Kokako Breeding Season at Ark in the Park

2013 - 2014

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Ark in the Park is a collaborative project by Forest and Bird and Auckland Council, supported by Te Kawerau a Maki.

With thanks to our main financial supporters

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1. Summary

For the Kokako breeding season 2013-2014 the Auckland Zoo surveyed the Ark in the Park (AiP), mapping kokako territories, from mid September 2013 through to the end of March 2014. Automated recorders that were deployed around AiP gave initial indications of where territorial kokako were spending their time and, more importantly, where they were not to be found throughout the area. Once areas with singing birds were identified, teams of volunteers led by zoo staff went to those sites and followed birds that were defending territories (via singing) to determine whether the singing birds were paired or were single birds hoping to attract mates, as well as to identify those birds which were colour banded. Pairs were followed as possible to determine territory boundaries.

Nesting began early this year at AiP, with three pairs becoming much quieter several weeks after surveys began, suggesting that nesting behaviours had begun. Six breeding pairs were identified in the Ark in the Park management area, from which the identities of six individuals were confirmed. One pair, Maurice & Kowhai, had at least two successful nests this season, with a known total of at least three successful fledglings. Sightings of multiple juveniles suggest other successful, though unidentified, nest sites from different breeding pairs during this longer than usual breeding season.

More kokako at AiP due to several years of successful breeding attempts, new techniques developed to track kokako through the largely impassable terrain at AiP where the kokako prefer to establish territories, and a constantly improving team of staff and volunteers mean that in future years more birds should be establishing territories and more of those territories will be identified. Although following kokako in the challenging early-stage forest at AiP is extremely difficult compared to older forests with a substantially less dense understory, with modifications of strategies used elsewhere to monitor kokako, perseverance, and effective teamwork it is possible to survey territories in even the densest portions of AiP.

2. Introduction

Ark in the Park (AiP) is a partnership between Forest and 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, native species have also been re-introduced to the area, including white head (*Mohoua albicilla*), North Island robin (*Petroica australis longipes),* hihi (*Notiomystis cincta*) (although this translocation was unsuccessful), and the target species for this project, the North Island kokako (*Callaeas cinerea wilsoni*).

The North Island kokako is an endangered forest bird endemic to New Zealand and a member of the New Zealand wattle-bird family Callaeidae. It is one of two subspecies; the second being the South Island kokako (*C. c. cinerea*) which is classified as data deficient and likely extinct. *C. c. wilsoni* population numbers have declined rapidly since the introduction of mammalian pest species to New Zealand, which predate the birds and also out-compete them for food resources. Therefore, populations must be continually managed, particularly in mainland areas, through continued pest control. In AiP, ship rats, stoats, weasels and possums are routinely targeted by trapping and poisoning to keep their numbers at a minimum; especially through the breeding season (November to February) when nesting birds with chicks are most vulnerable to predation. It is aimed to maintain rat density at 5% or below, measured via tracking tunnels. Food supply also influences the number of breeding attempts that kokako make, but nest predators determine the outcome of these attempts (Innes, 2013). The combination of predator control and thorough monitoring of translocated individuals is helping to establish kokako in AiP.

Since the first kokako translocation in 2009 and the subsequent translocations thereafter, the Kokako Recovery Group (KRG) has specified a minimum of 30 breeding pairs be identified before a viable population is considered to be established, and therefore, the AiP translocation deemed a success (Warneford, 2013). To continue monitoring the translocated individuals and identify breeding pairs, Auckland Zoo was contracted by Forest and Bird to conduct the survey for the 2013-2014 Kokako breeding season.

3. Predator Control

Rodent control in AiP is achieved through a grid of baitlines with Philproof bait stations containing Brodifacoum in sealed plastic bags set up at regular intervals (Warneford, 2013). Stoats are a major threat to female kokako on the nest (Flux 2006). In an effort to reduce this threat, DOC 200 traps are used and a ‘Ring of Steel’ is also placed around the perimeter of confirmed nest sites. The two nests that were found this season each had a 'Ring of Steel' put in place around them. The low trap count of three rats between both nests shows that the predator control system in place throughout the AiP is extremely efficient.

4. Translocations

The 26 kokako translocated to AiP to date are outlined below in Table 1. There are future plans for more translocations to establish the necessary number of founder birds.

Table 1. Summary of Kokako 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

Walk-through Survey

The main strategy to monitor kokako continues to be walk-through surveys combined with playback and the information gathered from recorders. Survey work for the 2013-2014 kokako breeding season began mid-September and initially focused on triangulation of the calls heard to identify territories. Multiple walk-through surveys were conducted in target areas in an attempt to confirm previous territories and the presence of breeding pairs in such territories.

The areas of AiP most heavily surveyed include: Ian Wells (IW), Cutty Grass South (CGS), Kokako (KOK), AW North (AWN), AW South (AWS) and D blocks. The latter two blocks were the main area of focus in the final weeks of the season. Within each block, bait lines were essential for accessing territories given the nearly impenetrable nature of the understorey. Certain bait lines were used frequently for surveying due to the advantages they provided, such as following ridge lines for clear vantage points and easy access into known territories.

On a larger scale, certain blocks were surveyed more than others, depending upon the results obtained from the recorders, prior success with identifying individuals/territories within an area, and perceived likelihood of success (e.g. extremely dense areas with little chance of sighting birds were frequented less often than more open areas). Figure 1 shows the hours spent conducting walk-through surveys of the various blocks within AiP during this season. Gleeson Block stands out for an extremely small number of hours spent compared to the other blocks, which was the result of unconfirmed sightings and a small amount of song heard in the area (see Appendix A). Due to a local resident's claim of a kokako occasionally singing on her Scenic Drive property, recorders were deployed in the Gleeson Block and it subsequently surveyed. The recorders suggest a bird that very rarely sings was certainly present, but walk-through surveys produced no sign of the bird at all. Therefore, it may be a single bird without a mate as it did not appear to be defending a territory. Based on this

assumption, Gleeson Block should be surveyed more extensively at the start of next season to confirm if the individual is still present and whether or not it has acquired a mate.

Apart from the Gleeson Block, the time spent in the other blocks largely mirrored the amount of kokako activity observed within each block. The KOK Block was a focal point for kokako activity, with at least two to three breeding pairs residing in the area. Figure 2 shows the areas where adult kokako were either heard or seen, as well as the locations where unidentified fledglings (with paler wattles) were seen by Auckland Zoo staff during the season. Additional unidentified fledglings were seen by AiP volunteers at the end of the breeding season as noted in the discussion section.

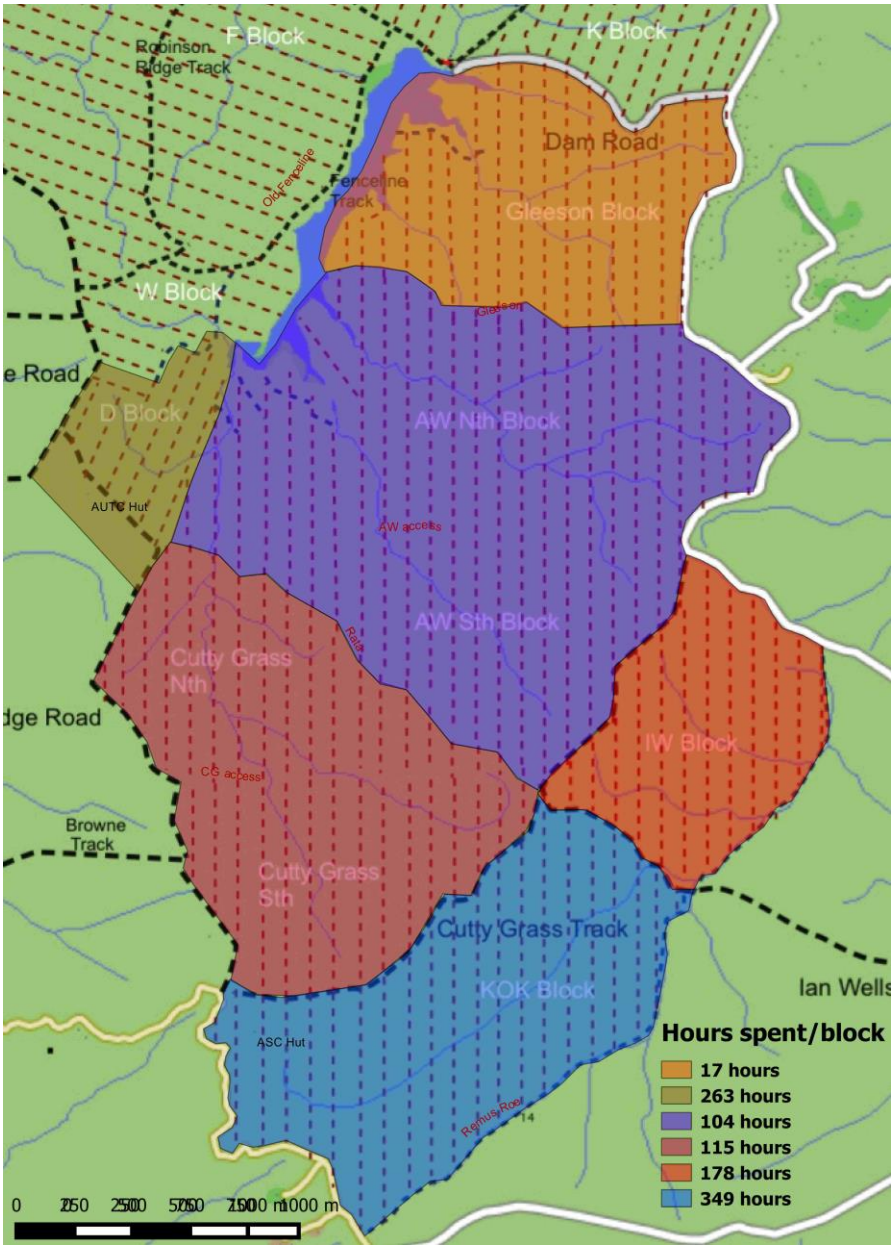

Figure 1. Hours spent conducting walk-through surveys of the Ark in the Park blocks.

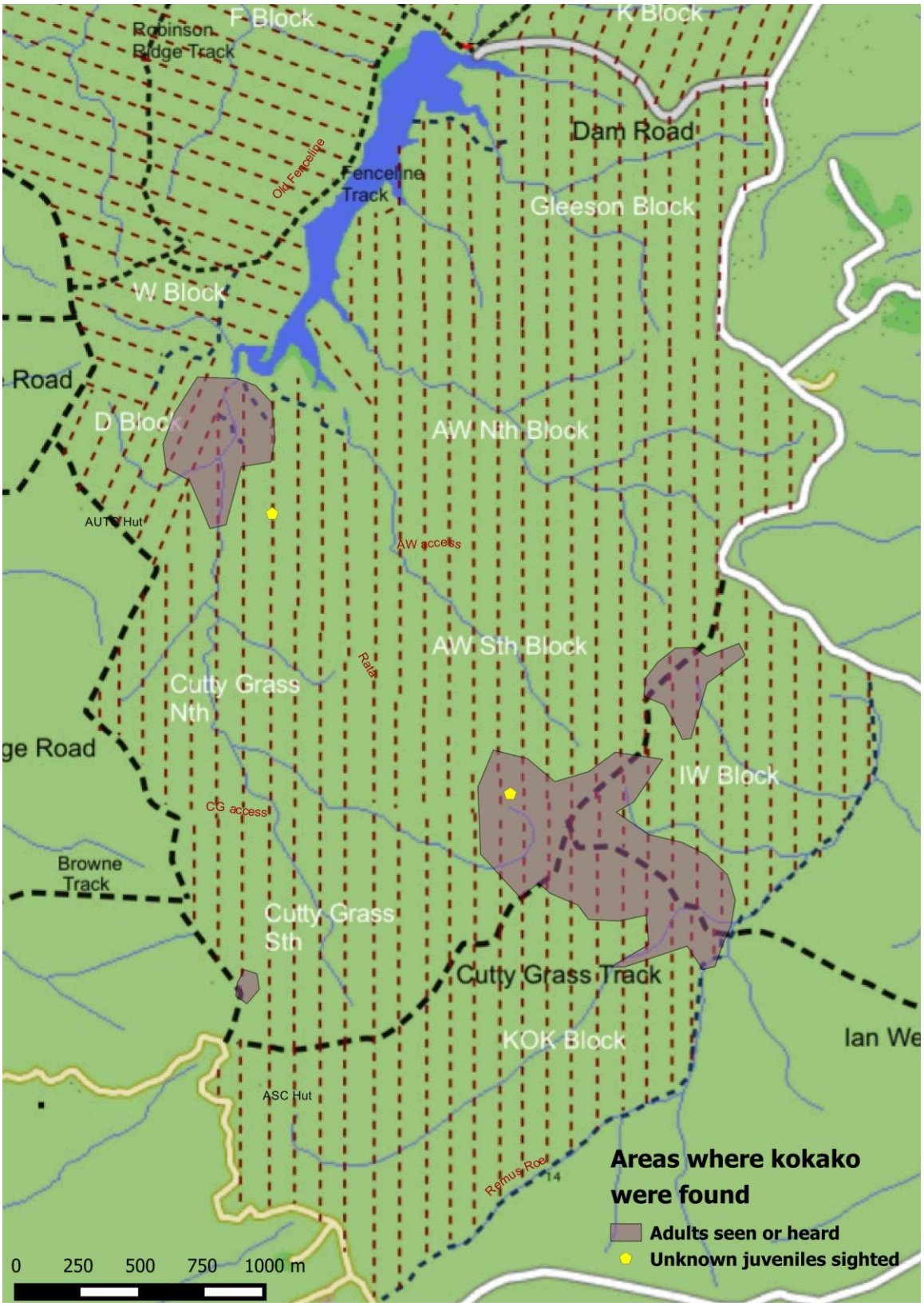

Figure 2. Areas where kokako were either seen or heard

Playback

During the initial stages of surveying, playback was not required, as numerous birds were frequently heard calling. In turn, there was concern that playback could potentially interfere with breeding behaviour by attracting other birds into breeding pair territories and delay nesting by creating the impression of intruders frequently invading established territories. However, as the season progressed and bird calls heard less frequently, playback use increased, especially following consultation with Dave Bryden of the Hunua Ranges Kokako Management Area (KMA).

Recorders

The recorders developed and analysed by AiP volunteer Eric Wilson, and installed in the field by AiP volunteer Kevin Ferguson, continue to be an invaluable source of information. For survey work, they are extremely helpful for assessing whether or not birds are present in specific areas (see Appendix A), thereby isolating target areas for surveying and drastically reducing unnecessary walk-throughs. Though an extremely efficient survey technique, the main limitation of the recorders remains the ratio of manpower to the sheer size of AiP. It would be ideal to have more individuals available to deploy recorders in target areas and review the recordings made, particularly at the beginning of breeding season when birds are actively calling, which may aid in the identification of more breeding pairs.

6. Survey Results

The survey period for the 2013-2014 kokako breeding season ran from September 2013 to March 2014. During this period, six breeding pairs (see Figure 3) were located within approximated territories in the AiP pest management area. However, of these six breeding pairs, only six individuals (as listed in Table 2) could be positively identified by band sightings, whereas the other individuals were either not banded or visual confirmation was hindered due to vegetative and topographical obstacles. As a result, several of the unidentified birds listed on Table 2 are likely to be listed twice, since their identities were not verified but they were probably listed already on the table.

The confirmed individuals of the breeding pairs consist of Maurice/Kowhai, Pierre/Sophie, Totara/unconfirmed (identified as Puke in previous years) and Karen/unconfirmed (identified as Sylvain in previous years). The other two breeding pairs, whose identities could not be confirmed, were regularly heard at the beginning of the breeding season and thus, approximate territories could be assumed from the data collected. The other breeding pairs consistently remained within their established territories, which correspond in part with the 2012-2013 survey findings. It should be noted that both Pair 1 and Pair 2 were denoted using conservative measures; since we did not get positive identification of individuals in either

pair, it is possible that there was more than 1 pair living in each "territory" and that we combined all different pair sightings through that area into a single pair erroneously. Similarly, Pair 2 is especially likely to have been more than 1 pair as they lived in even more inaccessible terrain than the other birds and were often heard together rather than seen together. Both of these pairs had territories on the highest elevations, which were also the first birds to reduce their song frequency and settle into the business of nesting, making their identification much more challenging (and for us, ultimately impossible despite intensive efforts).

In addition to the six breeding pairs, single birds were intermittently heard in IW, CGS, and KOK blocks. At the very end of the season, an unbanded bird of undetermined maturity was sighted once on the Ridge Road Access track close to the car park. On the same day, in response to playback, a confirmed juvenile was seen on AWN23.

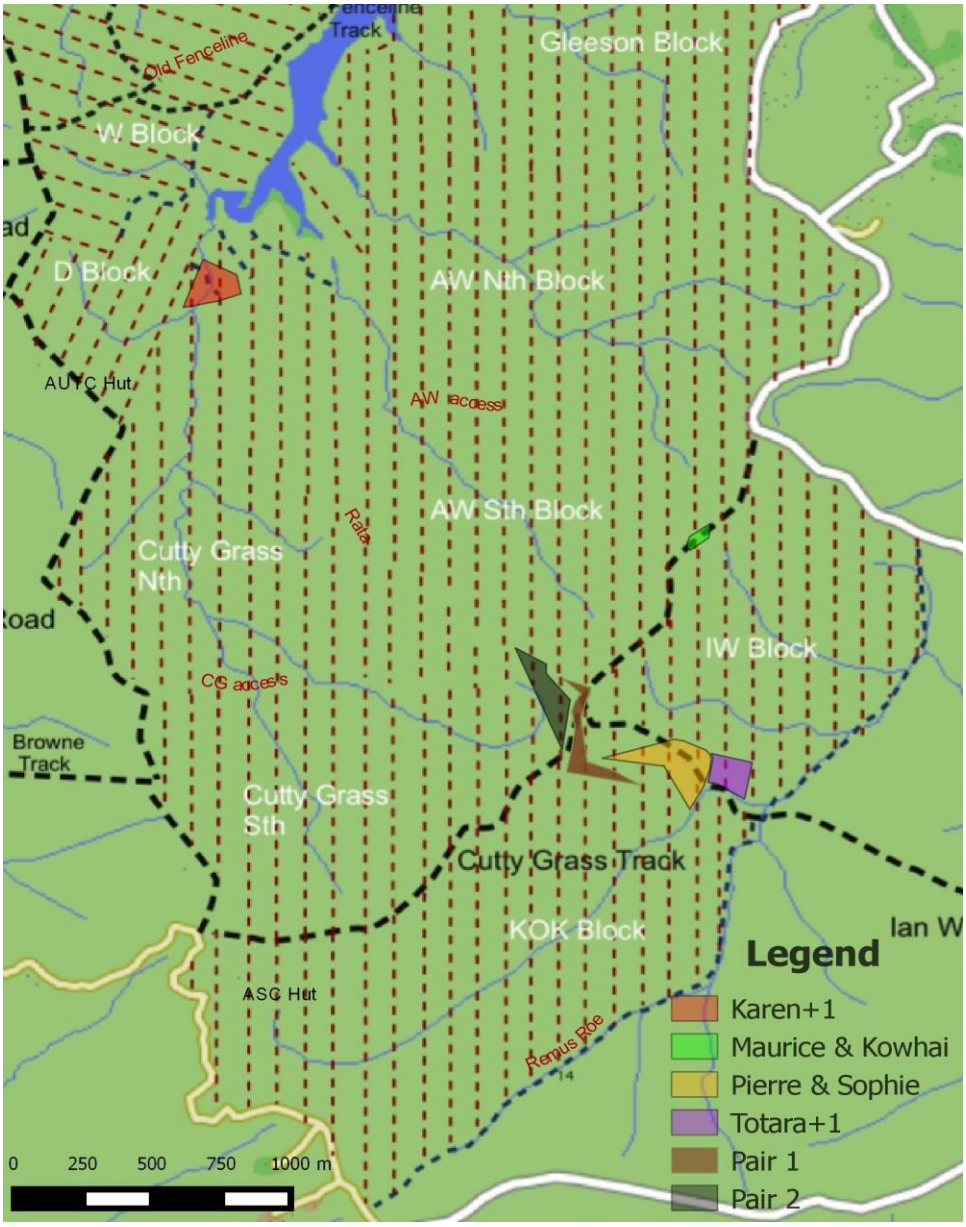

Figure 3. Territories held by Kokako pairs during the 2013-2014 breeding season in Ark in the Park.

Table 2. Summary of Ark in the Park banded kokako population at the end of the monitoring season, March 2014.

Name	Sex	Band combination	Status	Founder Capture site
Maurice	M	M/RG	pair	Waipapa site 7
Kowhai	F	M/RLg	pair	Waipapa site 6
Pierre	M	M/YR	pair	Tunawae - pair
Sophie	F	M/GY	pair	Tunawae - pair
Totara	M	M/WG	pair	Waipapa site 5
Unknown	F		pair	
Karen	F	M/RW	pair	Waipapa site 4
Unknown	M		pair	
Sylvain	M	M/WR	Last seen 2012/2013	Tunawae-middle pair
Puke	F	M/WY	Last seen 2012/2013	Waipapa site 7
Wahine	F	M/RB	Not seen since release	Waipapa site 7
Marty	M	M/YG	Last seen 2012/2013	Waipapa
Manuka	F	M/YB	Last seen 2012/2013	Waipapa
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	Unknown	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 2012/2013	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
Brittany	F	Lg/YM	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

7. Discussion

Based on the survey results of this season, the Kokako AiP translocation is still not considered complete, since 30 breeding pairs have yet to be established as required by the KRG. The inability to confirm more breeding pairs is largely due to the thick understory of kiekie, supplejack and cutty grass, which makes it extremely difficult to track birds for long distances. Moreover, surveying did not start until mid-September, and this coupled with pairs initiating nesting earlier than usual due to optimal environmental conditions resulted in a truncated period of the target species actively calling. Nonetheless, breeding pairs continued to be identified and progeny produced.

The only breeding pair confirmed to produce progeny was Maurice and Kowhai. Their first nest site was located on 30th of October, which was within five metres of the previous season's nest site. Nest watches commenced on the 1st of November until the chicks fledged later in the month. On the 2nd of November an AiP volunteer, Grant Capill, observed a dead chick being dropped from the nest by either Maurice or Kowhai. The chick was estimated to be 2 to 3 days old at time of death. Taking into consideration the estimated age of the deceased chick, the nesting behaviour of the pair and the optimum age of approximately 16 days for banding, two chicks were banded on the 14th of November by Tim Lovegrove. The two chicks were banded and named as follows: LgW/M "Poroporo" and WR/M "Hinau" and fledged around the 30th of November. In the following days, they were observed foraging in the same approximate area, but were not seen again for the remainder of the season.

Photo courtesy of Grant Capill

Maurice and Kowhai's second nest site of the season was located on the 1st of January within 15 to 20 metres of their first nest site. The second nest site was assessed in mid-January for accessibility to band any chicks present but it was deemed unsuitable for safety reasons. Therefore, the single chick which was seen to fledge was not banded, but successfully fledged around the 14th of February. Yet again, Maurice and Kowhai proved to be a massive success for another breeding season in AiP.

No other nest sites were found for the other identified pairs, although a probable nest site was investigated for Pierre and Sophie. While surveying the KOK block on 22nd of January, birds were observed repeatedly leaving and entering a large Rimu. One individual was confirmed to be Pierre, but we were unable to ascertain whether bands were present on the other individual. Earlier in the season, on the 20th of December, two birds were seen flying out of a different Rimu near KOK16 with another two birds flying out shortly afterwards, one of which had poorly formed song and was thought to be a juvenile. The area where the four birds were seen was within Sophie and Pierre's territory and was thought to be them. Based on the behaviour of these four birds seen in close vicinity to each other and the lack of aggression, it is likely that these birds were that pair with some of their fledglings from this season.

Other signs of breeding behaviour were exhibited by Totara/unconfirmed early in the surveying period. On 23rd of October, Totara was clearly identified flying with three other individuals. They were all travelling closely together, foraging and calling to one another without aggression, leading us to believe the other two birds with Totara/unconfirmed were their offspring. Furthermore, these four birds were not seen associating with each other again this season, suggesting they may be two juveniles from the previous season's clutch that are now sub-adults. On May 1, there was also a possible sighting of this pair by AiP volunteers. Three birds were seen foraging together in an area immediately south of Totara's known territory (so likely within the actual territory), one of which had a yellow and a white band. Only two birds have that colour combination, Puke and Dylan, and Puke was Totara's mate last season. If that bird was Puke, it would suggest that she was with Totara and they had a fledgling with them. On the other hand, if the bird seen was Dylan, he has moved slightly south from where he was last seen during the previous breeding season, and suggests he and his mate had a fledgling with them.

In regards to the two unidentified pairs, the territory outlined for pair two corresponds with Marty and Manuka's territory from last season, which leads one to think that Pair 2 may be Marty and Manuka. Pair 1, on the other hand, was frequently sighted along the ridgeline of CG track in an area that partially correlates with the last season's territory proposed for Kiekie/unbanded and into an area not previously recognised as a distinct territory. This could

mean one of two things: either pair one is Kiekie/unbanded or a new breeding pair yet to be identified

Apart from the fledglings observed with the known breeding pairs, a couple of other fledglings were seen at the end of the breeding season. As previously mentioned, a single fledgling was spotted around the North end of CGN, not particularly close to any known territories. On April 12, another fledgling was seen on the Rata track not far north of CG Track by AiP volunteers. It was accompanied by another bird that was not seen well. The total number of fledgling and juvenile sightings noted during the 2013-2014 AiP survey implies it was a successful breeding season for kokako.

8. **Acknowledgments**

Auckland Zoo would like to thank the AiP volunteers, especially Kevin Ferguson, Eric Wilson and Grant Capill, for the many hours they devoted to assisting zoo staff with surveying, nest watching, deploying and analysing recorders and baiting. Thanks to the nest watchers, especially Mike Siddens, John Staniland, Yvonne Vaneveld, David Gauld, Rachel Fewster and Sharon Keymer. Also, many thanks to: Gillian Wadams and Laurence Bechet at Forest & Bird for their support and advice, Tim Lovegrove for banding this season's chicks, Dave Bryden for hosting at the Hunua Ranges KMA and sharing his sound recordings for playback, Richard Gibson for invaluable support during the season, Nat Clark for her administrative work and assistance with editing, and special thanks to Asha Rodger for initiating and organizing the partnership between the Ark in the Park and the Auckland Zoo that allowed this to happen.

9. **References**

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10. Appendices

Figures 4 and 5 are sound recording maps created by Eric Wilson for the 2013-2014 breeding season in AiP. Blue circles denotes no kokako heard around that recorder, green denotes faint song only, yellow denotes medium volume song, and red denotes loud song. The density of the colours is relative to the number of days in the recording period in which Kokako song was heard (the denser colours representing the recorders with the most singing).

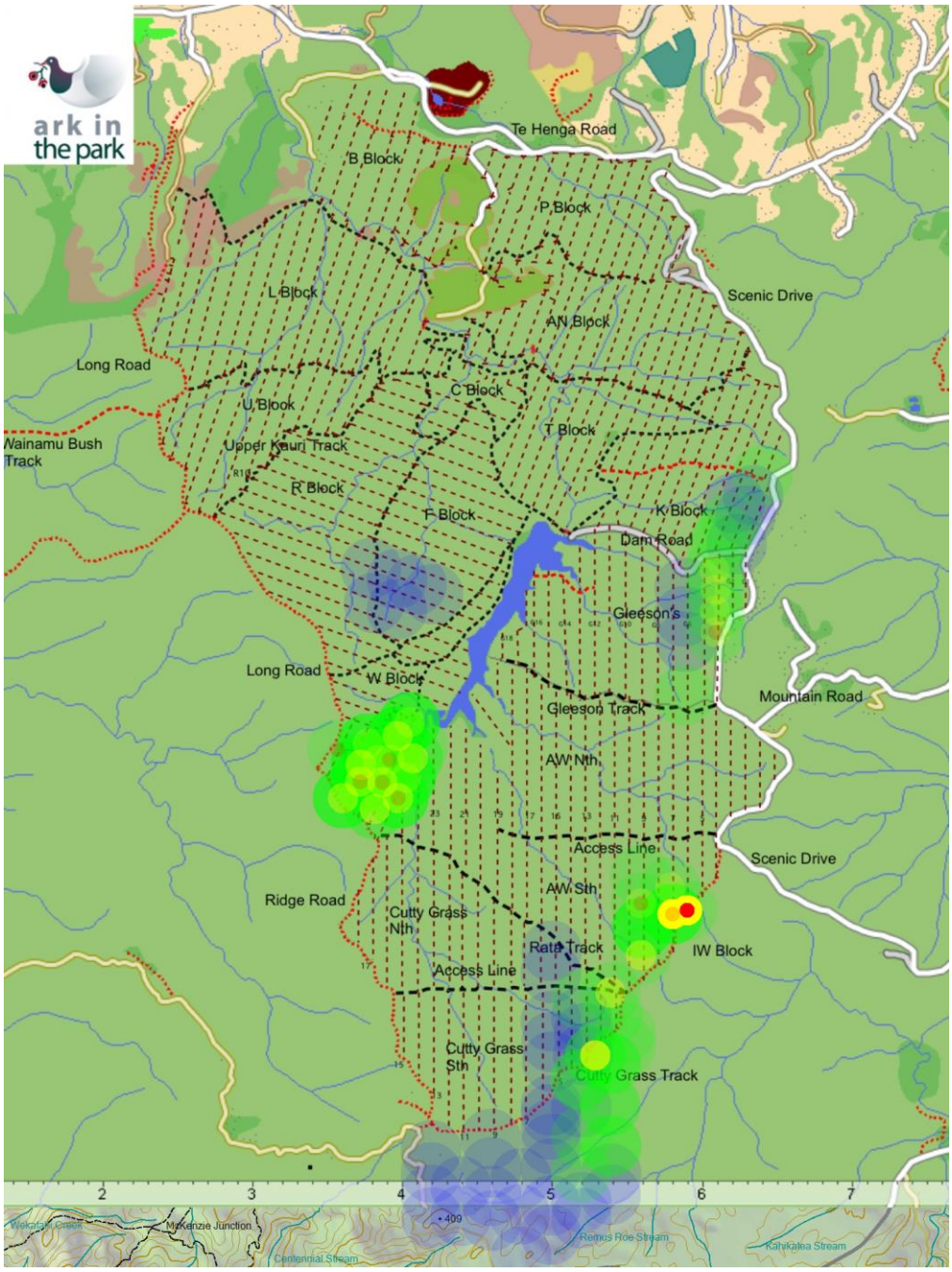

Figure 4. Sound Recording Map for October to December 2013

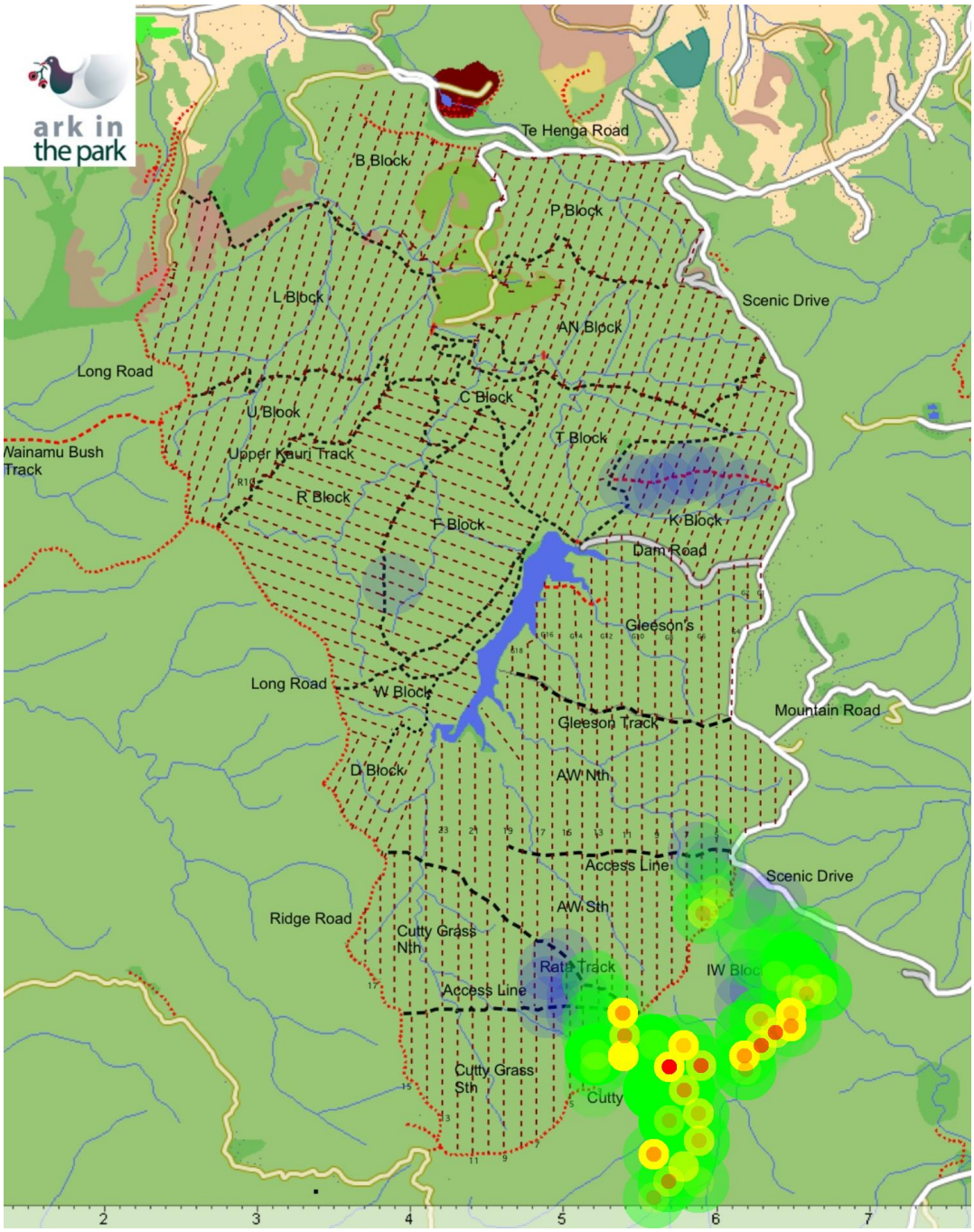

Figure 5. Sound Recording Map for January to March 2014

Figures 4 & 5 provided by Eric Wilson