GONE TO THE BIRDS?

A survey of land-based birdlife on the

Mangemangeroa Reserve and the effect of replantings

Undertaken by Ethan McCormick

as his ScienceFair Project

while at Somerville Intermediate

2014

INTRODUCTION

The Mangemangeroa Reserve is a unique estuary reserve in Howick which runs along the estuary foreshore from Shelly Park to Hayleys Lane. Walkways have been set up along the reserve through a wide range of habitats from coastal established forest, regenerating bush, farmland through to mangrove estuaries and wetlands.

The valley was initially occupied by the Ngai Tai Maori and was well established with bush that contained kauri as well as taraire, kohekohe, totara and kanuka. The birdlife would have been much the same as today but with kiwi, weka, kaka, kakapo, saddlebacks, eagles and small moa. The land was first owned by Europeans in 1837 and was farmed from 1870 until Archie Somerville died in 1992.

In 1994 Manukau City Council purchased the land at the request of The Forest and Bird Society and a restoration planting program has been underway ever since. In 2002 The Friends of the Mangemangeroa Society was formed and helped to put in place a 20 year restoration plan. This involves restoring bush with eco-sourced plants and protecting the ancient forest with edge plantings to provide a barrier against weeds, wind damage and erosion. Further plantings also reduce the amount of farmland. The many habitats bring a range of birdlife species into the reserve. A survey by Reverend Bruce Keeley in 2005 recorded 15 land based bird species amongst a list of 20 of the most numerous species on the reserve. Now in 2014, with 14 years of replanting completed the bush is regenerating well. The birdlife appears to be thriving , however no research has been done on bird numbers since 2005.

I wanted to know what the birdlife was like now. I researched the plant life and habitats of the reserve and decided to survey 3 different areas, to see how the different habitats affected birdlife. I also wanted to see whether the replanted areas showed any differences or effects on birdlife. Bird counts would give an idea of the range (diversity) and numbers (abundance) of bird species in each area and across the whole reserve. Area 1 consists of existing ancient forest and runs from the mangrove boardwalk south towards Shelly Park. This area is dense with mature trees and leaf litter. Area 2 covers the area below Archie's Lookout and is a more open area consisting of some mature trees and established replanted bush bordering the farmland. Replantings are up to 10 years old. Area 3 is newly planted (2013-2014) and runs towards Hayleys Lane from the Whitford Bridge. This area is also quite open and borders the estuary wetlands and Whitford farmland. I also researched bird count

methods and found that the Five Minute Bird Count (5MBC) method was the best and easiest to do.

Mangemangeroa History (Maori)

In the Mangemangeroa valley there were many paa (fortified villages) which were inhabited by the Ngai Tai people. Their villages were quite close together and there was a wide range of forest and marine food for them on the reserve.

The word Mangemangeroa means 'valley of mangemange' in maori. This is a tall tree fern that was used by the maori to make whare (huts) and hinaki (eel traps). It was also very soft (known as bushman's mattress) and they would use it as pillows and to bury their dead in.

There was quite a lot of kauri in the area and lumps of kauri gum have even been seen floating down the estuary at high tide today. Taraire, kahikatea, totara and kanuka were also commonly found.

The birdlife in the area included NZ wood pigeon (kereru), tui, bellbird, kiwi, weka, kaka, pukeko and small moa. There would also have been kakapo, kokako, saddlebacks, harriers and eagles. The estuary birdlife would have been much the same as today but a lot more common. There was plenty of marine life and in late summer sharks would breed in the estuary.

(Reference: 'Maori history of the Mangemangeroa' by Alan La Roche)

Mangemangeroa History (European)

The first European visit in the area was by Edwin Fairburn in 1837 whose family had set up a mission in Maraetai. Later the maori insisted that he should buy the land to help prevent intertribal warfare. After the Treaty of Waitangi, Fairburn was given land at Otahuhu and Maraetai by the government, in exchange for his land. The maori were then paid by the government for their land and relocated to land near the Wairoa River. The government then subdivided the land and it was sold for one pound an acre.

William McAuley and Peter Searles were two retired fencibles who bought two adjacent lots on what is now the Mangemangeroa Reserve. They farmed the land for about 20 years until McAuley sold his land to the Somervilles in about 1870. The Somervilles started dairy farming rather than growing oats, wheat and hay which was a problem in Auckland's humid climate. They used the land for drystock and sheep as there was not a good water supply.

Archie Somerville was the last of the family to farm the land. When he died in 1992 the land from his estate was bought by Manukau City Council.

(Reference: 'History of the Mangemangeroa Reserve' by Alan La Roche)

QUESTION

What is the birdlife like on the Mangemangeroa Reserve and what effect has the replanting had?

AIM

To survey and compare birdlife in different areas of the Mangemangeroa Reserve and investigate the effect of replanting on birdlife.

Equipment

Binoculars	Bird survey sheets (x27)
Pen	Camera
Clipboard	NZ Flora/fauna app
GPS/Phone	labelled marker pegs for areas

Variables

Independent Variables:

- The area of the reserve that is being surveyed (exisiting forest, established replantings, newly planted).

Dependent Variables:

- The number of birds observed at each count station in each area (seen or heard in a 5 minute period).

Controlled Variables:

- Weather (wind, temperature, sun, rain)
- Time of day
- The observer

Variables were controlled by surveying on similar days and weather conditions. Surveys were conducted at the same time of day over 3 days using the same observer.

METHOD

- Find areas to survey
- Use GPS or distance counter app to mark out 3 stations in each area approximately 200m apart
- Use labelled marker pegs to mark each count station
- Follow the timetable format to organise 3 time slots for each count station and area to survey over 3 days of similar weather

DAY ONE	Area1 9am 1A 9.15am 1B 9.30am 1C	Area3 12pm 3A 12.15pm 3B 12.30pm 3C	Area 2 3pm 2A 3.15pm 2B 3.30pm 2C
DAY TWO	Area3 9am 3A 9.15am 3B 9.30am 3C	Area2 12pm 2A 12.15pm 2B 12.30pm 2C	Area1 3pm 1A 3.15pm 1B 3.30pm 1C
DAY THREE	Area2 9am 2A 9.15am 2B 9.30am 2C	Area1 12pm 1A 12.15pm 1B 12.30pm 1C	Area3 3pm 3A 3.15pm 3B 3.30pm 3C

Area1=Existing Forest Area2= Established replanted
Area3= newly planted

- For each area use the Five Minute Bird Count (5MBC) Standard Data Field Form and record:
    - Observer name
    - Date
    - General location (Mangemangeroa)
    - Specific location (area)
    - Station Number

- Grid references (GPS coordinates)
- Start time (24 hour)
- Temperature
- Wind
- Other noise
- Sun
- Precipitation (type and value)

- Begin survey using timer on mobile phone. Record birds by species seen and heard in the appropriate column. Use binoculars and bird identification book to identify birds.
- Do not record birds seen flying high overhead. Record birds seen entering and leaving the survey area. Do not count the same bird twice but if a bird is heard then seen it should
  be included in the appropriate columns.
- Stop survey after timer reaches 5 minutes.
- Tally survey results

Survey Locations:

RESULTS

Tables showing results of 5MBC as mean numbers of birds counted per area

Mean number of birds counted at each station in Area 1				
Species	**1A**	**1B**	**1C**	**Mean**
Tui	8	6	5	6
Sparrow	4	2	2	3
Rosella	2	1	3	2
Blackbird	2	1	1	1
Fantail		1	3	1
Grey Warbler	1	1	1	1
Kereru	1	2		1
Kingfisher	1			1
Myna		1		1
Dove	1	1		1
Silvereye	1		1	1
Song thrush		1	1	1

Area 1 = existing forest

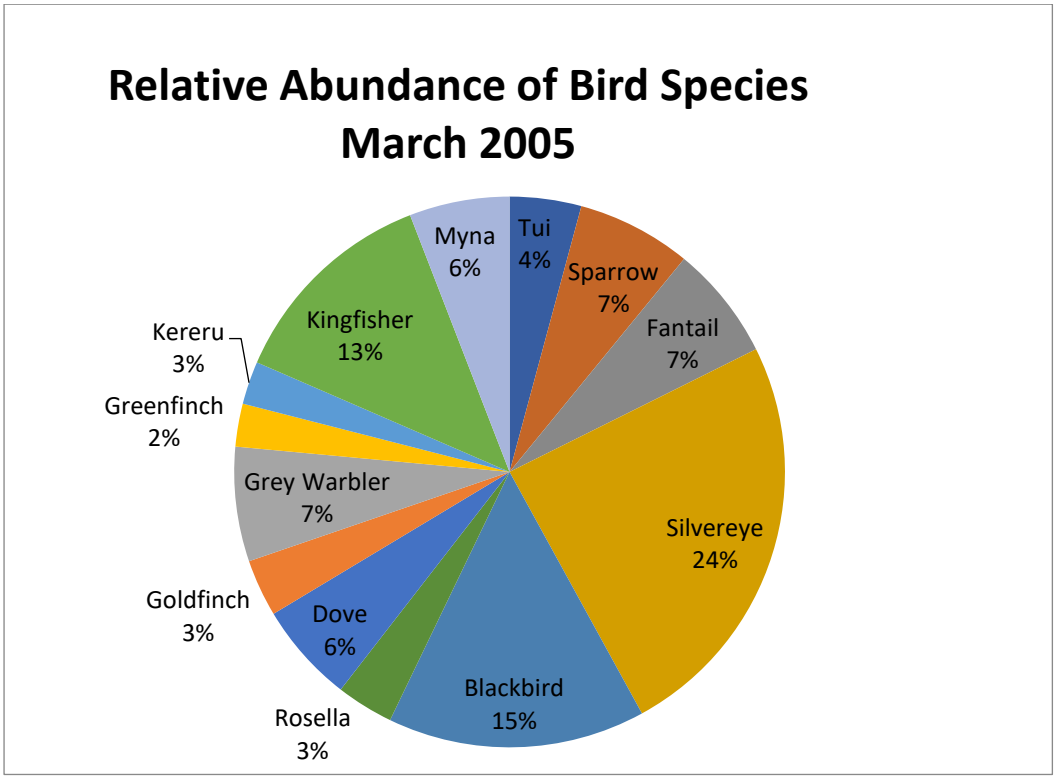
Mean number of birds counted at each station in Area 2				
Species	**2A**	**2B**	**2C**	**Mean**
Starling	6	22	12	13
Fantail	2	2	5	3
Sparrow	2	3	3	3
Silvereye	3	2	2	2
Tui	1	5	1	2
Goldfinch	4	1		2
Blackbird		1		1
Dove	1	1	1	1
Kereru	1			1
Kingfisher	1	1	1	1
Myna	1	1	1	1
Pheasant			1	1
Song thrush	1	1	1	1
Grey Warbler		1	1	1
Rosella	1	1		1
Skylark	1	1		1
Swallow	1		1	1

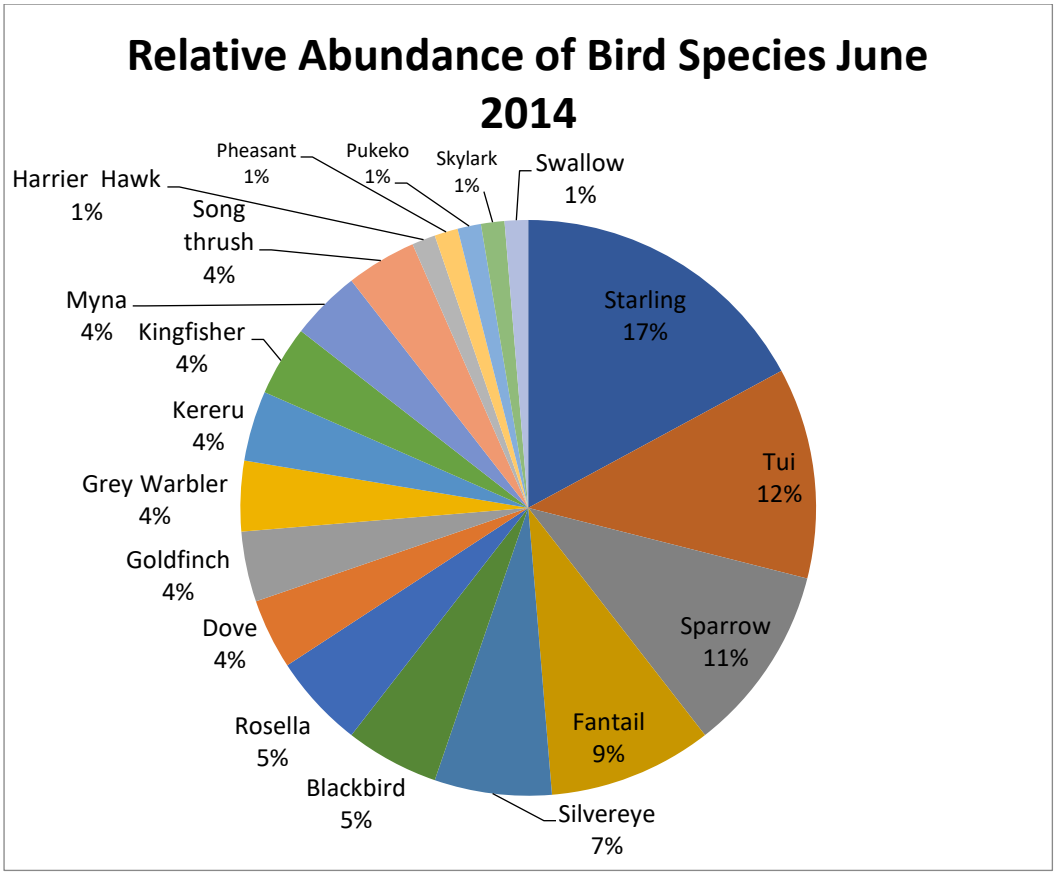
Area 2 = established replantings

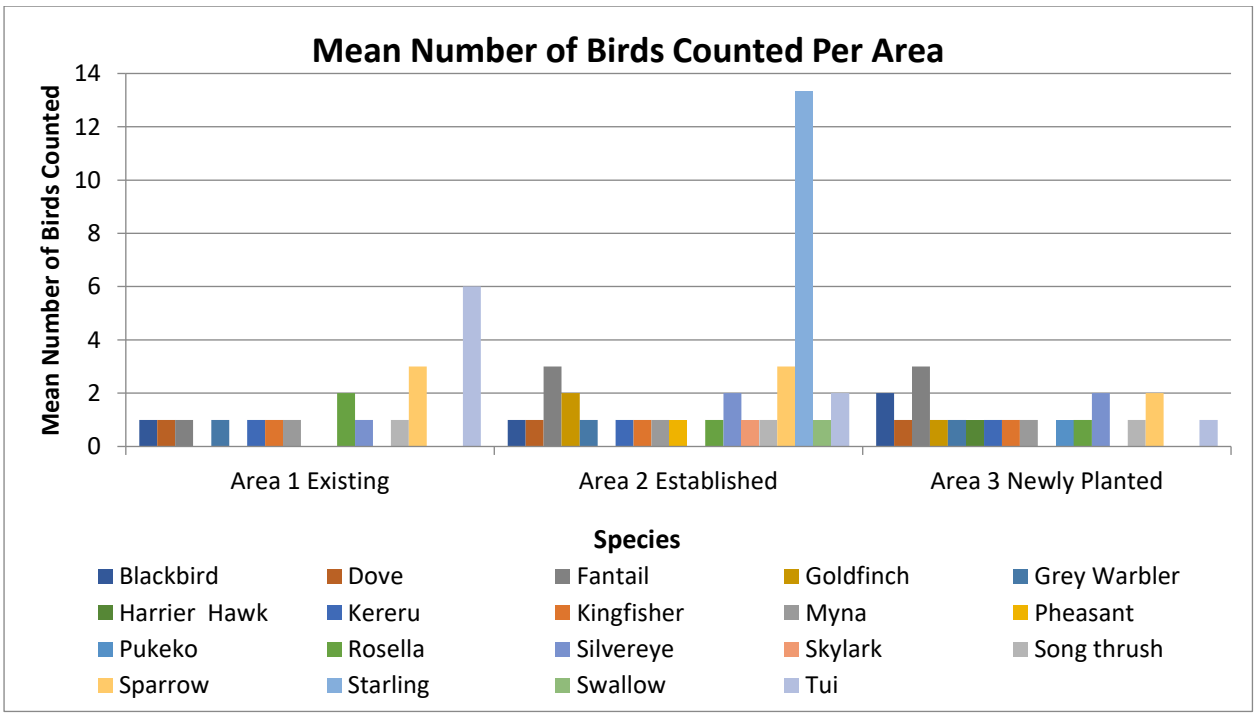
Mean number of birds counted at each station in Area 3				
Species	**3A**	**3B**	**3C**	**Mean**
Fantail	3	4	1	3
Blackbird	2	1	2	2
Silvereye	1	2	2	2
Sparrow	1	3	1	2
Pukeko	1	3		1
Dove	1			1
Grey Warbler	2	1		1
Harrier Hawk			1	1
Kereru			1	1
Myna		1	2	1
Song thrush	1	1	1	1
Tui	1	1	1	1
Goldfinch	1		1	1
Kingfisher	1	1		1
Rosella		1	1	1

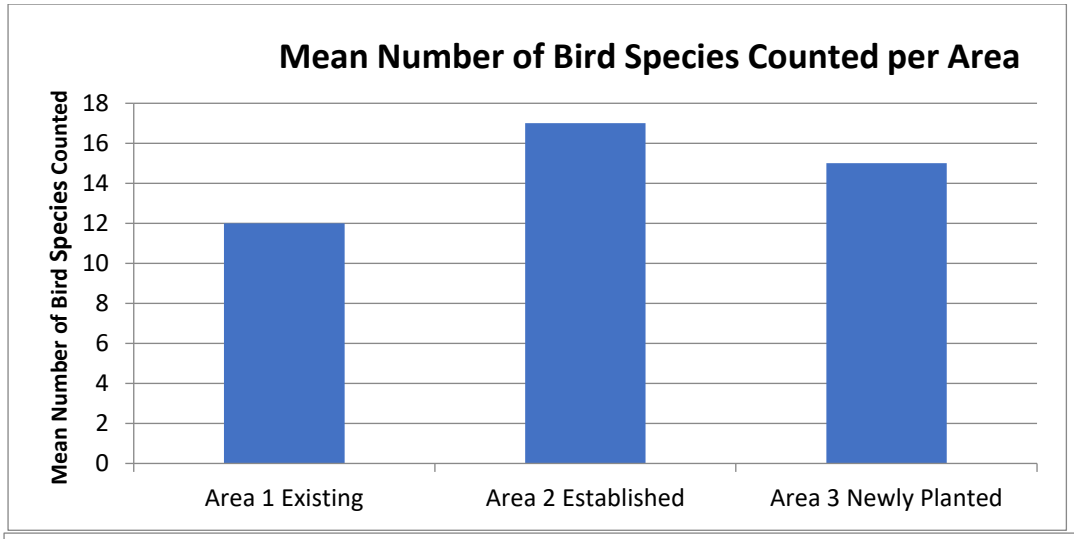
Area3 = newly planted

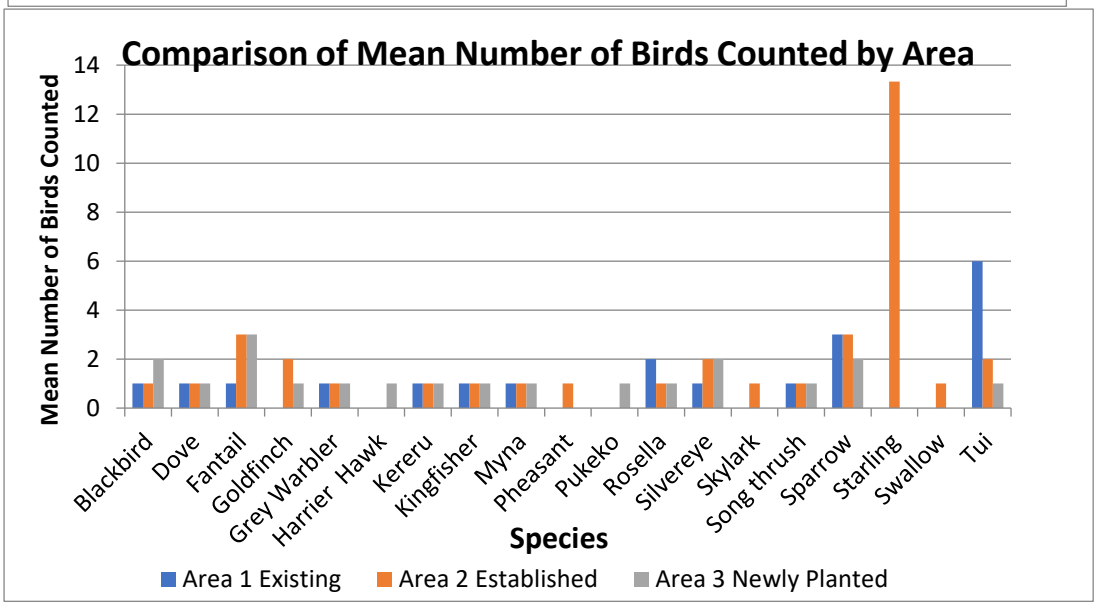
Graphs:

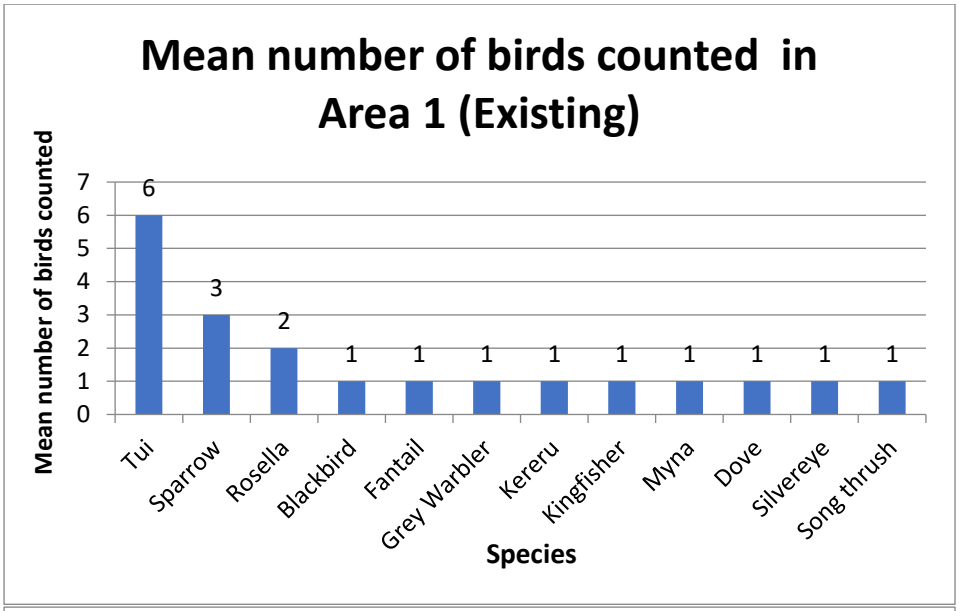

Relative Abundance of Bird Species
March 2005
Tui
4%
Sparrow
7%
Fantail
7%
Silvereye
24%
Blackbird
15%
Rosella
3%
Dove
6%
Goldfinch
3%
Grey Warbler
7%
Greenfinch
2%
Kereru
3%
Kingfisher
13%
Myna
6%

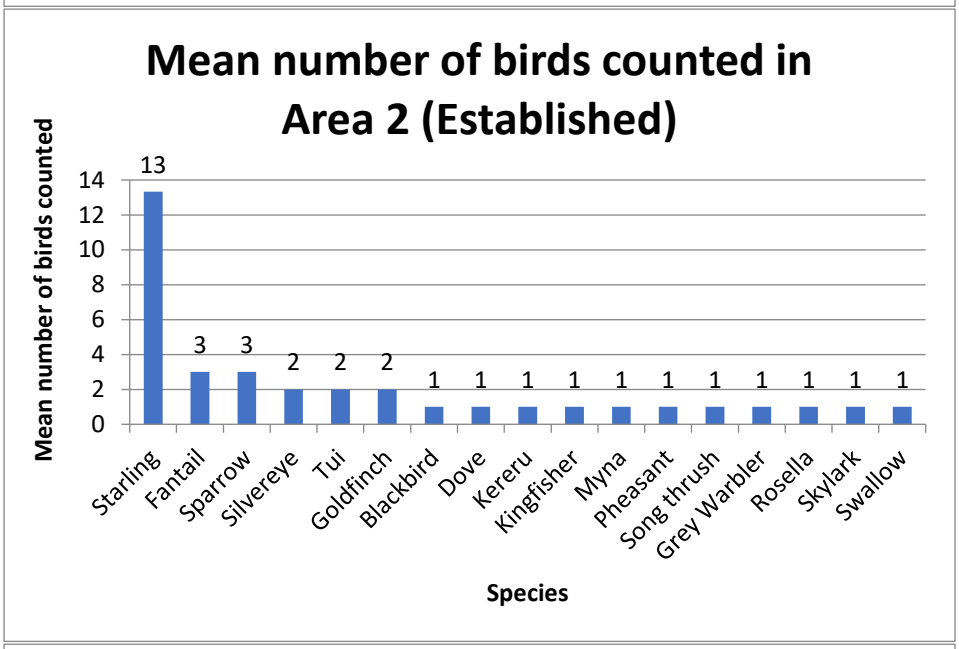

Relative Abundance of Bird Species June 2014
Starling 17%
Tui 12%
Sparrow 11%
Fantail 9%
Silvereye 7%
Blackbird 5%
Rosella 5%
Dove 4%
Goldfinch 4%
Grey Warbler 4%
Kereru 4%
Kingfisher 4%
Myna 4%
Song thrush 4%
Harrier Hawk 1%
Pheasant 1%
Pukeko 1%
Skylark 1%
Swallow 1%

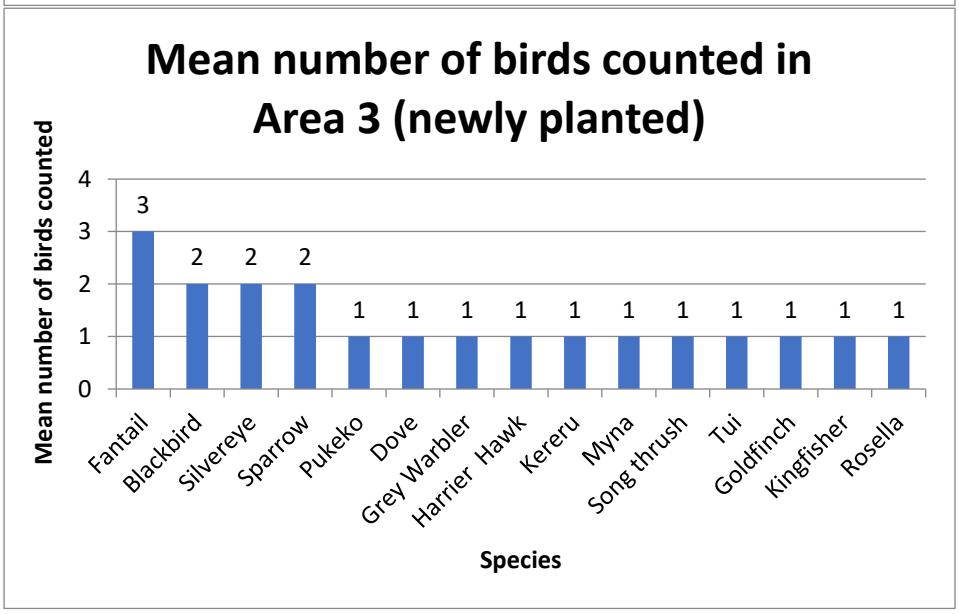

Mean Number of Birds Counted Per Area
Mean Number of Birds Counted
14
12
10
8
6
4
2
0
Area 1 Existing
Area 2 Established
Area 3 Newly Planted
Species
Blackbird
Dove
Fantail
Goldfinch
Grey Warbler
Harrier Hawk
Kereru
Kingfisher
Myna
Pheasant
Pukeko
Rosella
Silvereye
Skylark
Song thrush
Sparrow
Starling
Swallow
Tui


Mean Number of Bird Species Counted per Area
Mean Number of Bird Species Counted
18
16
14
12
10
8
6
4
2
0
Area 1 Existing
Area 2 Established
Area 3 Newly Planted


Comparison of Mean Number of Birds Counted by Area
Mean Number of Birds Counted
14
12
10
8
6
4
2
0
Blackbird
Dove
Fantail
Goldfinch
Grey Warbler
Harrier Hawk
Kereru
Kingfisher
Myna
Pheasant
Pukeko
Rosella
Silvereye
Skylark
Song thrush
Sparrow
Starling
Swallow
Tui
Species
Area 1 Existing
Area 2 Established
Area 3 Newly Planted


Mean number of birds counted in Area 1 (Existing)
Mean number of birds counted
0
1
2
3
4
5
6
7
6
3
2
1
1
1
1
1
1
1
1
1
Tui
Sparrow
Rosella
Blackbird
Fantail
Grey Warbler
Kereru
Kingfisher
Myna
Dove
Silvereye
Song thrush
Species


Mean number of birds counted in Area 2 (Established)
Mean number of birds counted
0
2
4
6
8
10
12
14
13
3
3
2
2
2
1
1
1
1
1
1
1
1
1
1
1
Starling
Fantail
Sparrow
Silvereye
Tui
Goldfinch
Blackbird
Dove
Kereru
Kingfisher
Myna
Pheasant
Song thrush
Grey Warbler
Rosella
Skylark
Swallow
Species


Mean number of birds counted in Area 3 (newly planted)
Mean number of birds counted
0
1
2
3
4
3
2
2
2
1
1
1
1
1
1
1
1
1
1
1
Fantail
Blackbird
Silvereye
Sparrow
Pukeko
Dove
Grey Warbler
Harrier Hawk
Kereru
Myna
Song thrush
Tui
Goldfinch
Kingfisher
Rosella
Species

CONCLUSION

These results show that the numbers or diversity of land-based species in the reserve has increased particularly in the replanted areas. This appears to be due to the more diverse habitats that the replantings have provided. The different habitats also affect the spread of some species as some prefer particular habitats over others due to plants, food or terrain. The relative abundance of some birds appears to have changed since 2005 and starlings, tuis, sparrows, and fantails appear to be a lot more common. Kereru and rosella are also slightly more common.

This project shows that the hypothesis that the numbers of bird species will have increased is correct. It is difficult to say that the number of birds has increased overall due to different survey methods however some birds such as starlings, tuis, sparrows, fantails kereru and rosella are more common.

APPLICATIONS

Feedback from Alan La Roche has been that my surveys have “identified accurately an increase in both the diversity and the relative numbers of birds. This is a most satisfactory result scientifically recorded.” Reverend Bruce Keeley suggested in his feedback that a team could be developed to maintain consistent surveys over the years. My results could be used by The Friends of the Mangemangeroa Society to indicate the number of land-based birds within the reserve in 2014. They have also given the Friends a method to which they can do more surveys in the future to monitor bird numbers and the effects of replanting.

ACKNOWLEDGEMENTS

A big thankyou to Sally Barclay and Reverend Bruce Keeley (Friends of the Mangemangeroa Society) for information on plantings, guidance and feedback on surveys. Also to Alan La Roche MBE (Howick Historian) for information on local history and feedback. Without your help my project would not have been possible.

REFERENCES

- www.mangemangeroa.org.nz
- Mangemangeroa Reserve Walk Guide by Sally Barclay
- 'The History of the Mangemangeroa Reserve', Alan La Roche MBE.
- 'Maori History of the Mangemangeroa valley', Alan La Roche MBE.
- Somerville (Mangemangeroa) Reserve Draft Management Strategy, Appendix1.
- 'The Birds of the Mangemangeroa Reserve' by Bruce R Keeley.
- Five Minute Bird Count Standard Data Field Form
- www.nzbirdsonline.org.nz
- www.doc.govt.nz (5MBC)
- 'Baseline survey of the diversity, abundance and distribution of birds in Wellington City reserves ',N McArthur, S Moylan and P Crisp.
- 'Monitoring birds in the Rimutaka Forest Park', Ian Armitage, www.rimutakatrust.org.nz
- 'Monitoring the impacts of vertebrate pest control operations on non-target wildlife species', Spurr and Powesland.
- Mangemangeroa Valley Walkway, Auckland Council.
- NZ Fauna and Flora (an app) by kiwipedia
- 'Greys Folly', Alan La Roche MBE.
- www.aerolink.co.nz
- www.naturespace.org.nz