Red Crowned Parakeet (*Cyanoramphus novaezelandiae*) health, disease and nesting study on Tiritiri Matangi

2014/2015

Emma Wells on behalf of

Auckland Zoo, Supporters of Tiritiri Matangi, Massey University and Murdoch University

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Summary

The Red crowned parakeet (RCP, *Cyanoramphus novaezelandiae*) banding trip, in September 2014, on Tiritiri Matangi, resulted in 74 birds being banded and sampled.

The kakariki breeding season of 2014/2015, resulted in 0 chicks fledging from 12 monitored nests.

Banding trip - September 2014

Over a 5 year term, the team is working towards banding much of the kakariki population on Tiritiri Matangi. This will increase the likelihood of birds observed during the nesting season (Dec-Mar) being individually identifiable and their reproductive success monitored over a long term period.

Annual banding trips occur in September/October, prior to the breeding season. The first mist netting/ banding trip of the project was held over the first 10 days of September 2014. The team comprised of Auckland Zoo, Massey University, Supporters of Tiritiri Matangi (SoTM), Auckland University and some other keen volunteers. Despite bad weather, the trip was a success.

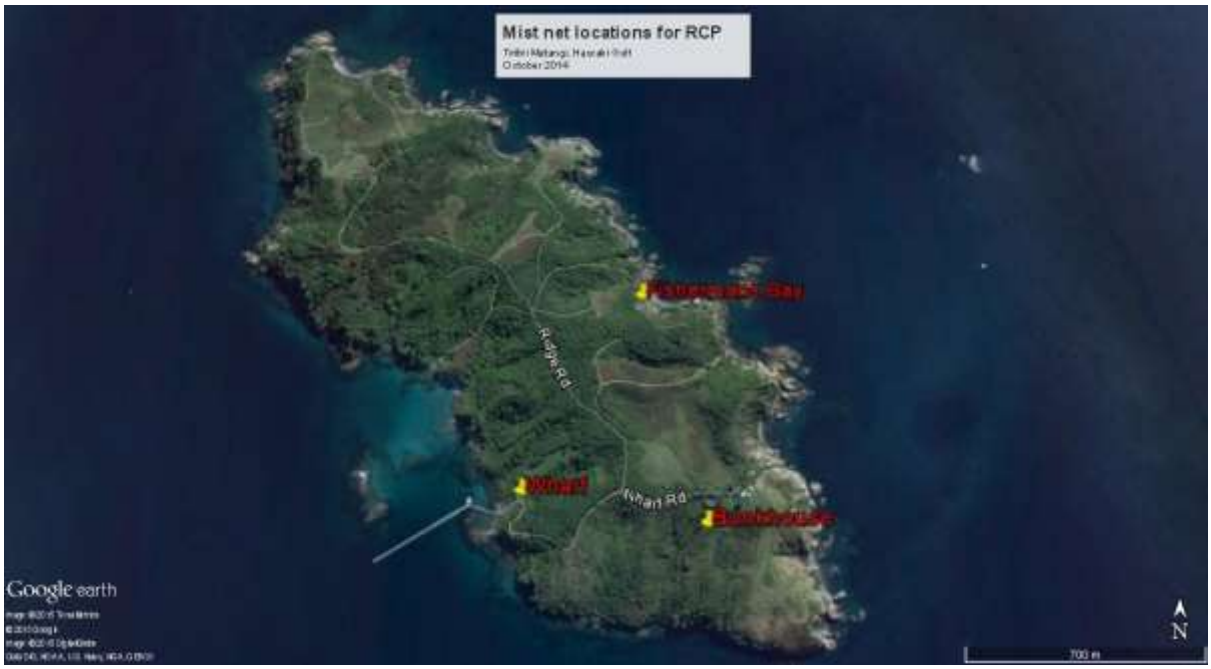
A total of 74 RCP were caught and processed as well as 3 Eastern rosella's (*Platycercus eximius*). All RCP (and rosella's) caught were weighed, measured (culmen width, length, depth, tarso-metatarsus, wing chord, tail), banded (DOC metal band and colour bands), blood samples taken from the brachial vein (blood smears and samples onto filter paper - for haematology, BFDV, avian malaria testing), feathers collected (DNA sexing and BFDV) and parasites were collected. Photos were taken of all birds to continue surveillance of health and disease in the population.

Table 1: Comparison of males vs females and adults vs fledglings caught during banding trip on Tiritiri Matangi Island, October 2014

	Male	**Female**	**Total**
Adult	21	23	44
Yearling	16	14	30
Total	37	37	74

Catching efforts were concentrated in three areas - the Bunkhouse, Fisherman's Bay and the Wharf, mainly due to weather conditions restricting us catching elsewhere around the island. On the second to last day (at the wharf), an incredible 19 kakariki and 1 rosella were caught and processed. It was hoped these birds would use the nest boxes in the study site (Wattle Valley, Doug's alley, Shortcut).

Map 1: Mist net locations, Tiritiri Matangi, October 2014



The majority of birds were in good body and feather condition, with approximately 10% having feather loss on their heads (compare this with the 53% feather loss noted during Dr Bethany Jackson's PhD research at the same time in 2012). This supports the theory that the feather loss or mange is endemic in this population, but varies each year based on factors that are yet to be determined, but likely include resources and climate.

There were five recaptures from Dr Jackson's (Murdoch University) trips in 2012. One of these birds was a female who was caught with a male at the same time - presumably her partner. One banded fledgling from last year was caught. The nest she fledged from was in the bottom of Wattle Valley and she was captured in the Shortcut, a relatively short distance.

Three Eastern rosella's, *Platycercus eximius* (one male and two females) were also caught - they were banded and samples taken for comparison with kakariki.

Emma Wells and Nat Sullivan (Auckland Zoo) processing kakariki

Ian Fraser (Auckland Zoo) and Morag Fordham (SoTM) extracting birds from mist nets

Background – nesting study

With the prevalence of nest mites observed in monitored RCP nests over the 2013/2014 season; the team's focus shifted to look into the effects of these mites over successive seasons. This will help us to investigate the relationship between nest mites and health of RCP chicks. Nest mites feed on blood, and we suspect chicks from nests with large

numbers of nest mites will be anaemic – i.e. they will have fewer red blood cells as a result of the infestation.

When chicks are banded, blood samples will be taken from them to check for signs of anaemia.

Objectives

This project is a five-year study following the success and natural fluctuations of productivity and survival of RCP on Tiritiri Matangi. The 2014/2015 season is the second of the project. Some of the information we are studying includes:

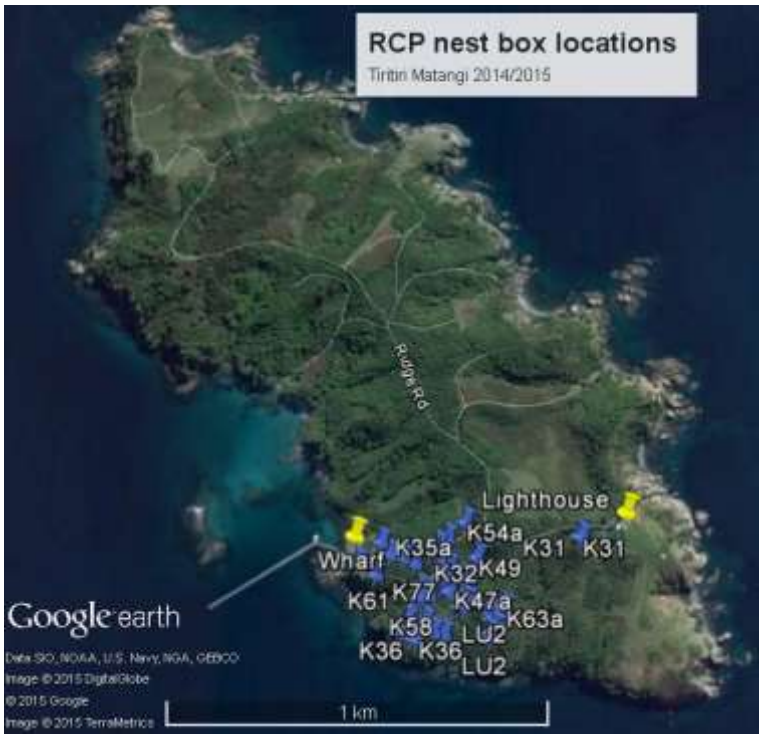
- Clutch size (how many eggs are laid)
- Hatching success (including status of unhatched eggs)
- Fledging success (how many chicks leave the nest successfully)
- Parent health and evidence of feathering problems
- Causes of chick deaths
- Presence/absence of nest mites
- Presence/absence of BFDV infection
- Chick health at fledging (including blood counts)
- Temperature and humidity in the nest box and how this relates to nest success Nesting/ rearing behaviour of RCP (using video)

Methods

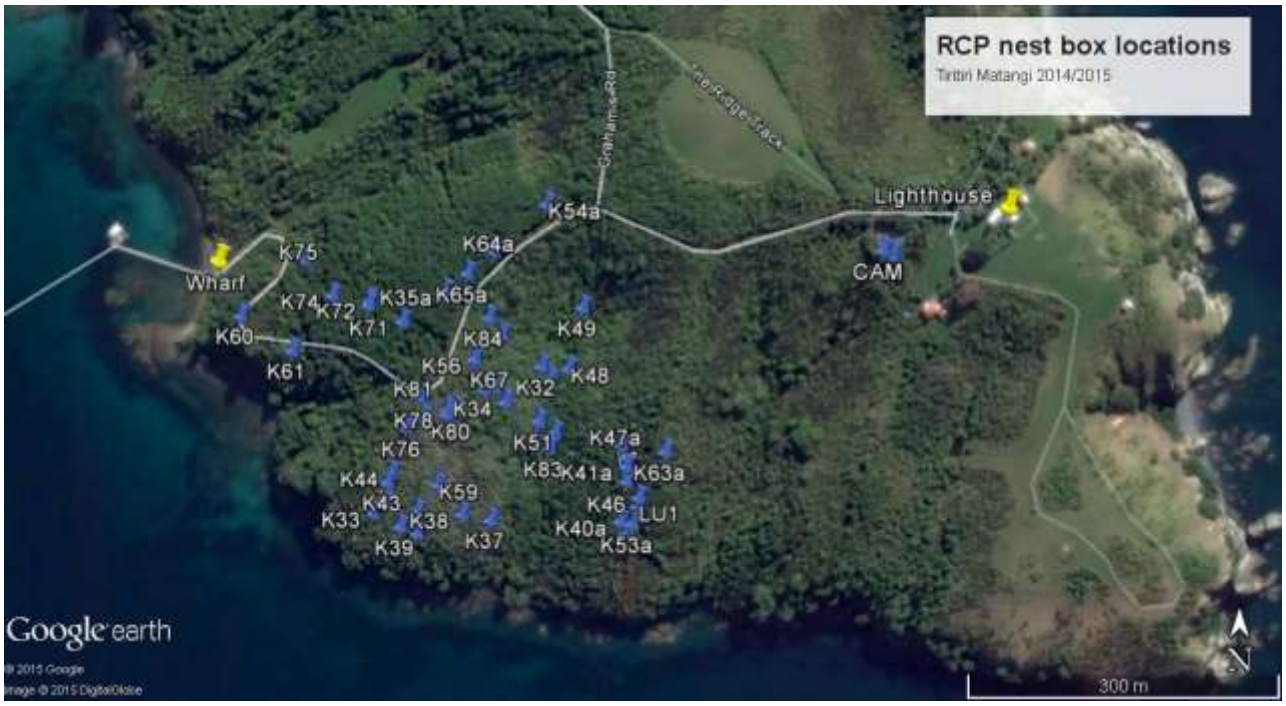
Prior to the 2014/2015 breeding season, an additional thirteen nest boxes, including a camera nest box were put up in Wattle Valley and Doug's Alley. These additional nest boxes replaced old wooden nest boxes which were failing.

In 2013/2014 thirty eight artificial nest boxes were put in the same area.

Map 2: Tiritiri Matangi, showing RCP nesting study area in south west of island



Map 3: Tiritiri Matangi Island, showing RCP nest box locations



Nest boxes were checked weekly throughout the breeding season and information recorded on eggs, chicks, nest mite presence/absence, and observations of the parent's health. Feathers, nest mites and nesting material were collected when checking nest

boxes to potentially carry out future disease screening and to identify nest mites. Any dead chicks that were found in the nest were removed and preserved for future disease screening. Two dead chicks were taken to the NZCCM for necropsy. Unhatched eggs were removed when there was no longer a chance of them hatching and fertility checked.

Thermocrons (devices that measure temperature and humidity) were firmly secured to the inside wall of ten active nest boxes.

The camera nest box and camera equipment was provided by Marc Cremades (Singapore Hornbill Project). This was installed behind the maintenance workshop, due to the proximity to power sources. Recording equipment and screen were situated in the workshop so any activity in the box could be monitored remotely.

PRELIMINARY RESULTS

As with at least four other bird species on Tiritiri Matangi, the RCP breeding season was an unusual one. After the exceptional season of 2013/2014, with 24 fledged chicks, there were high hopes of an equally abundant breeding season, but unfortunately that wasn't the case.

The breeding season started in December, which is not unusual for RCP on Tiritiri Matangi. Within a few weeks there were 12 active nest boxes (the same as the previous season). Of significance to the study, a male we banded in September, paired up with a female near to where he was caught. A fledgling male from last season also paired up, as did a monitored, banded male from last season who we believe to have been banded about 10 years ago **(pers comm, Luis Ortiz Catedral).**

Banded male RCP – possibly banded 10 years ago (pers comm, Luis Ortiz Catedral)

By mid-January, after this promising start, the first of our nests started failing. The numbers of chicks hatching was much lower than previous years. Chicks that did hatch had slow growth rates and most died around 1-3 weeks of age. One nest was abandoned just prior to hatching – there were 10 eggs (all in varying stages of development). The nest was full of nest mites, something only previously seen in nests with chicks (these nest mites feed on the blood of the chicks).

Nest box showing thermocrons and nest mites on the door

Egg covered in nest mites. Interestingly, no eggs hatched

An interesting behavior observed this season was that approximately half of all monitored females were leaving the nests for food without waiting for the male to call them off. This may be related to a lack of food which many of the species on Tiri experienced. Luis Ortiz Catedral observed this behavior during his study (2004-2005) and also attributed it to lack of food (pers comm, February 2015). This theory is supported by two freshly deceased nestlings that were taken to the NZCCM for necropsy; both were in poor condition and had low body weights.

Early reports from Tiritiri Matangi suggest that the hihi breeding season produced the lowest number of new fledglings for over a decade. Saddleback, kokako and bellbird numbers were also markedly down from previous seasons, so although there were no successful RCP nests this season, the data collected and the behaviours seen during the season will be important for the long term study.

Table 2: Comparison of RCP success on Tiritiri Matangi Island, including clutch size, hatching success and chicks fledged between Ortiz-Catedral (2004-2006), Jackson (2012-2013), Wells (2013-2014) and Wells (2014-2015)

	Average clutch size	**Average number of chicks hatched**	**Average number of chicks fledged**
Ortiz-Catedral (2004-2005)	6.3	2.6	1
Ortiz-Catedral (2005-2006)	7.3	4.7	3.3
Jackson (2012-2013)	6.8	2.9	0.9
Wells (2013-2014)	8.2	3	2
Wells (2014-2015)	5.5	1.3	0

Table 3: Nesting results from 2014/15 breeding season of RCP on Tiritiri Matangi Island, including clutch size; chicks fledged, and nest mite presence

Nest	Nest mites	WHEN MITES NOTED (average fledging period is 5-6 weeks)	Clutch size	Chicks fledged
K53	Y	1 week after first hatching - chick dead/ nest abandoned	10	0
K84	Y	2 weeks after first hatching	8	0
K79	Y	4 weeks after first eggs found **NB: No chicks hatched**	10	0
K66	Y	1 week after first hatching	10	0
K81	Y	1 week after first hatching - chick dead/ nest abandoned	6	0
K42	Y	1-2 weeks after first hatching	5	0
K64	N	No chicks hatched	4	0
K52	N	No chicks hatched	5	0
K46	N	No chicks hatched	5	0
K40	N	No eggs laid - abandoned early	0	0
K45	N	No chicks hatched	1	0
LAV3b	Y	1 week after first egg found **NB: No chicks hatched**	2	0

Table 4: Monitored RCP nest boxes on Tiritiri Matangi 2014/2015

Nest Site Data		Important dates		Totals			
	Location	**First egg found**	**Estimated fledging date**	**Clutch size**	**Unhatched eggs**	**Live young**	**Chicks fledged**
K53	Wattle Valley	10/12/2014	12/02/2015	10	9	1	0
K84	Wattle Valley	18/12/2014	20/02/2015	8	2	4	0
K79	Doug's Alley	24/12/2014	27/02/2015	10	10	0	0
K66	Wattle Valley	31/12/2014	5/03/2015	10	5	5	0
K81	Wattle Valley	31/12/2014	5/03/2015	6	4	2	0
K42	Doug's Alley	6/01/2015	12/03/2015	5	1	4	0
K64	Wattle Valley	7/01/2015	15/03/2015	4	4	0	0
K52	Wattle Valley	15/01/2015	30/3/2015	5	5	0	0
K46	Wattle Valley	15/01/2015	30/3/2015	5	5	0	0
K40	Wattle Valley			0	0	0	0
K45	Wattle Valley	21/01/2015	5/4/2015	1	1	0	0
LAV3b	Wharf	21/01/2015		2	2	0	0

Note: LAV3b is a wooden saddleback nest box.

K40 a female was seen sitting. Her behavior indicated she would lay, however she abandoned the nest.

Recommendations

Following on into the 2015/2016 season we are proposing the following amendments our procedures:

- Despite the camera nest box not enticing any birds this year, the equipment set up was successful. With the assistance of Marc Cremades, we are hoping to set up four new camera nest boxes in a known nesting site in Wattle Valley. Each nest

box will initially have one camera monitoring it. Once one of the four nest boxes is active, all four cameras will be moved to that nest box – three cameras recording behaviours of the birds inside and one monitoring the birds from the outside including any chicks fledging.

- Catch the parent RCP's and process as with other birds i.e. band, take bloods, morphometrics. This would be done when the chicks are approximately 3 weeks old and being fed by both parents. Banding these birds will give us valuable information as to whether the nest boxes are reused year to year by the same pair.
- Dr Bethany Jackson (Murdoch University) will be returning annually for the next four banding trips. Dr Jackson will be taking skin biopsies from birds, under anaesthetic, as per her previous trips. Skin biopsies provide important information on the presence/ absence of skin mites which cannot otherwise be readily obtained. This will provide key information as to the relationship between mites and factors such as age, sex, body condition and blood parameters, as well as better characterising the disease on an annual basis.
- Weather permitting; we will aim to sample birds from different areas of the island, to get a better geographic spread for our data.

Collaboration

This project is being run as a collaborative project between the Auckland Zoo, Supporters of Tiritiri Matangi (SoTM), Massey University and Murdoch University (Perth, Australia). Emma Wells (Auckland Zoo Bird Keeper) is leading the project.

Acknowledgements

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