THE BREEDING ECOLOGY OF THE NORTH ISLAND LITTLE SHEARWATER, *Puffinus assimilis haurakiensis.*

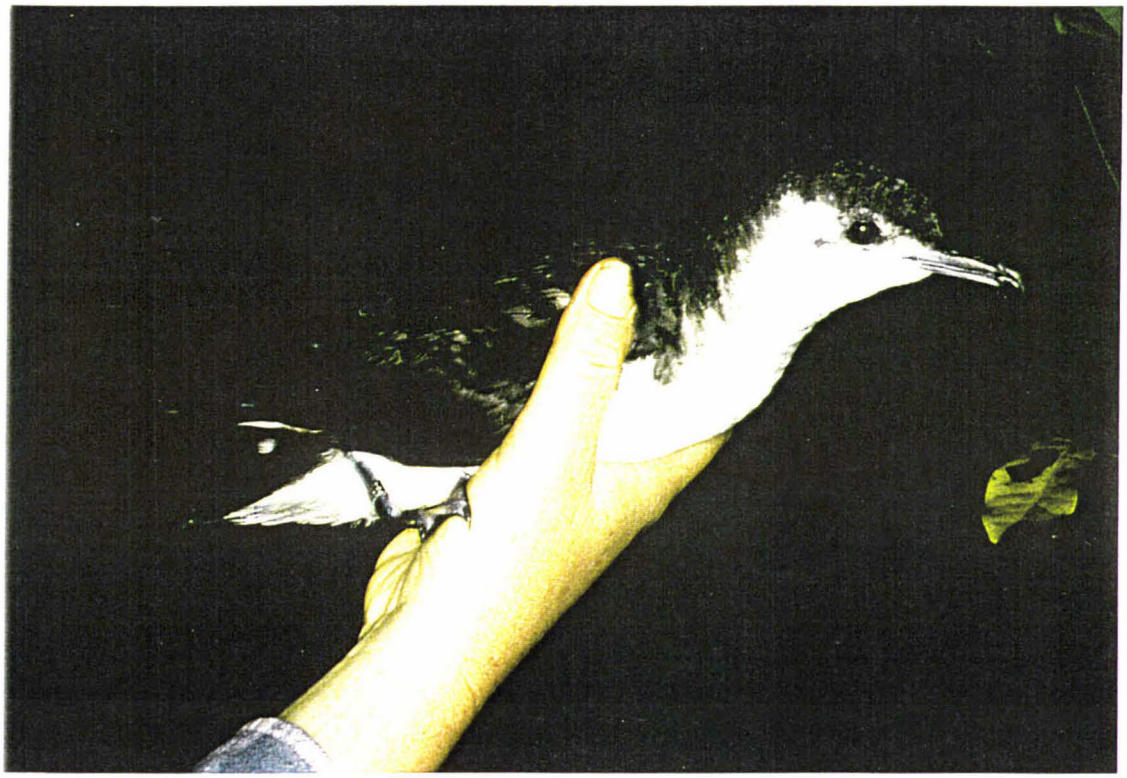
A thesis presented in partial fulfilment
of the requirements for the degree of

Master of Science in Ecology

at Massey University.

Andrea Marie Booth

1996



Frontispiece: North Island Little Shearwater (*Puffinus assimilis haurakiensis*), Lady Alice Island, Hen and Chickens Group, New Zealand, 1994.

ABSTRACT

The breeding ecology of the North Island Little Shearwater *Puffinus assimilis haurakiensis* was investigated on Lady Alice Island, Hen and Chickens Group, Northland, New Zealand, during the 1994 breeding season.

The Little Shearwater showed a high degree of intra-population asynchrony in laying compared to other procellariiform species. This suggests that there is not an optimum time for laying in this species, and that laying is influenced by a low variability in the food supply during the breeding season.

The behaviour of Little Shearwater breeding adults was monitored throughout the chick rearing period. Chicks were fed, on average, on 96% of nights. This result is not compatible with the theory that large fat deposits in procellariiform chicks are an adaptation to a fluctuating food supply.

Parents coordinated their feeding sessions, with one bird at a time feeding the chick for approximately seven night in a row. This strategy may result in less variation in the food provisioning rate compared with records for other Procellariiformes, in which adults forage independently. If this is so, coordination of foraging sessions does not support the hypothesis that fat deposits in Little Shearwater chicks provide insurance against variation in the food delivery rates of parents. Coordination of foraging shifts may allow adults to obtain more accurate information about the nutritional status of the chick, and therefore regulate meal size according to chick requirements. Little Shearwater chicks lost a smaller proportion of their body mass between obtaining maximum chick mass and fledging (17.7%), than other species in the family Procellariidae. This observation is compatible with adults regulating the amount of food delivered to chicks. Adults do not appear to feed chicks at the maximum rate possible for parents, as has been suggested for species which forage independently. Further research is required to determine the factors influencing both fat deposition in chicks, and adult foraging behaviour in the Little Shearwater.

Little Shearwater burrows were monitored throughout the breeding season for signs of predation by kiore, *Rattus exulans*. Direct evidence of kiore predation of eggs was obtained by timelapse video. The breeding success rate of Little Shearwaters was 38% (n = 29), The majority of breeding failure occured during incubation, with 16 (89%) of the 18 unsuccessful nests failing at this stage. Kiore predation of eggs was the suspected cause of failure for at least 12 (75%) of the nests which failed at incubation. The long-term impact of kiore predation on the Little Shearwater, and the implications of these findings for management, are discussed.

ACKNOWLEDGEMENTS

This thesis would not have been possible without the ongoing help and support of my two supervisors, Ed Minot and Robin Fordham. Like myself, procellariiform ecology was a new field for both of them, and throughout the whole thesis process they shared my enthusiasm for learning more about this fascinating and relatively unknown group of birds. I would especially like to thank Ed for being there when I had 101 questions during the writing stage, and Robin for his ideas, and braving treacherous weather to visit my study site.

I would like to thank Mike Imber for initially suggesting the topic and getting the project underway, helping with fieldwork, and sharing his extensive knowledge of Procellariiformes. John Warham, Kerry-Jane Wilson, and Brian Bell all gave their time to comment on my project proposal and make suggestions for improvement. This thesis also benefitted from discussions with the late George Dunnet.

I would like to thank the Department of Conservation, Northland Conservancy, for giving me permission to work on Lady Alice Island. Many thanks to Ray Pierce, who helped in many ways throughout the fieldwork period, and was always available to discuss aspects of the study. I also thank Keith Hawkins and the rest of the Whangarei Field Centre staff, for providing boat transport, accomodation, and general assistance.

Many thanks to my intrepid field assistants: Ina May, Peter Graham, Dagmar Ohlfest and Peter Elliott, who freely gave their time and energy to help me in the field, and didn't complain when I made them carry 22kg batteries up hills.

Students and staff of the Ecology Department, Massey University, helped throughout this study. I would especially like to thank Rosemary Miller for her support and commenting on drafts of the thesis, Barbara Just for assistance with equipment and accounts, Liz Grant for the drawing of the kiore, Jens Jorgesen for his engineering skills, and Isabel Castro and Phil Battley for bird discussions, although they still haven't realised that seabirds are much more interesting than bush birds and waders.

Thanks to Paul Jansen for making and lending the video equipment, and John Innes for his comments on kiore predation.

A very special thanks to my family, for their ongoing encouragement and support over the last two years - mum, Jacqui, Brendon, Jesse, Caitlin, Kathleen, Nicky, and Jim. Also to Eric Allen, who made the final writing stage much more bearable by his patience and encouragement.

Funding for this project was gratefully received from the Massey University Graduate Fund, the Massey Ecology Department, the Royal Forest and Bird Protection Society of New Zealand, and the Ornithological Society of New Zealand.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES