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**The breeding biology of northern white-faced storm
petrels (*Pelagodroma marina maoriana*) and a feeding trial
in preparation for translocation, New Zealand**

A thesis presented in partial fulfilment of the requirements for the degree of
Master of Science in Conservation Biology,

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Plate 1.1 Captured in paint - a white-faced storm petrel foraging in the Hauraki Gulf, New Zealand. Photograph by Neil Fitzgerald. Artist: Thomas Young.

Abstract

As keystone species and ecosystem engineers, petrels are integral to ecosystem restoration. However, many petrel breeding populations are currently reduced from their former ranges due to marine and terrestrial threats. Consequently, seabird translocation is now a rising species management tool for establishing/re-establishing colonies. The goals of this study were to investigate the expansion of translocation from medium sized *Pterodroma* and *Puffinus* species to much smaller storm petrels and to generate customised translocation protocols for white-faced storm petrels (*Pelagodroma marina maoriana*). This project aimed to 1) monitor and measure chick growth, 2) quantify chick provisioning: feeding frequency and meal size, 3) describe emergence periods and fledging morphology, and 4) undertake a mini-translocation to trial current petrel feeding practices on this relatively small species and outline a suitable artificial feeding regime. The breeding biology of a northern white-faced storm petrel (WFSP) population was monitored during the breeding season of 2011/2012 on Burgess Island, Hauraki Gulf. Results were compared with a southern WFSP population from previous research.

Northern WFSP bred one month earlier than southern populations and fledged at smaller weights and sizes. Chick rearing was longer (68 days) than expected and burrow emergence began 2–6 nights before fledging. Growth patterns generally aligned with Procellariiform chick development. Mean overnight provisioning masses delivered to chicks by parents were similar between northern and southern populations (7.8 g and 6.4 g respectively), however mean feeding rates were lower in the north (57.1% of monitored nights vs. 71.7%). Periods of fasting were longer than expected, frequently lasting 4–7 days. This low provisioning rate may reflect limited prey availability; possibly from the concurrent La Niña-Southern Oscillation climate. Stable isotope analysis of adult blood showed an increase in $\delta^{15}\text{N}$ between burrow prospecting and chick rearing phases; indicating a shift in trophic level potentially due to a behaviour change in adult foraging or prey availability. Analysis of $\delta^{13}\text{C}$ shows WFSP potentially foraging at greater ranges than expected.

During the feeding trial, a 10 Fg x 70 mm PVC crop tube was used to successfully feed chicks until fledging. Chick weight was maintained on a daily 7–8 ml regime of sardine puree diet. This research shows that WFSP are suitable candidates for translocation operations. Future translocations of northern WFSP are recommended to transfer chicks at 10 days before fledging, selected by criterion of wing lengths ranging from 120.9–129.7 mm and weights greater than 55 g. Translocation management should consider population variability due to

environmental and climatic fluctuations, and also latitudinal gradients as factors influencing temporal planning and chick selection.

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Plate 1.2 The wonderful volunteers who together made this project a success.

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