

SHORT NOTE

Second record of Buller's shearwater breeding outside of the Poor Knights Islands

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Buller's shearwater (rako; *Puffinus bulleri*) was discovered in October 1884 when Walter L. Buller found a storm-tossed female on Waikanae Beach (Fig. 1), and in 1888, Osbert Salvin formally described the bird in honour of its initial finder (Salvin 1888; Harper 1983). More than thirty years passed before Robert A. Falla discovered the species breeding on the Poor Knights Islands in December 1923 (Falla 1924). Nearly a century later, Buller's shearwaters are reported to only breed with regularity on the Poor Knights Islands and outlying islets and rock stacks. The population increased significantly following the eradication of pigs from Aorangi Island in 1936 and has been estimated to stand at around 300,000–400,000 breeding pairs (Medway 2001; Clout & Russell 2006; Waugh *et al.* 2013). A recent survey of the Poor Knights Islands revealed the breeding population is lower than previously estimated and not yet at capacity,

with extensive areas of suitable burrowing habitat remaining (M. Friesen *pers. comm.*). Despite this, Buller's shearwater remains a common species, often seen feeding in large flocks close to numerous islands around eastern Northland, Hauraki Gulf and Bay of Plenty waters.

On 16 January 2019 we were conducting burrow transect counts and determining the contents of burrows on Lady Alice Island/Mauimua (Chickens/Marotere Islands; 35.89°S, 174.73°E). In total, we inspected 570 burrows in nine different seabird colonies across the island. One burrow checked contained a Buller's shearwater incubating an egg. The burrow was located in a highly burrowed area that is primarily a flesh-footed shearwater (*Pu. carneipes*) colony. The colony is interspersed with occasional Pycroft's petrel (*Pterodroma pycrofti*), sooty shearwater (*Pu. griseus*), and fluttering shearwater (*Pu. gavia*) burrows while grey-faced petrel (*Pt. macroptera*) and little shearwaters (*Pu. assimilis*) breed within the colony during the winter months. The burrow was approximately one metre long and the nesting chamber was accessible from

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Figure 1. Locations of Buller's shearwater recorded ashore in New Zealand and Australia. Stars represent breeding localities while triangles represent locations of Buller's shearwater recorded ashore but not breeding. Waikanae Beach (mentioned in text) is represented by a circle and is included for context.

the burrow mouth. The egg was aberrantly shaped, being of comparable width but well below the mean length, and even outside of the range, for Buller's shearwaters breeding on Aorangi Island (Table 1). Egg size often increases with female age in a variety of avian species and so an egg with the aforementioned dimensions could be indicative of a first- or early-breeding attempt by the female (Christians 2002). By 25 January 2019 the breeding attempt had failed with the entrance to the burrow covered by leaf litter and no bird or egg present inside the burrow. In January 2020 Buller's shearwaters were present and breeding in the same burrow. Travel restrictions due to the COVID-19 pandemic meant we were not able to revisit Lady Alice Island in April/May 2020 and determine if this breeding attempt was successful.

This is only the second reported record of Buller's shearwater attempting to breed outside of the Poor Knights Islands. The only other record of Buller's shearwater breeding outside of the Poor Knights Islands came from Motu Puruhi Island

Table 1. Comparison of the egg found in the Buller's shearwater burrow on Lady Alice Island, Hen and Chicken Islands, in 2019 and a sample of eggs measured on Aorangi, Poor Knights Islands, between 1963 and 1981 (Harper 1983).

	Lady Alice Island (<i>n</i> = 1)	Aorangi Island (<i>n</i> = 74)	
		Mean ± SE	Range
Length (mm)	57.4	65.4 ± 0.3	59.0–72.3
Width (mm)	42.4	43.0 ± 0.2	40.1–46.1

(Simmonds Islands; 34.76°S, 173.16°E) in the far north of New Zealand. It is reported by G.R. Parrish and B. Waddell in Taylor & Parrish (1991) that an adult and chick were found in a burrow on 25 January 1990. The Simmonds Islands are classified as a Nature Reserve and visits to the islands by the Department of Conservation (DOC) are infrequent.

When they do occur, trips focus primarily on renewing toxins in bait stations and weed control (I. Petrove, DOC, *pers. comm.*). As such, it remains unclear whether this was a one-off record or if there is now an established breeding population on the island, but the former seems more likely.

A single Buller's shearwater had previously been observed at night-time on Lady Alice Island on 11 February 2017. This bird was found resting on the surface and was not observed exiting or entering a burrow. Another individual was observed resting on the surface at night-time on 6 Feb 2020. One individual was captured on a trail camera (Reconyx XP9 UltraFire, Reconyx USA) on 01 January 2020 set up to monitor fluttering shearwater activity on the island (Fig. 2). All of these observations were in separate locations to each other and not in the same immediate area as the breeding burrow. All of the observations were, however, within a 150 m radius and inside the defined boundary of the flesh-footed shearwater colony.



Figure 2. Buller's shearwater captured on a trail camera on Lady Alice Island in January 2020.

Elsewhere, a single Buller's shearwater was observed at night-time on Motumahanga/Saddleback Island (Ngā Motu/Sugar Loaf Islands, Taranaki 39.05°S, 174.02°E) on 17 January 2019. This bird was caught and banded but again was not observed prospecting existing burrows on the island (G. Taylor & M. Bell *pers. comm.*). Buller's Shearwater have been recorded prospecting on Manawatāwhi/Three Kings Islands (34.16°S, 172.13°E; Gill *et al.* 2010). Single Buller's shearwaters were caught during spotlighting on Burgess Island (Mokohinau Islands; 35.91°S, 175.11°E) on 31 January 2011 and Little Barrier Island/Te Hauturu-o-Toi (36.20°S, 175.08°E) on 3 March 2016 (C. Gaskin *pers. comm.*). In New South Wales, Australia, live birds have been observed ashore on Montague/Baranguba Island (36.25°S, 150.23°E) and Cabbage Tree Island/John Gould Nature Reserve (32.69°S, 152.22°E) multiple times since the 1960s (Serventy *et al.* 1971; Priddle

& Carlile 2004). These locations are summarised in Figure 1.

Procellariiform seabirds are generally considered highly philopatric and as such natural dispersal and colonisation or recolonisation of a new site has been regarded as unusual (Warham 1996). Procellariiformes will forage over thousands or even tens of thousands of kilometres yet remain indisposed to disperse and breed at sites mere tens or hundreds of kilometres away. This phenomenon was coined the "seabird paradox" by Milot *et al.* (2008) and was well exemplified in a study of two breeding colonies of Hawaiian petrels (*Pt. sandwichensis*; Wiley *et al.* 2012). In New Zealand, a review of recent seabird recolonisation events suggested that New Zealand seabird populations may have a greater capacity as colonisers of other islands (Buxton *et al.* 2014; Towns *et al.* 2016). Genetic analysis of grey-faced petrel colonies across New Zealand has shown no genetic structure in grey-faced petrel populations, suggesting high levels of gene flow between colonies (Lawrence *et al.* 2014).

The Hen and Chicken Islands lie 45 km due south of the Poor Knights Islands and are the nearest locality to the Poor Knights that support significant Procellariiform populations due to their predator-free status. The most influential factor in New Zealand seabird recolonisation events has been found to be having a nearby (most commonly ≤ 25 km) source population from the island being recolonised (Buxton *et al.* 2014). The attractiveness of an established seabird colony through calls and flight activity – even a heterospecific one – also makes it a much more likely candidate for recolonisation than nearby mainland sites such as Bream Head (Mönkkönen *et al.* 1999; Buxton & Jones 2012). As such, it seems logical that if Buller's shearwaters are indeed expanding in their breeding range that Lady Alice Island would be one of the first islands to become colonised. Multiple observations of Buller's shearwaters on the surface at night time may suggest that this species is primarily in the prospecting stage for a new breeding colony. A period of prospecting generally precedes a colonisation event and allows individuals to assess the quality and attributes of a potential new breeding location (Kharitonov & Siegel-Causey 1988; Oro & Ruxton 2001).

Buller's shearwaters have been characterised as "aggressive colonisers" and are believed to have displaced grey-faced petrels and fluttering shearwaters on Aorangi Island following the remarkable influx of Buller's shearwaters from neighbouring Tawhiti Rahi by 1981 (Harper 1983). If indeed our observations of Buller's shearwater breeding and prospecting on Lady Alice Island is a sign of a species expanding its breeding range, and not just a singular event, there is potential for

a resulting shift in the composition of the seabird community on the island in the future.

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