

Using paleoecology and spatial ecology to promote the restoration of the endemic mottled petrel within New Zealand.

Rachael L. Sagar

PhD candidate, University of Auckland

Accelerated climate change is a threat of increasing importance that confronts seabirds, and in particular is known to cause shifts in prey source availability. As apex predators, seabirds are vulnerable to shifts in the food web, and prey availability drives population success. Understanding exactly how shifts in trophic webs are affecting populations requires an understanding of foraging ecology at the species level. Such information is often lacking due to the inherent difficulties of obtaining such data from far-ranging, pelagic animals. Examining the historical foraging ecology of animals over a larger temporal range of change can provide valuable insight into the causes of population declines, including how populations could be expected to respond to changes in available resources or environmental conditions. When combined with knowledge of current foraging ecology and population dynamics, this information allows us to undertake predictive modelling, thereby guiding conservation action.

The endemic mottled petrel (*Pterodroma inexpectata*) historically occurred through-out New Zealand. However, due to predation and habitat loss, mottled petrel are now found only on predator free-offshore islands. Preliminary evidence shows that mottled petrel forage at least as far as 70°S, amongst the pack-ice of the Southern Ocean during breeding (Rayner and Sagar unpub. data). As the severity of climate change increases, mottled petrel could play an important role as proximate indicators of ecosystem functionality in the Southern Ocean.

The main aim of this research is to determine what ecological factors will drive the successful restoration of mottled petrel populations, specifically the factors that influence breeding success including foraging ecology, provisioning behaviours and diet of mottled petrels. Moreover, via the use of bone collections going back 20,000 years this project has an unprecedented opportunity to establish changes in foraging ecology of this species over time. Such findings, with relevance to both region (e.g. latitude) and prey availability, will help guide conservation efforts for this species into the future.

The Birds NZ Research Grant will cover the costs associated with the stable isotope analysis of bone/fossil and blood samples of mottled petrels.



Rachael Sagar and mottled petrel chick