

# **THE 2006 CENSUS OF TERRITORIAL KOKAKO IN KAHAROA CONSERVATION AREA**

## **WHICH INCLUDES THE KAHAROA FOREST AND THE ADJOINING ONAIA ECOLOGICAL AREA**

### **Summary**

Kaharoa Forest and the adjoining Onaia Ecological Area were surveyed during September and October 2006 to establish the number of territorial kokako in the area.

121 kokako were located

- 60 in the Aislabie Block
- 22 in the Onaia West block
- 39 in the Onaia East Block

The Kaharoa Kokako Trust, with funding from the EBOP Environmental Enhancement Fund, and support from Department of Conservation Rotorua Lakes Area office, co-ordinated the undertaking of this Adult Census and the writing of this report.

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Unpublished Report  
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## Introduction

The Kaharoa Conservation Area is approximately 1000ha in size and because of the geography, history of management and monitoring, has been divided into three management areas.

It is situated approximately 12kms north of Lake Rotorua in the Bay of Plenty, about 30Km by road, north-east of Rotorua City, with access from the end of Kapukapu Road via Kaharoa Road, or from near the end of Kaharoa Road, which is off SH 35, (the Tauranga Direct Road)

Management areas are:

KAHAROA FOREST (Aislabie's Block) The most Northern of the three forest areas which has been heavily modified in places by fire and logging. Kaharoa Forest comprises approx. 300ha of the total reserve and has the longest history of kokako management in this Conservation Area.

Pest control and kokako monitoring was carried out in Kaharoa Forest between 1990 and 1993 then from 1997 to 2003, 2005 and 2006.

The last census in 2002 found 47 territorial kokako (23 pair and 1 single bird).

This Census there are 60 territorial kokako (30 pair).

ONAIA ECOLOGICAL AREA: This area comprises approx 350ha of the total Kaharoa Conservation Area. The Onaia Stream runs through this Ecological Area, dividing the forest into two distinct management areas: The Onaia West and Onaia East Blocks.

Onaia West Block comprising approx.171ha in total is a strip of relatively unmodified native forest on the Western side of the Onaia Stream, which adjoins Kaharoa Forest in the North. Pest control and monitoring has been carried out in this area for seven consecutive years.

In 2001 there were 13 territorial kokako (4 pair and 5 single birds).

This Census there are 22 territorial kokako (11 pair).

Onaia East Block comprising approx.183ha in size is located on the eastern side of the Onaia Stream and has been heavily modified by logging and by fire in some places.

In 2002 funding from EBOP's Environmental Enhancement Fund allowed the Kaharoa Kokako Trust (KKT) to install tracks and bait stations throughout the block. Pest control and monitoring has been carried out in this area for five consecutive years.

In 2001 there were 9 territorial kokako (2 pair and 5 single birds).

This Census there are 39 territorial kokako (17 pair and 5 single birds).

Most territorial pairs in the Aislabie Block had at least one sub-adult with them and a number of pair in both the Onaia Blocks also had sub-adults close by.

## Objectives

1. To survey the whole of the Kaharoa Conservation Area, to record the number and location of territorial kokako therein.
2. To monitor rat and possum densities within the area.
3. To enable the KKT and DOC to make future planning decisions as to the management of the Kaharoa Conservation Area, eg. pest control, kokako numbers, consequent management plans.
4. To establish whether kokako are dispersing out of the managed Kaharoa Conservation Area.
5. To address education and support needs of surrounding land owners with adjoining forest areas should it be established kokako are dispersing into them.

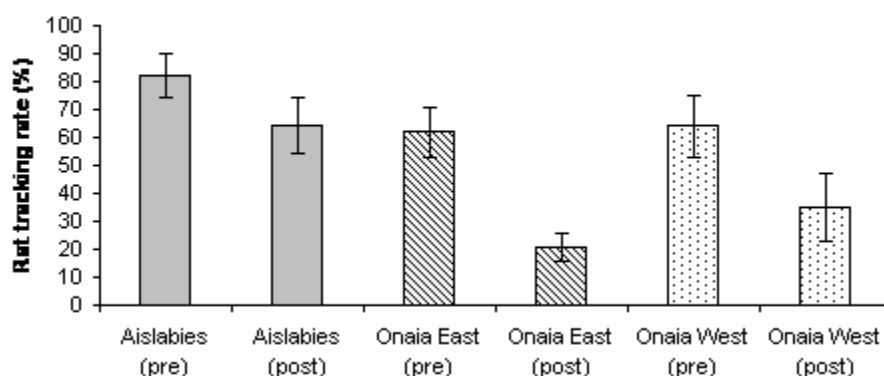
## Pest Control

### Predators: Rodents

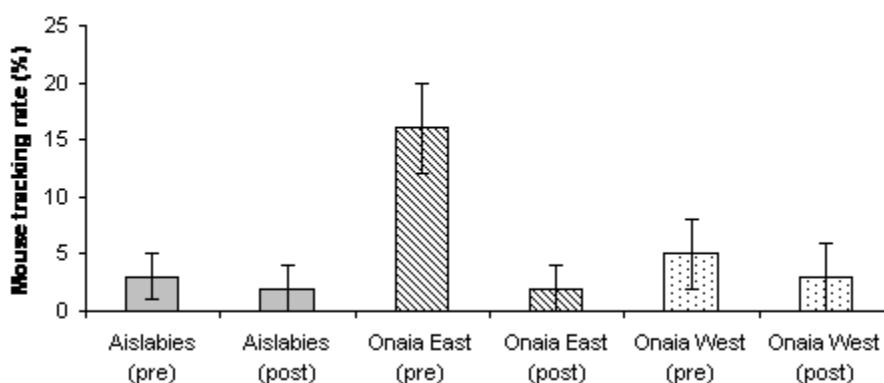
Pre and Post Operation Rat Monitoring undertaken early July and early November as undertaken by DOC and reported by Rebecca Lander DOC.

	Mean rat tracking rate (%) ± Std error		Mean mouse tracking rate (%) ± Std error	
	Pre	Post	Pre	Post
Aislabies	82 ± 8	64 ± 10	3 ± 2	2 ± 2
Onaia East	62 ± 9	21 ± 5	16 ± 4	2 ± 2
Onaia West	64 ± 11	35 ± 12	5 ± 3	3 ± 3

Kaharoa rat tracking rates 2006



Kaharoa mouse tracking rates 2006



Rat density was monitored using core-flute run-through tracking tunnels. The tracking tunnels have a wood base 75mm wide and 550mm long, the tunnels have a plastic core-flute cover approx 100mm high. A Black Trakka pre-lined card is placed in each tunnel. Peanut butter is used as bait at either end of the tunnel to entice rats to run through, over the dye on the centre of the tracking card leaving tracks on the paper at either end. Rat density is expressed as % of tunnels that have tracked over one fine night.

In Aislabie Block 6 random lines of 10 tunnels were placed, in Onaia East, 5 random lines and Onaia West, 4 random lines; 150 lines in total over the whole area.

## Possums

**Pre Operation Monitoring** was undertaken in July by Guus Knopers, using Victor No 1 traps, raised of the ground. The monitoring was NPCA "Protocol for Possum Population Monitoring using the Trap-Catch Method".

Ten lines of ten traps were set for three nights. In the Aislabie and Onaia West blocks only. Onaia East was not monitored.

Weighted Catch Rate: 7.85% Approximate 95% confidence interval +/- 2.8

Combined Standard Error: 1.4%

### Discussion

All traps were raised set as there is Kiwi-birds present in the area which might have some affect (less catching) on trapping the possums.

### Observation

Good numbers of native birds present. A large number of Norwegian and ship rats present (a total of 30 rats were caught) and goat sign was present between line 4 and 6, Aislabie Block.

**Post Operation Monitoring** was undertaken by D Ritchie and D.Ritchie Jnr between 20/11/06 and 23/11/06. The NPCA "Protocol for Possum Population Monitoring using the Trap-catch Method" was used. Lines of ten traps were set for three fine nights using Victor No 1 traps at 70cm on leaning boards. Eight lines were set in the Stratum 1 (Aislabie and Onaia West) and three lines were set in Stratum 2 (Onaia East).

### Summary of Results.

Stratum 1      **4.7%** RTC. Approximate 95% confidence interval +/- 3.1%

Stratum 2      **2.7%** RTC. Approximate 95% confidence interval +/- 1.9%

**Overall mean** (strata weighted by area)

**4.2%** RTC. Approximate 95% confidence interval +/- 2.0%

### Discussion

- Rat presence was noted on all lines and the three non-target captures were rats.
- A pre-control monitor carried out by EBOP in Stratum 1 used a different monitoring method (brackets at 35cm) and results are therefore not comparable.

The post control result for 2005, overall mean – 1.4% (95% CI +/- 2.2), stratum 1 – 1.7% (95% CI +/- 3.0), stratum 2 – 0.7% (95% CI +/- 1.9) however the difference are not significant.

## Pest Control Operation

Bait stations were filled with 1.25Kg of Pindone Possum Pellets on 5 August and refilled on 26 August and 23 September. By the third fill much less bait had been taken. Bait stations were emptied on 28 October, a few were already empty but varying, and large, amounts were cleared from many stations.

When it was established possum numbers were higher then anticipated, Feratox was also used (in bags) nailed onto trees on bait lines in some areas of both the Aislabie and Onaia West blocks.

## Comment

Pre and post monitoring results indicate that the 2006 rat pest control operation was not a success, but possum numbers were reduced. Statistically pest numbers remained too high after pest control to guarantee a successful breeding season for kokako. (RTI) for both rodents and possums is 5% or less, at 1 November.

## **Kokako Discussion, Results and History**

Kaharoa Forest was part of an eight year Research by Management (RbM) experiment (1990–97).

During the three years of pest control at Kaharoa (1990-1993) adult kokako increased from 22 to 36 birds and chick output peaked at 80%.

Between 1993 and 1997 (four years of no pest control) adult kokako numbers dropped from 36 to 26, with 12 breeding pairs.

In 1994, one year post pest control, breeding success dropped to 30%. In 1995 it dropped to 13% and during the next two seasons, 1995-96 and 1996-97, no kokako were successfully fledged in Kaharoa Forest (Aislabies).

In 1997 the Kaharoa Kokako Trust (KKT) was established. With Department of Conservation (DOC) and local community volunteer support, pest control was re-established resulting in 4 pair (25%) successfully fledging young in the 1997-98 breeding season.

### **Subsequent Adult Census have been undertaken.**

In 2001 in conjunction with the Kaharoa Forest Adult Census, the first census was undertaken in the Onaia Ecological Area (OEA). Also, close to the Onaia Stream and the southern boundary of the Onaia Ecological Area, a single territorial bird was found on private land.

- A total of 26 pair and 12 single territorial kokako were found.
  - 20 pair and 2 singles in Kaharoa Forest
  - 4 pair and 5 singles in Onaia West Forest
  - 2 pair and 5 singles in Onaia East Forest.

In 2002, in the whole Kaharoa Conservation Area – 47 kokako comprising twenty-three pair and one single territorial bird were found.

In 2003 in the Onaia Ecological Area

- Onaia West -19 kokako comprising nine pair, and one single,
- Onaia East - 20 kokako comprising ten pair

In 2004 in the Onaia Ecological Area

- Onaia West -25 kokako comprising twelve pair, and one single
- Onaia East - 27 kokako comprising thirteen pair and one single

This Census, in 2006, was undertaken between September 04<sup>th</sup> and November 04<sup>th</sup> in the Kaharoa Forest and adjoining Onaia Ecological Area. All known kokako territories from previous monitoring were surveyed to determine the number of kokako in each territory, (i.e. whether a pair or single bird territory holder).

Areas between known territories were surveyed, with a tape of local dialect played to elicit a response from kokako. Survey routes, listening stations, follows of kokako and observational data were documented on daily follow sheets. Follows of kokako were transferred to a master territory map for each forest area. The criteria for acceptance of kokako into an Adult Census, as given in the Kokako Management folder (Flux, I; Innes, J; 2001), were adhered to.

Results from the 2006 Census are:

121 territorial adult kokako were surveyed in the area comprising:

- 60 in the Aislabie Block, 30 identified pair,
- 22 in the Onaia West block, 11 identified pair,
- 39 in the Onaia East Block, 17 identified pair and 5 singles

## CONCLUSIONS

Although the pre and post monitoring results indicate that the 2006 rat pest control operation was not as successful as was hoped, possum numbers were reduced. Statistically pest numbers remained at a higher than recommended level following pest control to guarantee a successful breeding season for kokako. Despite this the forest health has improved markedly over recent years primarily due to the pest control efforts of the KKT.

The number of territorial kokako identified in this census has increased from previous census figures. There were also numerous sub-adult kokako observed, a sure sign of successful breeding during the 2005-06 breeding season. Kokako were observed and/or heard in adjoining forest areas (neighbouring properties) during the 2006 census. These birds would have dispersed from the Kaharoa Conservation Area.

The Kaharoa Kokako Trust continues to be committed to the Trust mission statement 'to ensure long-term protection and survival of kokako in Kaharoa, and beyond, so future generations can enjoy the haunting sound of this precious bird.'

## ACKNOWLEDGEMENTS

The Kaharoa Kokako Trust wish to thank

- Environment Bay of Plenty for the funding received through the Environmental Enhancement Fund, which has covered the cost of toxins used for pest control and enabled the 2006 whole forest adult census for kokako to be completed. It is also acknowledged with thanks the support, expertise and contractors who undertook the pre pest control possum monitoring provided by the EBOP Rotorua Office to assist in this project.
- The Department of Conservation, Lakes Area Office for their ongoing support of the KKT by contributing expertise, equipment, materials and personnel. DOC staff undertook the pre and post pest control rat monitoring and post pest control possum monitoring and furnished these reports for the Trust. Assistance to undertake the Census was also provided by Department staff.
- Ecologists Carmel Richardson, Sid Marsh, Bridget Evans, Rachel Lander assisted by Phil Tucker
- The community and volunteers who so willingly give their time, energy and interest to carry out track maintenance and pest control. The wider community also for their financial support through donations.
- The Rotorua Landrover Enthusiasts Club for the upkeep and use of their 4WD vehicle, and their members who assist with transportation of volunteers to tracks on work days.
- KKT members A.Managh and C.Richardson for producing this report.

## REFERENCES

- Flux, I; Innes, J. 2001: Kokako Management Folder. Threatened Species Occasional Publication 19.*
- Richardson, C.M 2002: Census of Territorial Kokako in the Kaharoa Conservation Area and adjoining Onaia Ecological Area. Unpublished report for the KKT, Rotorua.*

## APPENDIX 1

### ADULT CENSUS RESULTS 1986 - 2006

	Management Regime	Year	No of Pairs Kaharoa	No of Singles	No of Pairs Onaia West	No of Pairs Onaia East	No of Territories	Total No of Territorial Kokako
	No pest management	1986	13	5			18	31
Research by Management	Intensive Pest Management	1990	7	8			15	22
		1991	10	5			15	25
	Ending May 1993	1992	13	2			15	25
		1993	18	0			18	36
	No Pest Management	1994	13	3			16	29
		1995	16	1			17	33
		1996	13	3			16	29
	Pest Management Start Oct '97 KKT	1997	12	2			14	26
		1998	12	6			18	30
		1999	15	1			16	31
		2000	17	0			17	34
		2001	20	2	4Pr 5Sgle	2Pr 5Sgle	38	64
		2002	23	1	8Pr 1Sgle	9Pr 3Sgle	45	85
	Onaia Census Only	2003	Est. 26		9Pr 1Sgle	10	46	91
	Onaia Census Only	2004	Est. 27		12Pr 1Sgle	13Pr 1Sgle	54	106
	No Census	2005	Est. 29		13	14	56	Est. 112
	Whole Forest Census	2006	30		11	17Pr + 5 Sgle	63	121

## APPENDIX 2

### KOKAKO FEEDING OBSERVATIONS

Plant Species & Invertebrates observed being eaten by Kokako during Adult Census.

<u>Species</u>		<u>Parts Eaten</u>	<u>Observations</u>
<b><u>Trees, Shrubs, Vines and Ferns</u></b>			
Grisilinia	( <i>Griselinia littoralis</i> )	Leaves	1
Kamahi	( <i>Weinmannia racemosa</i> )	Leaves	2
		Flowers	1
Kohekohe	( <i>Dysoxylum spectabile</i> )	Fruit	5
Lancewood	( <i>Pseudopanax crassifolius</i> )	Fruit	1
Mapou / Matipo	( <i>Myrsine ausyralis</i> )	Flowers/buds	2
		Fruit	6
Mangeao	( <i>Litsea calicaris</i> )	Fruit	2
Miro	( <i>Podocarpus ferrugineus</i> )	New growth	1
Nikau	( <i>Rhopalostylis sapida</i> )	Fruit	1
Pigeonwood	( <i>Hedycarya arborea</i> )	Fruit - unripe	6
		Fruit - ripe	1
		Flowers	1
Putaputaweta	( <i>Pittosporum cornuifolium</i> )	Flowers	1
Rewarewa	( <i>Knightia excelsa</i> )	Nectar from Flowers	11
		Seed from Pods	30
		Leaves	1
Supplejack	( <i>Ripogonium scandens</i> )	Fruit	5
Tanekaha	( <i>Phyllocladus trichomanoides</i> )	Leaves/cones	6
Tawa	( <i>Beilschmiedia tawa</i> )	Fruit	8
Tree Fern	( <i>Dicksonia squarrose</i> )	Leaflets	1
Clematis	( <i>Clematis paniculata</i> )	Flowers	2
Hanging Spleenwort	( <i>Asplenium flaccidum</i> )	Leaves	6
Lichen - flat			1
Orchid	( <i>Bulbophyllum pygmaeum</i> )	Leaves	1
<b><u>Invertebrates</u></b>			
Bagmoth	( <i>Oeceticus omnivorus</i> )	Caterpillar	2

**APPENDIX 3: HISTORICAL BANDING RECORD –  
AISLABIE BLOCK / KAHAROA**

Number	Bird Name	Band Combination	Year Banded	Observed 2003	Observed 2006
<b>1</b>	<b>Prince</b>	R/M	<b>1985</b>	<b>X</b>	√ ?
<b>2</b>	Busk	<b>Y / M</b>	1985	X	
<b>3</b>	Epic	<b>RY/M</b>	1990	X	
<b>4</b>	<b>Kalimba</b>	<b>RB/M</b>	<b>1990</b>	√	<b>R B / M</b> √
<b>5</b>	Jabberwocky	<b>RG/M</b>	1990	X	
<b>6</b>	Riccochet	<b><u>GW/M</u></b>	1990	as <b>W-M</b>	
<b>7</b>	Uhu	<b>B/M</b>	1992	X	
<b>8</b>	<b>Poss</b>	<b>G/M</b>	<b>1992</b>	√	√
<b>9</b>	Un-named	<b>W/M</b>	1992	X	
<b>10</b>	Junglejuice	<b>YY/M</b>	1995	√	
<b>11</b>	Lemrac	<b>GG/M</b>	1995	X	
<b>12</b>	Lezah	<b>WW/M</b>	1995	√	
<b>13</b>	Cursor	<b>WR/M</b>	1995	X	
<b>14</b>	<b>Maroid</b>	<b>GY/M</b>	<b>1995</b>	√	√
<b>15</b>	<b>Gumboot</b>	<b>RR/M</b>	<b>1995</b>	√	√
<b>16</b>	Flipflop	<b>RW/M</b>	1995	√	
<b>17</b>	Chip	<b>GR/M</b>	1995	√	
<b>18</b>	Aria	<b>WG/M</b>	1995	X	
<b>19</b>	Quoll	<b>YG/M</b>	1995	X	
<b>20</b>	Ripshort	<b>YR/M</b>	1995	√	
<b>21</b>	<b>Un-named</b>	<b>M/O</b>	<b>2000</b>	<b>X</b>	√
<b>22</b>	Mow	<b>M/OW</b>	2000	√	
<b>23</b>	<b>Omey</b>	<b>OM/Y</b>	<b>2001</b>	√	√
<b>24</b>	<b>Mob</b>	<b>M/OB</b>	<b>2001</b>	<b>X</b>	√
<b>25</b>	<b>Mog</b>	M/OG	<b>2001</b>	√	√
<b>26</b>		<b><u>M/Y</u></b>	2004		

□