

Ark in the Park
Kōkako Breeding Season Report
2014 - 2015



Photo courtesy of Grant Capill

Thomas Knight and Deja Rivera

Auckland Zoo
Motions Road, Western Springs
Auckland



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1. Summary

Auckland Zoo (AZ) surveyed Ark in the Park (AiP) in the Waitakere Ranges, West of Auckland, from August 2014 through to the end of March 2015, mapping North Island kōkako (*Callaeas wilsoni*) territories, identifying birds and searching for nests. The season began with an intensive census of the entire AiP, using a mixture of automated recorders and the use of playback on foot to identify areas with singing birds. Once identified, teams of volunteers led by zoo staff visited these locations to determine whether the singing birds were paired or single birds hoping to attract mates, as well as if each individual was colour banded or un-banded. Where possible, pairs were followed to determine territory boundaries and possible nest sites.

Nesting began late this year at AiP with little indication of successful breeding; a contrast with last year's extended breeding season, which produced at least three confirmed progeny. Despite the deficient breeding season, thirteen territorial pairs were identified in the management area, from which the identities of ten founders were confirmed. In addition to the ten confirmed founders in territorial pairs, another two founders (potentially unpaired) were also identified, bringing the total number of founders located this season to 12 of the original 26.

2. Introduction

Ark in the Park (AiP) is a partnership between Forest & Bird and Auckland Council. Located in Auckland's Waitakere Ranges Regional Park, it is an approximately 2100 ha 'mainland island' set up to restore native ecosystems through pest control and subsequent recovery of existing native flora and fauna species. To supplement this recovery, translocations of native bird species into the area have occurred. Such species include whitehead (*Mohoua albicilla*), North Island robin (*Petroica australis longipes*), and the target species for this project, the North Island kōkako (*Callaeas wilsoni*).

The North Island kōkako is an endangered forest bird endemic to New Zealand and a member of the wattle-bird family Callaeidae. Population numbers have declined rapidly since the introduction of mammalian pest species to New Zealand, which predate upon birds and also out-compete them for food resources. Therefore, populations must be continually managed, particularly in mainland areas, through recurrent pest control. In AiP, rats are routinely targeted by trapping and poisoning to keep their density at 5% or below; especially through the breeding season (August to February) when nesting birds with chicks are most vulnerable to predation. Food supply influences the number of breeding attempts that kōkako make, but nest predation determines the outcome of these attempts (Innes, 2013). Predator control is helping kōkako to establish in AiP and thorough monitoring of translocated individuals is providing valuable information about kōkako within AiP as well as on a national level.

3. Predator Control

2013-2014 was an extremely good season for fruiting throughout the North Island (and a Beech mast year in the South Island). The high production of fruit contributed to the successful breeding of kōkako last season, but unfortunately, in conjunction with a warm winter, also led to increased rat numbers. This year, rat numbers were reported to be much higher than normal through much of New Zealand with AiP being no exception. AiP took several immediate measures to offset their high rat index, including doubling the number of bait stations in some southern blocks (including kōkako areas) and increasing the frequency of baiting. These actions succeeded in reducing rat numbers back down to normal by February 2015 in targeted blocks, however numbers remained higher in other parts of AiP.

4. Translocations

The 26 kōkako translocated to AiP to date are outlined in Table 1 below. To increase the genetic resilience of the AiP kōkako population, the Kōkako Recovery Group recommends the translocation of additional kōkako from King Country sites to achieve the target of 40 paired founders, with 36 of these breeding (Thurley et al, 2014). Given the difficulties in identifying existing kōkako at AiP, it is currently proposed that up to a total of 21 individuals will be translocated to this site in 2015 and 2016, comprising 16 kōkako from Mangatutu Ecological Area (Pureora Forest Park) and five from Mapara Wildlife Reserve (Bryden, 2015). By continuing annual surveying within the management area, it should be evident how many of these kōkako have recruited into the population by the 2017 and/or the 2018 surveys, and up to 19 additional kōkako may be translocated as necessary from Mangatutu or Mapara in 2018 or 2019 to achieve the target of 40 paired translocated kōkako. Annual surveys may also detect additional founders that may already be present from the 26 kōkako initially translocated, and these will be factored in to the number of kōkako required between the 2016 and 2019 catch periods.

Table 1. Summary of kōkako translocations to Ark in the Park 2009-2011 (Warneford, 2013)

Date	Source	Birds
Sept - Nov 2009	Waipapa	4 female, 2 males
May 2010	Tiritiri Matangi	1 female, 1 male
Sept 2010	Mapara	1 female, 1 male, 1 unknown
Oct 2010	Tunawae	4 female, 5 male, 2 unknown
Sept – Oct 2011	Waipapa	2 female, 2 male

5. Methods

Census

A census of the entire AiP (see Figure 1, pg. 6) was conducted this season using two different methods. This first method was as stated by Department of Conservation Standard Operating Procedures (DOC SOP) and entailed surveyors familiar with identification of the calls and songs of kōkako hiking down bait lines, in parallel with other surveyors when possible, and stopping every 200 m at a site to listen for birds with a set protocol. The set protocol at each site was as follows: the surveyor would listen for five minutes, then play a series of three 'mew calls' followed by a five minute listening period, followed by three more 'mew calls' followed by a five minute listening period, followed by a series of songs, one each of the various dialects from the native populations of the founder birds at AiP, followed by a final five minute listening period. Four-hundred and seventy-nine sites were sampled in this manner. Another seventy-one sites were sampled using recorders to detect kōkako calls. The second method of recorders was utilized in the areas in the furthest North end of AiP (L, B, P, AN, and T blocks), where kōkako are rarely, if ever, heard or seen. When recorders deployed in those areas detected birds, surveyors investigated further by foot to determine if there were any resident birds. In total, more than three hundred and eighty hours were spent conducting the census, which commenced early August and was completed in mid-October.

Territory Mapping

Identifying individual birds at AiP is challenging as a result of the birds' preferential use of tall emergent trees in areas with dense understory and impenetrable ground cover outside of cut bait lines. Given these challenges, a less straightforward method than 45minute-follows, as per the DOC SOP, was used to determine the number and position of territories and whether the birds in each territory were pairs or single birds. When covering an area with several surveyors, the surveyors would spread widely over the area. When kōkako started singing, all of the surveyors would record the following: 1) present location, 2) compass headings for the various singing birds, 3) estimated distance from the singing birds, 4) how many birds could be heard from each direction and lastly, 5) whether the birds were dueting. Birds thought to be close would then be approached to determine from behaviour if they were in pairs or facing off at a territorial boundary. Also when possible, kōkako would be followed to aid in determining the extent of each territory and to attempt identification. Information on direction would later be correlated on a map and using triangulation rough positions of the birds were determined. After collating the information from different surveyors in different areas over time, a picture of where the different territories are and who is occupying them comes together, even if identifying the individuals is not possible. Although this is not the most ideal strategy for monitoring kōkako pairs, it appears to be the most effective method for territory mapping under the circumstances at AiP.

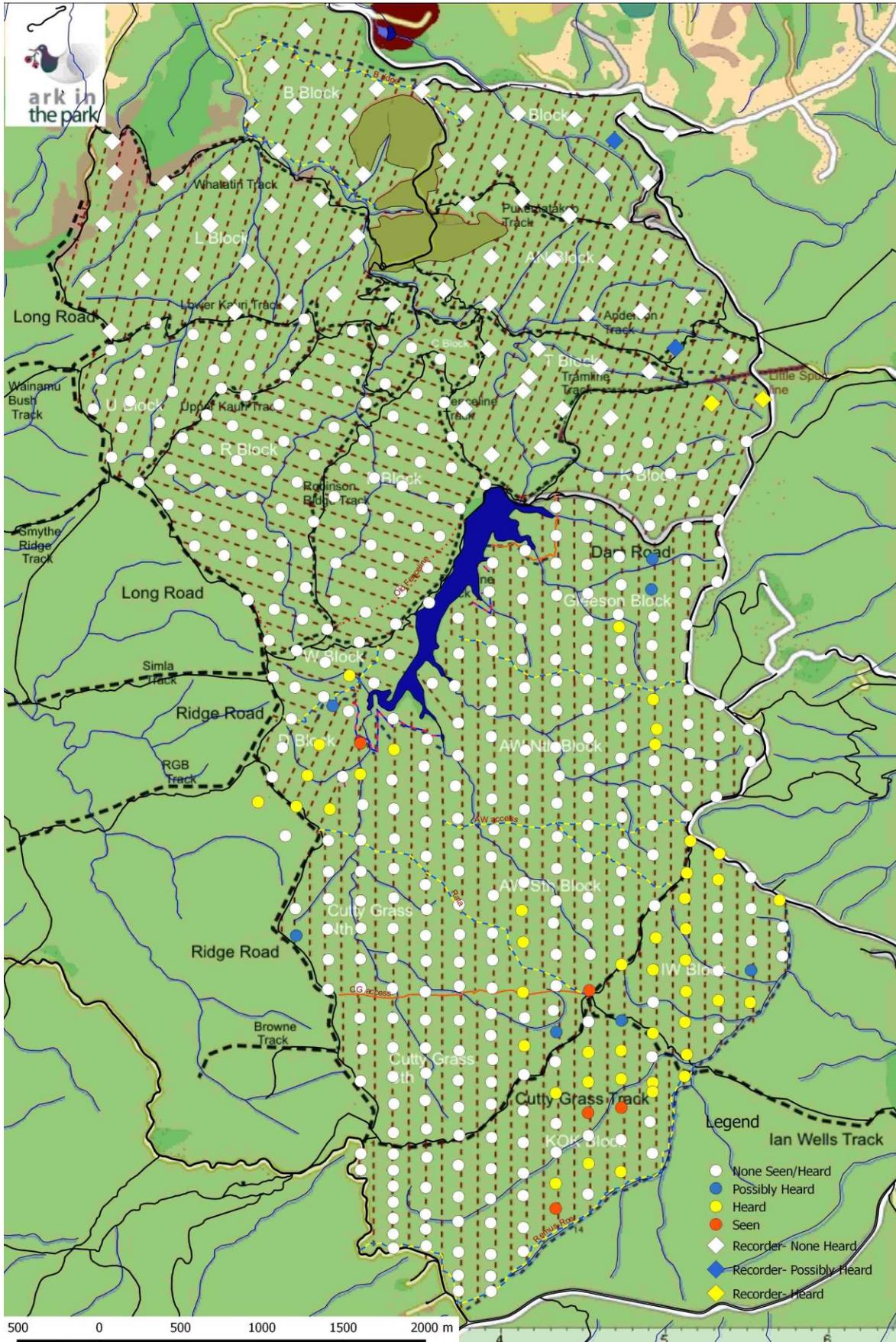


Figure 1. Census results for the Ark in the Park during the 2014/2015 season.

Playback

As in the previous season, the use of playback outside of the census was minimized to reduce adverse effects on territoriality and breeding. As noted in previous years, kōkako at AiP do not respond reliably to playback in comparison with kōkako in other management areas.

Recorders

The recorders developed and analysed by AiP volunteer Eric Wilson, and deployed in the field by AiP volunteer Kevin Ferguson, continue to be an extremely efficient surveying tool for assessing whether or not birds are present in specific areas (see Appendix A). From the information gathered from the recordings, surveyors can determine which areas require further investigation by foot. Additionally, recorders are helpful for detecting the presence of a territorial bird unresponsive to playback during a walk-through. As in the previous season, the main limitation of the recorders remains the limited pool of individuals to deploy the recorders and analyse the recordings. Unfortunately, the analysis of recordings is very time consuming and mentally exhausting, so continues to be tackled by a very small crew of extremely dedicated and skilled individuals.

6. Survey Results

The survey period for the 2014-2015 kōkako breeding season ran from August 2014 to March 2015 during which AZ staff spent 1219 hours identifying individuals and territories, mainly in the IW and KOK blocks, and monitoring individuals for signs of nesting. The staff of AZ were most ably assisted by a small army of volunteers who contributed countless further hours to the project. During the survey, 12 of the 26 founders were located (see Table 2, pg. 8); several of which were sighted on numerous occasions (see Figure 2, pg. 9). One founder, Rata, appears to be unpaired whereas another, Dylan, is potentially paired, but the identity of his companion could not be confirmed nor was their behaviour like that of a territorial pair when sighted together. The confirmed individuals of founder pairs at AiP this season are as follows: Maurice/Kowhai; Pierre/Sophie; Totara/Puke; Marty/Manuka; and Karen/Sylvain. All these birds have held territories as pairs with their current partners in previous years in the same general areas as their current territories. The pairs whose identities could not be confirmed were regularly heard (often dueting) at the beginning of the breeding season. From the data collected, the approximate territories of those pairs as well those of single birds could be inferred.

Table 2. Summary of Ark in the Park banded kōkako population at the end of the monitoring season, March 2015.

Name	Sex	Band combination	Status	Founder Capture site
Maurice	M	M/RG	Pair seen 2014/15	Waipapa site 7
Kowhai	F	M/RLg	Pair seen 2014/15	Waipapa site 6
Pierre	M	M/YR	Pair seen 2014/15	Tunawae - pair
Sophie	F	M/GY	Pair seen 2014/15	Tunawae - pair
Totara	M	M/WG	Pair seen 2014/15	Waipapa site 5
Puke	F	M/WY	Pair seen 2014/15	Waipapa site 7
Karen	F	M/RW	Pair seen 2014/15	Waipapa site 4
Sylvain	M	M/WR	Pair seen 2014/15	Tunawae-middle pair
Marty	M	M/YG	Pair seen 2014/15	Waipapa
Manuka	F	M/YB	Pair seen 2014/15	Waipapa
Wahine	F	M/RB	Not seen since release	Waipapa site 7
Moby	M	OM/Y	Unknown	Tiritiri Matangi Island
Punga	F	YM/R	Last seen 2011	Tiritiri Matangi Island
Nikau	M	M/WLg	Unknown	Mapara- (South)
Rata	F?	M/BR	Last seen 2015	Mapara-Rain1 (South)
Maire	F	M/BW	Last seen 2011	Mapara-Rain2 (South)
Pareira	F	GLg/M	Unknown	Tunawae
Grace	F	M/GW	Last seen 2012	Tunawae-Rain
Duncan	M	M/RY	Last seen May 2013	Tunawae-Nth Ea access
Rhonda	F	M/GR	Last seen 2012/2013	Tunawae-Nth Ea access
Dylan	M	M/YW	Last seen October 2014	Tunawae
Lucy	M	M/LgY	Last seen 2011	Tunawae-Owawenga
George	M	M/LgR	Last seen 2011	Tunawae-Owawenga
Kiekie	?	M/YLg	Last seen 2012/2013	Tunawae-middle pair
Rimu	M	M/GB	Last seen 2012	Waipapa
Kauri	F	M/LgW	Unknown	Waipapa
Miro	M	R/GM	Last seen 2011	AiP
Matai	M	WB/M	Last seen 2011	AiP
Andy	?	BB/M	Fledged	AiP
Poroporo	?	LgW/M	Fledged 2013 / 2014	AiP
Hinau	?	WR/M	Fledged 2013 / 2014	AiP

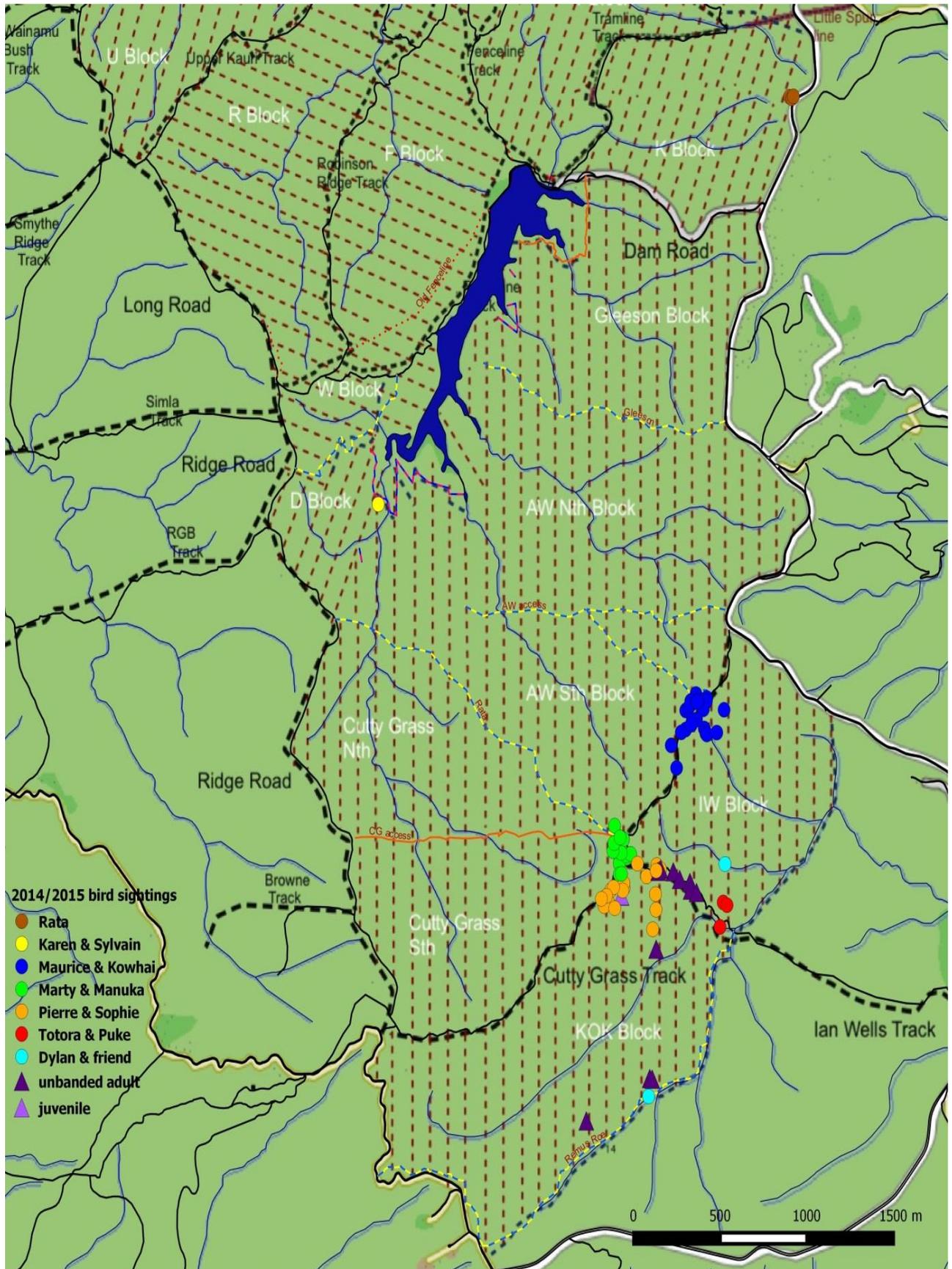


Figure 2. Locations where identified birds were seen during the 2014/2015 season

Eighteen territories were located within the AiP pest management area (see Figure 3, pg. 11), all of which were found in the IW and KOK blocks (with occasional overlaps of some territories to areas just the other side of the Cutty Grass Track) except a territory along the border between D & AWN blocks, another in CGS block, and one in the K block. Figure 3 shows: ‘border known’ where birds from both adjacent territories were seen at the edges of the territory or the birds in the territory repeatedly refused to go further than the delineated boundary; ‘border known < 50m’ where both territory holders were sighted in the vicinity but the exact edge of the territory could not be determined; and “border known > 50m where a boundary must exist, but has yet to be ascertained. Of the eighteen territories plotted in Figure 3, thirteen were defended by pairs, four were defended by single birds, and one was possibly defended by a pair, but the presence of more than one bird could not be confirmed (see Table 3, pg. 12). Of the thirteen pairs, both individuals in five pairs were identified as founders (Territory 2 (T2), T3, T8, T11 and T12) whereas the individuals from the other eight pairs were either not banded or could not be sighted.

In addition to the territorial pairs, a number of single birds also defended territories this year (T1, T10, T13 and T18). Rata, a founder as noted previously, is living alone in T1 (see cover photo). Some of the other single birds, like the bird occupying T10, defended their territory with significantly less enthusiasm than the pairs while others were extremely vocal and defended their territories vigorously. The single, large un-banded male in T13 was an excellent example of this; he managed to evict long-established pairs from the prime ridgeline area along part of the Ian Wells track and was seen and heard more often than his paired neighbours.

Unfortunately, a territory for the founder Dylan could not be confirmed as he was seen in two different areas separated by 1,170 m. During his first sighting he was seen in T17 foraging with another kōkako and unresponsive to playback. For the second sighting, he was with an unidentified bird again, but at the boundary of three territories: T6, T8, and T9. T8 is held by Totara and Puke, but the owners of T17, T6, and T9 are unknown; therefore, Dylan and his companion are possibly the owners of one of these territories and were just investigating the boundary of the other territories. Another possibility is that they have a disjointed territory with a very large gap between sites. However, this seems very unlikely given the extreme distance between these territories. Lastly, they may not possess any territory and are simply floating silently around from territory to territory, trying not to attract the attention of the territory holders, in which case there is no reason to believe they are even a pair. This last possibility seems the most likely given the extreme distance between the two areas and the complete lack of interest in singing or responding to playback displayed by Dylan and the other bird.

As in previous years, occasionally birds showed up as ‘floaters’, individuals that do not appear to be bound to any particular territory or area in general. Such birds would either sometimes be captured on the recorders, usually as birds that called or sang very rarely, or

occasionally detected by surveyors. Subsequent follow-up by recorders and/or surveyors would usually not find these birds again. None of these instances are represented on the maps within this report except in Appendix A, Figures 4 through 7, as they have little or no impact on pairs, but it should be noted that these birds are definitely present throughout the AiP and sometimes show up in surprising areas.

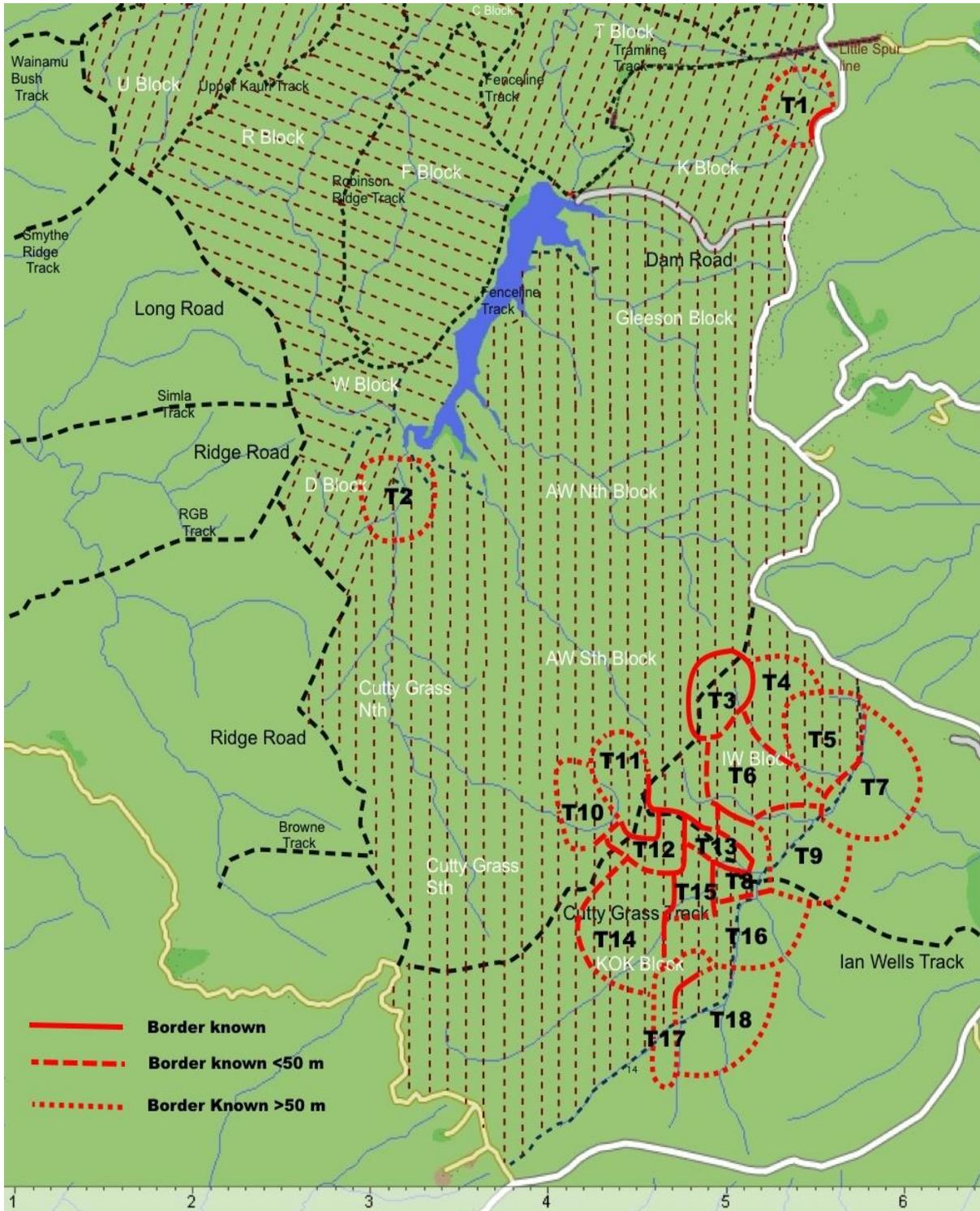


Figure 3. Territories held by kōkako pairs during the 2014-2015 breeding season in the Ark in the Park.

Table 3. Summary of the kōkako present within each territory during the 2014-2015 breeding season.

Territory	How many birds present	Identities
T1	Single	Rata
T2	Pair	Karen & Sylvain
T3	Pair	Maurice & Kowhai
T4	Pair	Unidentified
T5	Single or Pair	Unidentified
T6	Pair	Unidentified
T7	Pair	Unidentified
T8	Pair	Totara & Puke
T9	Pair	Unidentified
T10	Single	Unidentified
T11	Pair	Marty & Manuka
T12	Pair	Pierre & Sophie
T13	Single	Unbanded male
T14	Pair	Unidentified
T15	Pair	Unidentified, but one is probably unbanded
T16	Pair	Unidentified
T17	Pair	Unidentified “Swamp Pair”, probably founders
T18	Single	Unbanded

7. Discussion

The inability to confirm more identities of the kōkako present at AiP is predominately due to two factors. Firstly, the birds tend to frequent areas with tall emergent trees scattered amongst a dense understory, which makes it nearly impossible to see them from the forest floor. They seldom come down to forage or sing in the understory since the young trees do not provide a comfortable flight distance from an observer. Secondly, the dense understory in conjunction with the thick ground cover of kiekie, supple-jack, and cutty grass makes it extremely difficult to follow birds for any distance and completely impossible to do so quietly. However, when the dense understory grows higher in these areas and creates a more established canopy it will be easier to move around on the forest floor. Additionally, the increasing height of these trees should encourage the birds to utilize the lower canopy along with the emergent trees providing more opportunities for visual identification. Until that time, identification of individuals will be extremely sporadic. Despite these obstacles, it is possible to identify the number of pairs, if not their identity. The number of pairs of kōkako found in AiP this season was substantially more than in previous seasons. Moreover, a number of new territories definitely not present in previous seasons were also identified. This suggests that some of the offspring from previous seasons are now old enough to start establishing territories in the area.

While the 2013-2014 season was good for kōkako breeding, no breeding was detected in the 2014-2015 season. In December, Maurice and Kowhai were seen building a nest in an area where they have reliably nested in previous seasons. A 'line of steel' was implemented through the general area before nesting behaviour was first noted. The 'line of steel' caught a higher than normal number of rats. Unfortunately, the pair abandoned the nest site early on; whether this was due to predation of eggs laid in the nest or some other factor is unknown. No other birds showed any signs of nesting. Other mainland kōkako areas have reported a similar lack of nesting success, with many birds not even attempting to nest and the ones that did attempt nesting were unsuccessful. Poor weather early on combined with highly inflated rat numbers could explain the poor breeding season for kōkako. However, it is possible there was some breeding as a bird that sounded like a juvenile was heard late in the season in an area with no territorial birds. In contrast with previous years, no juveniles were actually sighted this year which suggests that successful breeding, if any, was minimal.

Accurate figures on mortality in AiP are impossible to obtain. This is largely due to the previously discussed difficulties in identifying birds as well as the fact the birds cannot be contained within the management area. Thus, the absence of a bird does not necessarily mean it is deceased. A great example of this was when a founder bird, Duncan, was reported in Glendowie in May 2013, a suburb about 30km away from AiP. As for the remaining 14 founders unidentified this year, they may either be dead, have moved out of AiP, be some of the unidentified birds in territories found this year, or a combination of these.

Sadly, one bird was confirmed dead this season. The remains of Brittany, the offspring of Moby and Punga from 2010, were discovered in September 2014 under a house in Bethell's Beach ~6 km from her fledge site. Nothing remained of the body except some bones and feathers, so it is assumed a considerable amount of time passed before it was discovered and presumably a large predator like a cat dragged it there. Overall, it is very difficult to assess whether the AiP population has suffered similar increased mortality like that observed in the Hunua population as a result of increased predator numbers. It will be easier to speculate upon whether there was higher mortality this season upon completion of the census next year, so it should be kept in mind that there may be some changes to the population as a result of potential mortalities from this season as well as future releases of translocated birds.

8. Future Recommendations

Auckland Zoo continues to recommend the survey period commence in August to adequately monitor known pairs and new territory holders before the breeding season begins. In particular, it will be important to confirm the presence of those birds potentially translocated from Mangatutu Ecological Area and/or Mapara Wildlife Reserve early on in the season. To assist with this task it would be optimal to have a larger pool of people to analyse the kōkako recordings more quickly and deploy the recorders in more localities than currently targeted. These actions would exponentially increase the likelihood that all of the kōkako in AiP are accounted for, especially when new founders as well as younger birds already within the population start looking for new areas to set up territories.

9. Acknowledgments

Auckland Zoo would like to thank the AiP and Auckland Zoo volunteers, especially Kevin Ferguson, Eric Wilson, Grant Capill, and John Tyne, and Primate team leader Amy Robbins and her team for the countless hours they devoted to assisting zoo staff with surveying, deploying and analysing recorders, and baiting. Also, many thanks to: Gillian Wadams and Laurence Bechet at Forest & Bird for their support and advice, and Dave Bryden for sharing his time, sound recordings and expertise. Lastly, on behalf of the Auckland Zoo Bird team, a big thank you and a fond farewell to Thomas Knight who led the project for the last two seasons with much enthusiasm and dedication.

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11. Appendices

Appendix A

Figures 4-7 are sound recording maps created by Eric Wilson for the 2014-2015 breeding season in AiP. Each circle colour denotes different types of kōkako song recorded: Blue is no song, green is faint song only, yellow is medium volume song, and red is loud song. The density of each colour is relative to the number of days in the recording period in which kōkako song was heard (the denser colours representing the recorders with the most singing).

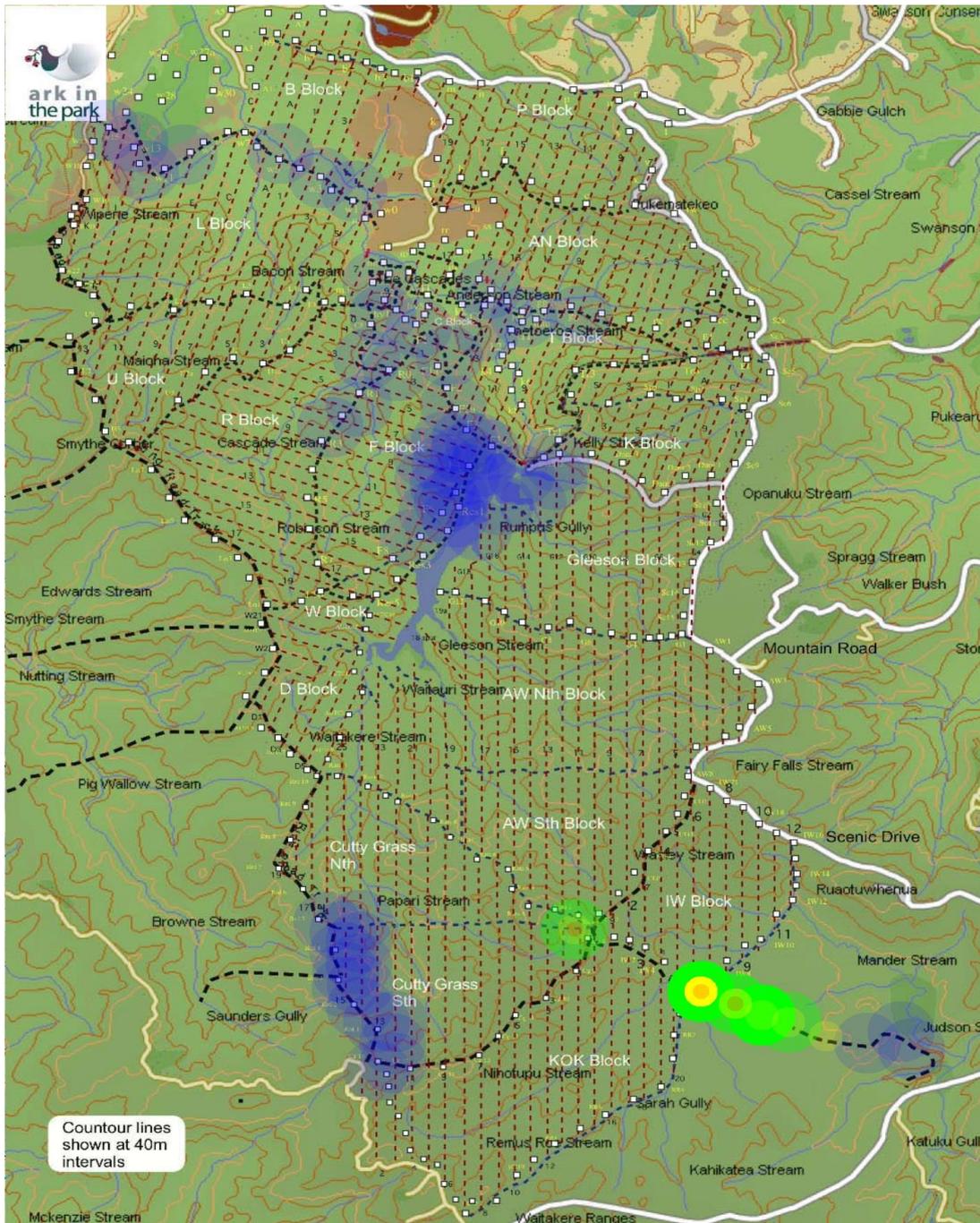


Figure 4. Sound Recording Map for April to June 2014

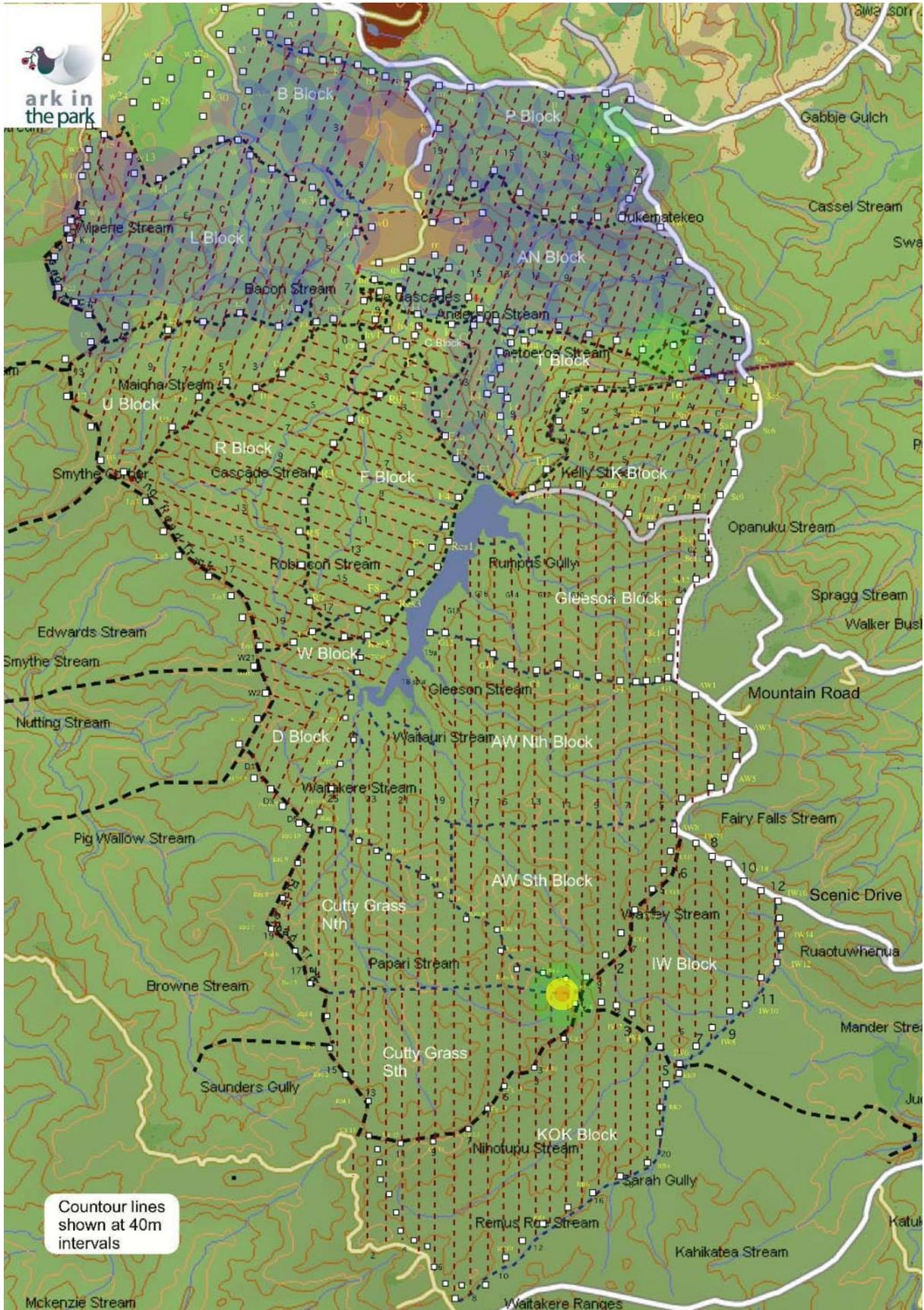


Figure 5. Sound Recording Map for July to September 2014

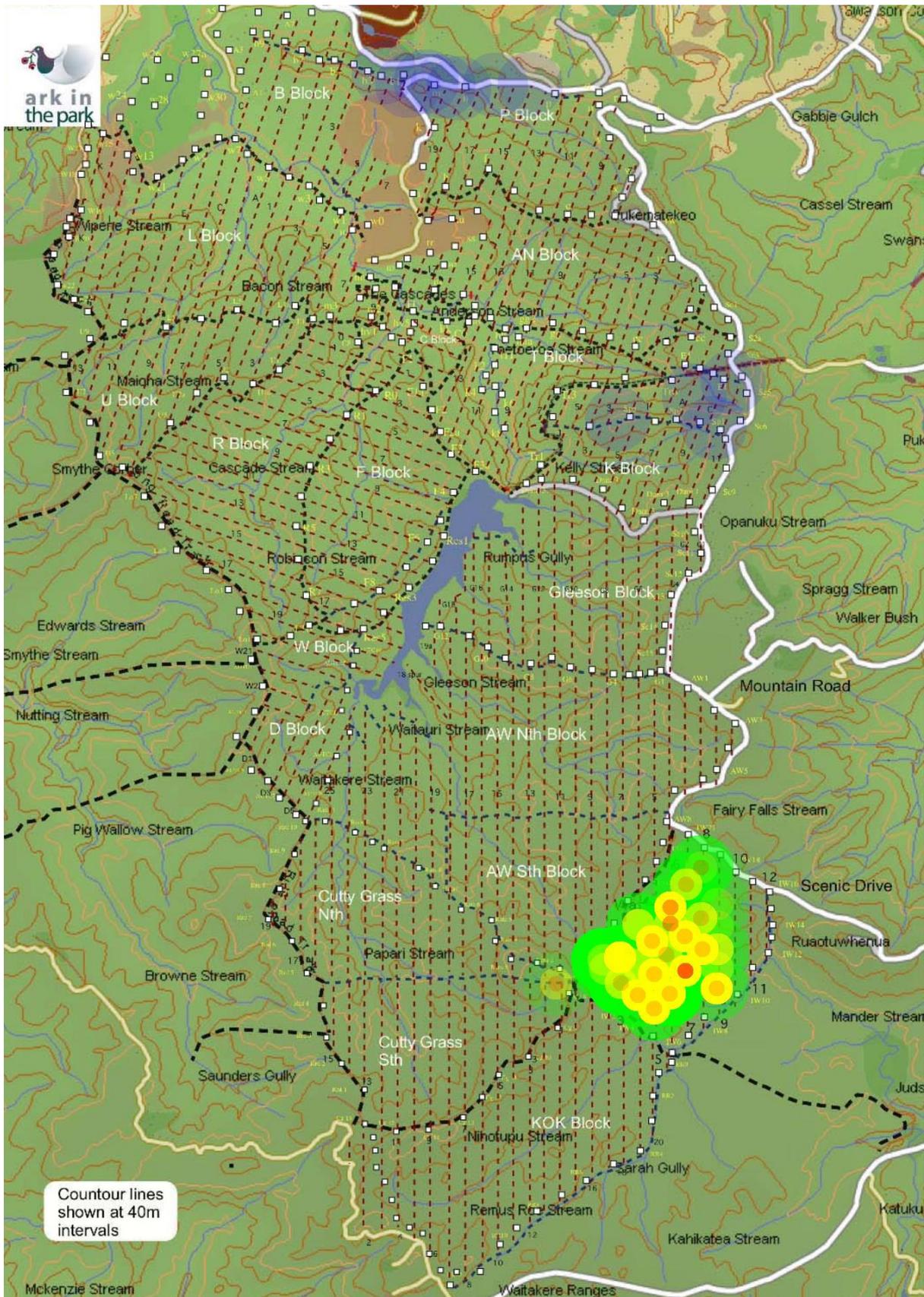


Figure 7. Sound Recording Map for January to March 2015

Figures 4-7 provided by Eric Wilson