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**The Feeding and Breeding Ecology of Little Blue  
Penguins (*Eudyptula minor*) from Tiritiri Matangi  
Island, New Zealand**

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

Master of Science in Conservation Ecology.

Massey University, Auckland.

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2006

***Arara te manu whakarongo tipuna, te manu nei a te kororā***

***Kororā-ā-uta, kororā-ā-tai***

***Kowhetewhete māi o ngutu***

***Nau na Tane, naku na Tane***

***Hui e taiki e***

Listen attentively for it is the bird that converses with our ancestors

This bird the blue penguin

The *land* blue penguin, the *sea* blue penguin

Your lips are murmuring to us

You are of Tane and we are of Tane

Bind us together

Let it be so!

(By Laurie Porima and Jacqueline Courts)



*Finding the connection between the land and the sea*

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## Abstract

At present the New Zealand populations of Little Blue Penguins (LBP: *Eudyptula minor*) are classified as 'Threatened' and in 'Gradual Decline' by the Department of Conservation. Effective conservation management of the North Island sub-species requires an understanding of the factors affecting their survival and breeding success. There is little information on the breeding ecology of the *E. minor*, especially in the North Island of New Zealand. The overall goal of this study was to establish baseline data on a North Island population of LBP in New Zealand. The aims of this study were to 1) identify population demographics, 2) quantify breeding success and identify abiotic and biotic parameters influencing nesting success, 3) identify feeding ecology based on diet and trophic level assessment, and 4) identify cause of death and underlying patterns associated with mass mortalities of the LBP species. Breeding success was quantified by monitoring the nesting activity of 87 nesting attempts during the 2005/06 breeding season. Nest monitoring also involved identifying risks associated with both the egg and chick stage. Diet analysis involved comparing stomach regurgitation samples and isotope samples of feathers spanning a 120 year period. The cause of death for the mass occurrence of beach wrecked birds found during 2005/06 was established through necropsies and histological tests. The major cause of death was compared to patterns of past beach wreck events that has occurred in New Zealand over a 33 year period, obtained through the Ornithological Society of New Zealand. Where possible, both short- and long-term comparisons were made to establish a sound understanding of the key factors that are influencing breeding success, foraging, and survival.

Results showed that 2005/06 was a poor breeding year which was the result of a large number of nest desertions. Furthermore, analysis of stable isotopes shows that the LBP

have been feeding at low trophic levels over the past 120 years and that 2005 was significantly lower in carbon levels suggesting a low year of marine productivity. The largest cause of death associated with mass beach wrecks was starvation. Analysis of past beach wrecks suggest that during the year LBP are at a greater risk of death after the breeding season, after moult, and during winter which are energetically expensive periods. A more long-term study is required to identify the trends in LBP breeding success and to ascertain the primary reason as to why they are unable to obtain enough food. Seabirds are increasingly being used as biological indicators since they are largely influenced by changes associated with the marine environment. The use of LBP as biological indicators may have limitations depending on the parameters being used. However stable isotope measures may be one of the easiest methods to achieve this and allows for reconstruction of past ecological histories through analysis of historical tissues.

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# Table of Contents

ABSTRACT .....	V
ACKNOWLEDGEMENTS.....	VII
LIST OF PLATES .....	XIII
LIST OF FIGURES .....	XIV
LIST OF TABLES.....	XVI
<b>CHAPTER 1 GENERAL OVERVIEW.....</b>	<b>1</b>
1.1 ABSTRACT .....	2
1.2 INTRODUCTION.....	3
1.2.1 General Overview.....	3
1.2.2 Status of Penguin Species.....	4
1.2.3 Life Chronology.....	7
1.2.4 Biology.....	7
1.2.5 Breeding Ecology.....	8
1.2.6 Feeding Ecology.....	9
1.2.7 Threats.....	10
1.2.8 Significance of this Study.....	12
1.3 THESIS AIMS AND OBJECTIVES .....	14
<b>CHAPTER 2 BREEDING ECOLOGY OF LITTLE BLUE PENGUINS.....</b>	<b>17</b>
2.1 ABSTRACT .....	18
2.2 INTRODUCTION.....	19
2.2.1 Breeding in Little Blue Penguin.....	20
2.2.2 Significance of Current Study.....	22
2.3 AIMS.....	23
2.4 METHODS .....	24
2.4.1 Study Site.....	24
2.4.1.1 Sampling Area.....	24
2.4.2 Survey Methods.....	26
2.4.2.1 Locating Nests.....	26
2.4.2.2 Nest Types.....	28
2.4.2.3 Banding Procedure .....	29
2.4.2.4 Sexing.....	30
2.4.3 Data Collection .....	30
2.4.3.1 Nest Monitoring.....	30
2.4.3.2 Definitions.....	33
2.4.4 Weather Data .....	35
2.4.5 Data Analyses.....	36
2.4.5.1 Sexing.....	36
2.4.5.2 Breeding success .....	36
2.4.5.3 Weather Effects .....	38
2.4.5.4 Nest Material .....	38
2.5 RESULTS .....	39
2.5.1 Banding .....	39
2.5.2 Sexing.....	40
2.5.2.1 Molecular sexing .....	40
2.5.2.2 Weight differences.....	42
2.5.3 Nesting Attempts.....	43
2.5.4 Egg Laying.....	44
2.5.5 General nest types .....	48
2.5.6 Breeding Success.....	48
2.6 DISCUSSION .....	51
2.6.1 Lay Date and Environmental Conditions.....	53
2.6.2 Food Availability and Body Condition.....	55

2.6.3	<i>Age, Quality and Reproductive Success</i> .....	56
2.6.4	<i>Nest Type and Site Fidelity</i> .....	58
2.6.5	<i>Baseline Data</i> .....	60
2.6.5.1	Body Condition .....	60
2.6.5.2	Banding and Baseline Data .....	61
2.6.6	<i>Considerations</i> .....	62
2.6.7	<i>Conclusions</i> .....	63
2.7	APPENDIX .....	66
2.7.1	<i>Morphological measurements from Little Blue Penguin</i> .....	66
2.7.2	<i>Little Blue Penguin band numbers</i> .....	67
<b>CHAPTER 3 CAUSES OF EGG AND CHICK MORTALITY IN LITTLE BLUE PENGUINS ON TIRITIRI MATANGI ISLAND</b> .....		<b>71</b>
3.1	ABSTRACT .....	72
3.2	INTRODUCTION .....	73
3.2.1	<i>Risks during Incubation</i> .....	73
3.2.2	<i>Risks during the Chick Stage</i> .....	75
3.3	AIMS .....	77
3.4	METHODS .....	78
3.4.1	<i>Monitoring</i> .....	78
3.4.2	<i>Egg Analysis</i> .....	80
3.4.2.1	Embryo Development .....	80
3.4.3	<i>Chick Necropsies</i> .....	81
3.4.4	<i>Data Analysis</i> .....	82
3.4.4.1	Nest failure .....	82
3.4.4.2	Egg and chick failure .....	82
3.5	RESULTS .....	84
3.5.1	<i>Nest Desertion</i> .....	84
3.5.2	<i>Egg Analysis</i> .....	86
3.5.2.1	Egg Properties .....	87
3.5.2.2	Incubation Length .....	87
3.5.3	<i>Chick Analysis</i> .....	88
3.6	DISCUSSION .....	90
3.6.1	<i>Survival at the egg stage</i> .....	92
3.6.1.1	Incubation .....	92
3.6.1.2	Nest type .....	94
3.6.2	<i>Chick Survival</i> .....	95
3.6.2.1	Potential influences of egg dimensions on chick development .....	95
3.6.2.2	Effects of parasites .....	97
3.6.3	<i>Conclusions</i> .....	98
<b>CHAPTER 4 FEEDING ECOLOGY</b> .....		<b>101</b>
4.1	ABSTRACT .....	102
4.2	INTRODUCTION .....	104
4.2.1	<i>Diet Analysis of Little Blue Penguins</i> .....	106
4.2.1.1	Conventional diet analysis of LBP .....	106
4.2.1.2	Long term diet analysis using stable isotopes .....	107
4.2.1.3	Current study .....	109
4.3	AIMS .....	111
4.4	METHODS .....	112
4.4.1	<i>General Application</i> .....	112
4.4.2	<i>Overview</i> .....	112
4.4.3	<i>Data Collection</i> .....	113
4.4.3.1	Stomach Flushing .....	113
4.4.3.2	Quantification of Food Samples .....	114
4.4.3.3	Bait Fisheries .....	115
4.4.4	<i>Isotope Sampling</i> .....	116
4.4.4.1	General .....	116
4.4.4.2	Methods used by NIWA .....	117
4.4.5	<i>Data Analysis</i> .....	118
4.4.5.1	Food Samples .....	118
4.4.5.2	Species identification .....	119

4.4.6	<i>Isotope Analysis</i> .....	121
4.5	RESULTS .....	123
4.5.1	<i>Regurgitations</i> .....	123
4.5.2	<i>Isotope Sampling</i> .....	127
4.5.2.1	Diet Assessment .....	127
4.5.2.2	Individual Diet Assessment .....	128
4.5.2.3	Trophic levels.....	129
4.5.2.4	Long term diet change.....	131
4.6	DISCUSSION .....	134
4.6.1	<i>The Diet of LBP</i> .....	134
4.6.1.1	Biases associated with the conventional method .....	135
4.6.1.2	Sample sizes .....	137
4.6.1.3	Isotope signatures and sampling period.....	138
4.6.1.4	Application of enrichment values.....	140
4.6.1.5	Sampling period.....	141
4.6.2	<i>Stomach Regurgitations</i> .....	143
4.6.2.1	Generalist feeding pattern in LBP .....	143
4.6.2.2	Effect of prey life-cycle.....	143
4.6.3	<i>Stable Isotope Analysis</i> .....	146
4.6.3.1	Annual differences.....	146
4.6.3.2	Foraging range.....	147
4.6.3.3	Competition.....	149
4.6.4	<i>Conservation Management Recommendations</i> .....	150
4.6.5	<i>Conclusions</i> .....	154
4.7	APPENDIX .....	156
4.7.1	<i>Total length and weight regression of a South African Anchovy</i> .....	156
4.7.2	<i>Total length and weight regression of a South African Myctophid</i> .....	157
4.7.3	<i>Comparison of <math>\delta^{15}N</math> and <math>\delta^{13}C</math> values</i> .....	158
4.7.4	<i>Precision data for repeat analysis of urea standards</i> .....	158
4.7.5	<i>Trophic levels for all years</i> .....	159
4.7.6	<i>Yearly mean differences for <math>\delta^{13}C</math> Carbon values</i> .....	159
4.7.7	<i>Yearly mean differences for <math>\delta^{15}N</math> Nitrogen values</i> .....	159
4.7.8	<i>Total catches for commercial fisheries from North East Coast areas of New Zealand</i> ....	160
<b>CHAPTER 5 SURVIVAL OF LITTLE BLUE PENGUINS .....</b>		<b>161</b>
5.1	ABSTRACT.....	162
5.2	INTRODUCTION.....	163
5.2.1	<i>Mortality in Seabirds</i> .....	163
5.2.2	<i>Determining Cause of Death</i> .....	164
5.2.3	<i>Significance of This Study</i> .....	166
5.3	AIMS.....	168
5.4	METHODS.....	169
5.4.1	<i>Dead Bird Collection</i> .....	169
5.4.2	<i>Beach Counts from Previous Years</i> .....	169
5.4.3	<i>Definitions</i> .....	171
5.4.3.1	Cause of Death .....	171
5.4.4	<i>Necropsies</i> .....	173
5.4.4.1	Preservation.....	173
5.4.4.2	External Examination .....	173
5.4.4.3	Internal Examination .....	174
5.4.5	<i>Necropsy Results</i> .....	178
5.4.6	<i>Weather Data</i> .....	178
5.4.7	<i>Data Analysis</i> .....	179
5.4.7.1	2005 and 2006 beach counts.....	179
5.4.7.2	OSNZ data from 1966 to 1999 .....	179
5.5	RESULTS .....	180
5.5.1	<i>Necropsy Findings</i> .....	180
5.5.2	<i>Cause of Death</i> .....	182
5.5.2.1	Laboratory Tests.....	182
5.5.3	<i>Analysis of Beach Counts</i> .....	183
5.5.3.1	2005-2006 counts .....	183
5.5.3.2	OSNZ data 1966 – 1999 .....	185
5.6	DISCUSSION .....	189

5.6.1	<i>Cause of Death in LBP</i> .....	189
5.6.2	<i>Patterns of Mortalities</i> .....	190
5.6.2.1	Monthly counts.....	190
5.6.2.2	Annual counts.....	191
5.6.3	<i>Inter-Annual Differences and LBP Survival</i> .....	191
5.6.3.1	Winter.....	191
5.6.3.2	Breeding season.....	194
5.6.3.3	Post- breeding season and moulting .....	195
5.6.4	<i>Other Causes of Mortality</i> .....	197
5.6.4.1	Asperogillis .....	197
5.6.4.2	Predation.....	198
5.6.4.3	Parasites.....	198
5.6.4.4	Ectoparasites.....	198
5.6.4.5	Endoparasites.....	200
5.6.5	<i>Other Considerations</i> .....	203
5.6.6	<i>Mortalities and Population Demographics</i> .....	204
5.6.7	<i>Conclusions</i> .....	205

## **CHAPTER 6 THE USE OF LITTLE BLUE PENGUINS AS BIOLOGICAL INDICATORS.. 207**

6.1	GENERAL SUMMARY .....	208
6.1.1	<i>Conclusions</i> .....	208
6.1.2	<i>Interrelating Factors</i> .....	209
6.1.3	<i>Future Recommendations</i> .....	213
6.1.4	<i>Conclusions</i> .....	215
6.2	REFERENCES – CHAPTER 1 .....	216
6.3	REFERENCES – CHAPTER 2 .....	220
6.4	REFERENCES – CHAPTER 3 .....	226
6.5	REFERENCES – CHAPTER 4 .....	232
6.6	REFERENCES – CHAPTER 5 .....	240
6.7	REFERENCES – CHAPTER 6.....	248
6.8	PERMIT.....	250

## List of Plates

PLATE 1.1. ADULT LITTLE BLUE PENGUINS.....	1
PLATE 2.1. LITTLE BLUE PENGUIN CHICK.....	17
PLATE 2.2. STAINLESS STEEL BAND ON LITTLE BLUE PENGUIN.....	29
PLATE 3.1. LITTLE BLUE PENGUIN CHECK ON TIRITIRI MATANGI ISLAND.....	71
PLATE 3.2. PHOTOS OF THE EMBRYONIC DEVELOPMENTAL STAGES OF THE LITTLE BLUE PENGUIN.....	81
PLATE 4.1. A LITTLE BLUE PENGUIN FROM TIRITIRI MATANGI ISLAND.....	101
PLATE 4.2. REGURGITATION PROCEDURE FOR LITTLE BLUE PENGUIN.....	113
PLATE 5.1. LITTLE BLUE PENGUINS FOUND DEAD ON TIRITIRI MATANGI ISLAND.....	161
PLATE 6.1. MOULTING LITTLE BLUE PENGUIN.....	207

---

## List of Figures

FIGURE 2.1.A) MAP OF NEW ZEALAND OUTLINING THE HAURAKI GULF	25
FIGURE 2.2. LOCATIONS MONITORED ON TIRITIRI MATANGI ISLAND.....	26
FIGURE 2.3. THE DIFFERENT LITTLE BLUE PENGUIN NEST TYPE CLASSIFICATIONS.....	28
FIGURE 2.4. MEAN WEIGHTS ( $\pm$ SE) OF THE DIFFERENT LITTLE BLUE PENGUIN SEXES AT BANDING	42
FIGURE 2.5. DIAGRAM OF LITTLE BLUE PENGUIN NEST SITES FOUND ON TIRITIRI MATANGI ISLAND.....	43
FIGURE 2.6. LITTLE BLUE PENGUIN NEST COUNTS ON TIRITIRI MATANGI ISLAND, NEW ZEALAND,.....	44
FIGURE 2.7. LITTLE BLUE PENGUIN LAY DATE AND AVERAGE SEA SURFACE TEMPERATURE .....	45
FIGURE 2.8. MONTHLY AVERAGE SST FOR MONTHS BEFORE AND AFTER LAYING.....	45
FIGURE 2.9. LITTLE BLUE PENGUIN LAY DATES.....	47
FIGURE 2.10.COMPARISON OF THE NEST TYPES.....	48
FIGURE 3.1. NEST DESERTIONS OCCURRED THROUGHOUT THE NESTING SEASON .....	84
FIGURE 3.2. NEST DESERTIONS IN RELATION TO WIND SPEED AND RAIN FALL. ....	85
FIGURE 3.3. COMPARISON OF THE DIFFERENT INCUBATION LENGTHS ( $\pm$ SE).....	88
FIGURE 4.1. DRAWINGS OF LEFT AND RIGHT OTOLITHS FROM FISH SPECIES .....	120
FIGURE 4.2. NUMBER OF PREY SPECIES IN STOMACH SAMPLES. ....	124
FIGURE 4.3. COMPARISON OF THE ISOTOPE MEANS.....	127
FIGURE 4.4. STABLE ISOTOPE SIGNATURES FOR 2004 AND 2005. ....	128
FIGURE 4.5. STABLE ISOTOPE MEASUREMENTS FROM REGURGITATED LITTLE BLUE PENGUIN .....	129
FIGURE 4.6. A) $\Delta^{15}$ NITROGEN & B) $\Delta^{13}$ CARBON. ....	132
FIGURE 4.7. COMPARISON OF THE DIFFERENT YEARLY STABLE ISOTOPE VALUES. ....	133
FIGURE 5.1 DIFFERENT SECTIONS OF NEW ZEALAND USED BY THE ORNITHOLOGICAL SOCIETY OF NEW ZEALAND (OSNZ) FOR BEACH PATROLS.....	170
FIGURE 5.2 DIAGRAM OF THE INTERNAL ORGANS OF A LITTLE BLUE PENGUIN .....	175
FIGURE 5.3. DIAGRAM OF A FEMALE LITTLE BLUE PENGUIN. ....	177
FIGURE 5.4 DEAD PENGUINS FOUND IN AND CLIMATE PETURBATIONS .....	184
FIGURE 5.5.DEAD PENGUIN COUNTS AROUND NEW ZEALAND.....	186
FIGURE 5.6. STANDARDISED TOTALS OF DEAD PENGUINS AND SOUTHERN OSCILLATION . ....	186
FIGURE 5.7. DEAD PENGUIN COUNTS AND SEARCH EFFORT .....	187
FIGURE 5.8 TOTAL LITTLE BLUE PENGUIN BEACH COUNTS AROUND NEW ZEALAND .....	188
FIGURE 6.1. SCHEMATIC FLOW DIAGRAM OF THE LINKAGES BETWEEN MARINE AND TERRESTRIAL ENVIRONMENTAL PARAMETERS .....	210

---

## List of Tables

TABLE 1.1. IUCN RED LIST .....	6
TABLE 2.1. DESCRIPTION OF THE MORPHOLOGICAL MEASUREMENTS. ....	33
TABLE 2.2. DEFINITIONS USED FOR CALCULATING THE DIFFERENT STAGES OF SUCCESS .....	38
TABLE 2.3. NUMBER OF LITTLE BLUE PENGUIN BANNED IN PREVIOUS YEARS ON TIRITIRI MATANGI ISLAND, NEW ZEALAND.....	39
TABLE 2.4. MORPHOLOGICAL MEASUREMENTS OF LITTLE BLUE PENGUINS .....	40
TABLE 2.5. THE DISCRIMINANT FUNCTION (DF) ESTIMATES MALE AND FEMALE. ....	41
TABLE 2.2. CALCULATIONS OF LITTLE BLUE PENGUIN BREEDING SUCCESS.....	49
TABLE 2.3. CATEGORICAL DATA MODELLING. ....	50
TABLE 3.1. COMPARISON OF THE FAILURE OUTCOMES OF LITTLE BLUE PENGUIN EGGS AND CHICKS.....	86
TABLE 3.2. COMPARISON OF SAMPLE NUMBER OF NESTS .....	86
TABLE 3.3. COMPARISON OF LBP EGG DIMENSIONS ( $\pm$ SE) BETWEEN YEARS AND BETWEEN SUBSPECIES. .	87
TABLE 4.1. THE NUMBER (N) OF ANALYSED LITTLE BLUE PENGUIN FOR DIET ANALYSIS .....	116
TABLE 4.2. MEAN ( $\pm$ SD) WET WEIGHT (G) OF STOMACH SAMPLES.....	123
TABLE 4.3. PROPORTION OF THE MAIN PREY TYPES WITHIN THE TOTAL NUMBER OF SAMPLES.....	124
TABLE 4.4. INDIVIDUAL COUNTS AND THEIR PROPORTIONS OF THE TOTAL NUMBER OF SAMPLES .....	125
TABLE 4.5. CALCULATIONS OF THE FOO (%) AND RO (%) OF ALL SPECIES .....	125
TABLE 4.6. THE NUMBER OF STOMACH SAMPLES (N) CONTAINING EACH FISH TYPE.....	126
TABLE 4.7. TROPHIC LEVEL COMPARISON COVERING 120 YEARS.....	130
TABLE 5.1. FRESHNESS LEVELS AND DEFINITIONS USED FOR CLASSIFYING DEAD LITTLE BLUE PENGUIN .	171
TABLE 5.2. AGE OF LITTLE BLUE PENGUIN FOUND DEAD ON TIRITIRI MATANGI ISLAND AND OTHER HAURAKI REGIONS REFERS TO TOTAL SAMPLE SIZE FOR EACH AGE GROUP. ....	181
TABLE 5.3. LIVE AND DEAD WEIGHTS OF MALE AND FEMALE LBP .....	181
TABLE 5.4. PARASITES FOUND ASSOCIATED WITH LITTLE BLUE PENGUIN.....	183