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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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