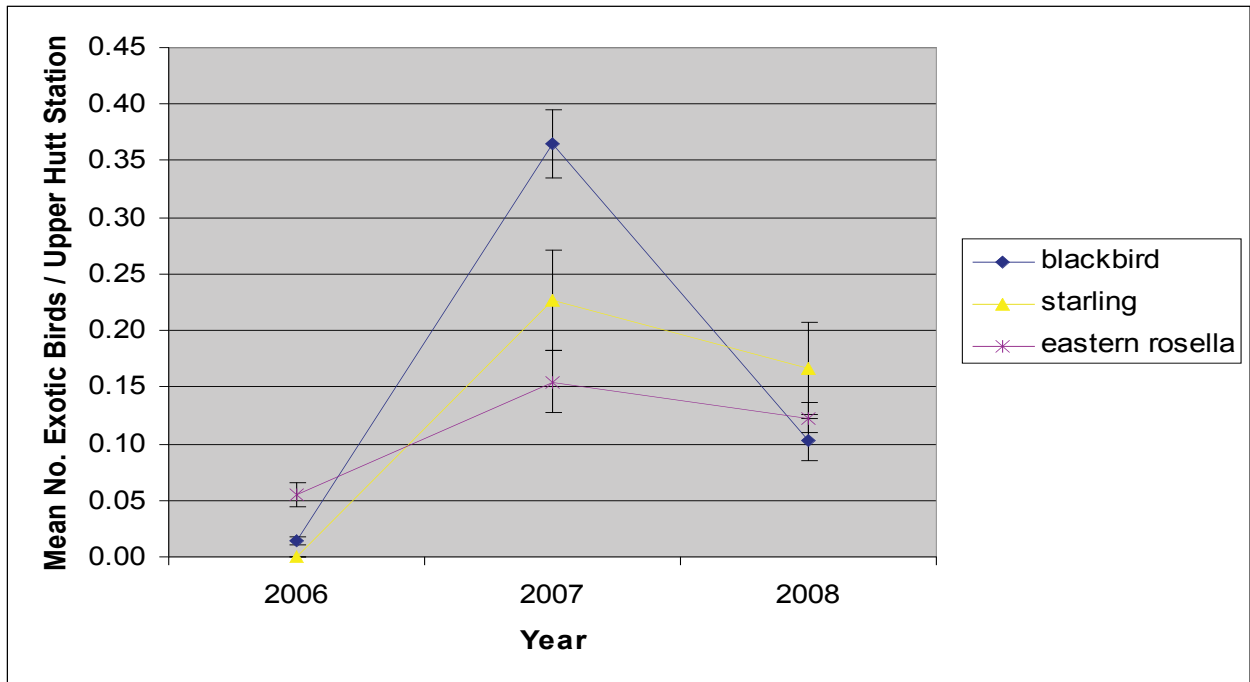


Chart 6: Mean number of exotic birds in the Upper Hutt region



### 4.3 Individual reserves – presence/absence

Table 4 shows the presence and absence of each native forest bird species in each reserve and Table 5 summarises this information (corrected for the number of reserves monitored each year). The only unusual observation this year was for the Tauherenikau Racecourse bush area where a kākāriki was heard in one of the nine counts performed there. Kākāriki were also observed in Porirua Scenic Reserve in 2007 and 2008 and Keith George Memorial Reserve in 2006.

All reserves in 2008 had fantail, tui and silvereye. Grey warbler were present in all reserves this year except for Trentham Memorial and woodpigeon were present this year in all except for Greytown Park and Waikanae River. Bellbird have been consistently detected in the Keith George Memorial, Pounui and Sulphur Wells KNEs.

Tomtit and whitehead are consistently heard in Keith George Memorial reserve with tomtit occasionally heard in Pounui also. Keith George has consistently been the reserve with the greatest native bird species diversity.



Table 5: Summary of the presence of each native forest bird species over the last three years from the data shown in Table 4 divided by the total number of reserves monitored in each year ("1.00" represents presence in all reserves)

<b>Totals Wellington</b>			
<b>SPECIES ▼</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
bellbird	0.56	0.42	0.57
grey warbler	1.00	1.00	0.93
fantail	0.89	1.00	1.00
kākāriki	0.11	0.08	0.14
woodpigeon	0.89	0.75	0.86
silvereeye	1.00	0.83	1.00
tomtit	0.22	0.25	0.07
tui	1.00	0.92	1.00
whitehead	0.11	0.17	0.07

Table 6: Summary of the presence of each native forest bird species over the last three years from the Upper Hutt reserves shown in Table 4 divided by the total number of Upper Hutt reserves monitored in each year ("1.00" represents presence in all Upper Hutt reserves)

<b>Totals Upper Hutt</b>			
<b>SPECIES ▼</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
bellbird	0.50	0.43	0.43
grey warbler	1.00	1.00	0.86
fantail	0.75	1.00	1.00
kākāriki	0.25	0.00	0.00
woodpigeon	0.75	0.57	1.00
silvereeye	1.00	0.71	1.00
tomtit	0.25	0.29	0.14
tui	1.00	0.86	1.00
whitehead	0.25	0.14	0.14

## 5. Discussion

As previously stated, three years is a very short time to detect any significant trend in bird populations and what may appear to be a trend may only be due to natural fluctuations and not necessarily the effects of pest management. Bird monitoring on a regional scale using five minute bird counts traditionally takes years to discern any significant change in bird populations.

### 5.1 All Wellington reserves

Silvereeye were the most abundant species for the last three years when all reserves are combined, and the second most for Upper Hutt reserves. They are a very common species throughout New Zealand inhabiting native forest, scrub from sea level to the tree line, exotic plantations, orchards and suburban gardens and have spread too many of the offshore islands. They are considered a self-introduced native species present in New Zealand since about 1850 (Heather and Robertson, 2005). They have a varied diet of insects, fruit and nectar. Due to this successful colonisation, their flocking behaviour, and generalised diet, silvereeye are commonly recorded in higher numbers than other native species in our bird counts.

Tui, the second most abundant bird in the Wellington combined counts, is an endemic species widespread throughout the North Island and west of the main ranges in the South Island (Robertson et al, 2007). They are the dominant nectar eater in New Zealand and although often seen feeding with other tui, are generally solitary in their habits (Heather and Robertson, 2005). They are the second most abundant species for all reserves combined and the most abundant species in the Upper Hutt reserves this year. Froude (2008) reports a “spectacular increase” in the relative abundance of tui in WCC reserves. They are a native forest species exhibiting a very positive response to predator control.

The insectivorous grey warbler and fantail are the third and fourth most abundant native species for all reserves combined. The endemic grey warbler is common throughout New Zealand and is one of the few native passerines to have benefited from human modification of landscape (Heather and Robertson, 2005). Voted Forest and Bird’s “Bird of the Year” for 2007, it is a diminutive bird with a beautiful song and we are fortunate in the greater Wellington region to hear their melody in many of our reserves. Fantails are one of the most common and widely distributed native birds on the New Zealand mainland which has benefited from the large-scale clearance of forest and the creation of forest edge and scrub habitats (Heather and Robertson, 2005). Their populations are known to fluctuate widely in response to severe climatic changes; however in the past three years in these reserves they have had a consistently strong presence.

Woodpigeon, the largest native bird recorded in this study are our third most abundant species for Upper Hutt sites and the fifth for all reserves combined. They are present every year in most of these reserves. They are an impressive endemic species with loud wing beats as they fly heavily through the bush and display spectacular behaviours in flight. Long-term monitoring of woodpigeon is important as they play a particularly important role in our native ecosystems dispersing the seeds of large-fruited trees and shrubs (e.g. tawa, miro, matai, hinau titoki and karaka). Hutching (2004) states “with the extinction of the moa and other giant ground-dwelling birds, the native pigeon, kereru, remains the only bird capable of swallowing the large seeds throughout native forests.”

Time will tell if the less abundant species in this study (bellbird, tomtit, whitehead and kākāriki) will show greater presence as we maintain control and monitoring in our reserves. Miskelly et. al (2005) reports successful re-establishment of bellbird, whitehead, red-crowned parakeet and tomtit in unfenced reserves on Wellington peninsula, and as we are consistently detecting these species in our counts this supports the findings of Miskelly et. al. Bellbirds were present in low numbers in Wellington before the Karori Wildlife Sanctuary releases in 2001 and have now spread throughout the region (Miskelly et al, 2005). They have also been detected each year in the Sulphur Wells and Pounui reserves in the Wairarapa.

Colin Miskelly et. al (2005) recently attributed the recent successful re-establishments of kaka, kākāriki, whitehead, tomtit and bellbird in Wellington to the effective control of possums and rats by the Department of Conservation and “especially” by Greater Wellington which gives us early encouragement that the effects of management are very beneficial for native species.



The apparent increase of exotic birds may have been caused by the addition of a number of smaller reserves in our counts after 2006 (i.e. Cloustonville, Greytown Park, Riverstone, Trentham Memorial and Waikanae River). With the limited amount of habitat available for our native species in the greater Wellington region, it may prove that as their numbers increase, the native species will displace the introduced species from the shared habitats. It may however have an opposite effect, with improved forest habitat also benefiting the exotic bird species. It will be interesting to see how long-term pest animal control affects the levels of these exotics bird species.

Wellington City Council also record silvereye as the most common bird in their five-minute counts conducted in spring and autumn, with tui the next most common (Froude, 2008). They have detected significant increases in tui and grey warbler numbers in their five minute counts since 2001 and have also detected a number of rare species namely; kaka, stitchbird, saddleback and robin in two reserves adjoining the Karori Wildlife Sanctuary (Froude, 2008). In time it is hoped that such rare natives start to appear in some of the reserves in this programme.

## **5.2 All Upper Hutt reserves**

Within the Upper Hutt reserves alone, bird numbers fluctuate in order over the years for both the native and exotic species. Tui replaced the silvereye this year as the most abundant bird in Upper Hutt sites. Tui appear to be recovering exceptionally well in most reserves in Wellington where bird monitoring is performed. Silvereye are consistently present in high numbers also. Grey warbler and woodpigeon were equally abundant this year and future monitoring will reveal if this apparent increase in woodpigeons is significant.

It is a very positive result to have fantail, woodpigeon, silvereye and tui in every Upper Hutt reserve this year and grey warbler in all but one. Bellbird, tomtit and whitehead show minor fluctuations in numbers but are consistently present in some of these seven reserves each year. Kākāriki have previously occurred in Keith George Memorial Reserve (2006) but were not detected this year in any of the Upper Hutt counts.

For the exotic birds, the three species were at similar numbers this year but have changed considerably in the last three years.

It is not possible to say at this early stage in our monitoring programme whether these changes are due to environmental or behavioural factors or caused by pest management. As we continue to monitor our bird populations any significant changes will start to emerge above any minor fluctuations and the outcomes of long-term management will become apparent.

## **5.3 Individual reserves presence/absence**

Within individual reserves, it is encouraging to learn that kākāriki are present in Tauherenikau. In the Atlas of Bird Distribution in New Zealand (2007), the yellow-crowned parakeet was recorded (in low levels) on the eastern side of the Tararuas in three 10km grid squares. Future monitoring will determine if kākāriki are an itinerant or resident species in Tauherenikau. Both the North Island tomtit and the whitehead

were once common throughout the North Island (Heather and Robertson, 2005) and with their regular appearance in Keith George Memorial Reserve it is possible their range may extend to other reserves in Wellington. Keith George continues to be the reserve with most of these nine native forest bird species present in the reserve each year.

With five native species predictably present in all reserves (silvereve, tui, fantail, grey warbler and woodpigeon) and bellbird, tomtit, whitehead and kākāriki also regularly observed in some reserves, this shows that protecting and enhancing areas of valuable native bush throughout the greater Wellington region provides contiguous habitat for many of our protected native bird species.

Wellington is an unusual city with a comparatively large amount of forested habitat remaining in urban and peri-urban environments. There are intensively managed areas close to our bird count sites (e.g. Karori Wildlife Sanctuary, Wainuiomata Mainland Island, East Harbour Mainland Island, Otari/Wilton's Bush, Matiu/Somes Island, Kapiti and Mana Islands) that are providing potential sources of native bird immigration into other Wellington reserves. The close proximity to ranges with extensive native habitat (the Rimutakas, Tararuas and Aorangi ranges) could also potentially cause native birds to spill-over into Wellington reserves. With continued rodent, possum and mustelid control in these reserves, the forests within them may ultimately provide safe refuge for any immigrants to permanently settle.

## **6. Acknowledgements**

Thanks to all field staff involved in data collection. Thanks also to Upper Hutt City Council for collaborating with Greater Wellington in developing a bird monitoring programme that adds value to the Greater Wellington bird monitoring programme as well as providing trends for Upper Hutt reserves.

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