Ark in the Park

2021 Kōkako Census Report

Grant YY/GM - Photo courtesy of Casey Will, Auckland Zoo

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1. Summary

Auckland Zoo (AZ) conducted a partial 2021 census of North Island kōkako *Callaeas wilsoni*, at the Ark in the Park (AiP), Waitākere Ranges Regional Park, from early August to late-October 2021. The census was carried out largely in accordance with the Department of Conservation (DOC) Standard Operating Procedures (Flux et al. 2019). Following consultation with the Kōkako Recovery Group (KRG) a combination of walk-through surveys and automated Acoustic Recording Devices (ARDs) were used to identify areas with territorial birds. Once birds were located, zoo staff and trained volunteers followed the birds to determine whether they were territorial or not, paired or single birds, adults or sub-adults and if each individual was colour-banded or unbanded. Due to COVID-19 delta variant entering the community and Auckland moving to Alert Level 4 lockdown restrictions, the kōkako census was put on hold for a period of six weeks (from mid-August to late September) but was resumed at a reduced capacity during Alert Level 3 restrictions with a focus on known kōkako territories, banded birds (founders and progeny) and any pairs likely to be selected for nest monitoring.

Forty-six kōkako were identified compared with forty-eight in the 2020 census. The composition was as follows:

Confirmed founders	6
Potential founders	3
Unbanded adults	22
Banded AiP-bred	9
Unidentified *	6
Total individuals:	**40 + 6 unidentified**
Total territorial pairs:	**14**

*unidentified birds were those who were found but unable to be called-in to have their status as banded or unbanded confirmed.

Among the birds identified, 14 pairs (which included six translocated birds: five founders and one potential founder, and seven banded AiP bred birds) and seven single adults (including one founder, two potential founders and one banded AiP bred bird) were confirmed as territorial while the other birds were either ‘floating’ or insufficient information was gathered to determine territoriality.

2. Methods

Census

The 2021 census of AiP, which commenced early August and carried through to late-October[1], was conducted using a combination of the following three methods: walk-through survey, automated acoustic recording devices (ARDs) and targeting known territories. The walk-through survey protocol, as stipulated by DOC Standard Operating Procedures, involved surveyors walking along bait lines, in parallel with other surveyors when possible, and stopping at 200m intervals to listen for birds or trigger a response from birds using a standard playback sequence (see *Playback*) played with a handheld Foxpro NX4 speaker system.
The census was put on hold for a period of six weeks (from the 17th August until the 27th September) during a Covid Alert Level 4 lockdown but was resumed at a reduced capacity during Alert Level 3 restrictions. After consultation with the Kōkako Recovery Group (KRG) it was recommended to focus the remaining time and resources on known kōkako territories, banded birds (founders and progeny) and any pairs likely to be selected for nest monitoring. The reduced census only surveyed areas known from the previous census to contain a higher density of kōkako. These areas were N, IW, AWS, KOK and eastern CGN blocks (Fig. 1). One hundred and thirty-five sites within the established management area and seventeen sites outside of the management area were sampled in this manner. Another thirty-five sites were sampled using ARDs to detect kōkako calls in R, F, T, CGS blocks, the KOK access line and Huia Dam Track.

For birds to be included in the territorial count, they had to meet the following criteria (from Flux et al. 2019).

1) For banded kōkako previously known to be territorial in the same place as the 2020 census, surveyors had to confirm ID within the known territory and complete at least a 15 minute ‘follow’.
2) For newly-banded individuals such as recently translocated individuals; pairs with an unbanded individual; banded or unbanded birds in a new location, surveyors had to complete two 10 minute ‘follows’ at the same location; or one follow of at least 30 minutes in which one bird of the pair sung full song.

The most northern blocks of AiP (L, B, U, AN and P) were not surveyed (by either foot or ARDs) as part of the 2021 census as no kōkako have been detected in these areas in previous census years (though kōkako were detected in those blocks while being radio-tracked after release). In total, 536 AZ staff hours, 40 training hours and 120 AiP volunteer hours[2] were spent in the field conducting the census.

[1] Alert level 4 lockdown in Auckland paused the 2021 kōkako census for a period of 6 weeks (from mid-August to late September).
[2] Eighty of these volunteer hours were training new volunteers. Due to lockdown level 3 restrictions only fully-trained volunteers were able to assist with the census if available. Hence the significantly reduced number of volunteer hours contributed compared with previous years.

Playback

After an initial 5-minute listening period, the standard playback used at each interval of the walk-through survey for the 2021 census (as part of the set protocol for the walk-through survey) is as follows::

1) 3x AiP dialect mew calls, followed by a 5-minute listening period
2) An additional set of 3x AiP dialect mew calls, followed by a 5-minute listening period
3) 30 seconds of AiP dialect song, followed by a 5-minute listening period.

Acoustic Recording Devices

Automatic ARDs were used only in R, F, and T blocks, the KOK access line and Huia Dam Track. The ARDs used were either designed and built by AiP volunteer Eric Wilson or sourced from DOC. A total of fourteen ARDs (divided into two groups of seven) were rotated in the field on a weekly basis by AiP volunteer Kevin Ferguson. For the deployed week, each ARD began recording about 30 minutes before sunrise for two hours per day. The recordings were then downloaded and analysed using the audio editing program, Audacity. Through specific settings, Audacity generates a spectrogram, which provides a visual representation of the unique sound spectrum for each type of bird call.

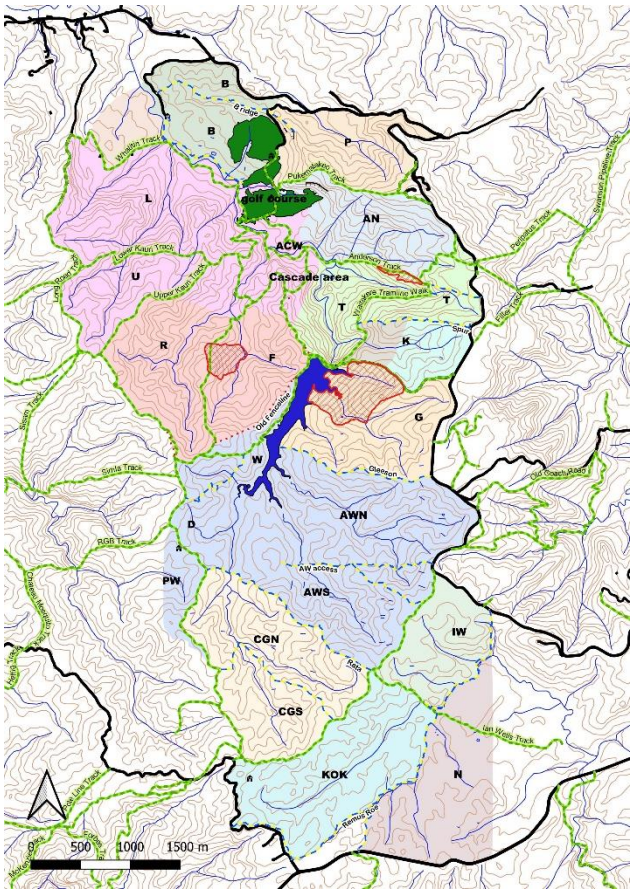

Figure 1: Ark in the Park management zones. Waitakere Ranges. (Source: AiP).

3. Census results

Six founders and three potential founders (see Tables 1&2), 22 unbanded birds, nine banded AiP bred birds (see Table 3) and six unidentified birds were confirmed. Of the 46 birds counted, 14 pairs and seven single adults were confirmed as territorial. The remaining birds were either unidentified, identified as floating, or surveyors could not gather enough information to determine if they were holding a territory.

The 14 territorial pairs consisted of:

- One founder pair (Gordon/Kiwitea).
- One founder paired with a potential founder (Mānuka/Ranginui respectively).
- One founder paired with AiP-bred bird (Ātaahua/Kapua respectively)
- One founder (Pierre) paired with unbanded bird
- Four banded AiP-bred birds (GM-OB, Grant, Cloud and Kohu) paired with unbanded birds
- One pair consisting of banded AiP-bred birds (Pūtahi/GM-WR).
- Five unbanded pairs (pair#1: Gleeson access line, pair#2: IW12, pair#3: N11, pair#4: N13, pair#5: N18/N17).

Two pairs that appeared to be territorial have not been included in the total number of territorial pairs due to the lack of identification (unbanded/unidentified seen at IW8/10-14 and unbanded/unidentified at the north end N19).

The seven territorial single adults recorded were:

- One founder male (Francis).
- Two potential founder males (Aumangea and Tahi Kaha).
- One banded AiP bred bird (Nino).
- Three unbanded birds.

The three single non-territorial birds recorded were:

- GM-RY
- N17/7 unbanded
- KAT-4 unbanded

Territorial pairs

Three changes among territorial pairs were observed this census. Aumangea and Grant were a territorial pair in the 2020 census, however, in the 2021 census Grant was paired with an unbanded bird at Spragg's Bush, outside of the AiP management area. Grant is the only bird sighted this year from the 2018/2019 breeding season. Pūtahi, who was previously paired with an unbanded bird in the 2020 census, was discovered paired and holding a territory with

GM/WR, a banded bird that hatched during the 2020/21 breeding season. Pierre, who was paired with Indigo during the 2020 census, was sighted this year with an unbanded bird and appeared to be holding a similar territory. Indigo was not found.

Kiwitea/Gordon, Mānuka/Ranganui, Ātaahua/Kapua, Cloud/unbanded and Kohu/unbanded were all holding very similar, if not the same territories, compared with last year.

Three of the six AiP birds from the 2020/2021 breeding season were sighted, two of which had paired up and were holding territories in the most populated areas of the management area - GM-WR paired with Pūtahi and GM-OB who was found paired with an unbanded bird on Cutty Grass track in the late stages of the census.

Territorial single adults

Tahi Kaha was observed with GM-WR (now paired with Pūtahi) on one occasion during the 2021 census, but they were confirmed as two single birds. On many subsequent follow-ups Tahi Kaha was observed as a single bird and as in previous years is still holding a large territory. During the past two censuses, similar behaviour from Tahi Kaha has been observed, where he was sighted early on with a second bird but confirmed as single later in the census period/breeding season.

Francis was observed as a single bird for the third consecutive year, holding the same territory on Scenic Drive residential properties and across into K block inside the AiP management area. He was initially sighted with an unbanded bird but has been confirmed as a single bird on consequent follow-ups.

For the second consecutive year Nino was sighted holding a territory as a single bird down the southern end of the Ian Wells track (off Piha Road).

Aumangea, who was paired with Grant in the 2020 census, was sighted potentially paired with an unidentified individual early on in the census. However, during multiple subsequent follow-ups was determined to be single.

Non-territorial kōkako

Three non-territorial singles were identified in the 2021 census. These included two unbanded birds and GM-RY a bird from the 2020-2021 breeding season who was sighted multiple times as a single bird and appeared to be floating having been observed in different areas of the management area.

Known kōkako not sighted in 2021

Three AiP-bred birds that were sighted during the 2020 census were not observed in the 2021 census despite multiple visits to their previously confirmed territories.

Indigo, who hatched in the 2016/2017 breeding season, was paired with Pierre during the 2020 census. During the 2021 census Pierre was confirmed paired with an unbanded bird and Indigo could not be found.

Kevin and Gahnia, who were paired together in N block for two consecutive years, were not found after multiple visits to their previously confirmed territory.

Unbanded and unidentified kōkako

Five unbanded pairs and five unbanded singles were identified in the 2021 census. The majority of these birds were found in the southern blocks of the management area: IW, KOK and N blocks. One unbanded pair and one unbanded individual were also found in G block. Two partially identified pairs were also observed with one individual of each pair being unbanded and the other unidentified.

Six unidentified kōkako, consisting of two partial identified pairs, Huia Dam single, banded single with Ātaahua and Kapua and one pair heard duetting East of IW12 were also observed. Despite multiple visits to the initial and surrounding areas the birds could not be called-in or identified.

Unmanaged areas outside of AiP

Several areas outside of AiP were investigated. This included Upper Huia Dam track, Spragg's Bush, KOK access line and several Scenic Drive residential properties included in the 'buffer zone'.

As with previous years Francis was observed along several Scenic Drive properties and into K block. Residents also reported multiple sightings of an unbanded pair and an unbanded individual moving between Scenic Drive properties and G block where a known pair and single bird reside. Cloud and unbanded partner and Nino were again observed holding territories at the southern end of the Ian Wells track off Piha Road. Grant was observed paired with a unbanded bird in Spragg's Bush.

A pair of kōkako were heard duetting East of IW12 outside of the management area. They did not respond to playback and access into this area was too difficult to pursue the birds.

Recorders placed on the Huia Dam Track (northern end) and across Piha road on the KOK access line, both outside the AiP management area, picked up faint-to-medium kōkako calls at both these sites. Investigations down the KOK access line found one non-territorial unbanded bird, however, nesting season had already begun, and more birds were heard in close proximity. One bird was heard briefly during investigations down Huia Dam track, but no bird could be sighted.

As in previous years, the southern blocks of the AiP management area continue to be the more heavily populated area for kōkako, which may account for several birds found in contiguous areas outside of the management zone.

ARD recorder blocks

The edges of F and R blocks in the north-west and T block in the north-east of the census area were surveyed by ARD recorders. Analysis of the files found a few faint-to-medium calls from

one recorder placed at F15/10 for one day of recording. However, as individual birds cannot be discerned and actual numbers of kōkako obtained, these birds are not included in the census total. Despite this, it is an indication that there are more birds north of the areas surveyed during the 2021 census. The remaining results indicated that there are no other kōkako likely within these blocks and the immediate surrounding areas.

Table 1. Summary of the founder kōkako population at end of 2021 census.

Note that for tables 1 to 3 all highlighted rows indicate birds that were seen in the 2021 census.

Name	Sex	Band Combo	Status	Source
Francis	M	YM-GR	Single 2021 census	Mapara
Pierre	M	M-YR	Paired with unbanded bird 2021 census	Tunawaea-pair
Kiwitea	F	YM-GB	Pair seen 2021 census	Mangatutu
Gordon	M	YM-YB	Pair seen 2021 census	Mangatutu
Mānuka	F	M-YB	Paired with Ranginui 2021 census	Waipapa
Ātaahua	F	YM-OG	Paired with Kapua 2021 census	Mapara
Maurice	M	M-RG	Paired with unbanded bird 2019 census	Waipapa site 7
Karen	F	M-RW	Paired with unbanded bird 2019 census	Waipapa site 4
Zelah	F	YM-RY	Pair seen 2018 census	Mapara
Kōwhai	F	M-RLg	Paired with Maurice 2017 census	Waipapa site 6
Sylvain	M	M-WR	Paired with Karen 2017 census	Tunawaea-middle pair
Sophie	F	M-GY	Paired with Pierre 2017 census	Tunawaea-pair
Marty	M	M-YG	Paired with unbanded bird 2017 census	Waipapa

Table 2. Summary of the potential founder kōkako population at end of 2021 census.

Name	Sex	Band Combo	Status	Source
Aumangea	M	YM-YG	Single 2021census	Mapara
Tahi Kaha	M	/-M	Single 2021 census	Mapara
Ranginui	M	YM/LO	Paired with Mānuka 2021 census	Mangatutu
Duncan	M	M-RY	Seen with unbanded bird 2019 census	Tunawaea-Nth Ea access
Rereahu	M	YM-LR	Seen with unbanded bird 2019 census	Mangatutu
Thurley	F	YM-YR	Pair seen 2018 census	Mapara
Tōtara	M	M-WG	Paired with unbanded bird 2018 census	Waipapa site 5
Puke	F	M-WY	Paired with unbanded bird 2018 census	Waipapa site 7
Papari	M?	YM-GO	Seen 2018 Census	Mapara
Tahi	M	YM-LY	Seen 2018 Census	Mangatutu
Nuage	M	YM-RO	Seen 2017 Census	Mapara

Name	Sex	Band Combo	Status	Source
Aroha	Y	YM-OW	Paired with Tahi Kaha 2017 census	Mapara
Te Ariki	M	YM-YO	Paired with Rātā 2017 census	Mapara-Rain1 (South)
Rātā	F?	M-BR	Paired with Te Ariki 2017 census	Mapara-Rain1 (South)
Dylan	M	M-YW	Paired with unbanded bird 2016 census	Tunawaea
Grace	F	M-GW	Seen with unbanded bird 2016 census	Tunawaea-Rain
Bryda	F	YM-RG	Seen 2016 Census	Mapara
To be confirmed	M	YM-RL	Released May 2016	Mapara
To be confirmed	M	YM-RB	Released May 2016	Mapara
Kiekie	?	M-YL	Paired with Grace 2015 census	Tunawaea-middle pair
Pōtae	M	YM-YW	Released Aug 2015	Mangatutu
Tiriwa	F	YM-LB	Released Aug 2015	Mangatutu
Rua	F	YM-LG	Released Aug 2015	Mangatutu
Moby	M	OM-Y	Last seen winter 2013	Tiritiri Matangi Island
Nīkau	M	M-WL	Last seen Feb 2013	Mapara- (South)
Kauri	F	M-LW	Last seen Feb 2013	Waipapa
Rhonda	F	M-GR	Last seen 2012/2013	Tunawaea-Nth Ea access
Pareira	F	GL-M	Seen with Grace 2012-2013 season	Tunawaea
Rimu	M	M-GB	Last seen 2012	Waipapa
Punga	F	YM-R	Last seen 2011	Tiritiri Matangi Island
Maire	F	M-BW	Last seen 2011	Mapara-Rain2 (South)
Lucy	M	M-LY	Last seen 2011	Tunawaea-Owawenga
George	M	M-LR	Last seen 2011	Tunawaea-Owawenga
Wahine	F	M-RB	Not seen since release	Waipapa site 7

Table 3. Summary of banded AiP-bred kōkako population at the end of the 2021 census.

Name	Sex	Band Combo	Status	Dam/Sire
Kapua	M	RY-RM	Paired with Ātaahua 2021 census	Unbanded/Marty
Pūtahi	M	YR-RM	Paired with GM-WR 2021 census	Karen/Sylvain
?	?	GM-WR	Paired with Pūtahi 2021 census	IW10 UB pair
Cloud	?	RW-RM	Paired with unbanded 2021 census	Unbanded/Marty
Nino	?	YW-RM	Single 2021 census	Kōwhai/Maurice
Grant	F	YY-GM	Paired with unbanded 2021 census	Maurice/Unbanded
Kohu	?	LY-RM	Paired with unbanded 2021 census	IW10 UB pair (#1)
?	?	GM-OB	Paired with unbanded 2021 census	Gordon/Kiwitea

?	?	GM-RY	Single 2021 census	Ātaahua/Kapua
Gahnia	?	WM-GY	Paired with Kevin 2020 census	Kiwitea/Unbanded
Kevin	?	LR-GM	Paired with Gahnia 2020 census	Kiwitea/Gordon
Indigo	F	LG-RM	Paired with Pierre 2020 census	Karen/Sylvain
Eric	?	RY-GM	Seen 2019 census	Maurice/Unbanded
	?	OY-GM	Seen April 2019	Zelah/Frances
	?	GR-WM	Fledged 2017/18 breeding season	Kiwitea/Unbanded
	?	LR-RM	Fledged 2017	IW10 pair (#1)
Misty	?	WY-OM	Fledged Jan 2016	Mānuka/Marty
Māpere	?	WG-OM	Fledged Jan 2016	Mānuka/Marty
Hīnau	?	WR-M	Seen 2015 census	Kōwhai/Maurice
Andy	?	BB-M	Seen 2015 census	Kōwhai /Maurice
Poroporo	?	LW-M	Fledged 2013 / 2014	Kōwhai /Maurice
Miro	M	R-GM	Last seen 2011	Kōwhai /Maurice
Mātai	M	WB-M	Last seen 2011	Kōwhai /Maurice

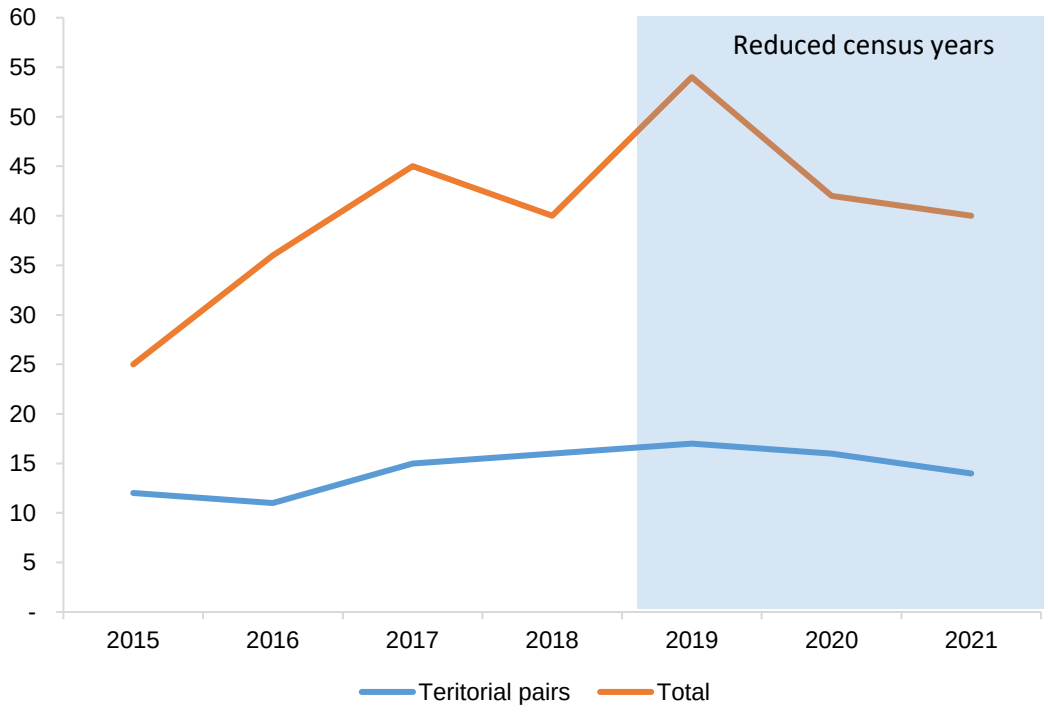

Figure 2. Kōkako population trends (2015-2021) – Number of identified territorial pairs (blue) and total number of identified individuals sighted during the annual census period (orange) (Note: Unidentified birds have not been included in the totals).

Overall, from 2015 to 2021 the total kōkako population and number of pairs observed has increased. Figure 2 indicates a downward trend in total population over the past two years, but this can likely be attributed to the aforementioned challenges leading to incomplete/reduced censuses. Despite adverse weather contributing to an incomplete census in 2019, it continues to be the highest population count to date with 54 individuals identified.

The number of observed territorial pairs has not changed significantly since 2015. However, the last three years are not a true representation of the total number of pairs in the AiP (due to the census focussing on known pairs rather than identifying new pairs),and is likely to be an underestimate.

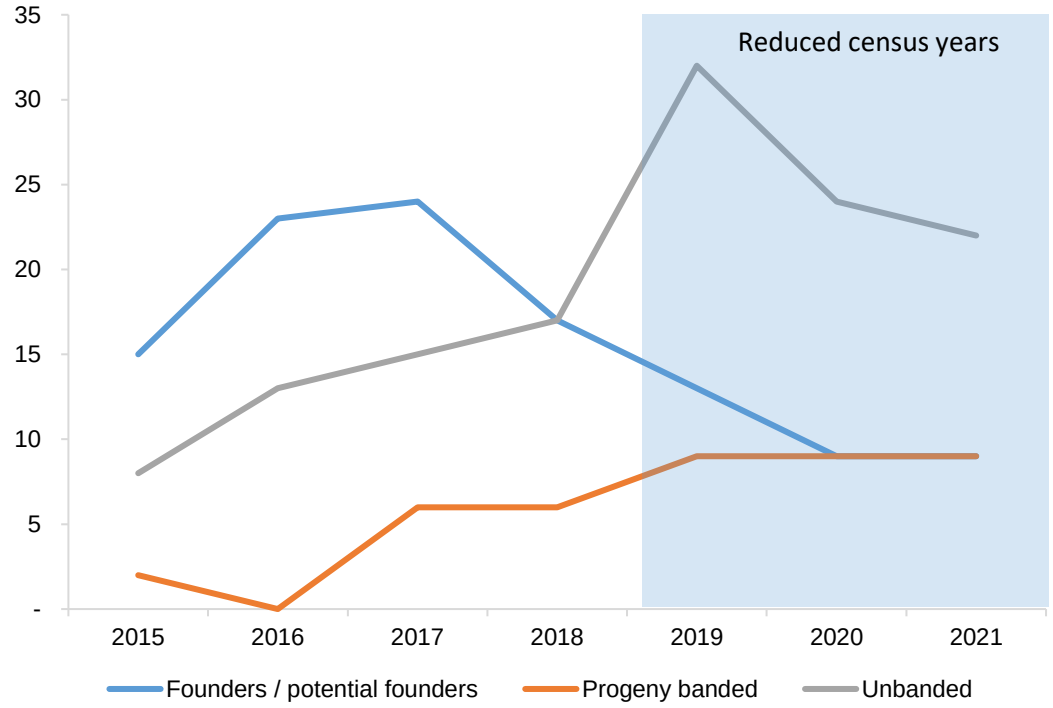

Figure 3. Kokako population trends (2015-2021) – Founders/potential founders (blue), banded (orange) and unbanded progeny (grey) identified during the annual census period. (Note: Unidentified birds have not been included in the totals).

The number of translocated birds (founders/potential founders) encountered has declined since 2015, but the number of banded and unbanded progeny has increased (Fig. 3).

Banded progeny identified was increasing until 2019 but has remained constant over the past three years. Unbanded kōkako numbers peaked in 2019 and have gradually decreased in the last two years but again is reflective of census efforts focusing on banded kōkako in the reduced census years. The 2019-2021 survey years are unlikely to accurately represent non-territorial progeny or progeny that hold territories outside of the blocks fully surveyed.

4. Discussion and recommendations

For the second consecutive year, restrictions imposed by the COVID-19 pandemic have limited the scope of the kōkako census. The loss of six weeks resulted in a change of focus, with the limited time and resources used to identify kōkako in known territories, banded birds (translocated birds and progeny) and any pairs likely to be selected for nest monitoring.

Forty-six kōkako were identified during the 2021 census. This number is slightly lower than the 2020 census (forty-eight kōkako) but is likely attributed to the aforementioned challenges due to COVID-19 leading to a reduced census. In addition to the identified birds, other kōkako were heard by surveyors but could not be followed up for identification, therefore, this number is not a true representation of the whole kōkako population at AiP.

The reduced census included completing a full walk-through survey in areas that were known from previous censuses to contain a higher density of kōkako (N, IW, KOK and AWS). Due to the reduced time available before nesting behaviours were observed, follow-ups of unidentified birds to confirm identity were limited. However, following up on unidentified birds in late October would not have given a true indication of population numbers as it may not have been possible to determine whether these birds were in fact single or part of a pair with a nesting partner.

Since the 2017 census, birds translocated into the Ark have been slowly declining (see Figure 2). A decline in translocated kōkako is expected as there have been no new translocations since 2016 and as the ages of translocated individuals aren't all known, age-related mortalities may have occurred. However, the total founder/potential founder number for the 2021 census has remained the same as the previous year with Ātaahua now reclassified as a founder after successfully fledging two chicks during the 2020/21 breeding season (Bryden & Rogers 2021). The number of AiP-bred birds also remained the same as last year; however, three of those found in the 2020 census were not identified in the 2021 census while three AiP-bred birds from the 2020/21 breeding season were added to the census total. The increase in the number of banded and unbanded progeny found over the last five years is an indication that kōkako can successfully fledge chicks each year from monitored[3] and unmonitored nests. Three out of six birds which fledged from the 2020/2021 breeding season were not found. However, non-territorial individuals not sighted could be attributed to the focus of the census shifting and less area covered by the walk-through survey.

Kōkako calls were picked up using ARD's in some areas not surveyed by foot, indicating that there are more birds within and outside of the AiP management area than have been identified during the 2021 census. Unfortunately, too much time was lost during lockdown to survey remaining non-surveyed areas with ARD's.

[3] The 2020/2021 nest finding report (Bryden & Rogers, 2021) shows the number of banded kōkako from monitored nests that successfully fledge each year.

The last census that fully surveyed the entire walk-through survey area at AiP was completed in 2018. Therefore, it is hoped that more banded founders/potential founders and banded progeny will be resighted and are holding territories in areas not surveyed these past few years.

With 14 pairs confirmed, six founders and three potential founders identified during the 2021 census, AiP must continue to work towards a population of at least 25 pairs derived from at least 40 founders as per KSG requirements for all kōkako reintroductions.

Due to challenges encountered in the 2021 census, Auckland Zoo recommends the following:

1) The ARD survey should again begin approximately three weeks before the walk-through survey, provided the birds have begun calling adequately, to allow for recorders to be deployed, collected and analysed within an acceptable time frame for surveyors to investigate areas where birds are detected.
2) Heavily populated blocks (N, IW, KOK, AWS) should be surveyed early on in the walk-through survey and the walk-through census period concludes by the beginning of October due to the decreased responsiveness of the birds attributed to the onset of nesting behaviours, unless poor weather or other factors dictate otherwise.
3) If poor weather or other unexpected factors put constraints on the completion of the walk-through survey, the blocks not able to be covered should be surveyed using ARD's to detect any birds present in the areas and, if the KRG again concurs, the walk-through survey should be halted, and the focus shifted to finding birds in their previously known territories.
4) Due to the large area to be covered for the walk-through-survey it would be beneficial to run a minimum of two surveying teams at different areas of the park to shorten the length of the census period.

5. Acknowledgments

Auckland Zoo would like to thank Grant Capill, Mark Darin, Annalily van den Broeke and nine trainee AiP volunteers for their assistance with the walk-through survey; Kevin Ferguson and Eric Wilson for deploying and analysing recorders; Sam Lincoln and Eduardo Colley at Forest & Bird for their support and on-going partnership in the ecological restoration project; and Dave Bryden and Amanda Rodgers for their guidance and expertise.

6. References

Flux, I.; Innes, J.; Barea, L.; Burns, R.; Corkery, I.; Parker, K.A.; Speed, H.; Thurley, T.; Wills, S. (2019). Kōkako Standard Management Techniques. Wellington, Department of Conservation– doc-5897165

Bryden, D. and Rogers, A. (2021). Kōkako Nest Monitoring: Ark in the Park 2020-21.