

Characterising the foraging ecology of the Nationally Critical Whenua Hou diving petrel and the sympatric common diving petrel on Whenua Hou

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The Whenua Hou Diving Petrel (WHDP) has been classified as 'Nationally Critical', with the entire population existing as a single colony of ~200 individuals on the sand dunes of Codfish Island (0.018 km²). My MSc thesis aimed to characterise various aspects of the foraging ecology of the WHDP, including intraspecific trophic dynamics, seasonal and annual variation in occupied isotopic niche, interspecific competition with the sympatric population of CDPs, and exposure to mercury (Hg) in the marine environment through their diet. Trophic dynamics were investigated through stable isotope analysis of blood and feather samples collected from WHDPs and CDPs over a three year sampling period (2017-2019). The same samples were used to analyse the Hg concentration absorbed from diet (blood) and accumulated over the long inter-moult period (feathers). A better understanding of the factors contributing to the slow population recovery of the WHDP, such as interspecific competition for prey and Hg contamination interfering with reproduction, will help inform future conservation management initiatives.

Results indicate WHDP foraging ecology varies among years and between sexes during the breeding season. Males appear to be targeting higher trophic level prey closer to the breeding colony than females, potentially causing detrimental strain on females and limiting their reproductive performance. Trophic plasticity across the years suggests the WHDPs may not be strongly impacted by changing prey availability with climate change. The overlap of the core trophic niches (50% KUD) of WHDPs and CDPs does not exceed 10% during the breeding season, indicating trophic segregation between the two species when they share a breeding ground. During the non-breeding season, there is up to 50% overlap between core trophic niches, however as the non-breeding migration of this population of CDPs is unknown, I cannot accurately assess the potential for interspecific competition during the non-breeding season. Hg contamination was higher in WHDPs than CDPs, both in blood and feather tissue. Therefore, this could indicate a factor contributing to the limited population recovery of WHDPs since the pest eradication on Whenua Hou.

In summary, this research, thanks to the support of the BNZRF 2019, has increased understanding on WHDP trophic dynamics and foraging ecology in relation to the sympatric CDPs on Whenua Hou. It has also highlighted the potential for increased Hg levels to interfere with successful reproduction in WHDPs.



Figure 1. Whenua Hou diving petrel during sampling on Codfish Island.