

Ecology, breeding biology and conservation status of the South Georgian Diving Petrel (*Pelecanoides georgicus*) on Codfish Island (Whenua Hou)

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The South Georgian Diving Petrel (*Pelecanoides georgicus*) is considered “Nationally Critical” by the New Zealand Department of Conservation. Its sole breeding population in New Zealand (roughly 150 individuals) persists in dunes of Sealer’s Bay on Codfish Island (Whenua Hou). Despite receiving the highest threat ranking possible, little is known about this species including threats affecting its long-term viability. The removal of invasive species from Codfish Island has resulted in a population growth between the 1980’s and the late 1990’s. Following eradication of these invasive species, the greatest remaining threat was perceived to be human disturbance, as dunes at Sealer’s Bay are fragile. In addition, the encroachment of dunes by vegetation and erosion caused by storm events might pose further risks to *P. georgicus*. Finally, as both Common Diving Petrels (*P. urinatrix*) and possibly Mottled Petrels (*Pterodroma inexpectata*) have recently started breeding in the same dunes, competition for nest sites might pose a future threat to *P. georgicus*. Many of these putative threats, however, are based on speculations. As a first step towards developing effective conservation strategies, I will conduct research aimed at 1) investigating the importance of dune characteristics for nest site selection and successful reproduction; and 2) describing the breeding biology of *P. georgicus*.

To assess the importance of dune characteristics for nest site selection and successful reproduction, I propose to evaluate the role of the following dune parameters: plant cover, plant height, dominant plant species, presence of *Acaena novae-zelandiae*, position of the burrow in the individual dune, position within the dune system, distance to the dune-scarp, sand penetrability, sand flux, slope, orientation, and nearest distance to other burrows. Field methods are designed to minimize damage to dunes and disturbance to breeding birds. I will then compare characteristics at all currently known burrow locations to those from 100 random locations devoid of burrows using logistic regression. Furthermore, I will also assess dune characteristics at known nest sites of *P. urinatrix* and *Pterodroma inexpectata* to assess the potential for competition for nest sites with *P. georgicus*.

To describe their breeding biology, I will monitor 20 randomly selected active burrows of *P. georgicus* with remote cameras from early November 2015 to February 2016. This will allow me to assess the following breeding characteristics: hatch dates, feeding rates, adult departure dates, emergence rates and lengths, fledgling dates and fledgling plumage. Five of the burrows monitored with remote cameras will also be fitted with PIT tag readers to provide high-resolution data on entrance and exit rates. Non-invasive toothpick barrier monitoring will provide insights on the total number active burrows. Combining data from these methods will allow me to estimate the total breeding success of *P. georgicus* on Codfish Island for the 2015-2016 breeding season. In addition, up to 100 individuals will be captured by hand and banded. Coupling banding data, data on active burrows and breeding success will ultimately allow me to accurately estimate the population size of *P. georgicus* on Codfish Island.

While banding individuals, I will also take biometric measurements including weight, wing length, tail length, tarsus length, skull length, and bill length and depth. Vocalisations will also be recorded. For 10 individuals I will use genetic methods to determine sex ultimately allowing me to assess sexual dimorphism in morphology and vocalisations in *P. georgicus*.

Combining assessments of nest site selection, breeding biology, and sexual dimorphism will enable me to provide a much clearer picture of the ecology, breeding biology and conservation status of *P. georgicus* on Codfish Island. Such information will be critical to direct future conservation management plans. For example, once biological and physical characteristics of dunes required by *P. georgicus* for nest site selection are identified, specifically directed management of the Sealer's Bay dunes on Codfish Island can be implemented to meet these requirements. Additionally, in a time when the translocation of seabirds to establish new breeding colonies is common practice, it is only logical to study the breeding biology of one of New Zealand's rarest Procellariiforms. After all, increasing knowledge on breeding biology increases the chances of a successful establishment after translocation.

In conclusion, I would like to thank the Ornithological Society of New Zealand for supporting this research and providing the opportunity to study one of New Zealand's rarest birds.



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