

Buller's shearwater, Poor Knights Islands.

Buller's shearwater (*Ardenna bulleri*) is an endemic New Zealand Procellariiform that nests only on the Poor Knights Islands group, off the north-east of the North Island, and is classified as Vulnerable (IUCN Red List) and At Risk, Naturally Uncommon. Buller's shearwaters are a common feature of the Hauraki Gulf during spring and summer but no comprehensive survey for this species has previously been conducted on Tawhiti Rahi (163ha), the largest island in the Poor Knights group. The total population was estimated in 1981 to be 2.5 million birds (c. 800,000 pairs) with c.200,000 breeding pairs nesting on Aorangi Island. However, following their visit to Aorangi Island in 2012, Graeme Taylor and Alan Tennyson suggested that the figure of 300,000-400,000 pairs could be more likely.

The objective of this study was to investigate Buller's shearwater populations and breeding biology at the Poor Knights Islands by using burrow checks, acoustic surveys and population models. Teams of volunteers were on Tawhiti Rahi for a total of twenty-five days in December, January and March. Overall we established three large permanent plots and surveyed them for burrows, occupancy and chicks. Seventy random plots were surveyed and transects established across the island in all habitats. Forty acoustic recorders were deployed in permanent plots and on transects between December and March and automatic cameras placed at burrows to observe incubation and feeding shifts. We also measured and banded adult birds and chicks where this was possible.

In total we surveyed 2,375 m² of random area for burrow density which ranged from 0 to 44 burrows in 6 meter diameter plots. Burrow occupancy was found to be 51.7%. Data gathered on burrow density and occupation, habitat, breeding success, incubation and feeding shifts, has allowed us to develop a population model and estimate for this species on Tawhiti Rahi. Our preliminary population estimate for Buller's shearwater at Tawhiti Rahi is 137,451 breeding pairs.

Our research is a crucial step in understanding the status of Buller's shearwater and will provide a baseline estimate for future population monitoring of this species and investigations into how fisheries and climate change may be indirectly impacting seabird populations in New Zealand and across the Pacific Ocean. We used efficient strategies for surveying populations of burrow-nesting seabirds on remote islands, using small teams, random points, and novel acoustic techniques. We believe the methodology developed for this project will contribute to island research in NZ and internationally.

In addition to the core aspects of the project, we conducted habitat surveys, five-minute bird counts and made numerous incidental observations of wildlife on this extra-ordinary but little visited island (n.b. a manuscript describing the avian community of Tawhiti Rahi has been prepared).

Due to extreme weather in March we were unable to conduct a planned comparative survey on Aorangi Island. However, we are grateful to have received further funding from the Birds New Zealand Research Fund to conduct population surveys on Aorangi Island and comparative surveys on Tawhiti Rahi in the 2017-2018 breeding season.

The project was conducted by seventeen volunteers including botanists, photographers, experienced ornithologists and 'early career' scientists aiming to gain research experience. We are grateful for the advice received from Sandy Bartle, Paul Sagar, Graeme Taylor and Matt Rayner in developing and conducting this project. We thank the Ngatiwai Trust Board for the privilege of working on these very special islands; Clive Stone for his support; DOC staff at the Whangarei office, especially Neil Forrester, for general support and their thoroughness with biosecurity measures; and Dive Tutukaka for boat transfers between Tutukaka and the island. Funding for the project (2016-2017 season) is from Birds New Zealand Research Fund with further support from Te Papa Tongarewa (Museum of NZ) and the Northern NZ Seabird Trust. The survey was conducted under the *Wildlife Authority 38016-FAU - Hauraki Gulf seabirds*.

Dr. Megan Friesen presented an overview of this project at the Hauraki Gulf Marine Park Seminar, 6th September 2017. [<https://www.youtube.com/watch?v=UOiNim6kxcM>]

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Buller's shearwater. Photo: Edin Whitehead www.edinz.com

