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The Effect of a Translocation on a Source Population Using North Island Robins as a Case Study.

A thesis presented in partial fulfilment of the requirements for the degree of

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in
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Errata Sheet

Corrections and amendments to pages 7, 30, 50, 53 and 75.

Page 7: “There are approximately 2-3 birds/ha with about 2 pairs/ha”. The line should read only: *There are approximately 2-3 birds/ha.*

Page 30: “Based on 500 bootstrap data sets, the global model $\{\phi(a*y + s*y + p), p(a*y + s*y + p)\}$ appears to fit the data ($P = 0.14$)”. *The value of $P = 0.14$ means that, under the assumptions of the model, the probability of a deviance as large or greater than the observed value (269.716, Table 2.2) is approximately 0.14. This is well above an α level of 5% (0.05), so it is reasonable to assume that the data set meets the assumptions of the model.*

Page 50: Paragraph 3. For adult survival the β value should read $\beta = 3.92$. For juvenile survival the formula should read $\beta = 4.07 - 0.87P$.

Page 53, Table 3.1: The row “Intercept (β value) for juvenile survival” should read as follows:

Parameter	Worst value (Lower 95% confidence interval)	Predicted values	Best values (Upper 95% confidence interval)
Intercept (β value) for juvenile survival	2.95	4.07	5.19

Page 75: Methods, first sentence. Reference to Appendix C should be *D*.

Abstract

This thesis aims to assess the effects of a translocation on a source population. In 1999, 21 North Island robins (*Petroica australis longipes*) were translocated from Tiritiri Matangi Island (Hauraki Gulf) to Wenderholm Regional Park (north of Auckland). Previous research on Tiritiri Matangi Island suggested that the population was limited to about 60 birds by the available habitat. There was high (about 75%) juvenile mortality each year, and the number of juveniles surviving closely matched the number of adults dying. It was therefore hypothesised that juvenile survivorship was density dependent, and that a portion of the population could thus be removed each year with little impact. The translocation was designed as an experimental reduction in density to test this hypothesis.

Survival was modelled using by mark-recapture analysis, and suggested that density dependence was present in the Tiritiri Matangi population. Survival of juvenile robins was correlated with the number of pairs present in the population during the breeding season they were produced. Population viability analysis (PVA) suggested that the Tiritiri Matangi robin population was not affected detrimentally by the removal of 21 birds for translocation, with a 0% probability of extinction within the next 20 years. The PVA indicated around 3 years was required for the population to recover to an equilibrium of around 65 birds. A sensitivity analysis suggested that even if all the parameters are overestimated, the probability of extinction of the Tiritiri Matangi population within 20 years was still low (1.3% for a worst-case scenario).

PVA indicated that the Wenderholm population had a high probability of extinction, but this may be an artefact of the translocation. This PVA was based on only one year of data, and therefore had a high degree of uncertainty. It nevertheless suggested that juvenile recruitment was a key factor limiting population survival; hence the viability of the population could be improved by identifying and managing threats to juvenile survival.

I investigated the viability of different harvesting regimes for the Tiritiri Matangi population. Annual, biennial and triennial harvesting indicated around 100, 90 and 80 birds

respectively, could be removed over 6 years resulting in a 5% probability of extinction within 20 years. The model indicated that harvesting the population to as few as 4 pairs was possible, and would result in an extinction probability of 0% within 100 years. This would take about 10 years to recover from.

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Contents

Title page.....	i
Abstract.....	ii
Acknowledgements.....	iv
Table of Contents.....	vi
List of Figures.....	ix
List of Tables.....	x
Chapter 1 Introduction.....	1
Translocations.....	2
North Island robins.....	3
Tiritiri Matangi Island.....	7
Wenderholm Regional Park.....	9
Objectives of Thesis.....	10
References.....	11
Chapter 2 Density Dependence and Juvenile Survival.....	15
Introduction.....	15
Methods.....	17
Field methods.....	17
The translocation.....	19
Analysis.....	21
Modelling survival.....	21
Model selection.....	24
Goodness of fit.....	24
Akaike's Information Criterion (AIC).....	25
Resighting probability.....	26
Survival probability.....	26
Results.....	29

Goodness of fit.....	30
Resighting probability.....	32
Survival probability.....	33
Discussion.....	36
Resighting probability.....	37
Survival probability.....	37
Summary.....	40
References.....	41
Chapter 3 Population Viability Analysis.....	45
Introduction.....	45
Methods.....	47
The translocation.....	47
Population modelling.....	48
Simulation of the Tiritiri Matangi population.....	49
Simulation of the Wenderholm population.....	54
Costs of reintroduction.....	58
Results.....	58
The Tiritiri Matangi population.....	58
The Wenderholm population.....	61
The cost of reintroduction.....	62
Discussion.....	62
The Tiritiri Matangi population.....	62
The Wenderholm population.....	63
The cost of reintroduction.....	67
Summary.....	69
References.....	69
Chapter 4 Harvesting.....	73
Introduction.....	73
Methods.....	75
Results.....	77

Discussion.....	81
Highest one-off harvest.....	81
Harvesting regimes.....	82
Lowest population to harvest to.....	83
Summary.....	84
References.....	84
Chapter 5 Summary and Conclusions.....	86
Density dependence.....	87
Tiritiri Matangi.....	88
Wenderholm.....	88
Harvesting.....	89
References.....	91
Appendices.....	93
Appendix A: Covariates for the model (trunc J).....	93
Appendix B: Tiritiri Matangi program.....	94
Appendix C: VORTEX 8.41 input values for Wenderholm.....	101
Appendix D: Harvesting subroutine.....	102

List of Figures

Figure 1.1.	Map showing locations of Tiritiri Matangi Island and Wenderholm Regional Park in the North Island, New Zealand.....	2
Figure 1.2.	North Island robin (<i>Petroica australis longipes</i>) feeding chick in nest.....	5
Figure 1.3.	Tiritiri Matangi Island showing forest fragments where robins have held long-term territories.....	8
Figure 2.1.	Locations of paired adult, unpaired adult and juvenile North Island robins removed from Tiritiri Matangi Island for translocation to Wenderholm Regional Park.....	20
Figure 2.2.	The Cormack-Jolly-Seber (CJS) model.....	22
Figure 2.3.	Formula used to calculate the value for the covariates used in the design matrix of the model $\{\phi (a + \text{trunc } J + p) p (a*y + p)\}$	28
Figure 2.4.	Survival probabilities (a) and resighting probabilities (b) for North Island robins on Tiritiri Matangi Island.....	31
Figure 3.1.	Trajectories of real and simulated robin populations on Tiritiri Matangi from 1994 to 1998 starting with 12 females and 23 males.....	59
Figure 3.2.	Simulated number of birds present in the Tiritiri Matangi robin population for 20 years after the translocation from the population.....	60
Figure 3.3.	Probability of the Wenderholm population going extinct within 20 years of reintroduction over a range of adult and juvenile survival probabilities...	61
Figure 4.1.	Trajectories of the real and the simulated robin populations on Tiritiri Matangi from 1994 to 2000, starting with 12 females and 23 males.....	77
Figure 4.2.	Simulated number of robins present on Tiritiri Matangi before and after a harvest of 42 adults.....	78
Figure 4.3.	Simulations of the Tiritiri Matangi robin population over three harvesting regimes (a) annual (b) biennial (c) triennial.....	79
Figure 4.4.	Reduction in extinction probabilities predicted by the Tiritiri Matangi model when the starting population, in numbers of pairs, is increased.....	80
Figure 4.5.	Simulated growth of the Tiritiri Matangi Population when the population starts at 8 birds (4 males and 4 females).....	80

List of Tables

Table 2.1.	Breeding North Island robin population (minimum number alive) on Tiritiri Matangi Island for the first 9 years after reintroduction.....	29
Table 2.2.	Models for resighting probability of North Island robins on Tiritiri Matangi Island.....	33
Table 2.3.	Models for survival probability of adult and juvenile North Island robins on Tiritiri Matangi Island.....	34
Table 2.4.	Monthly juvenile survival and the probability of juveniles surviving until September for years 1993 – 2000.....	35
Table 2.5.	Models for survival probability of North Island robins on Tiritiri Matangi Island, incorporating explanations for yearly variation in juvenile survival.....	36
Table 3.1.	Parameter values for the Tiritiri Matangi Island robin population.....	53
Table 3.2.	Estimates of adult survival, juvenile survival and reproduction rate in robin populations.....	57
Table 3.3.	Values over which the three parameters (adult and juvenile survival and reproduction rate) were varied.....	58
Table 3.4.	Expected population sizes +/- 1 standard deviation for the Tiritiri Matangi robin population 20 years after the translocation.....	60
Table A.1.	Calculated values for the covariates used in MARK for the truncation model.....	93
