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SHORT NOTE

Targeted searches to identify nesting grounds of Beck's petrel (*Pseudobulweria becki*)

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Over the past decade methods have improved for attracting, observing and identifying birds at sea. This has led to the high profile rediscovery of 'lost' species like New Zealand storm-petrel (*Pealeornis maoriana*) and Beck's petrel (*Pseudobulweria becki;* Saville *et al*. 2003; Shirihai 2008a). Such rediscovered species are likely to be highly threatened owing to the many threats to their populations both at sea and on land (Croxall *et al*. 2012). Locating the breeding grounds is a pre-requisite to understanding the relative impact of different potential threats on distribution, population size or in driving population declines. Identifying the breeding grounds also allows the detailed study of population demographics and productivity, land-based and some at-sea threats, and wider movements through the deployment of remote tracking devices. Novel technologies are supporting efforts to locate the breeding grounds of threatened petrels in the Pacific. Examples include radio tagging at sea of New Zealand storm-petrel (Gaskin & Baird 2006), and the use of remote listening devices with playback analysis software to record ashy storm-petrel (*Oceanodroma homochroa*) for the 1st time on West Anacapa, California (M. McKown, *pers. comm*.). However, where financial and/or logistical constraints preclude the use of novel technologies and/or repeat visits to areas, on-the-ground and coastal searches subsequent to at-sea surveys remains the most effective method for locating breeding sites (*e.g.,* Miskelly 2011; BirdLife International 2012).

Beck's petrel went unrecorded for over 75 years following its discovery and a description based upon 1 bird shot at sea in the Bismarck Archipelago, Papua New Guinea in 1928 and a 2nd specimen taken at sea east of Rendova, Solomon Is in 1929 (Shirihai 2008a). It was rediscovered during a 1,400 km voyage in the Bismarck Sea in Jul-Aug 2007, being recorded on 7 of 13 days using 'chum' (Shirihai 2008a). Shirihai (2008a) recorded a minimum of 65 Beck's petrels (and derived an estimated total of 97+ birds) within an area of sea encompassing St. George's Channel between New Britain and New Ireland, Cape St. George at the southern tip of New Ireland, the west coast of Buka and northern tip of Bougainville, and the Feni Is east of New Ireland. There was a clear hotspot of activity around Cape St. George with a single maximum count of 16 individuals (and a total of 30 estimated) attracted to chum on 4 Aug (Shirihai 2008a). A repeat search in 2008 concentrated on the St. George's Channel and Cape St. George and confirmed the relative

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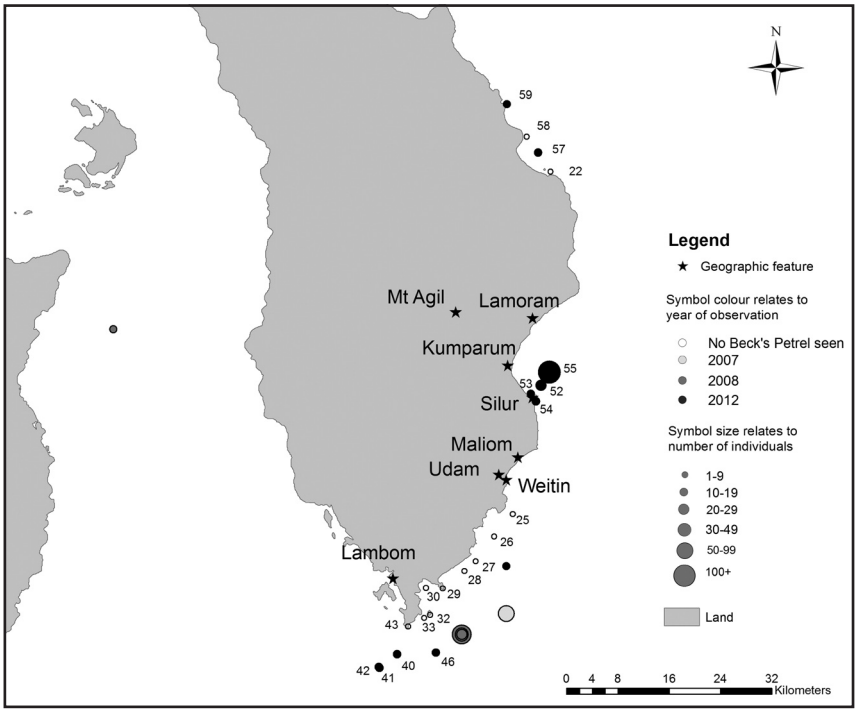

Fig. 1. Villages and survey points in southern New Ireland referred to in the text and Table 1. Points have been scaled by the number of Beck's petrels observed and published records from 2007 and 2008 are also provided. Only observations from 2012 are labelled with point names.

abundance of Beck's Petrel at the latter location with minima of 21, 9 and 6 and estimated totals of 50, 25 and 15 on 3-5 Aug (Shirihai 2008b). The species has also been seen in small numbers south-east of New Ireland and west of Bougainville during bird-watching cruises in 2008-2012 (Collins 2008, 2009, 2010, 2011; C. Collins *in litt*. 2012).

On the basis of the high ratio of recently fledged juvenile Beck's petrels to adults and the presence of tens of birds within 1-2 km of Cape St. George, Shirihai (2008a) speculated that a breeding population likely occurs in southern New Ireland. Inference from congeners and *Pterodroma* petrels led Shirihai (2008a) to pinpoint Mt. Gilaut (the origin of this name is not clear, but the waypoint given corresponds with the mountain locally referred to as Konokalang), several peaks to the east of Konokalang, and peaks in the Hans Meyer Range (locally known as Mt. Agil) as having potentially suitable breeding habitat. I visited New Ireland from 24 Feb to 16 Mar 2012 to liaise with local organisations to facilitate future implementation of conservation and research activities focussed on Beck's petrel, engage local communities and document local knowledge of seabirds in southern New Ireland, and to refine search areas for actual nest sites.

Historic and contemporary harvests of petrels occur across the Pacific with many local cultures utilising seabirds as an important food resource (Scofield 2009). Petrels are also frequently known in local culture and have propagated myths or taboo areas (Warham 1996). Consequently, exploring and utilising local knowledge can be an effective way of identifying breeding sites of petrels as was the case with the recent discovery of nesting Vanuatu petrel (*Pterodroma occulta*) and 'magnificent petrel' (*P. [brevipes] magnificens*) in the Banks Is, Vanuatu (Totterman 2009; A. Tennyson *in litt*. 2012). This project partnered with local organisation Ailan Awareness, who run an established community liaison programme working on biodiversity conservation and sustainable resource use in coastal areas of New Ireland. With their support informal discussions were held in southern New Ireland with individuals or groups from the villages of Weitin, Udam, Maliom, Lambom, Silur, Kumparum and Lamoram (Fig. 1). People were asked whether they recognised images of seabirds on several A4 laminated cards, and if the species occurred locally. The images were of common local species – black noddy (*Anous minutus*), sooty tern (*Sterna fuscata*), red-footed booby (*Sula sula*), lesser frigatebird (*Fregata ariel*); and scarce local species – Beck's petrel and white-tailed tropicbird (*Phaethon lepturus*); and absent species – northern gannet (*Morus bassanus*) and Cook's petrel (*Pterodroma cookii*). Recognition of different seabirds was poor: respondents regularly claimed to recognise species known to be absent from the area, or failed to recognise species

Table 1. Seabird observations in New Ireland, Feb-Mar 2012. Lines shaded grey represent static land-based observations; the remainder were boat-based observations. *refers to Beck's/Tahiti-type petrels not definitively identified; †a minimum count, the number of birds estimated in the area was 100+.

Date	Point name	*Sterna bergii*	*S. fuscata*	*S. anaethetus*	*S. sumatrana*	*S. hirundo*	*Anous stolidus*	*A. minutus*	*Pseudobulweria spp.**	*P. becki*	*P. rostrata*	*Fregata ariel*	*Pterodroma neglecta*	*Sula dactylatra*	*Sula sula*
27 Feb 2012	7											4	1		
27 Feb 2012	11	2													
29 Feb 2012	17		12						2						
1 Mar 2012	22	2			5							5			
2 Mar 2012	25				500		4								
2 Mar 2012	26	1			40		5					75		2	
2 Mar 2012	27							450						2	
2 Mar 2012	28		20		30			300				20		2	
2 Mar 2012	29				20										
2 Mar 2012	30				30										
2 Mar 2012	32				100		100								
2 Mar 2012	33		500		600		300	200				250		5	
2 Mar 2012	43		5				3					150		1	1
3 Mar 2012	40		30							3		20			1
3 Mar 2012	41		30				1			3					
3 Mar 2012	42								1	1					
3 Mar 2012	43		100				2					500		1	
4 Mar 2012	43		150				2					50		1	
4 Mar 2012	46		30	2		1	50		3	2		15			
13 Mar 2012	52								12	3					
13 Mar 2012	53								3	1		10			
14 Mar 2012	53			1				200							
14 Mar 2012	54							70	8					2	
14 Mar 2012	55			5						58†	1				
14 Mar 2012	57									2					
14 Mar 2012	58	40				150	2								
14 Mar 2012	59									1					

that are common in the area. However, while discrimination between species was generally poor there was a sound knowledge of where seabirds breed on offshore islets. Based upon responses there does not appear to be any current harvesting of seabirds, which may account for the low level of discrimination between species. Furthermore, no inland or upland sites are visited to harvest seabirds, there are no areas where nocturnal seabirds are heard (although large-tailed nightjar [*Caprimulgus macrurus*] and beach thick-knee (*Esacus giganteus*) were identified by this question), and no-one was

aware of any locations where birds can be heard flying inland from the coast at night. Collectively these results gave very little indication of whether Beck's petrel or any other Procellariiformes are likely to breed in southern New Ireland.

Active searches concentrated on the coast initially to refine search areas. Static sea-watches from prominent headlands were conducted on 3 mornings from dawn and 3 evenings until dusk using Swarovski 8.5 × 42 binoculars. In addition, time was spent on a 5 m fibreglass dinghy with outboard motor visiting coastal satellite islands and drifting during the early morning or evening. Waypoints were taken at all observation points using a Garmin 60 handheld GPS unit. *Pseudobulweria* petrels were observed on 11 occasions on 5 days during fieldwork (Table 1). Shirihai (2008a; 2008b) has documented the challenges of separating *becki* from Tahiti Petrel (*P. rostrata*) in the field, the 2 species being virtually identical, except the smaller size of *becki*. Close observations of some birds, and increasing familiarity later in the fieldwork allowed confirmation that the majority of birds encountered were *becki*-type petrels, based on small size, short arcing flight in windy conditions, and a languid deep butterfly-like flight in calmer conditions (in comparison with personal observations of Tahiti petrels in Fiji in 2011 and 2012). These observations corroborated Shirihai's (2008b) finding. However, it should be noted that the Beck's petrel observation rates reported for this survey, which did not use chum and was undertaken at the start of the likely breeding season, are not directly comparable with observations in 2008 (Shirihai 2008b) which used chum and were undertaken when fledgling juveniles were apparent.

Shirihai (2008a, 2008b) describes a Beck's petrel 'hotspot' at the southern tip of New Ireland. Observations of other seabirds suggested this area was a hotspot for a number of species, with highest numbers seen in the vicinity of Cape St. George (Table 1, Fig. 1) where disturbed seas south of the cape suggested the confluence of several currents and potential for nutrient mixing as a potential explanation for this phenomenon. I did not observe any petrels approaching land during the evening (when any breeding birds might be expected to be returning to burrows) or of calling birds flying inland after dark between Lambom and Weitin (Fig. 1). Those petrels seen were heading east in the evenings towards Buka and Bougainville. Tahiti petrel and some *Pterodroma* spp. are known to breed on low-lying islands, particularly in the absence of introduced mammalian predators (Warham 1996, P. Scofield *in litt*. 2012). Accordingly, active searches of coastal islets were made, but no evidence of nesting (*e.g.,* distinctive smell, faeces, feathers, burrows) was found. These findings were consistent with the apparent lack of local knowledge of burrow-nesting petrels.

Night-time use of spotlights and vocalisations/tape-playback has proven highly effective at detecting petrel populations at or near their colonies (*e.g.,* Watling & Lewanavanua 1985; Tennyson & Taylor 1990; Crockett 1994). Accordingly, spotlighting, playback of *P. rostrata* calls (because no recordings of Beck's petrel exist), "war-whooping" and periods of listening were all performed between nightfall (~1830 h) and 0000 h both at coastal sites and 2 inland vantage points on 4 nights. No seabird was seen or heard, but the 2 inland sites were unsuitable as they were below the treeline without good vantage points: attempts to reach higher elevations were hampered by logistic and communication difficulties.

Subsequently, further coastal observations were undertaken around New Ireland. These produced the major discovery of this trip, the presence of a flock estimated to contain 100+ Beck's petrels (based upon a minimum single count of 58 individuals) *c.*1 km from the coastline at the mouth of a large bay north of Silur (Fig. 1). There was insufficient time to follow up with further land-based surveys. Nevertheless, this observation of tens of birds in the same area close to shore and early on 2 consecutive mornings provides the most compelling evidence that Beck's petrel breeds in New Ireland, and importantly, gives an indication of the most likely location. The western head of the bay marks the shortest straight-line distance between the summit of 2,300 m Mt. Agil, New Ireland's tallest mountain and the sea. The upland interior of southern New Ireland is not populated, and is rarely visited. If this is the site of breeding Beck's petrels then it would explain the lack of local knowledge of the species. Furthermore, the introduced mammalian predators that are evident at lower elevations may be scarce or absent at higher altitude. Although Tahiti petrels and other petrels can breed on some low islands, most extant populations in this group of species are typically associated with montane summits, especially when invasive mammals are present (Warham 1996). For example, the largest known population of Tahiti petrels nests at the summit of Mt. Lata, Ta'u, American Samoa (O'Connor & Rauzon 2004).

Previous biological surveys have visited the Hans Meyer Range, but petrels are unlikely to be encountered unless nocturnal searches are undertaken. The area is also extremely remote and access is challenging: an attempt by the Rapid Assessment Program team to force their way to the summit of the Hans Meyer Range was foiled by a large area of tangled elfin scrub at 2,000 m (Beehler & Alonso 2001). Based on the results of this preliminary survey I recommend that a concerted

attempt be made to access the summit of Mt. Agil, with a specific focus of conducting night-time vantage point surveys for nesting petrels. This will require engagement with local communities, government bodies and non-governmental organisations. It offers the best chance of advancing our understanding and conservation of this Critically Endangered species.

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