Stress physiology of Grey-Faced Petrel as a Conservation Tool

Maira Fessardi, Masters in Biosecurity and Conservation - School of Biological Sciences, University of Auckland - mfes578@aucklanduni.ac.nz

Seabirds represent the most threatened group of birds in the world. This scenario is particularly worrisome given that seabirds are ecosystem engineers. Changes in seabird diet or population declines will directly impact the health of terrestrial and marine ecosystems. Because seabirds are an accessible top predator group sensitive to variations in ocean conditions, they also act as important indicators of environmental health. The Hauraki Gulf has been identified as an international hotspot for seabird diversity, with the highest number of endemic and breeding species in the world. Considering seabirds ecological relevance, the threats they face and the vital role the Hauraki Gulf plays as a seabird hotspot, it is urgent that we develop efficient methodologies to monitor populations and the marine environment .

This research will help determine whether variation in seabird stress levels can be used as an informative proxy of ocean conditions and seabird population success over time. That will happen by advancing the use of a minimally invasive measure of animal stress (feather hormones) as a monitoring tool. To do so, it is crucial to establish the pattern of when and how the stress hormone deposits in feathers in response to stressors. That knowledge will allow for more accurate conclusions and predictions and may inform the development of early indicators of population declines for adaptive management strategies. This study will integrate a validation effort to advance the understanding of stress hormone variation patterns using a key indicator species with colonies at the Hauraki Gulf (*Pterodroma macroptera*). It will scale up the analysis from previous studies by integrating data available from past breeding seasons and further samples from my research period.

To better understand how environmental conditions and population processes relate to stress hormone patterns in seabirds the proposed study has **two broad aims:**

(1) To determine whether variation in Grey-faced petrel stress hormones deposited in feathers can be used as an informative proxy of ocean conditions. *Hypothesis*: The population will show higher detectable levels of feather CORT in years under increased environmental stress.

(2) To determine whether stress hormones in Grey-faced petrel chick feathers is related to population success. *Hypothesis:* Higher CORT levels in adults will predict lower breeding success.

This project is funded with the support of the Birds New Zealand Research Fund and the Auckland Council Environmental Research and Evaluation Unit.