

# MONITORING OF AVIFAUNA BEFORE AND AFTER MANGROVE CLEARANCE AT WHANGAMATA

## ANNUAL REPORT MARCH 2014 - APRIL 2015

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MANGROVE CLEARANCE AT WHANGAMATA  
ANNUAL REPORT MARCH 2014 - APRIL 2015**

**Contract Report No. 3120c**

June 2015

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## 1. INTRODUCTION

The River and Catchment Services Group of Waikato Regional Council has resource consents to remove approximately 18 hectares of mangroves (*Avicennia marina* subsp. *australasica*) within Whangamata Harbour, and to undertake remedial works within sites cleared previously.

Condition 33(i)G of resource consent 122986 requires monitoring of avifauna use of long-shore strips of mangroves. Monitoring is required to be undertaken before clearance, at three-monthly intervals in the first year, and annually thereafter (subject to review of findings).

An Environmental Monitoring Management Plan (EMMP; Shaw and Dahm 2013) was produced as part of the resource consent conditions. The EMMP sets out the monitoring requirements and methodologies, including ‘trends and triggers’ to guide decision-making. Trends and triggers (EMMP Section 7.7.2 Avifauna Use) relating to avifauna (excluding banded rail; moho-pererū, *Gallirallus philippensis assimilis*, which are addressed separately in the EMMP) are reproduced below.

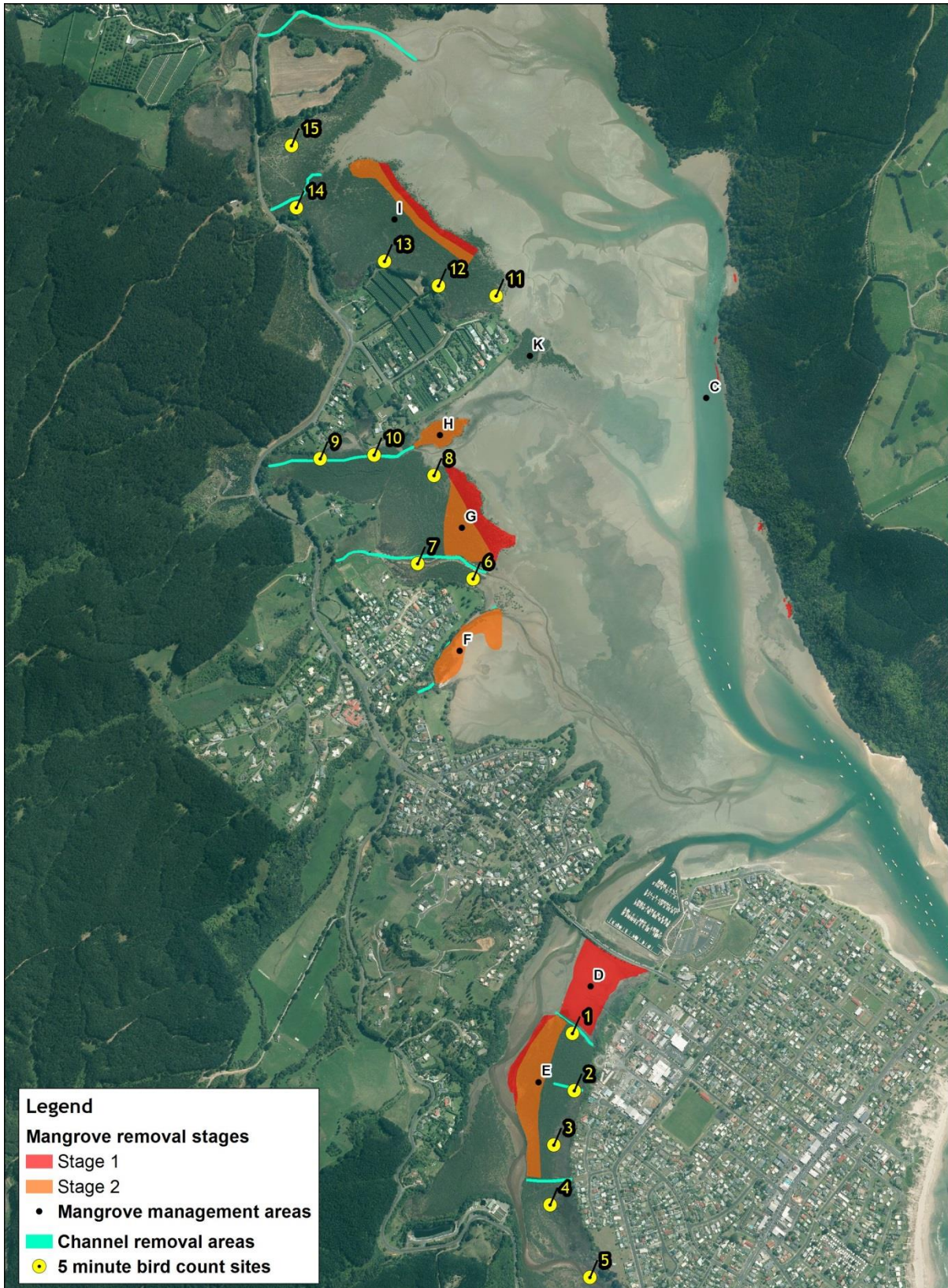
- *Triggers for decision-making will be based on very significant decreases in avifauna use, if that occurs.*
- *If unexpected or adverse trends arise, the reasons for any negative trends will be assessed before further clearance to ensure they are not related to the mangrove clearance.*

This report provides results for the round of monitoring undertaken in April 2015, presented as an update of Wildland Consultants (2014).

## 2. LOCATIONS OF MANGROVE MANAGEMENT AREAS AND AVIFAUNA MONITORING SITES

Monitoring of avifauna is required in mangrove management Areas E, G, and I (see Figure 1 for locations, and Appendix 3 for representative site photographs). Monitoring was not required at Area D, the area between Area E and the road causeway (see Appendix 4), as the resource consent to clear this area was retrospective, and no monitoring was undertaken prior to clearance.

Date ranges and areas cleared to date within each mangrove removal area are provided in Tables 1 and 2, and are depicted in Figure 1.



**Legend**

**Mangrove removal stages**

- Stage 1
- Stage 2
- Mangrove management areas
- Channel removal areas
- 5 minute bird count sites

**Data Acknowledgment**  
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Report: 3120  
 Client: ENVIWAIK  
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 File: WhangamataHarbour\_Clearing\_May2015.mxd

**Figure 1. Overview of mangrove removal areas and bird monitoring locations (areas E, G, and I), Whangamata Harbour**

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Scale: 1:17,500  
 Date: 06/05/2015  
 Cartographer: RPB  
 Format: A4

Table 1: Mangrove removal, to date, in Whangamata Harbour mangrove management areas - Stage 1 (M. Lewis, Waikato Regional Council, pers. comm.).

Area	Removal Method	Hand Removal Area (ha)	Mechanical Removal Area (ha)	Actual Area Cleared (ha)	Date of Removal
C	Hand	0.17		0.17	11Dec 2012- end Dec 2012
D	Hand - clean up	4.20		4.2	June 2013
E	Hand (at the same time as the mechanical trial in the same area)	0.30		0.3	17-24 June 2013
E	Mechanical trial		0.30	0.3	3-24 June 2013
G	Mechanical trial		2.00	2.0	11 March -23 April 2013
H	Hand	1.12			28 April 2015
I	Hand (at the same time as the mechanical trial in the same area)	0.10		0.1	13-17 May 2013
I	Mechanical trial		1.20	Not completed	Not completed
K	Mechanical trial		0.72	0.72	6-15 May 2013
F	Permission granted by RUG to proceed with hand clearance of Area F	2.33		2.33	24-26 April 2014
<b>Total</b>		<b>4.77 ha</b>	<b>4.22 ha</b>	<b>10.12 ha</b>	

Table 2: Planned mangrove removal, Stages 2(a) and 2(b), in Whangamata Harbour mangrove management areas (M. Lewis, Waikato Regional Council, pers. comm.).

Area	Proposed Removal Method	Removal Area (ha) identified in consent	Proposed Removal Area (ha)	Timing of Removal
<b>Stage 2 (a)</b>				
E	Hand	1.48	0.46	5 March 2015
F	Already cleared by hand in Stage 1	2.33	completed	See above table
H	Hand	1.12	1.12	28 April 2015
I	No further clearance proposed unless feasible methods can be identified- propose to move to Stage 3	1.20	No clearance	No clearance
<b>Total</b>		<b>8.64 ha</b>	<b>1.58 ha</b>	
<b>Stage 2 (b)</b>				
E	Hand	1.48	To be determined post Stage 2(a) tentatively up to 1ha	December 2015
G	Hand	2.51	0.53	December 2015
<b>Total</b>		<b>8.64 ha</b>	<b>1.53 ha</b>	

### 3. METHODS

#### 3.1 Overview

Methods used to monitor avifauna use of long-shore strips of mangroves follow Section 6.7 of the EMMP:

Monitoring of other avifauna was undertaken within or along the edge of mangroves on the landward sides of Areas E, G, and I. Within each of these three areas, the following was undertaken, in accordance with the EMMP:

- Count stations were established at five locations within each of the three study areas. Each count station was at least 200 m apart, and its location was recorded using GPS coordinates. Each station was located where a standing observer had good sight lines across the mangroves (Figure 1).
- One five-minute bird count was completed at each of the 15 count stations, as per 'best practice' methods (Hartley and Greene 2012). Counts were generally undertaken within two hours of low tide, to allow safe foot access to count sites.
- For each five-minute bird count, all birds seen or heard within mangrove habitats were recorded, including species and numbers. Birds were included in the records if they were detected under the canopy, in the canopy, or flying overhead. Birds were recorded, but excluded from the analysis if they were seen or heard within adjacent non-mangrove habitats, e.g. saltmarsh, coastal forest, open intertidal flats.
- For each five-minute bird count, the following environmental variables were recorded: vegetation height, temperature, wind strength, other noise, minutes of sunshine, and precipitation type and strength.

Most of the count stations were located in, or on the edge of, mangroves 0.5-2.5 m tall, with two stations - 9 and 14 - in mangroves up to 3.5 m tall. See Appendix 1 for more information on count sites.

#### 3.2 Monitoring dates

Banded rail monitoring and avifauna monitoring (using five-minute bird counts), was generally carried out on consecutive days, with the exception of the initial round undertaken in March 2013. Monitoring dates are set out in Table 3.

Table 3: Dates of five minute bird count monitoring, before, during, and after mangrove removal operations in Areas E, G, and I at Whangamata Harbour, 2013, 2014, and 2015.

Area	Avifauna Monitoring Session Dates					
	27-3-13	23-6-13	3-9-13	17-12-13	1-3-14	29-4-15
E	Before	During	After			
G	During					
I	Before	After				



## 4. RESULTS

### Overview

Nineteen indigenous bird species and twelve exotic bird species have been recorded in mangrove habitats at Whangamata, either within or under the mangrove canopy, or flying overhead. Results are summarised in Table 4; see Appendix 2 for a full checklist of avifauna recorded during this study. The total number of species recorded has increased over time, which can be attributed to cumulative survey effort: before control (one monitoring session) = 10 species, during/after control (five monitoring sessions) = 31 species. The total number of species recorded in any one session ranged from 11 to 19 (mean = 15.3 species detected per session, n = 6 monitoring sessions).

Silvereye (*Zosterops lateralis lateralis*) was the most abundant indigenous species (mean 1.21 recorded per site count, recorded in 48.9% of all site counts). Other common indigenous species were welcome swallow (*Hirundo neoxena neoxena*), kingfisher (*Todiramphus sanctus vagans*), tui (*Prosthemadera novaeseelandiae novaeseelandiae*), and black-backed gull (*Larus dominicanus dominicanus*).

The most abundant exotic species in mangrove habitats was house sparrow (*Passer domesticus domesticus*), with a mean of 0.96 recorded per site count, and recorded in 37.8% of site counts, followed by blackbird (*Turdus merula merula*).

Species of interest detected during five-minute bird count monitoring included bittern, fernbird, and banded rail. One pair of bittern was recorded during the June 2013 monitoring session at Station 10 in Area G, foraging in a shallow channel bounded by mangroves. One bittern was seen flying near Station 10 in April 2015, and one bittern was observed in Area E in February 2014 (during banded rail monitoring). Fernbird were recorded at Count Station 13 (Area I) in June 2013, as well as along the shoreline saltmarsh fringe in Area G. Banded rail have been detected at Station 6 (March 2013 - Area G), and Stations 3, 4, and 5 (April 2015 - Area E), and both of these areas are where banded rail tracks were found regularly during separate banded rail monitoring.

For most of the species recorded, relative abundance and/or frequency of occurrence before and after mangrove clearance either remained stable or increased. For five species - all classified as either Not Threatened or Introduced - there were before-during/after declines recorded. These patterns may be attributable, in part, to differences in sampling effort and seasonal timing: only one round of pre-clearance monitoring occurred (autumn 2013), while four rounds of post-monitoring have occurred (one in winter, one in spring, and two in summer).

Table 4: Relative abundance and frequency of occurrence of birds using mangrove habitat in Whangamata Harbour, including before, during, and after mangrove clearance. For species shaded grey, a before-after decline in one or both measures was recorded.

Threat Status	Species	Mean Number Recorded Per Site Count				Frequency of Occurrence at Count Sites			
		Before	During	After	Overall	Before	During	After	Overall
Threatened	bittern	0.00	0.06	0.00	0.02	0.0%	2.9%	0.0%	1.1%
	red-billed gull	0.00	0.06	0.00	0.02	0.0%	5.7%	0.0%	2.2%
At Risk	banded rail	0.00	0.03	0.07	0.04	0.0%	2.9%	6.7%	4.4%
	black shag	0.00	0.00	0.11	0.06	0.0%	0.0%	4.4%	2.2%
	fernbird	0.00	0.00	0.02	0.01	0.0%	0.0%	2.2%	1.1%
Not Threatened	black-backed gull	0.20	0.09	0.44	0.28	10.0%	8.6%	15.6%	12.2%
	fantail	0.20	0.31	0.38	0.33	10.0%	22.9%	20.0%	20.0%
	grey warbler	0.00	0.51	0.47	0.43	0.0%	28.6%	22.2%	22.2%
	harrier	0.00	0.09	0.02	0.04	0.0%	8.6%	2.2%	4.4%
	kingfisher	0.00	0.54	0.47	0.44	0.0%	40.0%	35.6%	33.3%
	little shag	0.00	0.06	0.00	0.02	0.0%	5.7%	0.0%	2.2%
	myna	0.40	0.09	0.07	0.11	10.0%	8.6%	4.4%	6.7%
	pukeko	0.20	0.11	0.20	0.17	20.0%	8.6%	17.8%	14.4%
	shining cuckoo	0.00	0.00	0.02	0.01	0.0%	0.0%	2.2%	1.1%
	silveryeye	1.90	1.66	0.71	1.21	80.0%	57.1%	35.6%	48.9%
	spur-winged plover	0.00	0.03	0.04	0.03	0.0%	2.9%	4.4%	3.3%
	swallow	0.30	0.97	0.38	0.60	20.0%	37.1%	24.4%	28.9%
	tui	0.00	0.37	0.18	0.23	0.0%	22.9%	15.6%	16.7%
	white faced heron	0.10	0.20	0.04	0.11	10.0%	8.6%	4.4%	6.7%
Introduced	blackbird	0.20	0.29	0.29	0.28	20.0%	14.3%	22.2%	18.9%
	chaffinch	0.00	0.26	0.16	0.18	0.0%	14.3%	6.7%	8.9%
	dove	0.00	0.14	0.00	0.06	0.0%	5.7%	0.0%	2.2%
	goldfinch	0.00	0.09	0.07	0.07	0.0%	8.6%	6.7%	6.7%
	greenfinch	0.00	0.00	0.04	0.02	0.0%	0.0%	4.4%	2.2%
	mallard	0.10	0.14	0.00	0.07	10.0%	2.9%	0.0%	2.2%
	pheasant	0.00	0.06	0.00	0.02	0.0%	5.7%	0.0%	2.2%
	rosella	0.00	0.00	0.02	0.01	0.0%	0.0%	2.2%	1.1%
	sparrow	0.70	0.74	1.18	0.96	30.0%	34.3%	42.2%	37.8%
	starling	0.00	0.11	0.07	0.08	0.0%	5.7%	4.4%	4.4%
	thrush	0.00	0.11	0.18	0.13	0.0%	11.4%	15.6%	12.2%
	yellowhammer	0.00	0.00	0.02	0.01	0.0%	0.0%	2.2%	1.1%

## Avifauna Use Resource Consent Trends and Triggers (EMMP Section 7.7.2)

- *Triggers for decision-making will be based on very significant decreases in avifauna use, if that occurs.*

For five species there were before-after declines in relative abundance and/or frequency of occurrence. None of these species are classified as Threatened or At Risk, all are commonly encountered at Whangamata, and these observed declines, if real, are not considered to be significant or of concern.

- *If unexpected or adverse trends arise, the reasons for any negative trends will be assessed before further clearance to ensure they are not related to the mangrove clearance.*

No unexpected, adverse, or negative trends are apparent in the avifauna monitoring data collected to date.

## 5. FUTURE MONITORING

The results of avifauna monitoring to date do not indicate that significant decreases in avifauna use, or that unexpected, adverse or negative trends have occurred. Useful information has been collected on presence-absence, and the distributions of cryptic bird species of interest, such as North Island fernbird, and bittern. It is considered that, in future, annual monitoring - as set out in Condition 33(i)G of the resource consent - is appropriate. Annual post-clearance monitoring should be undertaken in March, for consistency with pre-clearance monitoring.

## 6. CONCLUSIONS

Mangroves at Whangamata Harbour provide habitat for at least 31 bird species, of which 19 are indigenous. Two species, red-billed gull, and bittern, are classified as Threatened: Nationally Vulnerable and Nationally Endangered, respectively. Three are classified as At Risk: banded rail (Declining), fernbird (Declining), and black shag (Naturally Uncommon). Of these, only bittern and banded rail actively use mangroves for foraging, while fernbird utilise saltmarsh.

Silvereye was the most frequently encountered and most abundant indigenous species, with at least one being seen or heard at ten of the 15 count stations. Numbers of most species have appeared to be either stable or increasing over the five monitoring rounds. Numbers of five species - all common, and classified as either Not Threatened or Introduced - have apparently declined over the five monitoring rounds, however this is not considered to be of concern.

Continuation of avifauna monitoring, using the methods described in the EMMP and in this report, will provide further elucidation of avifauna use of mangrove habitats at Whangamata. Avifauna use of mangrove habitats at Whangamata may change seasonally, and additional species may be recorded in future monitoring rounds. Overall, the monitoring results suggest that the consented mangrove clearance

undertaken to date has not resulted in adverse effects on avifauna. It is emphasised, nevertheless, that these are interim results. Additional monitoring is required, including at least one full monitoring round once all mangrove removal operations have been completed. Mapping-based analyses of the timing and actual extent of mangrove removal operations will also be able to be used in the future to illustrate trends.

## ACKNOWLEDGMENTS

Over the course of this study Michelle Lewis, Jordan Downes, and Emily O'Donnell of Waikato Regional Council have provided client liaison. Alison Smith, formerly with Waikato Regional Council, provided useful comments on an earlier version of this report.

## REFERENCES

- Hartley L. and Greene T. 2012: Birds: incomplete counts - five-minute bird counts. Version 1.0. *In* Greene. T, McNutt. K (editors) 2012. Biodiversity Inventory and Monitoring Toolbox. Department of Conservation, Wellington, New Zealand.
- Miskelly C.M., Dowding J.E., Elliott G.P., Hitchmough R.A., Powlesland R.G., Robertson H.A., Sagar P.M., Schofield R.P., and Taylor G.A. 2008: Conservation status of New Zealand birds. *Notornis* 55(3): 117-135.
- Robertson H.A., Dowding J.E., Elliott G.P., Hitchmough R.A., Miskelly C.M., O'Donnell C.F.J., Powlesland R.G., Sagar P.M., Scofield R.P., and Taylor G.A. 2013: Conservation status of New Zealand birds, 2012. *New Zealand Threat Classification Series 4*. Department of Conservation, Wellington. 22 p.
- Shaw W. and Dahm J. 2013: Final Environmental Monitoring Management Plan - Whangamata Mangrove Consent. *Waikato Regional Council Internal Series 2012/12*. 54 pp.
- Wildland Consultants 2011: Banded rail survey of Whangamata Harbour. *Wildland Consultants Contract Report No. 2579*. Prepared for Waikato Regional Council. 20 pp.
- Wildland Consultants 2014: Monitoring of banded rail and other avifauna before and after Mangrove clearance at Whangamata Harbour - annual report (March 2013-March 2014). *Wildland Consultants Contract Report No. 3120b*. Prepared for Waikato Regional Council. 25 pp.

## FIVE-MINUTE BIRD COUNT SITES

Area	Station No.	NZTM Northing	NZTM Easting	Vegetation and Habitat
E	1	1854122	5878921	2-2.5 m high mangroves, and cleared mangroves.
	2	1854128	5878725	0.5-1.5 m high mangroves, saltmarsh, and cleared mangroves.
	3	1854058	5878540	0.5-2.0 m high mangroves, saltmarsh.
	4	1854045	5878336	1.5-2.0 m high mangroves, saltmarsh.
	5	1854181	5878089	2.0-2.5 m high mangroves, stream.
G	6	1853783	5880474	0.5-2.0 m high mangroves.
	7	1853594	5880526	0.5-2.0 m high mangroves and pampas.
	8	1853649	5880827	0.5-2.0 m high mangroves and cleared mudflats.
	9	1853260	5880884	2.0-2.5 m high mangroves.
	10	1853445	5880897	0.5-2.5 m high mangroves, and cleared mudflats.
I	11	1853862	5881440	1.5-2.5 m high mangroves.
	12	1853664	5881474	1.0-1.5 m high mangroves, exotic pine and poplar windbreak.
	13	1853481	5881558	0.5-1.5 m mangroves, and exotic shelterbelt.
	14	1853179	5881741	1.5-3.5 m mangroves, pohutukawa and exotic pines.
	15	1853163	5881953	0.5-1.0 m high mangroves.

## CHECKLIST OF AVIFAUNA RECORDED AT WHANGAMATA HARBOUR DURING BANDED RAIL AND AVIFAUNA MONITORING

### INDIGENOUS

<i>Botaurus poiciloptilus</i>	matuku; Australasian bittern
<i>Bowdleria punctata vealeae</i>	mātātā; North Island fernbird
<i>Chrysococcyx lucidus lucidus</i>	pīpīwharau; shining cuckoo
<i>Circus approximans</i>	kāhu; swamp harrier
<i>Egretta novaehollandiae novaehollandiae</i>	white-faced heron
<i>Gallirallus philippensis assimilis</i>	moho-pererū; banded rail
<i>Gerygone igata</i>	riroriro; grey warbler
<i>Haematopus unicolor</i>	tōrea, tōrea pango, variable oystercatcher
<i>Himantopus himantopus leucocephalus</i>	poaka; pied stilt
<i>Hirundo neoxena neoxena</i>	welcome swallow
<i>Larus dominicanus dominicanus</i>	karoro; southern black-backed gull
<i>Larus novaehollandiae scopulinus</i>	tarāpunga; red-billed gull
<i>Phalacrocorax carbo novaehollandiae</i>	kawau; black shag
<i>Phalacrocorax melanoleucos brevirostris</i>	kawau paka; little shag
<i>Porphyrio melanotus melanotus</i>	pūkeko
<i>Prothemadera novaeseelandiae</i>	
<i>novaeseelandiae</i>	tūi (tui)
<i>Rhipidura fuliginosa placabilis</i>	pīwakawaka; North Island fantail
<i>Todiramphus sanctus vagans</i>	kotare; sacred kingfisher, New Zealand kingfisher
<i>Vanellus miles novaehollandiae</i>	spur-winged plover
<i>Zosterops lateralis lateralis</i>	silvereye; tauhou

### INTRODUCED

<i>Acridotheres tristis</i>	common myna
<i>Anas platyrhynchos platyrhynchos</i>	mallard
<i>Callipepla californica bunnescens</i>	California quail
<i>Carduelis carduelis britannica</i>	European goldfinch
<i>Carduelis chloris</i>	European greenfinch
<i>Emberiza citrinella</i>	yellowhammer
<i>Fringilla coelebs</i>	chaffinch
<i>Gymnorhina tibicen</i>	Australian magpie
<i>Passer domesticus domesticus</i>	house sparrow
<i>Phasianus colchicus</i>	common pheasant
<i>Platycercus eximius</i>	eastern rosella
<i>Streptopelia sp.</i>	dove
<i>Sturnus vulgaris vulgaris</i>	common starling
<i>Turdus merula merula</i>	Eurasian blackbird
<i>Turdus philomelos</i>	song thrush





Plate 1: Mangroves near the low tide channel in the Moanaanuanu Inlet, near the northern end of removal Area E. 7 March 2013.



Plate 2: Unconsented mangrove clearance to the landward of removal Area E. No banded rail footprints were found within the cleared area or in the mangroves seaward of the clearance (right of photograph). 7 March 2013.





Plate 3: Mangrove removal Area G. Mangroves to be retained are present between the land (foreground) and the stream channel (visible photograph centre right). The mangrove removal area includes most of the mangroves to the seaward of the stream. 7 March 2013.



Plate 4: Removal Area I. Muddy substrates submerged at low tide with water 2-5 cm deep, 8 March 2013.





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