Ōhiwa Harbour marshbird survey 2015

Bay of Plenty Regional Council
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5 Quay Street
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NEW ZEALAND

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BAY OF PLENTY REGIONAL COUNCIL
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Cover photo: Spotless crake footprints on Uretara Island
Photographer: Lisa Bevan

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Shay Dean, Tim Senior and Mithuna Sothieson for reviewing and providing feedback on this report.

This survey is a repeat of the 2010 Ōhiwa Harbour marshbird survey by Annabel Beattie (Environmental Scientist, Bay of Plenty Regional Council) and Marshbird Habitat of Ōhiwa Harbour by Keith Owen (Department of Conservation) in 1990.

Executive summary

A survey of marshbird distribution and habitat in Ōhiwa Harbour was conducted during October and November 2015 as part of ecological work involved with the Ōhiwa Harbour Strategy. This work is a re-measure of a selection of sites from surveys undertaken in 1990 (Owen, 1994) and 2010 (Beattie, 2011). This report compares the results of these surveys as well as the overall health of the harbour's estuarine margin habitat.

Of the original 44 sites, 27 were surveyed (those considered more valuable habitat for marshbirds) by Bay of Plenty Regional Council staff, Department of Conservation staff and volunteers. Data on bird detections, threats, impacts and habitat quality were collected.

The number of sites with marshbird detections was higher or the same in 2015 compared with the 1990 survey for all target marshbird species except fernbird, and the difference between the two periods for this species (2) is not considered significant. Australasian bittern were the only species which showed a marked reduction in the number of sites with detections compared with the 2010 survey; however removing detections reported by locals from previous survey data would remove this difference. There may have a been a small reduction in distribution of two marshbrid species (banded rail and fernbird) between 2010 and 2015, though it is uncertain to what extent these represent true changes or is simply different detection rates.

There has been a substantial increase in the distribution of North Island weka since 2010, and this may have impacted to some extent on marshbird populations. However, the impact of weka is probably small in comparison to the impact of mammalian predators, which pose the greatest threat to marshbird survival and nesting success (Moon, 2009; Parker, 2002; Walls, 1999).

The snapshot nature of this survey and the cryptic behaviour of the surveyed marshbirds limit interpretation of the results. It is recommended that a review of the methodology is undertaken to increase consistency between the surveys and improve the ability to detect populations trends. However, this survey confirms that Ōhiwa Harbour can still be considered of national significance for Australasian bittern and banded rail, and regional significance for North Island fernbird.

Contents

Part 1: Introduction

The Ōhiwa Harbour Strategy (Environment Bay of Plenty, 2008) contains an action (Action 12.3.3) to Assess the Ecological Quality of Ōhiwa Harbour. As a result, a comprehensive monitoring programme has been set up which includes five-yearly monitoring of marshbirds. A full survey is planned at 10-yearly intervals and a partial survey at five-yearly intervals in between. Hence this survey is a re-measure of selected sites from a previous marshbird survey undertaken in 2010 (Beattie, 2011) in order to monitor the populations and habitat of marshbirds in the Ōhiwa Harbour over time.

The Ōhiwa Harbour contains regionally or nationally significant populations of several marshbird species and they are good indicators of the overall health of the estuarine margin habitat.

1.1 Previous work

See Beattie, 2011.

1.2 Objectives

The aim of this survey is to compare current marshbird populations and distribution with earlier surveys. Marshbirds are good indicators of estuarine margin vegetation condition as they are highly sensitive to modification or loss of this habitat and predation (Froude, 1998), so results from this survey will also add to our understanding of the ecological health of this habitat type in Ōhiwa Harbour and any changes taking place over time.

This survey was undertaken with the following objectives:

(i) To survey a selection of marshbird habitats identified by Owen (1994) within the harbour to gain information on the distribution of marshbird species.

(ii) To gain a crude indication of population trends by comparing marshbird distributions between surveys.

(iii) To assess the existing human, animal and natural threats and impacts on marshbird populations and their habitats.

(iv) To recommend management actions necessary to reduce threats and impacts on the long-term ecological welfare of all of marshbird populations and habitats.

(v) To summarise the data in a report outlining the results of the survey, and make copies available to the different partners of the Ōhiwa Harbour Strategy, and other interested organisations.

All birdlife encountered during the survey was recorded, but the work focused on the following five marshbird species specifically identified by Owen (1994):

- Australasian bittern (matuku) *Botaurus poiciloptilus*
- Banded rail (moho-pererū) Gallirallus philippensis assimilis
- Spotless crake (pūweto) *Porzana tabuensis plumbea*
- Marsh crake (koitareke) *Porzana pusilla affinis*
- North Island fernbird (mātātā) *Bowdleria punctata vealeae*

These species were originally chosen because they are all wetland dwelling birds that rely heavily on marshlands for their habitat (Owen, 1994). All five are listed as either threatened or at risk in the latest publication of the Conservation Status of New Zealand Birds (Robertson et al., 2012), and are therefore targets for protection.

Part 2: Methodology

This survey follows the same objectives and similar methodology as the previous survey in 2010 (Beattie, 2011) and in 1990 (Owen, 1994) to enable comparisons between the surveys. In contrast to previous surveys, only 27 of the original 44 sites were selected to re-survey. The sites selected were those identified from previous surveys as being of high quality, therefore enabling any change to be measured.

2.1 Survey coverage

An area of about 380 ha of estuarine and freshwater vegetation in Ōhiwa Harbour has been identified as marshbird habitat (Owen, 1994). This habitat is largely composed of mangrove (*Avicennia marina subsp. australasica*) scrub and shrublands, rushlands, sedgelands, flaxlands, shrub and freshwater wetlands located around the harbour margins.

The 27 sites surveyed in 2015 were considered to have the highest habitat quality for marshbirds and are to be resurveyed every five years. The full 44 sites are to be resurveyed every 10 years and the next full survey is due in 2020.

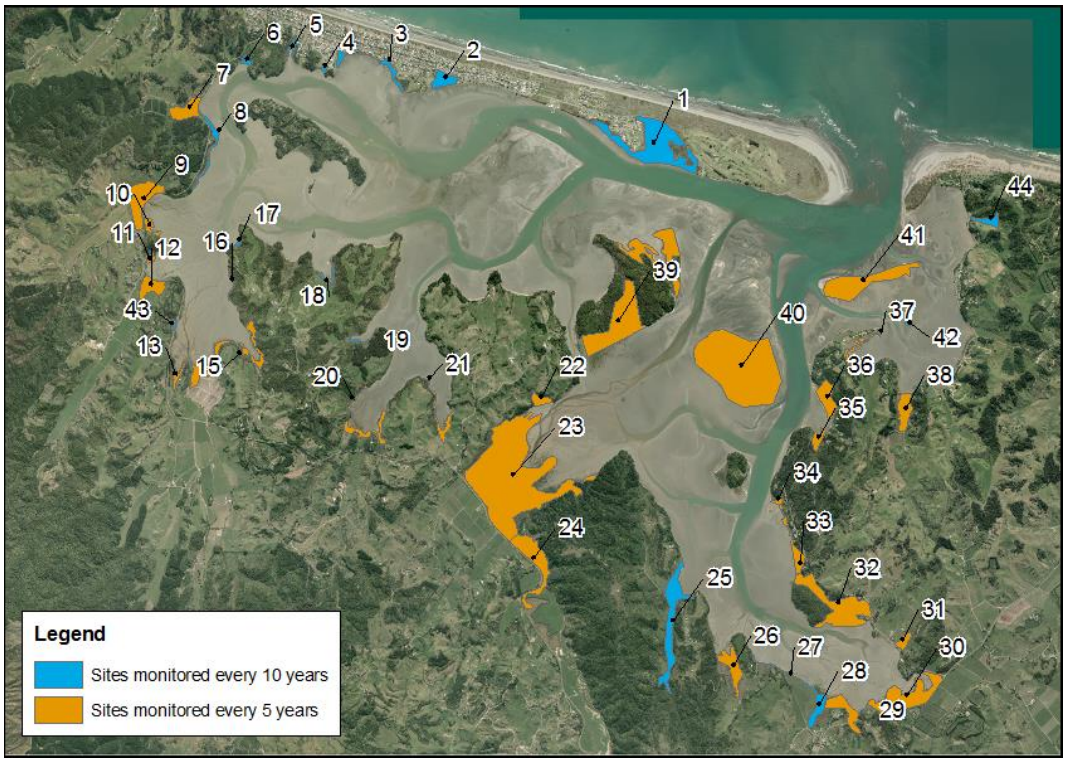


Figure 1 *Map of all marshbird habitat sites. Sites highlighted in orange were monitored during 2015 survey.*

2.2 Timing of survey

All of the sites were surveyed between 20 October and 4 November 2015, during the marshbird breeding season. As with the Beattie (2011) study, all sites were visited in the morning between 6:30 am and 10:00 am. The original Owen study did not record the time of day or the length of time each site was visited, however, at least some bird detections occurred at dusk.

Surveys were also ideally carried out close to low tide, to allow larger parts of the site to be accessed. The number of sites meant it was impossible to visit them all at identical stages of the tidal cycle, which may have influenced the number of birds recorded, particularly banded rail, due to varying times for footprints to accumulate.

2.3 Length of time spent at each site

The amount of time spent at each site varied from half an hour to several hours, as a result of the differing size and habitat complexity among sites. Varying time spent at each site was also recorded during the Beattie (2011) survey. However, Owen (1994) states that all sites were visited between one to two hours in the original survey.

2.4 Training and personnel

The survey was conducted by a mixture of Bay of Plenty Regional Council staff, Department of Conservation staff and volunteers. An initial training day was conducted by Department of Conservation staff and an expert from a local care group to ensure consistency between surveys and among personnel. Additionally, all new volunteers were paired up with an experienced person to ensure a consistent level of experience was upheld at every site.

2.5 Field methodology

At each site, a detailed walk-through survey was conducted. This consisted of slowly walking through all or a large part of the area (depending on time and ease of access), playing tape recordings of the target species and recording a number of data. Different areas at each site were targeted for different species, as the target species have been shown to differ significantly in their habitat requirements (Anderson and Ogden, 2003).

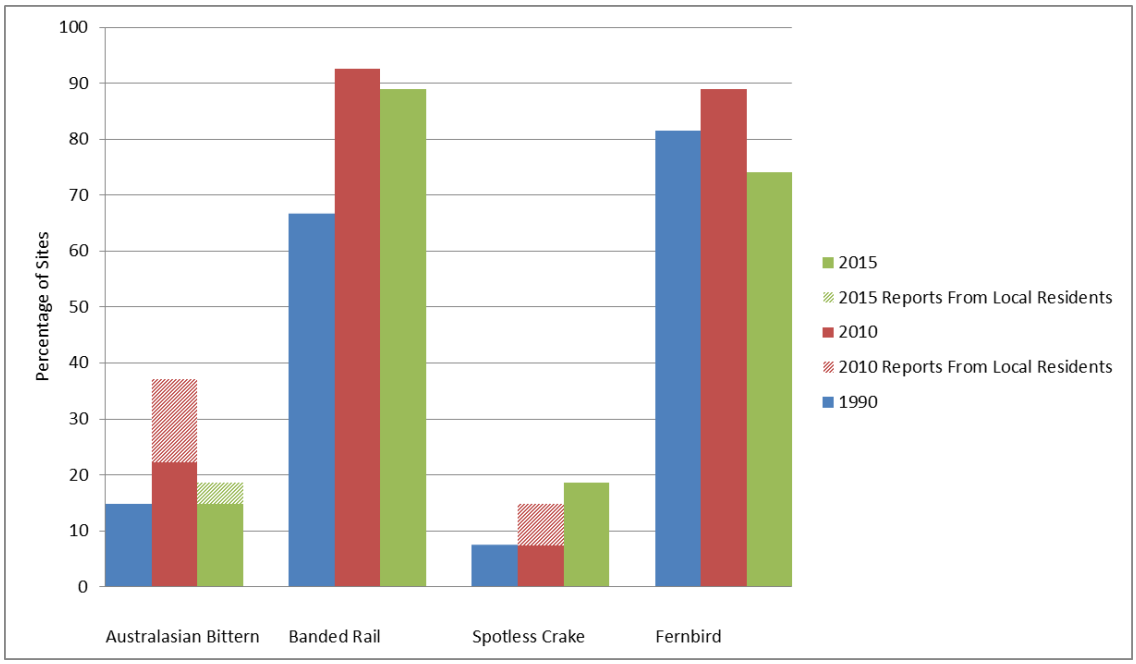
Data for each site was recorded on the survey sheet shown in Appendix 1. This sheet was based on one developed by Owen (1994), and used by Beattie (2011), to ensure consistency between the surveys. Data recorded included date, site number, time spent in area, observer names, habitat quality ranking and justification, species of birds recorded, numbers seen or heard, bird sign observed and whether tapes were played.

Data on threats and disturbances were also recorded for each site. The location of birds either seen or heard and the location where tape recordings were played were also recorded onto aerial photographs at most sites. The tape playback locations recorded in Beattie (2011) were revisited for consistency, however, additional playback locations were included if the coverage was not deemed sufficient.

At the end of each site visit, a subjective habitat quality ranking was assigned to the site based on a range of criteria such as rarity of marshbird species detected, relative number of individuals of a species recorded, size and shape of the wetland, vegetation type and communities within the wetland, habitat diversity, quality of habitat, long-term viability of populations and habitat, representativeness and naturalness of wetland, availability of corridors and buffers to wetland, and level of human, animal, plant and natural disturbances to the site (refer to Beattie, 2011 for full details). The ranking uses the same three-tier system (outstanding, high or moderate) outlined in Owen (1994) to enable comparison between surveys. Unlike the previous survey in 2010, sightings from local residents were not sought or included in the survey results except for one sighting by a local expert which is marked separately. Other limitations of this study design and methodology are described in Beattie (2011).

Part 3: Results

The percentage of the 27 sites with marshbird detections was the same or slightly higher compared to the 1990 survey for all species except fernbird, though the difference between the two periods for this species (two sites) is not considered significant. The Australasian bittern was the only species which showed a marked reduction in the percentage of sites with detections compared with the 2010 survey; however this may not have been the case if all sites were surveyed (bittern may have been utilising other sites) and when reports from local residents are removed, this would remove the difference. More detailed information on detections for each species is reported below.



Graph 1 *Comparing the percentage of sites with each marshbird species detected between the three surveys. Reports from local residents are marked accordingly to allow for separate analysis.*

Australasian bittern (matuku)

In the 2015 survey, bittern were observed at four of the 27 sites (site 7, 15, 20, and 23) which is not a significant difference from 1990 (four sites) nor 2010 (six sites).

A range of observation types were recorded to detect whether bittern were present. At site 7 a bittern preening site was found. A bittern was observed at site 15, at site 23 a bittern was heard and at site 20 a bittern roosting site was discovered. A local resident, who is considered a bittern expert, sighted a bittern at site 9 however this is not included in the results as the sighting was reported after the timeframe of this survey.

Due to the cryptic nature of the bittern it is likely the full distribution and abundance was under-recorded during these surveys. The distribution of Australasian bittern during each of the three surveys is shown in Figures 3 to 5. All reports from local residents are marked separately as they occurred outside of the survey timeframe. Local reports from 2010 are from unknown sources.

In all three surveys no bittern has been recorded along the Ōhope Spit, however, bittern have been consistently recorded at three sites (sites 7, 9 and 23). Bittern recorded on the eastern side of the harbour during the 2010 survey were not recorded in 2015 and may be due to the bittern's mobility and ability to fly long distances (Heather and Robertson, 1996).

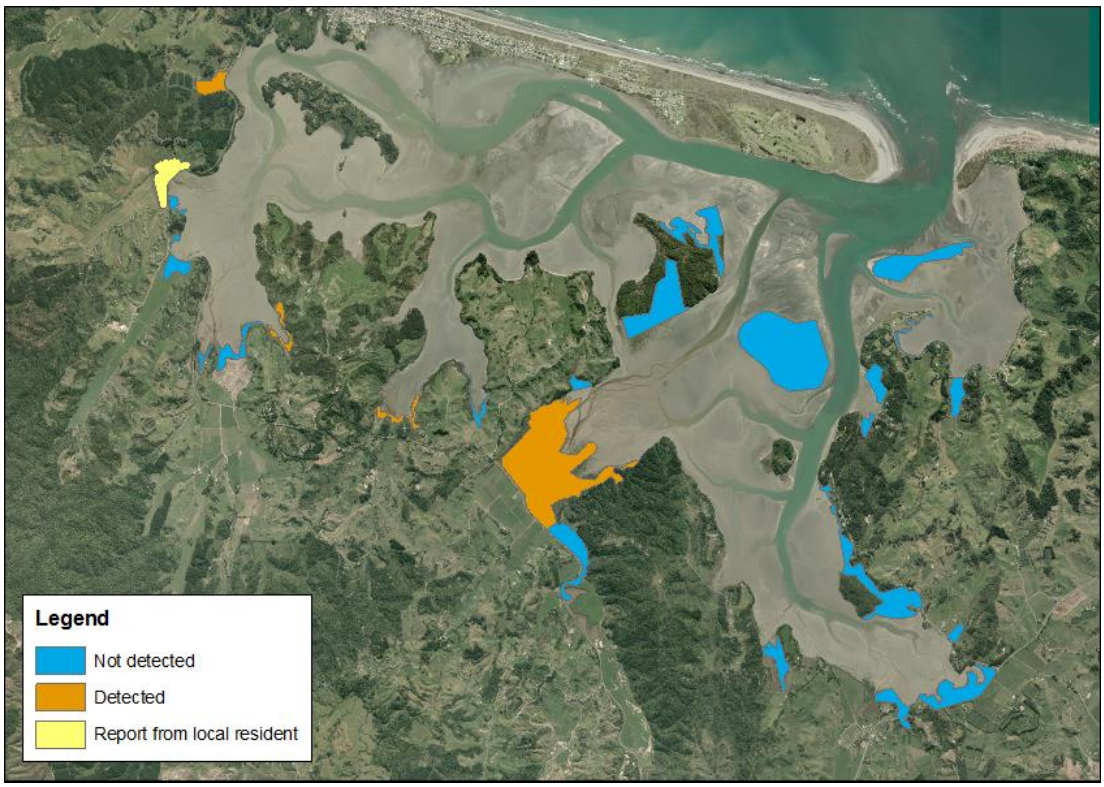


Figure 2 *Australasian bittern distribution in Ōhiwa Harbour detected during 2015 survey. Bittern were detected from four sites and a local resident reporting sighting a bittern at one site.*

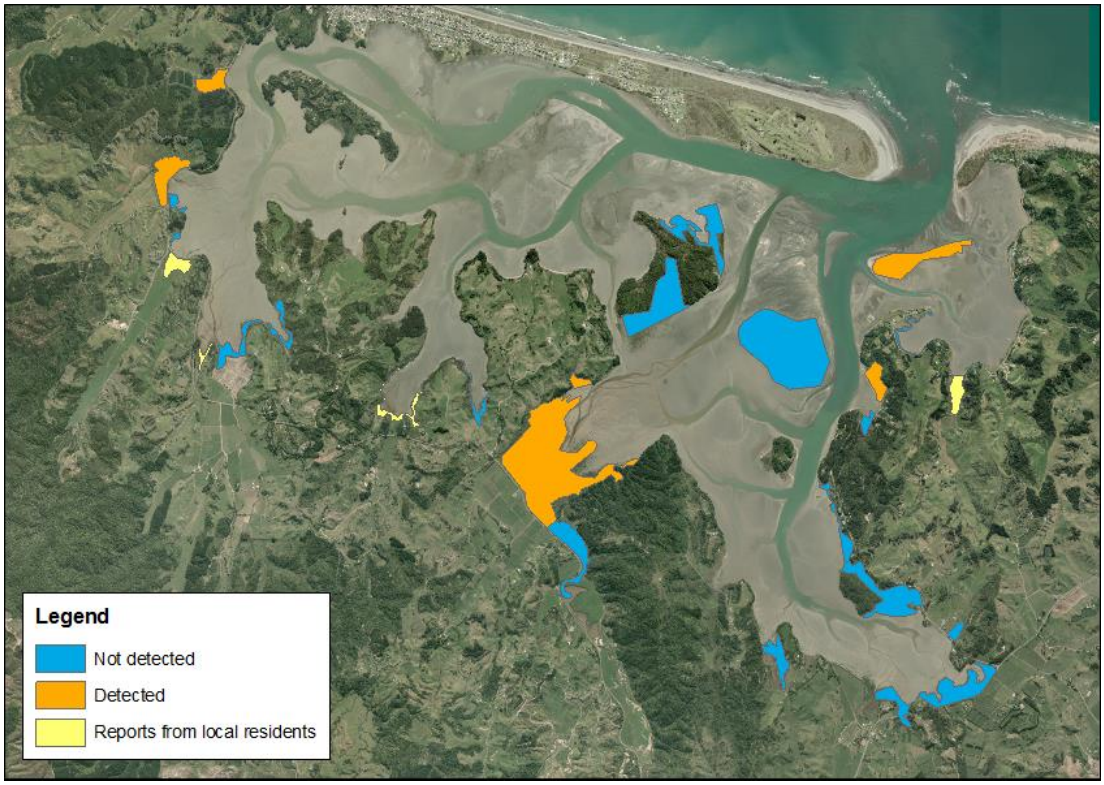


Figure 3 *Australasian bittern distribution in Ōhiwa Harbour detected during 2010 survey. Bittern were detected at six sites and local residents reported sightings of bittern from four sites.*

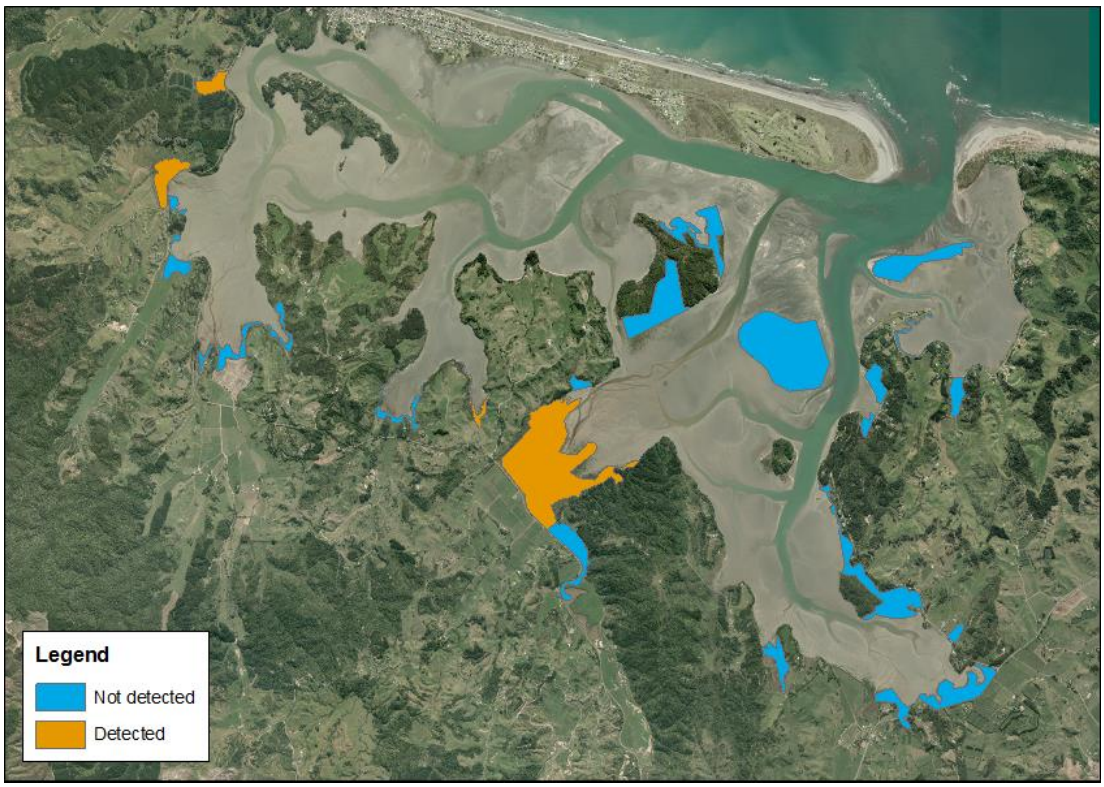


Figure 4 *Australasian bittern distribution in Ōhiwa Harbour detected during 1990 survey (four sites).*

Banded rail (moho-pererū)

In 2015, banded rail were recorded at all of the sites surveyed except sites 15, 24 and 31. Banded rail had the largest distribution recorded out of the five target species during the 2015 survey. Footprints were the most common form of identifying banded rail presence. These ranged from a single track to multiple tracks as well as tracks found in different areas indicating the possibility of multiple individuals. At sites 7, 9, 12, 13, 14, 22, 23, 30, 32, 35, 36 and 39, banded rail were heard, and at sites 9, 14, 30, 36 and 40, banded rail were seen.

For the 27 sites surveyed in 2015, there was no significant change in the number of sites with banded rail detections (24) compared to 2010 (25) but a marked increase compared to 1990 (18).

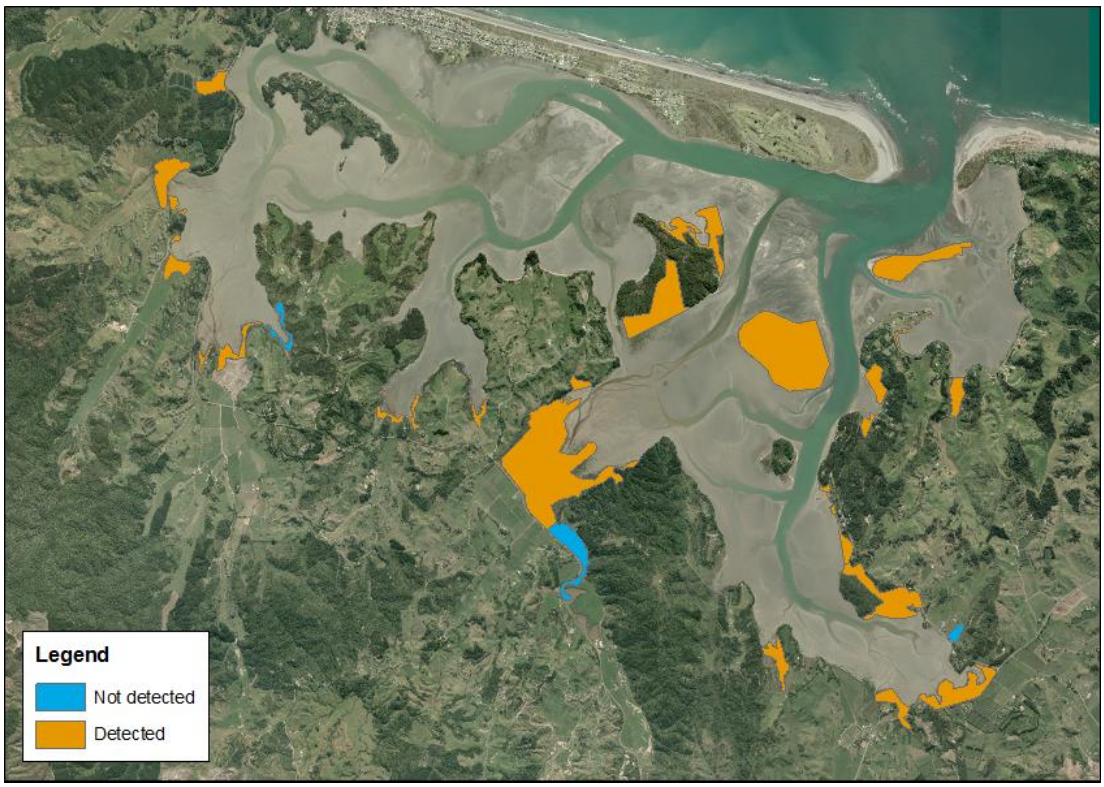


Figure 5 *Banded rail distribution in Ōhiwa Harbour detected during 2015 survey (24 sites).*

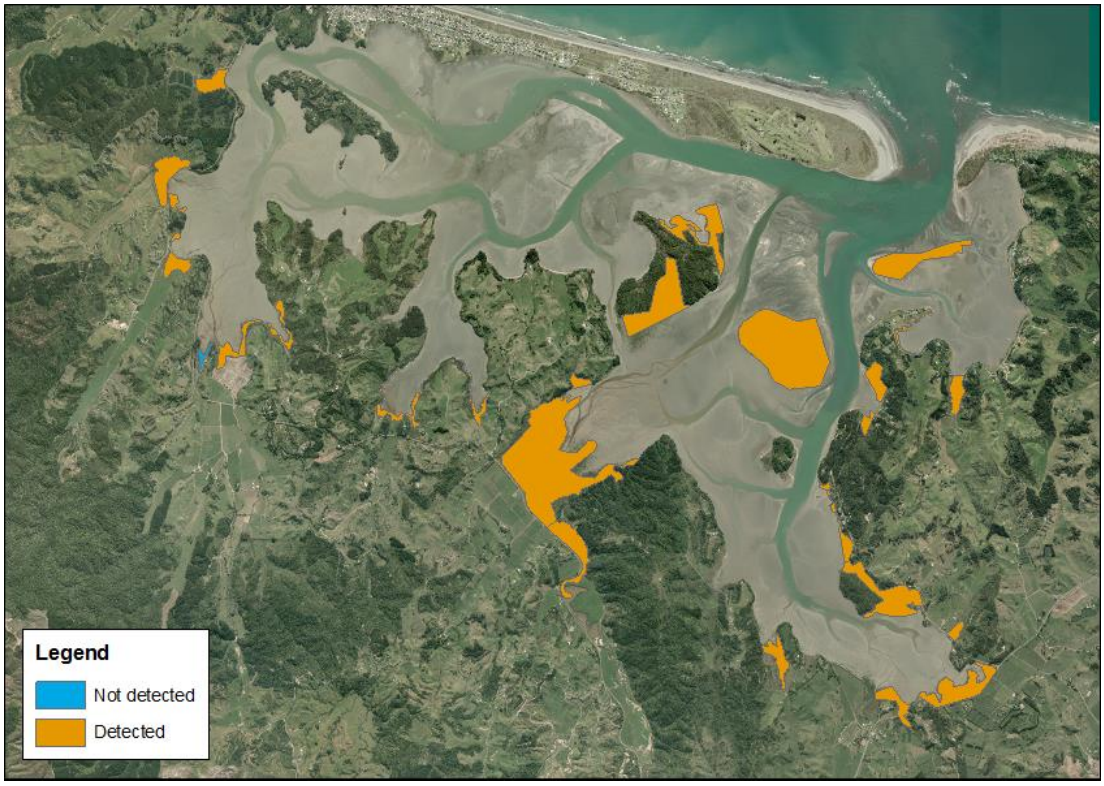


Figure 6 *Banded rail distribution in Ōhiwa Harbour detected during 2010 survey (25 sites).*

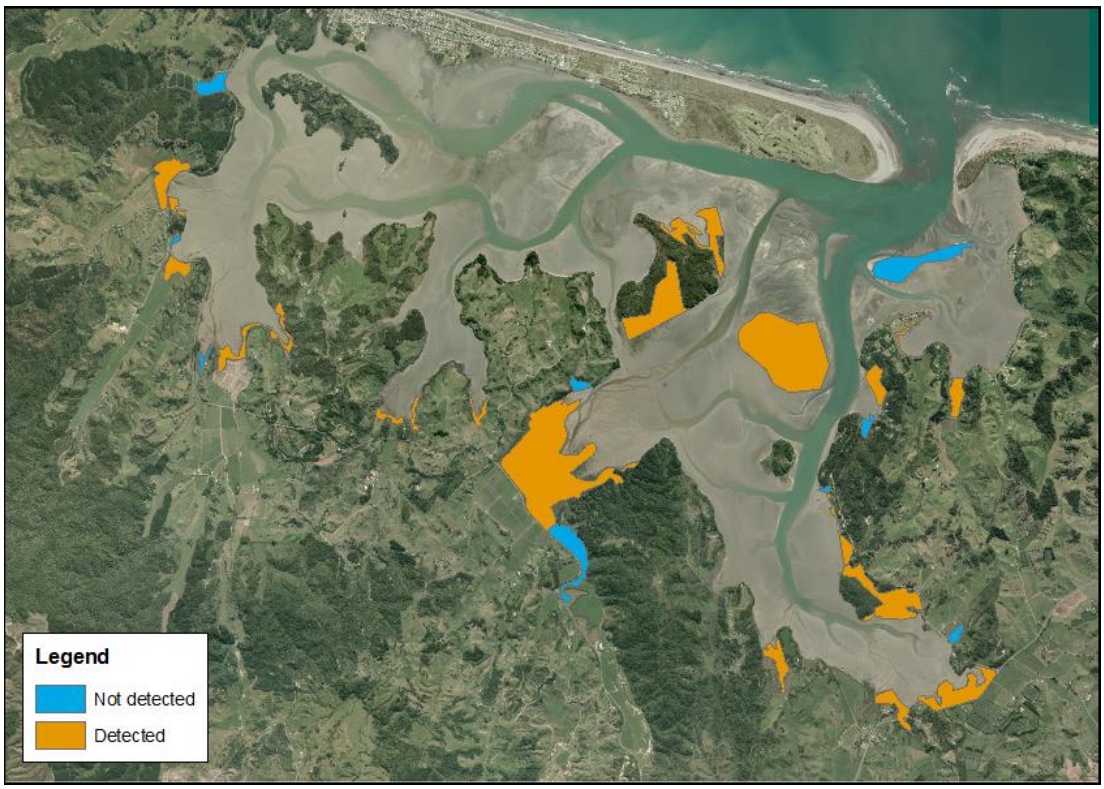


Figure 7 Banded rail distribution in Ōhiwa Harbour detected during 1990 survey (18 sites).

Spotless crake (pūweto)

In 2015, spotless crake were recorded at five sites (site 14, 15, 20, 35, and 39). Spotless crake were heard at sites 14 and 15. Two crakes were each heard at sites 20 and 35 and spotless crake footprints were found on Uretara Island.

For the 27 sites surveyed in 2015, the number of sites with spotless crake detections has markedly increased since 2010. With local reports included, there is a steady increase from two in 1990 to four in 2010, to five in 2015. Spotless crake have been recorded consistently from site 20 in all three surveys. The distribution is sparse but appears to have widened in 2015 from the previous distribution, localised to the middle part of Ōhiwa Harbour, as they now have been recorded on the eastern side, at site 35, and further west, at site 14 and 15.

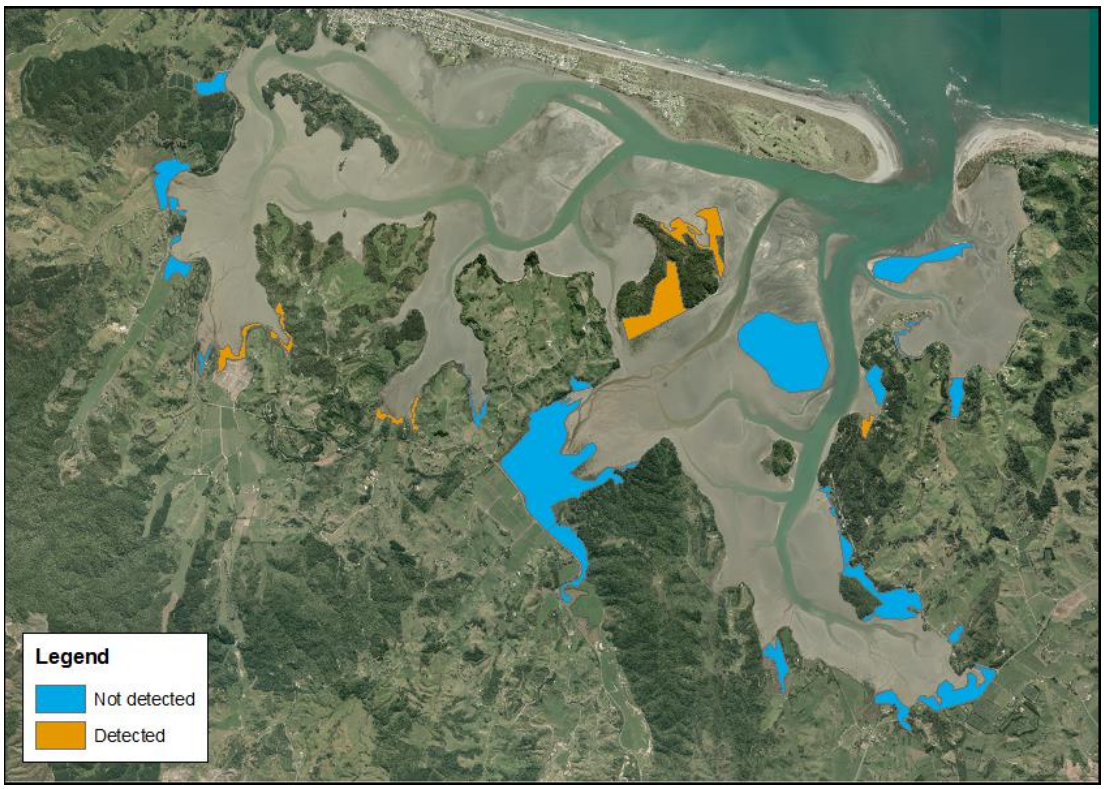


Figure 8 *Spotless crake distribution in Ōhiwa Harbour detected during 2015 survey (five sites).*

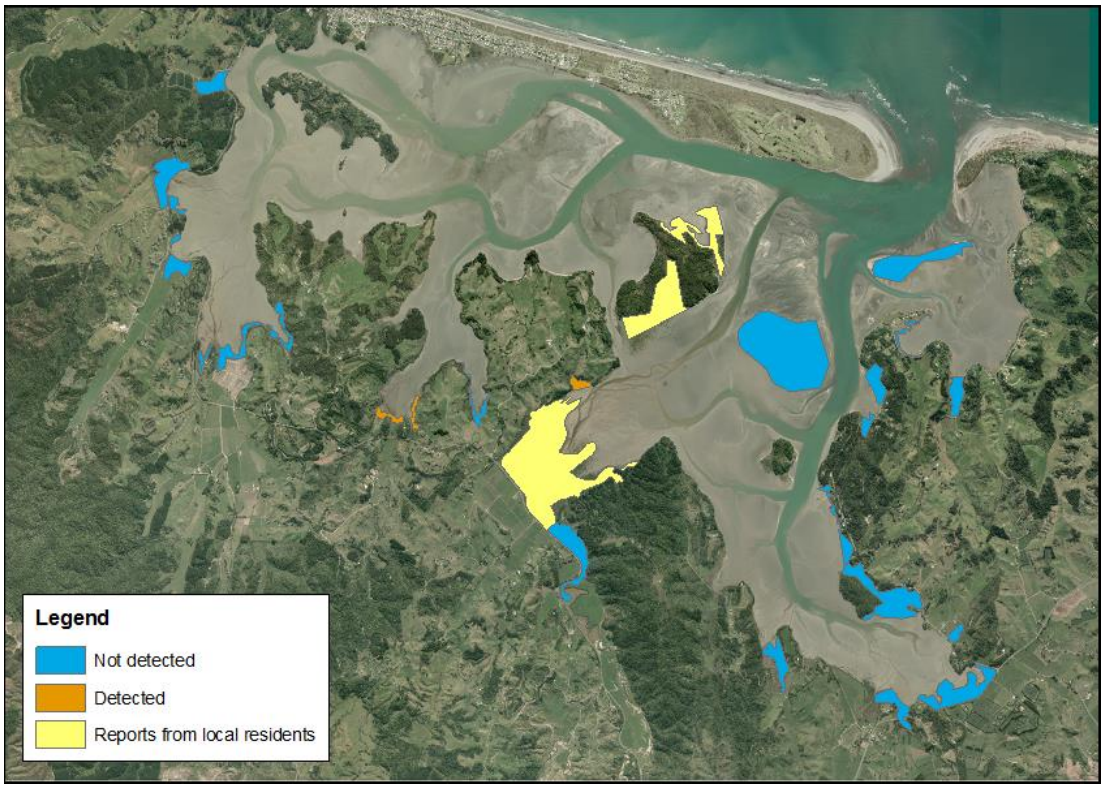


Figure 9 *Spotless crake distribution in Ōhiwa Harbour detected during 2010 survey. Spotless crake were detected at two sites and local residents report sightings from a further two sites.*

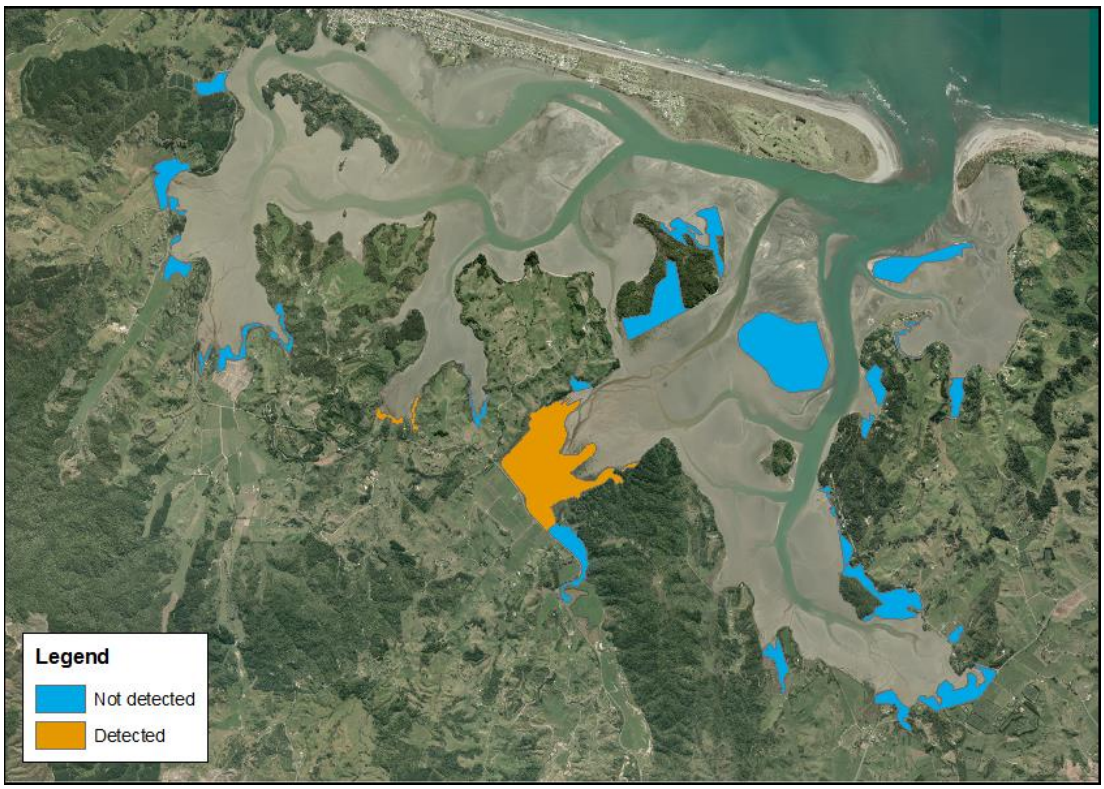


Figure 10 Spotless crake distribution in Ōhiwa Harbour detected during 1990 survey (two sites).

Marsh crake (koitareke)

No marsh crake were recorded in the 2015 or in previous surveys in Ōhiwa Harbour. This is not surprising given marsh crake are highly cryptic, not common in the North Island, and unlikely to be detected during morning surveys (*pers. comm.* Colin O'Donnell, Department of Conservation).

Fernbird (mātātā)

Fernbird were the most frequently detected of the five species recorded in Ōhiwa Harbour, with 77 calls recorded at site 23. Fernbirds were recorded at all sites except the following sites: 7, 22, 31, 32, 34, 37 and 38.

Of the 27 sites surveyed in 2015, fernbird was recorded at a total of 20 sites, representing a minor decrease from the 24 (out of 27) sites with detections in the 2010 survey and 22 (out of 27) sites with detections in the 1990 survey.

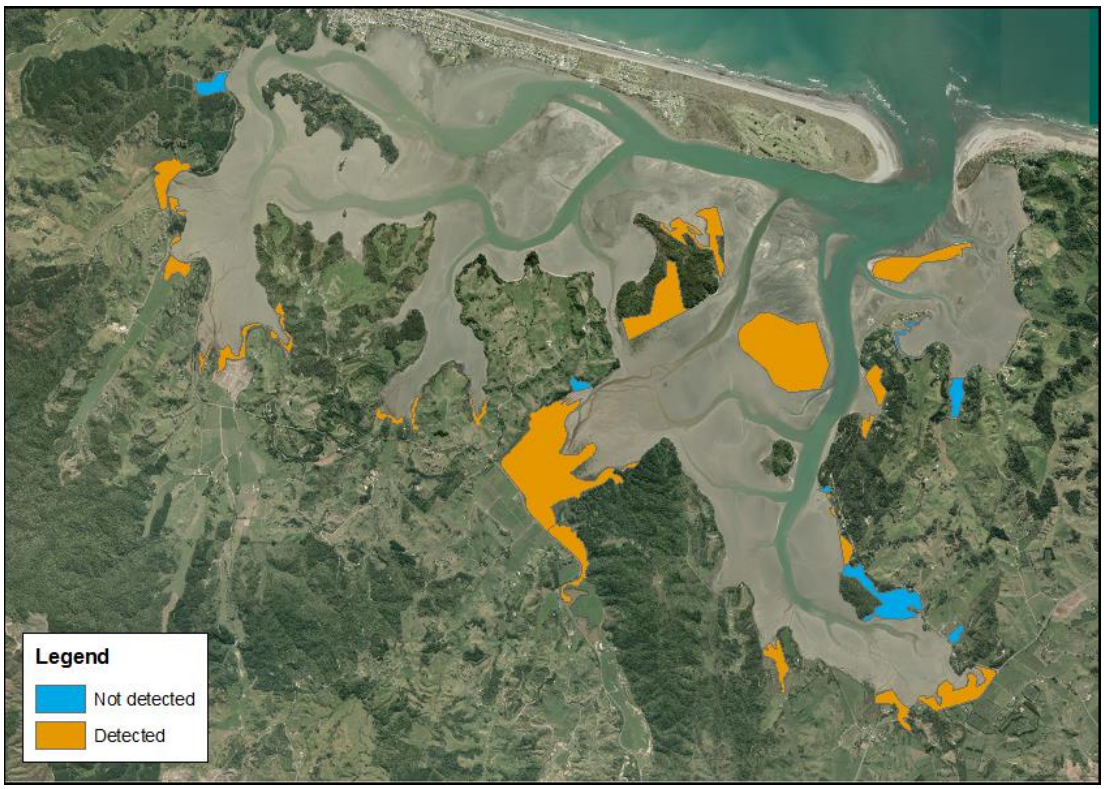


Figure 11 *Fernbird distribution in Ōhiwa Harbour detected during 2015 survey (20 sites).*

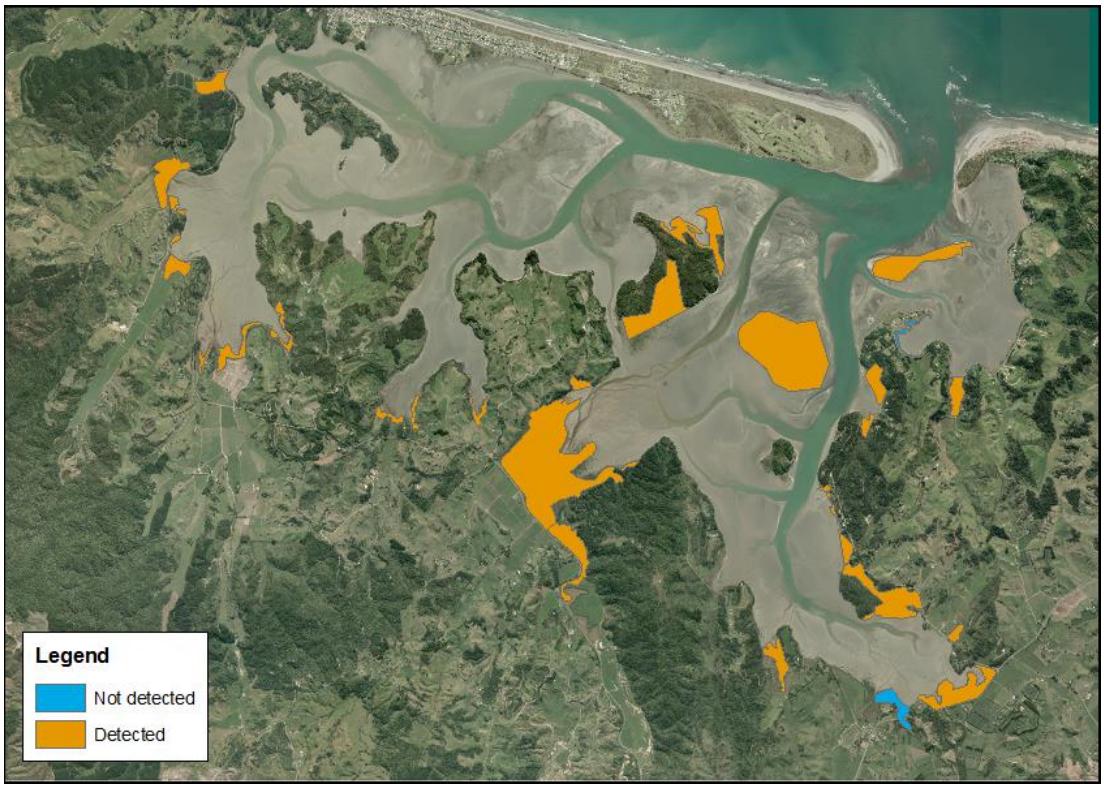


Figure 12 *Fernbird distribution in Ōhiwa Harbour detected during 2010 survey (24 sites).*

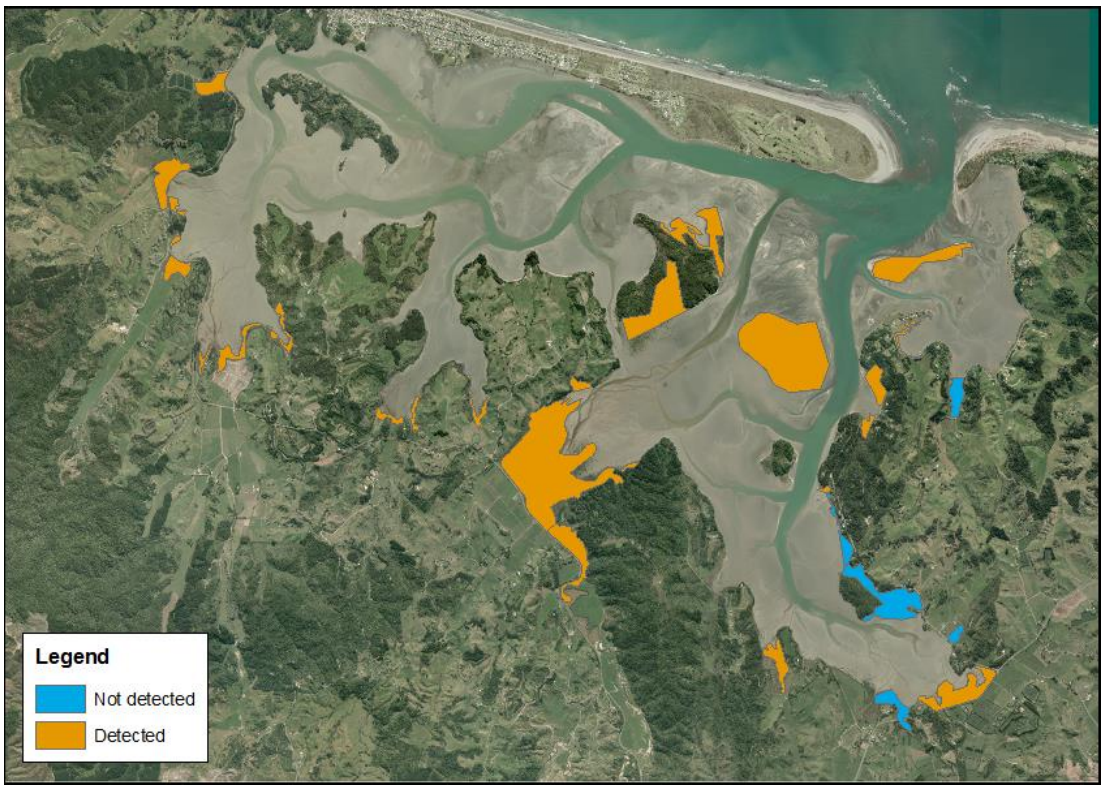


Figure 13 Fernbird distribution in Ōhiwa Harbour detected during 1990 survey (22 sites).

Other recorded bird species

North Island weka was recorded at 17 sites during the 2015 survey. North Island weka were not recorded at Ōhiwa Harbour in 1990 (Owen, 1994), and were only recorded at one site (out of 44) in 2010 (site 36).

According to MacKenzie (2013) North Island weka were becoming common on the eastern side of Ōhiwa Harbour at the time the report was written. The 2015 distribution shows that North Island weka has now been found on the western side of the harbour and is now widespread around much of Ōhiwa Harbour. Their distribution is predicted to expand further over time.

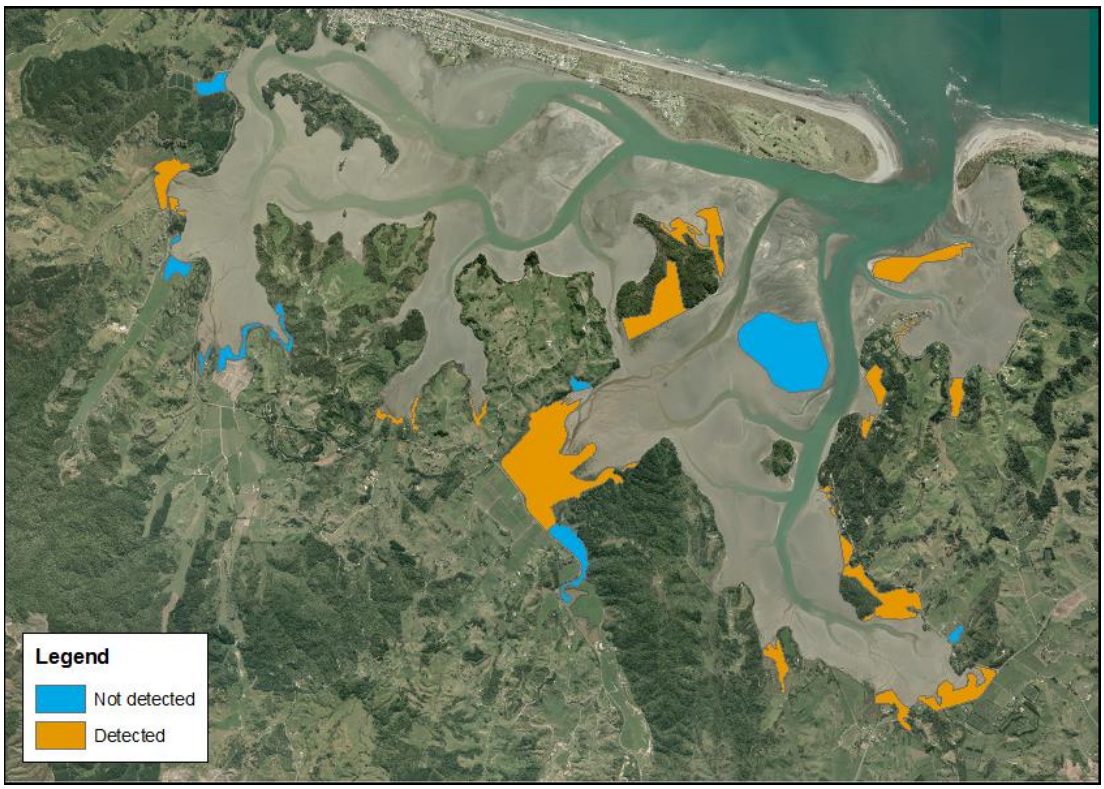


Figure 14 *North Island weka distribution in Ōhiwa Harbour detected during 2015 survey.*

Part 4: Threats and habitat rankings

4.1 Threats

There have been no significant changes in threats and impacts compared to Beattie (2010) except for the positive changes at site 26 where grazing practices have been ceased on half of the upper wetland which will likely benefit the marshbirds (*pers. comm*. Tim Senior, Bay of Plenty Regional Council) and at site 35 where pest control has started in response to this survey (*pers. comm.* Mithuna Sothieson, Department of Conservation).

4.2 Habitat rankings

Noting the subjective nature of the methodology used to rank habitat quality, all sites ranked as high or outstanding in the original Owen (1994) survey have not changed in habitat quality with the exception of Awarapatuna Stream. Reasons for the reduction of ranking for this site from high to moderate include low number of marshbirds present, the small size of habitat available and the apparent lack of food available.

An additional study was undertaken in 2015 which assessed the Wetland Condition Index (Clarkson et al. 2003) of saltmarsh sites around the harbour. These assessments could be used in the future to provide better understanding of changes in habitat quality over time. Refer to Bevan, 2015 for further information.

Part 5: Limitations of this survey

Interpretations of the results of this survey are limited by the snapshot nature of this survey, and the cryptic behaviour of the marshbirds surveyed. Different detection rates may have resulted from inconsistencies in methodology (i.e. amount of time spent at each site, tidal differences, differences in survey routes), differences in observational skills, or a number of environmental conditions.

Part 6: Conclusions and recommendations

The results of this survey suggest that:

- There has not been a significant reduction in marshbird distribution since the first survey was undertaken in 1990 (Owen 1994), but there has been a small increase in distribution of banded rail and spotless crake.
- There may have been a small reduction in distribution of two marshbird species (banded rail and fernbird) between 2010 and 2015, though it is uncertain to what extent these represent true changes or is simply different detection rates.
- Australasian bittern were the only species which showed a marked reduction (19%) in the number of sites with detections compared with the 2010 survey; however, removing detections reported by locals from previous survey data (which occurred outside of the survey timeframe) would remove this difference.
- There has been a substantial increase in the distribution of North Island weka since 2010, and this may have impacted to some extent on marshbird populations. However, the likely impact of weka is not known in comparison to the well understood impact of mammalian predators, which pose the greatest threat to marshbird survival and nesting success (Moon, 2009; Parker, 2002; Walls, 1999)
- Ōhiwa Harbour can still be considered of national significance for Australasian bittern and banded rail, and regional significance for North Island fernbird.
- Ōhiwa Harbour continues to provide important habitat for marshbird species, with strong populations of several different species.
- All sites considered to contain high and outstanding habitat in the 1990 survey were ranked high and outstanding again in this study, with the exception of Awarapatuna Stream.

Based on these conclusions, it is recommended that:

- A review of the current survey methodology is undertaken to increase consistency between surveys and improve the ability to detect population trends.
- Consideration be given to monitoring the relative abundance of fernbird, spotless crake and Australasian bittern using five minute bird counts and/or automatic recorders (as per standard Department of Conservation protocols).
- Methods of monitoring relative abundance of banded rail and weka at key sites should be investigated.
- Consideration be given to monitoring relative abundances of selected animal pest species at sites with and without animal pest control (in conjunction with surveys of relative bird abundance).
- A one-off dusk survey for marsh crake at a selection of sites around the harbour should be undertaken.
- Vigilance should be maintained on the changes in weka population and any detrimental effects weka may be having on the marshbird populations.
- Support for care group activities is continued, particularly predator control and habitat enhancement, as this is considered to be a large factor in the abundance and distribution of several species.
- The survey is repeated in 2020 (at the latest) on all 44 sites to demonstrate any change in marshbird populations, or estuarine habitat they are reliant on.

Part 7: References

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Appendices

Appendix 1 – Ōhiwa Harbour marshbird survey sheet 2015

ŌHIWA HARBOUR MARSHBIRD SURVEY SHEET 2015

Site name: _____

Site no: _____

Date: _____

Time spent in area: _____

Habitat quality: _____

Observers: _____

_____

Weather (circle the option that's most appropriate)							
Temperature			Wind		Other noise		Rainfall	
1	Freezing	<0 °C	0	Leaves still	0	Not important	0	None
2	Cold	0-5°C	1	Leaves rustling	1	Moderate	1	Dripping foliage
3	Cool	5-10°C	2	Leaves and branches in constant motion	2	Loud	2	Drizzle
4	Mild	10-15°C	3	Branches or trees swaying			3	Light
5	Warm	15-20°C					4	Moderate
6	Hot	20-25°C					5	Heavy

Species	Number of birds seen	Number of birds heard	Bird sign observed	Recordings played?	Recording sequence
Australasian bittern					
Banded rail					
Spotless crake					
Marsh crake					
North Island fernbird					

Threats/disturbances (including reclamation, drainage, rubbish, public utilities, fencing, stock, adventive plants, residential, recreation, harmful water discharges, fire, introduced mammals, others):

_____

_____

Additional comments:

_____

_____

Other bird species:

_____

_____

Brief description of site and justification of habitat quality (including distribution of bird species, habitat diversity, quality of habitat, long-term viability, representativeness, naturalness, human, animal, plant or natural disturbances, threats, and recommended management actions):

_____

_____

Appendix 2 – Site sheets

Refer to Bevan (2015) for recent vegetation descriptions.

Site name: Awarapatuna Stream

Site number: 7

Survey date: 20 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Australasian bittern			Preening area	
Banded rail		1		
Other observed bird species				
Paradise shelduck, pūkeko, mallard, peafowl, white-faced heron.				

Existing threats and impacts	
Public utilities	Sewage plant present at head of inlet. The road causeway reduces connection to harbour down to the culvert and has rip rap round base of causeway (erosion protection), power lines running down western side.
Pest control	No pest control from forest directly adjacent to saltmarsh.
Other	Limited food supply.

Habitat quality: Moderate

The quality has moved down from previous surveys from high to moderate because even though Australasian bittern and banded rail are present, there is very little evidence of bird life and apparent limited food source available.

Figure 15: Awarapatuna Stream (site 7) looking from the upper reaches of the inlet towards Wainui Road.

Site name: Tunanui Stream Inlet

Site number: 9

Survey date: 20 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail	1	1		
North Island fernbird	4	12		
Other observed bird species				
Pūkeko, white-faced heron, duck, North Island weka.				

Existing threats and impacts	
Reclamation/drainage	Drainage has been altered, and Tunanui Stream, which runs down the centre, has been channelised. Farmland inland has been reclaimed.
Public utilities	The road causeway separates this site for the harbour which is covered in adventive plants.
Pest animals	Signs of cats and rats.
Stock	Stock tracks were observed on mud flats and through saltmarsh.
Adventive plants	Gorse, pampas, sea couch, willow, wattle, pine, saltwater paspalum.

Habitat quality: High

Site appears to be in similar condition to previous survey.

Site name: Burma Road

Site number: 10

Survey date: 22 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints	Prints everywhere in mangroves.
North Island fernbird	2	1		
Other observed bird species				
Shining cuckoo, paradise shelduck, North Island weka.				

Existing threats and impacts	
Public utilities	Site bordered by Wainui Road.
Rubbish	Litter present.
Adventive plants	Adventives present along border with neighbouring property: honeysuckle, gorse, willow, bind weed, pampas.

Habitat quality: High.

The quality has moved up from previous surveys from moderate to high because there is good banded rail habitat and many prints seen. Only disadvantage is the road that might cause disturbance.

Site name: Pukehoko

Site number: 11

Survey date: 4 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail		1	Prints	Lots of prints seen along entire mudflat edge.
North Island fernbird		2		
Other observed bird species				
None				

Existing threats and impacts	
Reclamation/drainage	Drain present along landward edge of wetland and through the centre.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Waiotane Stream

Site number: 12

Survey date: 20 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail		1	Prints	
North Island fernbird	2	21		
Other observed bird species				
Chaffinch.				

Existing threats and impacts	
Reclamation/drainage	Tidal access is restricted by the size of culvert pipes under the road. The area inland from the wetland has been drained and reclaimed. Drain limits water inflows to the wetland.
Pest animals	Rat prints seen.
Adventive plants	Pampas, gorse, barberry.
Other	Limited food supply, only some crabs observed possibly due to limited tidal access.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Te Kooti Inlet

Site number: 13

Survey date: 20 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail		1	Prints	
North Island fernbird	4	2		
Other observed bird species				
Eastern rosella, shining cuckoo, paradise shelduck.				

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Wainui Stream

Site number: 14

Survey date: 20 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail	1	1	Prints	
Spotless crake		1		
North Island Fernbird	3	7		
Other observed bird species				
Swamp harrier, grey warbler, New Zealand fantail, eastern rosella, white-faced heron, tūī, peafowl, chaffinch, sacred kingfisher, pūkeko, spur-winged plover, Australian magpie, silvereye, song thrush, black shag, yellowhammer.				

Existing threats and impacts	
Pest animals	Rats.
Adventive plants	Willows.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Paparoa Road Inlet

Site number: 15

Survey date: 20 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Australasian bittern	1			
Spotless crake		1		
North Island fernbird		3		
Other observed bird species				
Grey warbler, pūkeko, shining cuckoo, chicken, sacred kingfisher, eastern rosella, tūī, common pheasant, black shag, New Zealand fantail, European goldfinch, chaffinch, Australian magpie, swamp harrier, silvereye, mallard, common starling.				

Existing threats and impacts	
Adventive plants	Willow, pampas.

Habitat quality: High

Site name: Wainui Wetland

Site number: 20

Survey date: 21 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Australasian bittern			Roosting site found	
Banded rail		1	Prints	Prints seen around mangroves.
Spotless crake		2		
North Island fernbird	2	4		
Other observed bird species				
Paradise shelduck, white-faced heron, common pheasant, shining cuckoo, California quail, North Island weka.				

Existing threats and impacts	
Reclamation/drainage	The stream draining into the head of the inlet has been channelised.
Pest animals	Rat.
Adventive plants	Gorse, pampas.

Habitat quality: High

Site appears to be in similar condition to previous survey.

Site name: Ouaki Creek

Site number: 21

Survey date: 21 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints	
North Island fernbird		2		
Other observed bird species				
Pūkeko, mallard, New Zealand fantail, white-faced heron, paradise shelduck, sacred kingfisher.				

Existing threats and impacts	
Reclamation/drainage	Drainage has been modified. A small culvert through the centre of the stopbank is the only means of tidal access to the upper inlet.
Stock	Stock have had access to wetland on eastern side as fences are not secure.

Habitat quality: Moderate

The quality has moved down from the 2010 survey from high to moderate as the food source in the upper inlet appears scarce and there is little bird sign.

Site name: Toritori Point

Site number: 22

Survey date: 6 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail		2	Prints	
Other observed bird species				
Mallard, white-faced heron, pūkeko, common pheasant, sacred kingfisher, chaffinch, Australian magpie, shining cuckoo, grey warbler, paradise duck.				

Existing threats and impacts	
Adventive plants	Gorse, buddleia, blackberry, grey willow.
Other	Appears to have insufficient food for marshbirds.

Habitat quality: Moderate

The habitat quality has decreased since 2010 as there appears to be little bird life and insufficient food such as crabs and shellfish in the mud. However, there is good habitat diversity and the dense mangroves provide ideal shelter.

Site name: Nukuhou River marshes

Site number: 23

Survey date: 31 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Australasian bittern	1			
Banded rail		4	Prints	
Spotless crake		2		
North Island fernbird	17	60		
Other observed bird species				
Pūkeko, white-faced heron, caspian tern, welcome swallow, sacred kingfisher, common pheasant, song thrush, chaffinch, swamp harrier, chicken, mallard, black shag, eastern rosella, Californian quail, North Island weka.				

Existing threats and impacts	
Pest animals	Rat, however, pests are actively managed by local care group.
Adventive plants	Willow, saltwater paspalum, gorse, pampas, blackberry.

Habitat quality: Outstanding

Site appears to be in similar condition to previous survey.

Site name: Nukuhou River riparian margins

Site number: 24

Survey date: 31 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
North Island fernbird	4	13		
Other observed bird species				
Eurasian blackbird, swamp harrier, yellowhammer, paradise shelduck, Californian quail, common pheasant, silvereye, grey warbler, welcome swallow, chaffinch, sacred kingfisher, European goldfinch.				

Existing threats and impacts	
Recreational	Whitebaiters frequent the area.

Habitat quality: Moderate

Habitat quality justification: The quality has moved down from the 2011 survey from high to moderate because even though there is a good terrestrial bird life only fernbirds from the five target marshbird species were present during the 2015 survey. White baiters also frequent the area.

Site name: Te Awawairoa Stream

Site number: 26

Survey date: 3 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints	
North Island fernbird	5	8		
Other observed bird species				
Sacred kingfisher, common pheasant, welcome swallow, white-faced heron, Caspian tern, North Island robin, Pūkeko, North Island weka.				

Existing threats and impacts	
Pest animals	Rat.
Adventive plants	Wattle, gorse, pampas, rank grasses, sea couch, blackberry, saltwater paspalum.
Stock	Stock have had access to upper part of wetland, however, the eastern part of the upper wetland is no longer grazed.
Reclamation/drainage	Drains present throughout wetland. Stopbank restricts tidal access to the bulk of wetland through small culvert. The stopbank around the culvert has collapsed and has eroded the bed to deep ponds either side of stopbank.
Public utilities	Power lines run across site.
Recreation	Track out to mud flats and track along stopbank.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Figure 16: Rat and banded rail prints sighted along a plank amongst the mangroves (site 26).

Site name: Papanui Road

Site number: 29

Survey date: 3 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints	Many prints through mangroves north of school.
North Island fernbird		2		
Other observed bird species				
Pūkeko, duck, song thrush, Eurasian blackbird, sacred kingfisher, North Island weka.				

Existing threats and impacts	
Pest animals	Rat.
Adventive plants	Honeysuckle, blackberry, pampas, sea couch, willow, wattle.
Rubbish	Litter in wetland south of road.
Other	Evidence of mangrove removal as well as frequently used track for access.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: State Highway 2 (overflow bridge)

Site number: 30

Survey date: 3 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail	2	2	Prints	Many prints.
North Island fernbird		19		
Other observed bird species				
Pūkeko, white-faced heron, North Island weka.				

Existing threats and impacts	
Stock	Small breach where stock have gotten past fencing.

Habitat quality: High

The quality has gone up from the previous surveys from moderate to high because of the large amount of good habitat for marshbirds and appears to have a large number of fernbirds and banded rail present.

Site name: Ruatuna Road embayment

Site number: 31

Survey date: 22 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
None				
Other observed bird species				
Pūkeko				

Existing threats and impacts	
Reclamation/drainage	Tidal entry is restricted to a culvert and the wetland is bordered by drains.
Stock	Stock have had access to parts of the wetland.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Pataua Island

Site number: 32

Survey date: 2 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail		2	Prints	Many prints throughout mangroves.
Other observed bird species				
Grey warbler, duck, sacred kingfisher, bellbird, New Zealand fantail, shining cuckoo, pūkeko, chicken, North Island weka, common pheasant.				

Existing threats and impacts	
Pest animals	Rat.
Adventive plants	Lots of wattles, willow, sea couch.
Rubbish	Lots of litter, household rubbish and bottles on perimeter and in wetland.
Recreation	Track adjacent to site and well used track out to Pataua Island.

Habitat quality: High

Site appears to be in similar condition to previous survey.

Site name: Ruatuna Road

Site number: 33

Survey date: 23 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints.	
North Island fernbird		1		
Other observed bird species				
Pūkeko, royal spoonbill, New Zealand fantail, white-faced heron, Eurasian blackbird, North Island weka.				

Existing threats and impacts	
Pest animals	Domestic pets.
Residential	Dwellings beside area.
Recreation	Recreational use, people looking for oysters, dinghy in saltmarsh, private jetties and tracks to harbour.
Other	Mangrove removal.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Ruatuna Road Inlet

Site number: 34

Survey date: 23 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints.	
Other observed bird species				
Mallard, New Zealand pigeon, sacred kingfisher, eastern rosella, pukeko, North Island weka.				

Existing threats and impacts	
Recreational	Private tracks and jetties to harbour from dwellings. Dinghy is stored on saltmarsh.
Residential	Dwellings nearby.
Pest animals	Domestic pets.
Adventive plants	Pampas, sea couch, wattle.
Rubbish	Litter.
Other	North Island weka have nests throughout the saltmarsh.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Pukeruru Point Inlet

Site number: 35

Survey date: 2 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail		4	Prints	
Spotless crake		2		
North Island fernbird	1	9		
Other observed bird species				
Pūkeko, welcome swallow, paradise ducks, kererū, tūī, house sparrow, sacred kingfisher, song thrush, Eurasian blackbird.				

Existing threats and impacts	
Adventive plants	Willow, privet, pampas, sea couch

Habitat quality: High

Site appears to be in similar condition to previous survey.

Site name: Ōhiwa Scenic Reserve Inlet

Site number: 36

Survey date: 2 November 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail	1	1	Prints	High volume of prints.
North Island fernbird	1	13		
Other observed bird species				
Kingfisher, tūī, Australian magpie.				

Existing threats and impacts	
Reclamation/drainage	Harbour connection is restricted through a culvert.
Rubbish	Litter.
Adventive plants	Garden escapes and green waste dumping in saltmarsh. Sea couch and pampas on margins.
Residential	Dwellings nearby.

Habitat quality: High

The quality has gone up from the previous surveys from moderate to high. This is because of large amount of banded rail prints present indicating many banded rail present.

Site name: Ōhiwa Loop Road Spit

Site number: 37

Survey date: 23 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints.	
Other observed bird species				
Tūī, sacred kingfisher, Australian magpie, New Zealand fantail, variable oystercatcher, black shag, spur-winged plover, eastern rosella, pukeko, chaffinch, European goldfinch, white-faced heron, North Island weka.				

Existing threats and impacts	
Stock	Cattle grazing nearby, stock fence across the marsh means there is no buffer between farmland and the harbour in a quarter of the area.
Adventive plants	Pampas, blackberry, saltwater paspalum, sea couch.
Residential	Dwellings nearby.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Reeves Road Inlet

Site number: 38

Survey date: 21 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints.	
Other observed bird species				
Pūkeko, song thrush, common pheasant, shining cuckoo, New Zealand fantail, silvereye, Australian magpie, swamp harrier, welcome swallow, Californian quail, grey warbler, sacred kingfisher, paradise shelduck, southern black-backed gull,white-faced heron, mallard, North Island weka.				

Existing threats and impacts	
Rubbish	Litter.
Stock	Stock have access to saltmarsh as fences are not secure.
Adventive plants	Pampas, willow, sea couch, saltwater paspalum.
Harmful water discharges	Freshwater stream shows signs of runoff from farming.

Habitat quality: Moderate

Site appears to be in similar condition to previous survey.

Site name: Uretara Island Scenic Reserve

Site number: 39

Survey date: 22 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Australasian bittern				
Banded rail		1	Prints	
Spotless crake			Prints	
North Island fernbird	9	42		
Other observed bird species				
New Zealand fantail, shining cuckoo, tūī, grey warbler, Eurasian blackbird, New Zealand pigeon, eastern rosella, Chaffinch, European goldfinch, song thrush, North Island weka, southern black-backed gull, sacred kingfisher, common pheasant.				

Existing threats and impacts	
Rubbish	Lots of litter at high tide mark.
Adventive plants	Saltwater paspalum, sea couch, wattle, gorse.

Habitat quality: High

Site appears to be in similar condition to previous survey.

Site name: Motuotu Island Nature Reserve

Site number: 40

Survey date: 27 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Australasian bittern				
Banded rail	1		Prints	One flushed
North Island fernbird	11	8		
Other observed bird species				
Variable oystercatchers, red-billed gull, grey warbler, white-faced heron.				

Existing threats and impacts	
Rubbish	Litter.
Adventive plants	Pampas, gorse, rank grasses, sea couch.

Habitat quality: High

Site appears to be in similar condition to previous survey.

Site name: Whangakopikopiko Wildlife Refuge Reserve

Site number: 41

Survey date: 23 October 2015

Surveyed birds				
Species	**Seen**	**Heard**	**Sign**	**Notes/comments**
Banded rail			Prints	Observed on southern end.
North Island fernbird	13	5		
Other observed bird species				
Pūkeko, southern black-backed gull, northern New Zealand dotterel, variable oystercatcher, red-billed gull, North Island weka.				

Existing threats and impacts	
Adventive plants	Sea couch, large area of saltwater paspalum.
Recreational	People often visit the island.
Other	Erosion on northern side.

Habitat quality: High

Site appears to be in similar condition to previous survey.

Figure 17: High volume of banded rail prints showing lots of activity (site 11)

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Appendix 3 – Bird species recorded in Ōhiwa Harbour

Common name	Māori name	Scientific name	Threat status (based on Robertson et al., 2013)
Australasian bittern	Matuku	*Botaurus poiciloptilus*	Nationally endangered
Australian magpie		*Gymnorhina tibicen*	Introduced and naturalised
Banded rail	Moho-pererū	*Gallirallus philippensis assimilis*	Declining
Bellbird	Korimako	*Anthornis melanura melanura*	Not threatened
Black shag	Kawau	*Phalacrocorax carbo novaehollandiae*	Naturally uncommon
Californian quail		*Callipepla californica*	Introduced and naturalised
Caspian tern	Taranui	*Hydroprogne caspia*	Nationally vulnerable
Chaffinch		*Fingilla coelebs*	Introduced and naturalised
Chicken		*Gallus domesticus*	
Common pheasant		*Phasianus colchicus*	Introduced and naturalised
Common starling		*Sturnus vulgaris*	Introduced and naturalised
Eastern rosella		*Platycercus eximius eximius*	Introduced and naturalised
Eurasian blackbird		*Turdus merula*	Introduced and naturalised
European goldfinch		*Carduelis carduelis bitannica*	Introduced and naturalised
Grey warbler	Riroriro	*Gerygone igata*	Not threatened
House sparrow		*Passer domesticus domesticus*	Introduced and naturalised
Mallard		*Anas platyrhynchos*	Introduced and naturalised
Northern New Zealand dotterel	Tūturiwhatu	*Charadrius obscurus aquilonius*	Nationally vulnerable
Sacred kingfisher	Kōtare	*Todiramphus sanctus vagans*	Not threatened
New Zealand pigeon	Kererū	*Hemiphaga novaeseelandiae*	Not threatened
New Zealand fantail	Pīwakawaka	*Rhipidura fuliginosa placabilis*	Not threatened
North Island fernbird	Mātātā	*Bowdleria punctata vealeae*	Declining
North Island robin	Toutouwai	*Petroica longipes*	Not threatened
North Island weka	Weka	*Gallirallus australis greyi*	Nationally vulnerable
Paradise shelduck	Pūtangitangi	*Tadorna veriegata*	Not threatened
Peafowl		*Pavo cristatus*	Introduced and naturalised
Pūkeko	Pūkeko	*Prophyrio melanotus melanotus*	Not threatened
Red-billed gull	Tarāpunga	*Larus novaehollandiae scopulinus*	Nationally vulnerable
Royal spoonbill	Kōtuku ngutupapa	*Platalea regia*	Naturally uncommon
Shining cuckoo	Pīpīwharauroa	*Chrysococcyx lucidus lucidus*	Not threatened
Silvereye	Tauhou	*Zosterops lateralis lateralis*	Not threatened
Song thrush		*Turdus philomelos clarkei*	Introduced and naturalised
Southern black-backed gull	Karoro	*Larus dominicanus dominicanus*	Not threatened
Spotless crake	Pūweto	*Porzana tabuensis plumbea*	Relict
Spur-winged plover		*Vanellus miles novaehollandiae*	Not threatened

Common name	Māori name	Scientific name	Threat status (based on Robertson et al., 2013)
Swamp harrier	Kāhu	*Circus approximans*	Not threatened
Tūī	Tūī	*Prosthemadera novaeseelandiae novaeseelandiae*	Not threatened
Variable oystercatcher	Tōrea	*Haematopus unicolor*	Recovering
Welcome swallow	Warou	*Hirundo neoxena neoxena*	Not threatened
White-faced heron	Matuku-moana	*Egretta novaehollandiae*	Not threatened
Yellowhammer		*Emberiza citrinella caliginosa*	Introduced and naturalised