

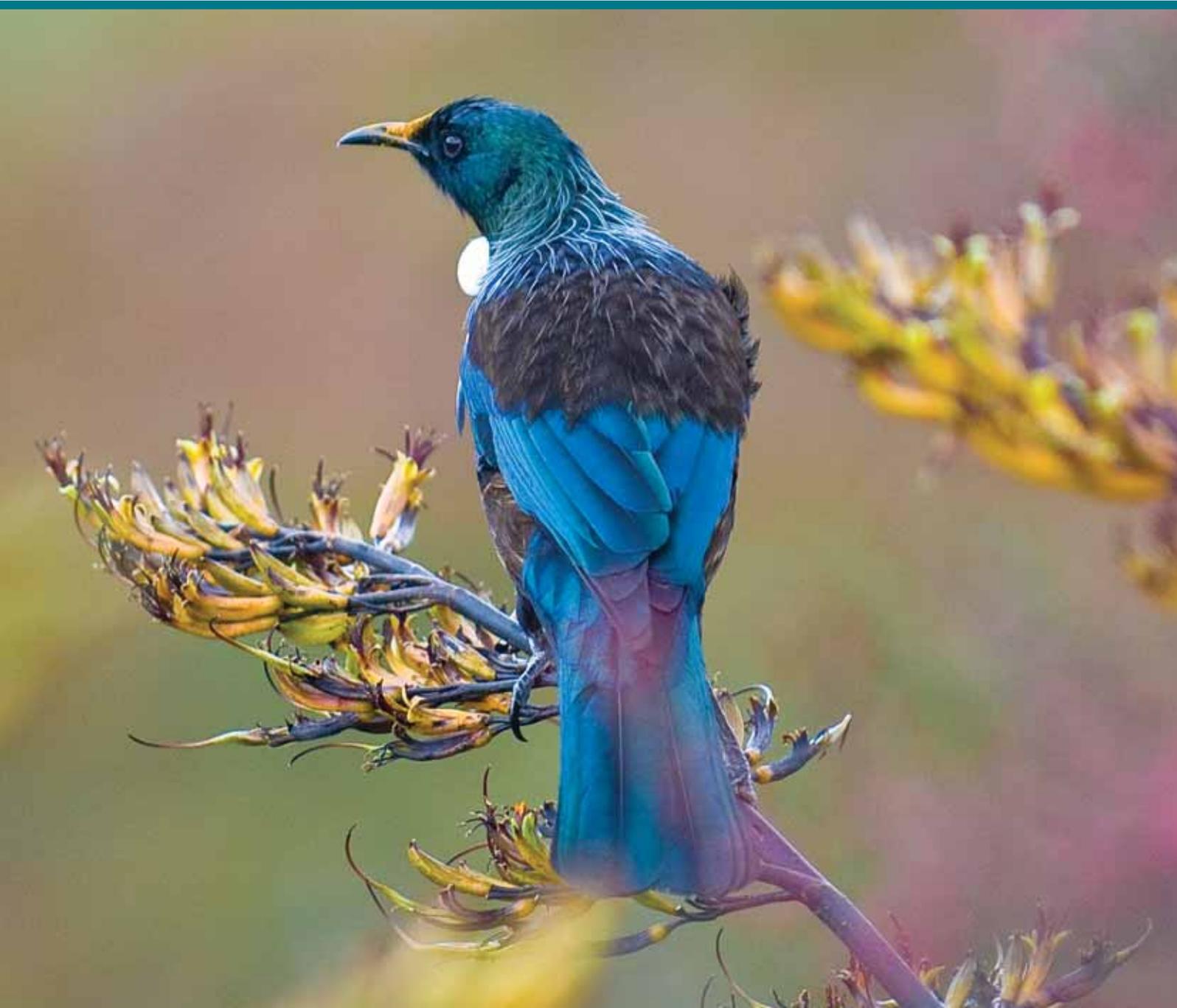


Baseline survey of the diversity, abundance and distribution of birds in Wellington City reserves

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Baseline survey of the diversity, abundance and distribution of birds in Wellington City reserves

June 2012

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Executive Summary

Five-minute bird counts were carried out in selected Wellington City parks and reserves between 2001 and 2009 to monitor trends in the relative abundance and distribution of several common native bird species. Over this period, a significant increase in the abundance of tui was observed and several bird species re-introduced to Zealandia (the Karori Wildlife Sanctuary) began to colonise Wellington City parks and reserves.

In 2011 changes were made to the survey design to improve our ability to detect changes in the relative abundance of birds over time. Improvements were also made to the coverage of bird count stations so that any changes in the distribution of native forest birds in Wellington City reserves could be mapped in greater detail.

Twenty-eight species of birds were detected in Wellington City parks and reserves during the 2011 bird counts, including 15 native and 13 exotic species. On average, a lower number of native forest bird species was recorded per bird count station in Wellington City reserves than in Upper Hutt reserves. This is because a quarter of the forest bird species detected in Wellington City reserves had very localised distributions whereas almost all species in Upper Hutt reserves had fairly widespread distributions.

Silvereye, tui and grey warbler were the most commonly encountered native forest bird species recorded in Wellington City reserves in 2011. Encounter rates for fantails were surprisingly low considering their widespread distribution in Wellington City reserves in 2011. This low encounter rate is probably a result of high mortality suffered during the unusually heavy snowfall the city experienced the previous winter.

Species re-introductions to Zealandia have had an important influence on the diversity and distribution of native forest birds in Wellington City reserves in 2011. 33% of the native forest bird species recorded during this survey are present as a result of the dispersal of birds from Zealandia; these include species such as kaka, North Island saddleback, whitehead and North Island robin. Several of these species were formerly present only on predator-free islands in the Wellington Region so their recent re-introduction to Zealandia and subsequent spread into surrounding Wellington City reserves has greatly increased the opportunity for Wellington City ratepayers to experience and interact with these unique and conspicuous species.

The current distribution of North Island robin in Wellington City reserves suggests that the dispersal and establishment of this species is being limited by an as-yet unidentified factor. An opportunity exists for a study to be carried out to compare the survival and reproductive success of marked birds both inside and outside of Zealandia's predator-proof fence to confirm whether such a limitation exists, identify its cause and recommend a potential management response.

We suggest that this bird monitoring programme be continued on an annual basis to identify any future trends in the diversity, abundance and distribution of both native and exotic birds in Wellington City's reserve network. This information will help local councils and community conservation groups to plan, execute and monitor the outcome of future restoration work in Wellington City's parks and reserves.

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1. Introduction

In recent years there has been a conspicuous increase in the diversity, abundance and distribution of native bird species in Wellington City parks and reserves (Miskelly et al. 2005). These changes have likely occurred as a result of two processes. Firstly, ongoing multi-species predator control being carried out by Wellington City Council, Greater Wellington Regional Council and community conservation groups in many Wellington City parks and reserves has resulted in spectacular local increases in already resident native bird species such as tui (*Prosthemadera novaeseelandiae*) (Bell 2008; Froude 2009; Brockie & Duncan 2012). Secondly, re-introductions of bird species to predator-free sites such as Zealandia (the Karori Wildlife Sanctuary) and Matiu/Somes Island have established large source populations from which previously locally-extinct or near-extinct species have been spreading into nearby forested reserves. These species include North Island kaka (*Nestor meridionalis*), red-crowned parakeet (*Cyanoramphus novaezelandiae*) and whitehead (*Mohoua albicilla*) (Miskelly et al. 2005).

In order to monitor these ongoing changes in native bird distribution and abundance in Wellington City it is important to carry out regular, standardised monitoring of bird populations at sites throughout the city. Such monitoring can allow early detection of species' declines that may require remedial action or highlight new high-priority sites for management in response to the spread and re-establishment of previously extinct or locally-rare species. Documenting ongoing changes in the distribution and abundance of native forest birds in Wellington City could also help with the planning and execution of restoration projects elsewhere in New Zealand (Miskelly et al. 2005).

Five-minute bird counts were carried out by Pacific Eco-Logic Ltd in nine selected parks and reserves in Wellington City between 2001 and 2009 (Froude 2009). The reserves that were sampled were the Wellington Botanic Gardens, Khandallah Park, Johnston Hill & Karori Cemetery, the Mapuia reserves, Otari-Wilton's Bush, Redwood Bush, Trelissick Park, Polhill/Denton Park and Wright's Hill/Burrows Avenue Park. The aim of this work was to monitor trends in the distribution and abundance of some of the more common native bird species present in these reserves, particularly kereru (*Hemiphaga novaeseelandiae*) and tui.

Froude (2009) reported that there was a large, statistically significant increase in the average number of tui counted per bird count station in the sampled reserves in both spring and autumn counts between 2001 and 2009. The mean number of tui counted per bird count station in spring increased three-fold between 2001 and 2009; whereas the mean number of tui counted per station in autumn increased nine-fold over the same period. This trend is consistent with the >100-fold increase in the number of days per year that tui were observed at a suburban Miramar site between 1998 and 2006 (Bell 2008).

Between 2001 and 2009 Froude (2009) reported that both kereru and bellbird were present in low numbers throughout the reserves sampled, but that no significant change over time in the encounter rate for either species was observed over this period.

Froude (2009) also reported an increase in the number of native bird species being detected in the sampled reserves between 2001 and 2009. This increase in species diversity was caused by species such as North Island saddleback (*Philesturnus rufusater*) and North Island robin (*Petroica longipes*) dispersing into reserves such as Denton Park and Wright's Hill following their re-introduction to Zealandia.

In 2011 this monitoring programme was reviewed by the current authors and several modifications were made to the survey design. For instance, by 2009 it had become apparent that the number of bird counts carried out in each of the nine reserves sampled was insufficient to detect realistic differences in the relative abundance of birds between individual reserves or changes in abundance within individual reserves over time. As a result, the existing set of bird count stations was replaced with a new set of 100 stations placed at random locations throughout the network of Wellington City parks and reserves. The aim of this new survey design is to monitor changes in the relative abundance of native forest birds across the entire network of Wellington City parks and reserves, rather than attempt to detect differences between individual selected reserves.

It was also decided that each bird count station would be counted twice each year in November-December, providing an annual sample of 200 bird counts. A sample of 200 bird counts was chosen because this ensured a sufficient sample size to detect a 10% or more change in the relative abundance of tui in Wellington City reserves from one year to the next. Tui was chosen as an indicator species for the purpose of determining the sample size of the new bird monitoring programme because:

1. They are a conspicuous species that is easily recognised and identified by the public.
2. They perform an important role as pollinators and seed dispersers in native forest ecosystems (Kelly et al. 2010).
3. They have shown a strong response to the pest control work being carried out in the Wellington Region over the past decade (Bell 2008; Froude 2009; Brockie and Duncan 2012).

A further reason for creating a network of 100 randomly-located count stations throughout the entire network of Wellington City parks and reserves was to improve our ability to detect further changes in the distribution of native birds in Wellington City.

Because of the changes that have been made to the survey design, it is not possible to directly compare data collected from 2011 onwards with those collected between 2001 and 2009. This report therefore provides a summary of the results from the 2011 bird counts, which will form a baseline against which future changes in native bird diversity, abundance and distribution can be compared.

2. Methods

2.1 Field technique

A network of 100 bird count stations were established at random locations in forest habitat throughout the network of Wellington City Council parks and reserves in November 2011 (Figure 2.1). Care was taken to ensure that each bird count station was a minimum of 200 metres from the next and that no bird count station was within 50 metres of the edge of a reserve.

Observers navigated to each count station using GPS and compass. Each station was marked with a blue triangle inscribed with the station number which was attached to the nearest living tree with >3 cm DBH. Where no such tree was available (or the count station was situated in plantation forest) count stations were marked with two lengths of pink flagging tape labeled with the station number.

Bird counts were carried out using the standard five-minute bird count method (Dawson & Bull 1975). Two bird counts were carried out at each station, but each count was done on a separate day. All counts were carried out during November or early December and counts were only made on fine, calm days between 1.5 hours after sunrise and 1.5 hours before sunset (approximately 7.30 am to 6.30 pm). At each station, an experienced observer spent five minutes recording the number of individuals of all bird species seen or heard from the count station (unbounded count). Care was taken not to record the same bird twice during a count.

Bird conspicuousness can vary in response to a number of variables such as time of year, change in observer, weather and time of day (Bibby et al. 2000). Because of this, every effort is being made to either standardise or sample the range of variation in each of these factors so that we can be confident that any changes in the mean number of birds counted from one year to the next will be more likely due to changes in abundance rather than conspicuousness. Precautions taken include carrying out these counts during the same months each year and using the same observers each year. Two observers were used to carry out these counts; both had excellent bird identification skills and both had prior experience and training in carrying out five-minute bird counts.



Figure 2.1: Locations of bird count stations established in Wellington City parks and reserves in 2011

2.2 Data analysis

Bird count data was entered into an excel spreadsheet using a standard five-minute bird count data template. This spreadsheet was then used to calculate the mean number of native forest bird species detected per count station in the Wellington City reserves network and this was compared to the mean number of species detected in the Upper Hutt and Wairarapa reserves that were also surveyed in 2011. Two-tailed t-tests assuming unequal variance were used to assess whether any differences in the mean number of species detected per station in Wellington City, Upper Hutt or Wairarapa reserves were statistically significant. This test is important because a statistically significant result indicates that any difference between two means is very unlikely to have occurred by chance, so instead represents as real difference in the species diversity of native forest bird communities between the three reserve networks.

The bird count data was also used to calculate the mean number of birds of each species detected per count station across the Wellington City parks and reserves network. This mean number of birds detected provides a measure of the relative abundance and/or conspicuousness of each bird species in the Wellington City reserves network (Dawson & Bull 1975).

Patterns in the distribution of native birds among Wellington City reserves were examined by mapping the presence or absence of each native forest bird species detected at each bird count station using Arcmap version 9.3.1. Although this technique does not take into account differential detection probabilities between species (less conspicuous species present within 200 metres of a bird count station will be less likely to be detected) it should be sufficient to detect relatively large changes in species' distributions, particularly for more conspicuous species such as kaka, saddleback or whitehead.

3. Results

3.1 Native species diversity

Twenty-eight species of birds were detected in Wellington City parks and reserves during the 2011 bird counts, including 15 native and 13 exotic species (see appendix). Of the native birds detected, 12 were species that are typically found in native forest habitat and it is these species for which relative abundance and distribution will be reported. The remaining three native species detected were either open-country or coastal species such as Australasian harrier (*Circus approximans*), welcome swallow (*Hirundo neoxena*) and black-backed gull (*Larus dominicanus*).

In 2011 the mean number of native forest bird species detected per count station in Wellington City reserves was significantly lower than the number of species detected per station in Upper Hutt City reserves (two-tailed t-test; $P=3.29 \times 10^{-11}$). A mean of 2.8 species were detected per count station in Wellington City reserves compared to 3.8 species detected per station in Upper Hutt reserves (Figure 3.1). In contrast, there was no significant difference in the number of bird species detected per count station in the Wellington City and Wairarapa reserve networks (two-tailed t-test; $P=0.48$).

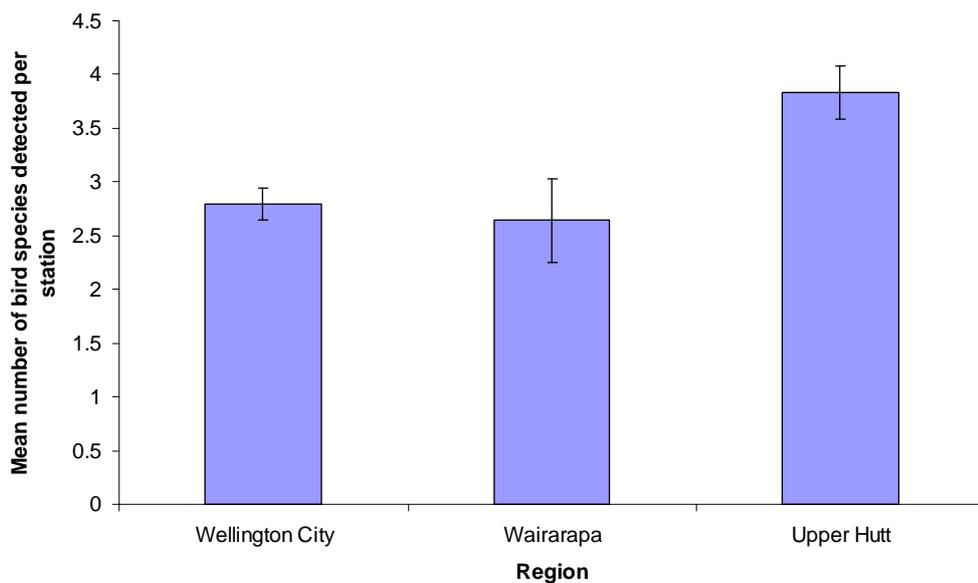


Figure 3.1: Mean number of native forest bird species detected per count station in Wellington City (n=200), Wairarapa (n=45) and Upper Hutt (n=90) reserves in 2011 (error bars show 95% confidence limits)

3.2 Bird abundance

Silvereye (*Zosterops lateralis*), tui and grey warbler (*Gerygone igata*) were the most commonly encountered native forest bird species recorded in Wellington City reserves in 2011. Silvereye was the most common native species, encountered at an average rate of 1.9 birds per count station. Tui was the second most common species with an average of 1.3 bird counted per station and grey warbler was the third most commonly encountered species with 0.8

bird counted per station. The nine remaining native forest bird species detected were all encountered at a rate of less than 0.5 birds per bird count station (Figure 3.2).

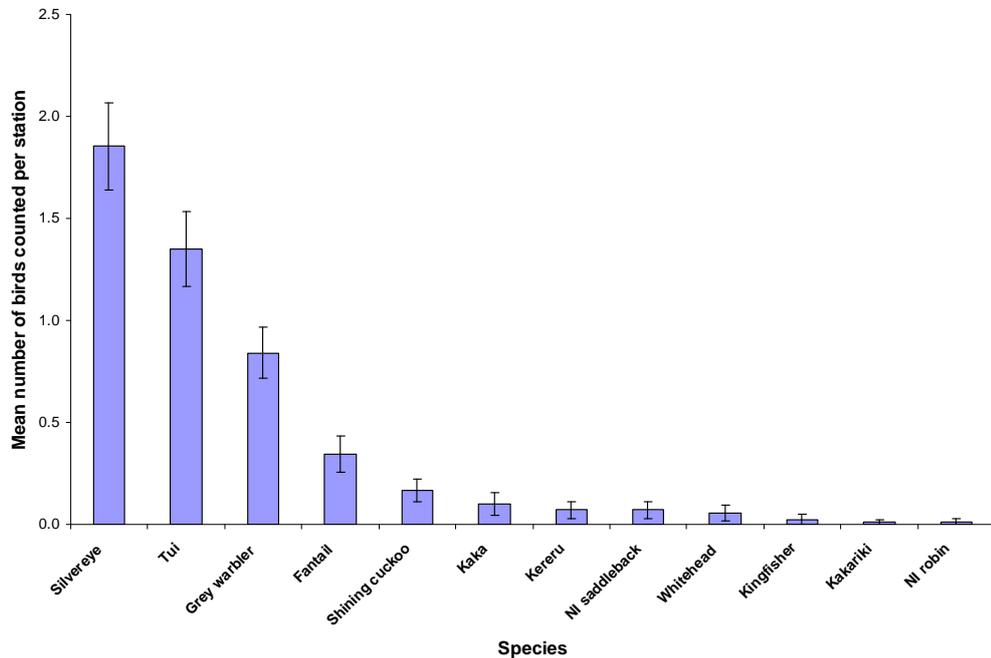


Figure 3.2: Mean number of birds detected per count station for each native forest bird species encountered in Wellington City reserves in 2011 (error bars show 95% confidence limits)

Of the 13 exotic bird species recorded during the 2011 bird counts, blackbird (*Turdus merula*) and chaffinch (*Fringilla coelebs*) were by far the two most frequently encountered species. Blackbirds were encountered at an average rate of 2.3 birds per count station, the highest encounter rate of any of the native or exotic bird species detected during the 2011 bird counts. Chaffinches were the second most frequently encountered exotic species and were encountered at an average rate of 0.9 birds per count station. All remaining species were encountered at a rate of less than 0.5 birds per bird count station (Figure 3.3).

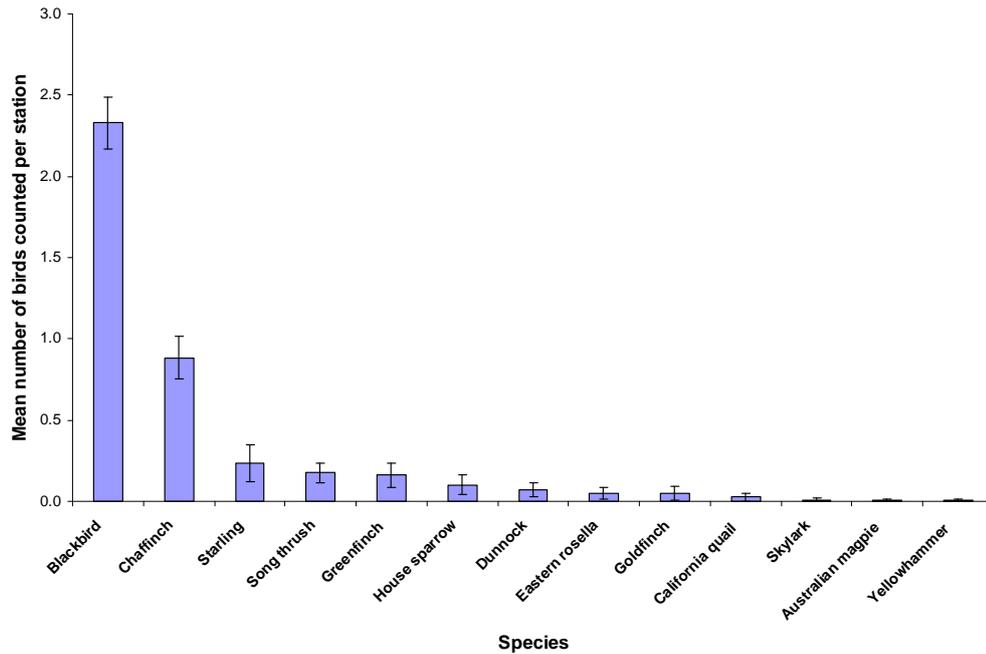


Figure 3.3: Mean number of birds detected per count station for each exotic bird species encountered in Wellington City reserves in 2011 (error bars show 95% confidence limits)

3.3 Native bird distribution

The distribution of native birds varied markedly between species. Several species, such as silvereye, tui, grey warbler and fantail (*Rhipidura fuliginosa*) had a widespread distribution and were detected at a high proportion of the bird count stations (e.g. Figures 3.4 and 3.5).

Kereru were less widespread and tended to be restricted to the larger forested reserves such as Wright's Hill and Otari-Wilton's Bush (Figure 3.6). Bellbirds on the other hand were not recorded from any of the 100 bird count stations surveyed in 2011. This was particularly surprising given that bellbirds had been recorded from several Wellington City reserves between 2001 and 2009 (Froude, 2009) and 60 female bellbirds had been translocated from Kapiti Island to Zealandia in winter 2011 (R. Empson¹, pers. comm.). The similarity in calls between tui and bellbird may also have contributed to this result; observers were instructed to record only those calls they were absolutely certain were tui or bellbird to the relevant species, all other calls were recorded as "unidentified". As a result of this conservatism, several "possible bellbird" observations were recorded as "unidentified" (A. Harvey, pers. comm.).

Several species have distributions that radiate out varying distances from Zealandia. Kaka were detected in Wellington City reserves up to 3 km from the sanctuary and whitehead up to 2 km from the sanctuary (Figures 3.7 and 3.8). In contrast, all North Island saddleback and North Island robin detections were clustered at locations within 1 km of Zealandia's predator-resistant boundary fence (Figures 3.9 and 3.10).

¹ Conservation Manager, Zealandia

Red-crowned parakeets were detected at bird count stations in Makara Peak and Otari-Wilton's bush, both sites greater than 2 km away from Zealania, the location of the nearest source population of this species (Figure 3.11).

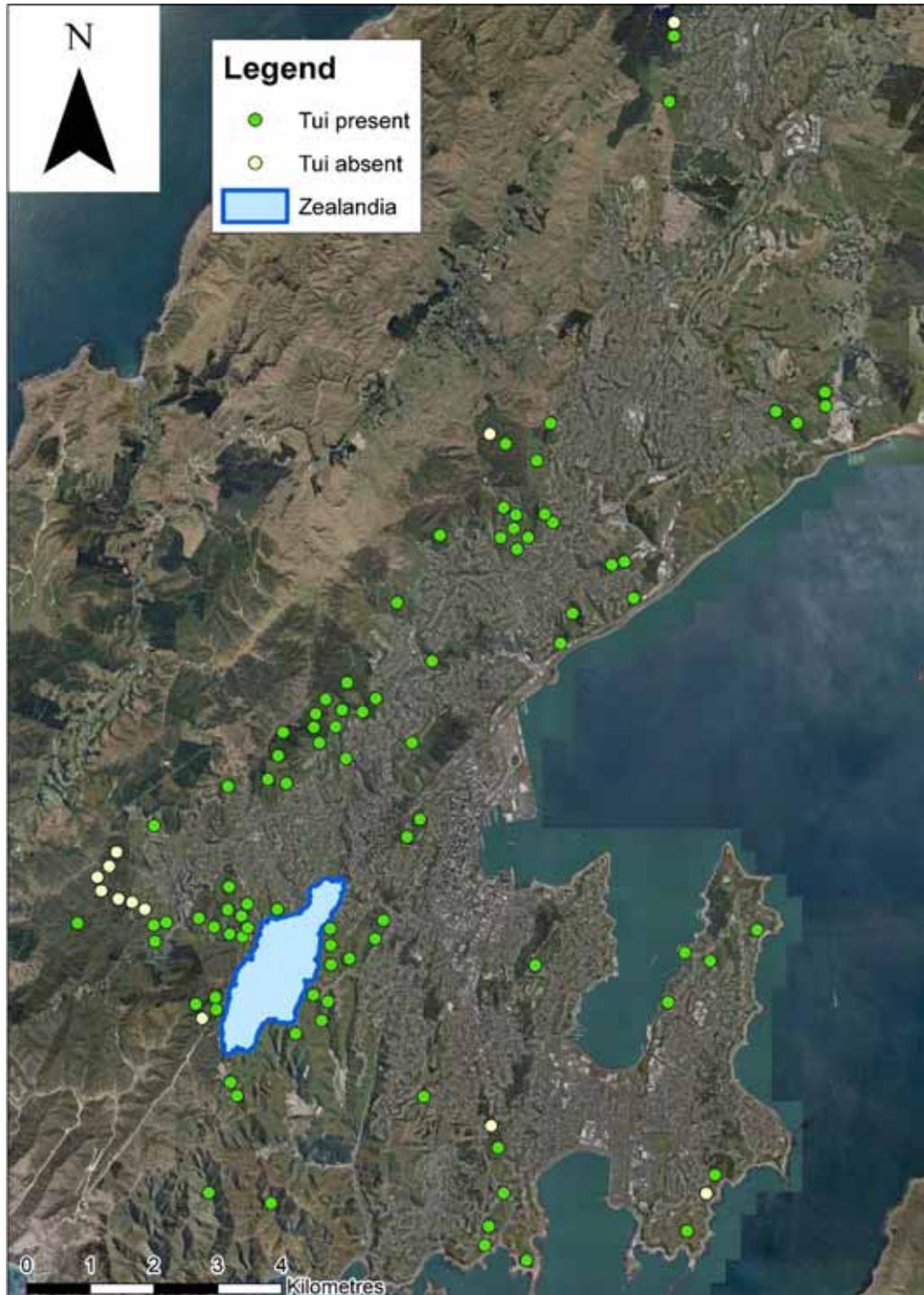


Figure 3.4: Distribution of tui across Wellington City reserves in 2011

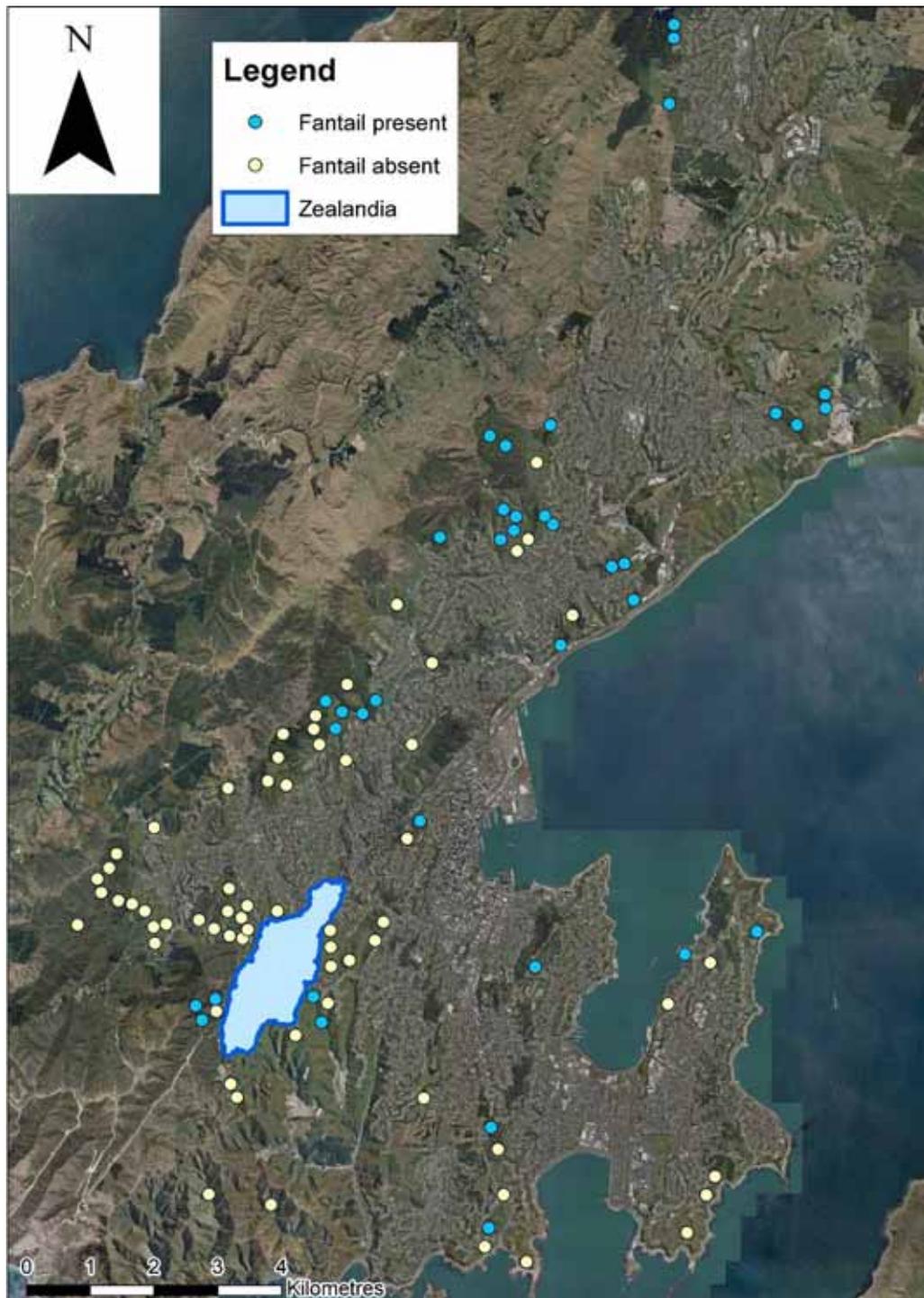


Figure 3.5: Distribution of fantail across Wellington City reserves in 2011



Figure 3.6: Distribution of kereru across Wellington City reserves in 2011

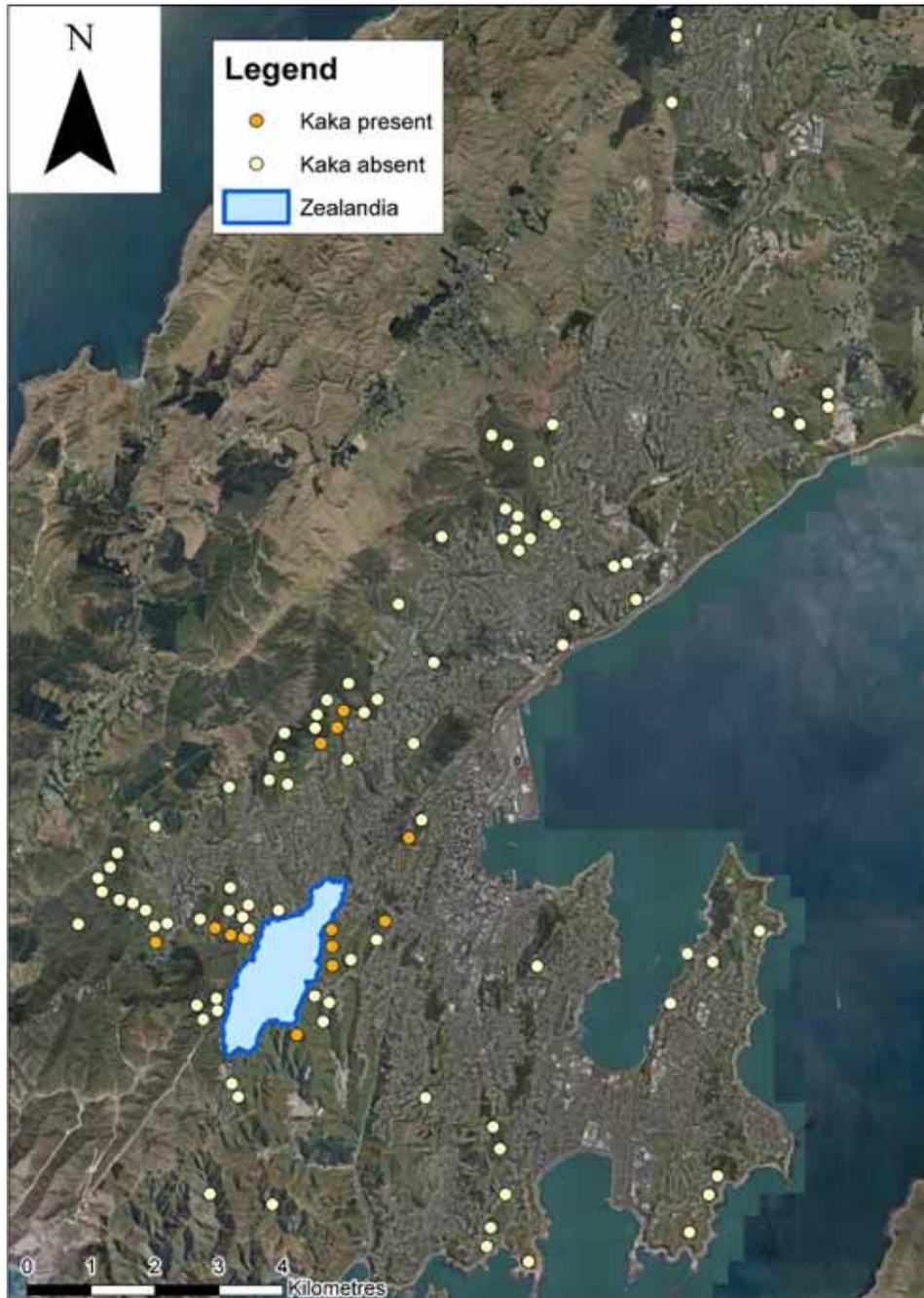


Figure 3.7: Distribution of kaka across Wellington City reserves in 2011

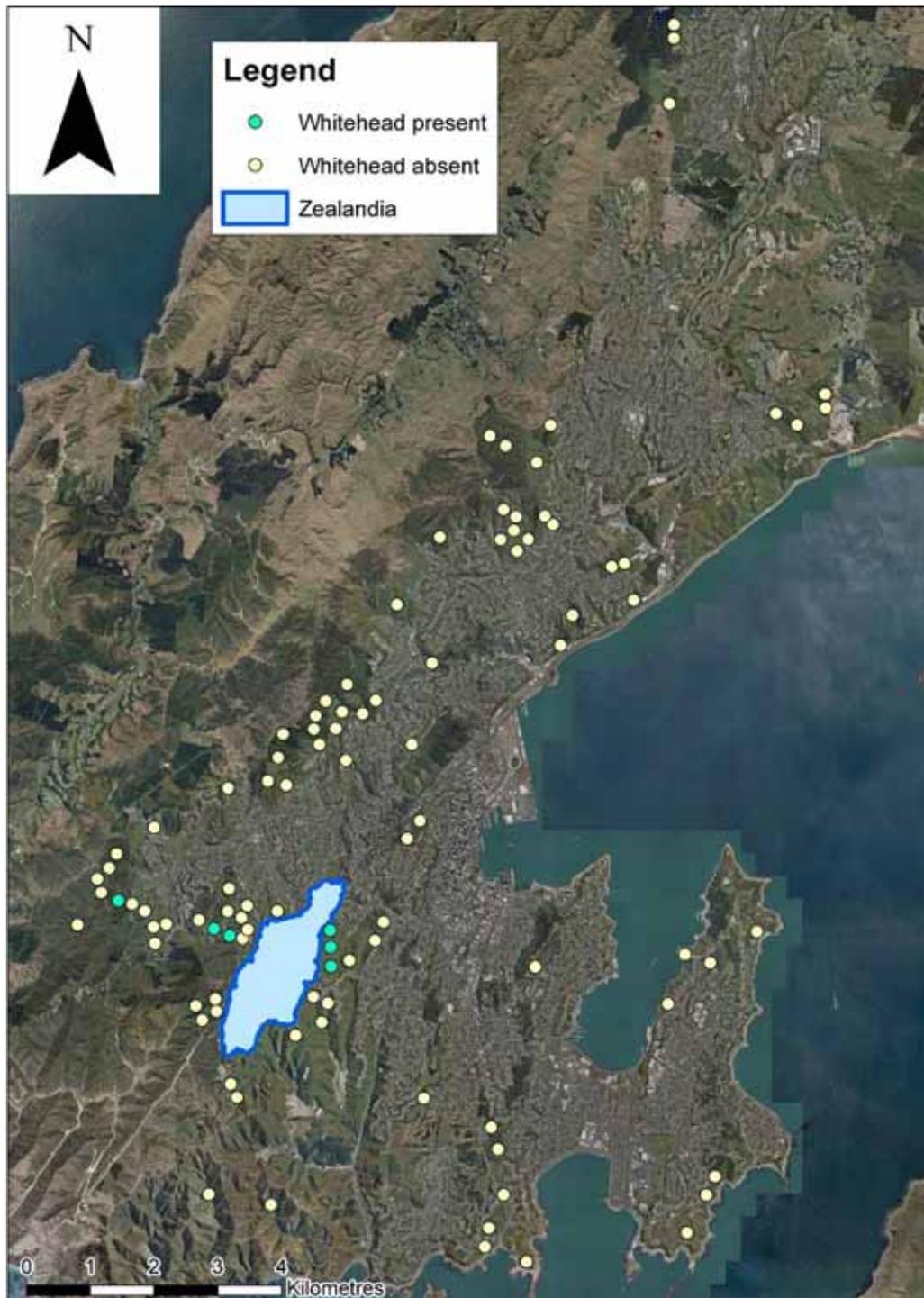


Figure 3.8: Distribution of whitehead across Wellington City reserves in 2011



Figure 3.9: Distribution of NI saddleback across Wellington City reserves in 2011



Figure 3.10: Distribution of NI robin across Wellington City reserves in 2011



Figure 3.11: Distribution of red-crowned parakeet across Wellington City reserves in 2011

4. Discussion

4.1 Native species diversity

Species re-introductions to Zealandia have had an important influence on the diversity of native forest bird species detected in Wellington City parks and reserves in 2011. Four of the 12 native forest bird species detected during this survey (33%) are present largely as a result of birds dispersing from recently established source populations in Zealandia. These species are North Island robin, whitehead (both released in 2001), kaka and North Island saddleback (both released in 2002).

Both kaka and whitehead had been recorded in Wellington City prior to their re-introduction to Zealandia (Miskelly et al. 2005), however the present distribution of both species (concentrated around the boundary of Zealandia) suggests that the majority of birds encountered during this survey were birds (or descendants of birds) that had dispersed from source populations in Zealandia.

Prior to 2001 both North Island robin and North Island saddleback were confined to Kapiti Island (both NI robin and NI saddleback) and Mana Island (NI robin only), providing only limited opportunities for the general public to encounter these two species. The reintroduction of these two species to Zealandia and their subsequent spread to nearby parks and reserves has provided a much greater opportunity for Wellington City ratepayers to experience and interact with these two conspicuous and distinctive species.

Red-crowned parakeet is another native bird species detected during the 2011 bird counts that may also be present as a result of birds dispersing from the nearby source population at Zealandia. However, red-crowned parakeets have occasionally been recorded in Wellington City prior to their re-introduction to Zealandia in 2010 (Miskelly et al. 2005). This and the lack of any noticeable “clumping” of detections around the boundary of Zealandia during the 2011 survey suggests that red-crowned parakeets may also be dispersing into Wellington City from either of the two other local source populations on Kapiti and Matiu/Somes Islands.

The remaining seven native bird species detected during the 2011 bird counts are all species that are relatively common and widespread in the Wellington Region (Robertson et al. 2007). Many of these species, such as grey warbler, silvereye and fantail, are those that have the ability to cope with the modification and fragmentation of native forest habitat (Heather & Robertson 1996). Their relatively high reproductive rates also enable populations of these species to persist in the presence of exotic predators such as rats (*Rattus* spp.) and cats (*Felis catus*), predators that are present in Wellington City parks and reserves (Heather & Robertson 1996; Greater Wellington Regional Council, unpublished data)

A total of 12 native forest bird species were detected in the Wellington City reserve network in 2011, the same number of species that were detected in the Upper Hutt City reserve network the same year. Despite this, the average

number of native forest bird species detected at each count station was significantly lower in Wellington City reserves than Upper Hutt reserves. This difference was caused by the fact that at least a quarter of the bird species detected in Wellington City reserves were detected at only a very low proportion of the bird count stations surveyed (mainly those within 1-2 km of the boundary of Zealandia). In contrast, almost all of the species detected in the Upper Hutt reserves were recorded at a high proportion of the bird count stations surveyed. Should the distribution of these “Zealandia” bird species continue to expand in Wellington City, this difference in average species diversity between the two cities could reduce, and perhaps even reverse over time.

4.2 Bird abundance

The mean number of birds counted at a bird count station reflects not only the abundance of each species but also their relative conspicuousness in the habitat being sampled (Bibby et al. 2000). For this reason, comparing the mean number of birds of each species counted at a bird count station does not usually provide a direct measure of their relative abundance. Mean counts for large, vocal or highly mobile species such as tui and fantail are likely to provide fairly accurate estimates of relative abundance, provided not too many birds are double-counted. On the other hand mean counts for smaller, less vocal or less mobile species such as tomtit or rifleman will likely provide underestimates of their abundance in comparison to more conspicuous species.

The results for these Wellington City bird counts suggest that silvereeye, tui and grey warbler are either the most abundant or most conspicuous bird species in Wellington City reserves. Silvereeyes and grey warblers are both relatively small species that can easily be overlooked in dense forest when not vocalising (N. McArthur, pers. obs.). This means that these two species may be even more abundant relative to the other native bird species detected than these results indicate. Tui on the other hand is a large, highly mobile and vocal species which is difficult to miss, even in relatively dense forest (N. McArthur, pers. obs.). The tui’s rank as the second most frequently encountered bird in Wellington City reserves is therefore not likely to be an underestimate of their abundance relative to other native forest bird species detected.

The nine remaining native forest birds species detected were all encountered at a rate of less than 0.5 birds per bird count station. Eight of these nine species were all species with very localised or sparse distributions in Wellington City, including all of the “Zealandia” species as well as kereru, kingfisher (*Todiramphus sanctus*) and shining cuckoo (*Chrysococcyx lucidus*). This sparse or localised distribution explains the relatively low mean counts for each of these species as the mean counts are calculated from all bird count stations across the entire Wellington City reserves network. The ninth species was the fantail and this species appears to be a bit of an exception. Fantails were relatively widespread across Wellington City parks and reserves in 2011 (Figure 3.5) but were nevertheless encountered at a very low rate (0.35 birds per count station), despite being a fairly conspicuous species. This may well be due to heavy mortality experienced by Wellington City fantail populations during the two unusually heavy snowfall events that occurred in the Wellington

Region in July and August 2011. Fantails are known to be particularly vulnerable to sudden declines and even local extinction following severe weather events (Heather & Robertson 1996; Miskelly & Sagar 2008) and bird monitoring data collected elsewhere in the region shows that other local fantail populations experienced dramatic declines in both distribution and abundance between 2010 and 2011, including in the Upper Hutt City reserves, the Akatarawa Forest, Kaitoke Regional Park and the Wainuiomata Water Catchment Area (McArthur et al. 2012; Greater Wellington Regional Council, unpublished data). The relatively high productivity of fantail populations, particularly at sites with low predator densities, should ensure that local populations quickly recover (Heather & Robertson 1996). Indeed, as of May 2012, fantails are being encountered more and more frequently in the Hutt Valley and surrounding tracts of forest, indicating that recovery of local populations is already well underway (N. McArthur pers. obs.).

Of the exotic bird species detected, it is perhaps the eastern rosella (*Platycercus eximius*) that poses the greatest immediate threat to native birds in Wellington City parks and reserves. Eastern rosellas are considered to be a potential competitor for nest sites with native cavity nesters such as the kingfisher and red-crowned parakeet (Wright & Clout 2001; Galbraith 2010), both of which are present in Wellington City reserves. Eastern rosellas in New Zealand also carry beak and feather disease virus (BFDV), a virus known to cause increased mortality in wild parakeet populations and that was recently detected in a wild red-crowned parakeet population elsewhere in New Zealand (Ortiz-Catedral et al. 2009; Galbraith 2010). For these reasons it is pleasing to note that the mean encounter rate for eastern rosella during the 2011 bird counts was very low (0.05 birds per count station), despite the fact that eastern rosella is a fairly conspicuous species. This indicates that eastern rosellas are currently at relatively low densities in Wellington City parks and reserves, which should limit their potential to act as significant nest-site competitors or disease vectors. Any significant increase in the relative abundance of eastern rosellas in Wellington City would be cause for concern however, and for this reason we recommend that this bird monitoring programme be continued on an annual basis to enable such an increase to be detected if it occurs.

4.3 Native bird distribution

The dispersal of bird species recently re-introduced to Zealandia into surrounding Wellington City parks and reserves has had an important influence on the species' distributions observed during the 2011 bird counts. Four of the 12 native forest bird species recorded during the 2011 counts had distributions that clustered around the boundary of Zealandia, radiating out varying distances into surrounding parks and reserves. Species with relatively strong dispersal abilities, such as kaka and whitehead have dispersed the furthest and were detected up to 3 km and 2 km respectively from the nearest boundary of Zealandia during these counts. Indeed, sightings reported by members of the public via Zealandia's "report-a-bird" webpage indicate that kaka are now regularly travelling up to 5 km from the sanctuary to forage in suburban parks and gardens as far afield as Island Bay, Ngaio and Makara (R. Empson pers. comm.).

NI robins are also known to be relatively strong dispersers, capable of dispersing up to 11 km in forested habitat (Oppel & Beaven 2004; Richard 2007). Despite this, and despite the fact that a large and highly productive NI robin population has been present in Zealandia since at least 2003 (McGavin 2009), NI robins were only detected at a single count station within a few hundred metres of Zealandia's boundary fence during this bird survey. Sightings of NI robins reported by members of the public on the New Zealand Ebird database or Zealandia's "report-a-bird" website also indicate that robins are rarely seen more than 1-2 km from Zealandia's boundary fence (R. Empson pers. comm.; <http://ebird.org/content/newzealand>: accessed 21/06/2012).

Given that natal dispersal of juvenile robins away from the large source population within Zealandia's predator-proof fence is almost certainly occurring, this suggests that those birds that settle in surrounding parks and reserves are experiencing low survival and/or reproductive rates. If this is the case, it will be unlikely that we will observe any significant increase in the distribution or abundance of NI robins in Wellington City reserves until the cause(s) of this low survival and/or productivity is identified and managed. Monitoring the survival and reproductive success of a sample of banded robins both inside and outside of Zealandia would be useful to identify whether the establishment of NI robins in surrounding Wellington City parks and reserves is being limited, and what is causing this limitation. Once this is known, potential management to remedy the situation can be planned and implemented. Until this occurs, opportunities for Wellington City ratepayers to encounter and interact with species such as NI robins in Wellington City's parks and reserves will be limited to visits to those reserves immediately adjacent to Zealandia.

Again, we recommend that this bird monitoring programme be continued on an annual basis so that future changes in the distribution of these native forest bird species can be monitored. This could be particularly useful for gauging the success or otherwise of any additional management that may be implemented in selected reserves in order to encourage the dispersal and establishment of "Zealandia" species into Wellington City's parks and reserves network.

References

- Bell B.D. 2008. Tui (*Prosthemadera novaeseelandiae*) increase at Seatoun, Miramar Peninsula, Wellington, New Zealand during 1998-2006. *Notornis* 55: pp 104-106.
- Bibby C. J. Burgess N.D. Hill D.A. and Mustoe S. 2000. *Bird census techniques* (2nd ed.). Academic Press, London.
- Brockie R.E. and Duncan C. 2012. Long term trends in Wellington City bird counts: 1969-2006. *Notornis* 59: pp 1-6.
- Dawson D.G. and Bull P.C. 1975. Counting birds in New Zealand forests. *Notornis* 22: pp 101-109.
- Froude V.A. 2009. *Changes in native forest bird distribution and abundance in Wellington City Council reserves 2001-2009*. Unpublished report for Wellington City Council, Pacific Eco-Logic Ltd, Russell.
- Galbraith J.A. 2010. *The ecology and impact of the introduced eastern rosella (Platycercus eximius) in New Zealand*. Unpublished MSc thesis, University of Auckland.
- Heather B.D. and Robertson H.A. 1996. *The field guide to the birds of New Zealand*. Viking, Auckland.
- Kelly D. Ladley J.J. Robertson A.W. Anderson S.H. Wotton D.M. and Wiser S.M. 2010. Mutualisms with the wreckage of an avifauna: the status of bird pollination and fruit dispersal in New Zealand. *New Zealand Journal of Ecology* 34: pp 66-85.
- McArthur N. Moylan S. and Crisp P. 2012. *State and trends in the diversity, abundance and distribution of birds in Upper Hutt reserves, June 2012*. Unpublished report, document reference #1061609, Greater Wellington Regional Council, Upper Hutt.
- McGavin S. 2009. Density and pair fidelity in a translocated population of North Island robin (*Petroica longipes*). *Notornis* 56: pp 206-212.
- Miskelly C. Empson R. and Wright K. 2005. Forest birds recolonising Wellington. *Notornis* 52: pp 21-26.
- Miskelly C.M. Dowding J.E. Elliott G.P. Hitchmough R.A. Powlesland R.G. Robertson H.A. Sagar P.M. Scofield R.P. and Taylor G.A. 2008. Conservation status of New Zealand birds, 2008. *Notornis* 55: pp 117-135.
- Miskelly C. M. and Sagar P. M. 2008. Establishment and local extinction of fantails (*Rhipidura fuliginosa*) on the Snares Islands, New Zealand. *Notornis* 55: pp 170-171.
- Oppel S. and Beaven B. 2004. Juvenile Stewart Island robins (*Petroica australis rakiura*) disperse up to 16 km. *Notornis* 51 pp 55-56.

Ortiz-Catedral L. McInnes K. Hauber M.E. and Brunton D.H. 2009. First report of beak and feather disease virus (BFDV) in wild red-fronted parakeets (*Cyanoramphus novaezelandiae*) in New Zealand. *Emu* 109: pp 244-247.

Richard Y. 2007. *Demography and distribution of the North Island robin (Petroica longipes) in a fragmented agricultural landscape of New Zealand*. Doctoral dissertation. Massey University, Palmerston North, New Zealand.

Robertson C.J.R. Hyvönen P. Fraser M.J. and Pickard C.R. 2007. *Atlas of bird distribution in New Zealand 1999-2004*. Ornithological Society of New Zealand, Inc. Wellington.

Wright D. and Clout M. 2001. *The eastern rosella (Platycercus eximius) in New Zealand*. Department of Conservation Science Internal Series No. 18. Department of Conservation, Wellington.

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Appendix

This appendix contains a list of all bird species encountered in Wellington City reserves during the 2011 bird counts. Threat classification rankings are as per Miskelly et al. (2008). (NV – Nationally Vulnerable; RC – Recovering; RE – Relict; NT – Not threatened; I – Introduced and Naturalised).

| <u>Scientific Name</u> | <u>Common Name</u> | <u>Threat Ranking</u> |
|--------------------------------------|-------------------------|-----------------------|
| <i>Alauda arvensis</i> | skylark | I |
| <i>Carduelis carduelis</i> | goldfinch | I |
| <i>Carduelis chloris</i> | greenfinch | I |
| <i>Chrysococcyx lucidus</i> | shining cuckoo | NT |
| <i>Callipepla californica</i> | California quail | I |
| <i>Circus approximans</i> | Australasian harrier | NT |
| <i>Cyanoramphus novaezelandiae</i> | red-crowned parakeet | RE |
| <i>Emberiza citrinella</i> | yellowhammer | I |
| <i>Fringilla coelebs</i> | chaffinch | I |
| <i>Gerygone igata</i> | grey warbler | NT |
| <i>Gymnorhina tibicen</i> | Australian magpie | I |
| <i>Hemiphaga novaeseelandiae</i> | kereru | NT |
| <i>Hirundo neoxena</i> | welcome swallow | NT |
| <i>Larus dominicanus</i> | black-backed gull | NT |
| <i>Mohoua albicilla</i> | whitehead | NT |
| <i>Nestor meridionalis</i> | kaka | NV |
| <i>Passer domesticus</i> | house sparrow | I |
| <i>Petroica longipes</i> | North Island robin | NT |
| <i>Philesturnus rufusater</i> | North Island saddleback | RC |
| <i>Platycercus eximius</i> | eastern rosella | I |
| <i>Prosthemadera novaeseelandiae</i> | tui | NT |
| <u>Scientific Name</u> | <u>Common Name</u> | <u>Threat Ranking</u> |

| | | |
|-----------------------------|------------------------|----|
| <i>Prunella modularis</i> | dunnock | I |
| <i>Rhipidura fuliginosa</i> | fantail | NT |
| <i>Sturnus vulgaris</i> | starling | I |
| <i>Todiramphus sanctus</i> | New Zealand kingfisher | NT |
| <i>Turdus merula</i> | blackbird | I |
| <i>T. philomelos</i> | song thrush | I |
| <i>Zosterops lateralis</i> | silvereve | NT |

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