Notes on the birds of Isabel, Solomon Islands, including the first record since 1927 of Island Leaf Warbler Phylloscopus maforensis

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Source: Bulletin of the British Ornithologists' Club, 139(4) : 311-319

Published By: British Ornithologists' Club

URL: https://doi.org/10.25226/bboc.v139i4.2019.a2

Notes on the birds of Isabel, Solomon Islands, including the first record since 1927 of Island Leaf Warbler *Phylloscopus maforensis*

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Received 19 February 2019; revised 26 August 2019; published 16 December 2019

http://zoobank.org/urn:lsid:zoobank.org:pub:3C229B98-F44A-47C1-BEFD-9975639A0304

Summary.—The birds of the Solomon Islands have received ample historical attention by explorers, collectors and researchers. Despite this, knowledge of the region's avifauna is categorised by BirdLife International as 'poor' and multiple new populations of birds have been found in recent years, highlighting our incomplete knowledge of the region's avifauna. Here, we present new information on the elevational occurrence, abundance and natural history for ten bird species we observed on Isabel Island. The data we present are based on three weeks of field work at three field sites that included the restricted montane forests above 1,000 m elevation on the Kubonitu-Sasari massif. In this poorly known montane area we observed multiple Island Leaf Warblers *Phylloscopus maforensis* for the first time since it was discovered on Isabel in 1927.

Archipelagos in the South Pacific are high in inter-island species diversity and endemicity. They have contributed to the development of influential theories of evolution, including speciation dynamics and island biogeography (e.g. Mayr 1942, MacArthur & Wilson 1967, Mayr & Diamond 2001). Yet our knowledge of the South Pacific avifauna is incomplete, exemplified by recent discoveries of new populations of birds (DeCicco *et al*. in review, Univ. of Kansas unpubl.) and our understanding of the regional avifauna was categorised as 'poor' by BirdLife International (2015).

The Solomon Islands have a complex and varied geological history that has resulted in a diverse and highly endemic fauna. This archipelago, spanning nearly 1,500 km from north-west to south-east, is oceanic in origin, having never been connected to a continental landmass (Petterson *et al*. 1999). At times of lower sea levels during the last glacial maximum (e.g. Wickler & Spriggs 1988) some of the major islands were joined to form larger landmasses—e.g., Buka, Bougainville, Choiseul, and Isabel were connected, producing a single landmass termed 'Greater Bukida' (Mayr & Diamond 2001). Connectivity among these islands manifests itself in patterns of shared biodiversity. Isabel shares most of its avifauna at the species and subspecies levels with nearby Choiseul and Bougainville (Kaestner 1987, Mayr & Diamond 2001, Dutson 2011). These patterns contrast starkly with the much higher levels of single-island endemism found on those parts of the Solomon archipelago that do not have a history of connectivity (e.g. Makira Island).

Isabel Island (also known as Santa Isabel, Santa Ysabel, Ysabel, or Bugotu) is the fourth largest island in the Solomon archipelago encompassing 4,095 km^2 (Mayr & Diamond 2001). Isabel comprises primarily low-elevation tropical forest with a small area of distinct mossy, montane forest above 1,000 m in the south, on the Kubonitu-Sasari massif (nomenclature follows Whitmore 1969, but spelling changed to Kubonitu to reflect common local usage;

ISSN-2513-9894 (Online)

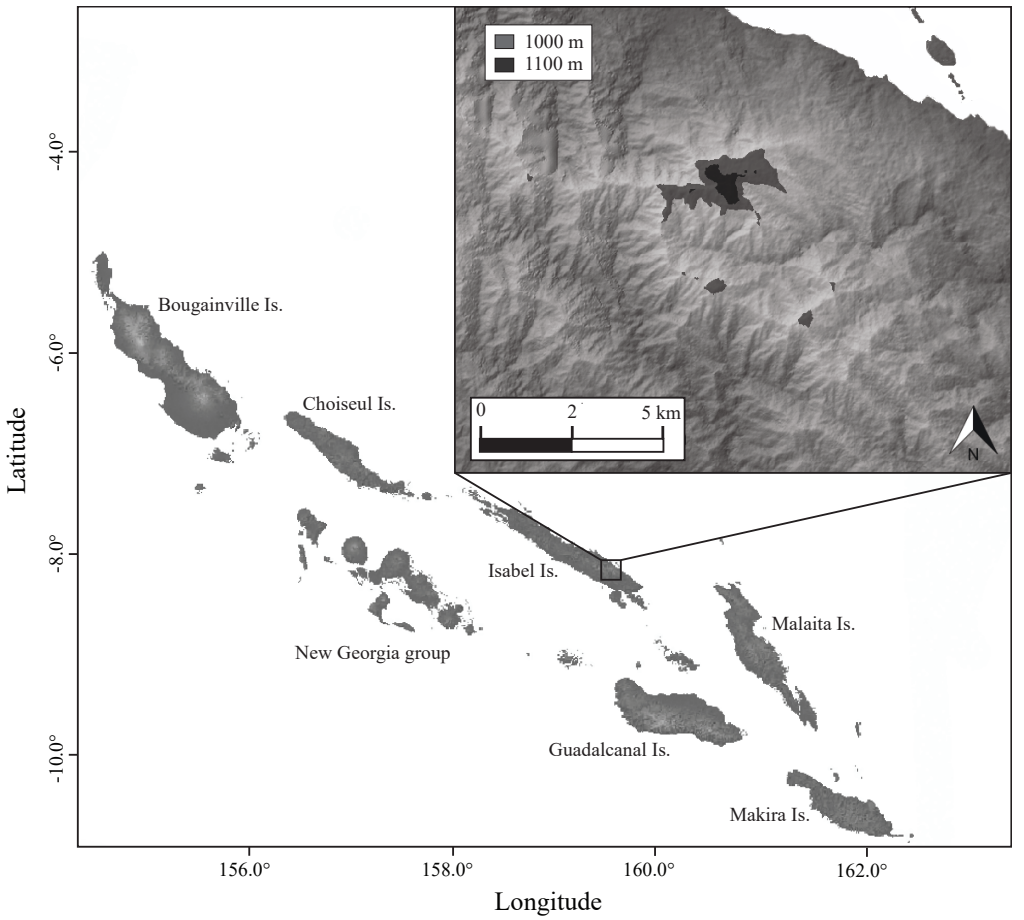

Figure 1. Map of the Kubonitu-Sasari massif (inset), Isabel Island, Solomon Islands, highlighting areas above 1,000 m (4.2 km^2) and above 1,100 m (0.7 km^2). Mossy montane forests occur above 1,000 m and Island Leaf Warbler *Phylloscopus maforensis* appears to be restricted to this elevation on Isabel Island.

Fig. 1). This massif is the highest elevation on Isabel at 1,186 m. The first bird specimens from Isabel were collected in 1838 (Mayr & Diamond 2001) and further collections of its birds were made in the late 1800s (summarised by Tristram 1892, 1894, 1895). In 1900, A. S. Meek made a thorough collection of 58 bird species from Isabel (Rothschild & Hartert 1902). Members of the American Museum of Natural History's (AMNH) Whitney South Sea Expedition visited Isabel in September 1927 and were the first to collect birds in the highlands (Beck 1927, Drowne 1927, Mayr 1935, Mayr & Diamond 2001). More recently, Webb (1992) and Kratter *et al*. (2001) summarised and updated information on the avifauna of Isabel—Webb (1992) focused on new information from his field observations across the island in 1986–88 and Kratter *et al*. (2001) on lowland coastal forests in 1997–98. The mossy montane forests of the Kubonitu-Sasari massif were visited by ornithologists only twice previously, first by the Whitney Expedition and later by Webb (1992). Dutson (2011) summarised much of this information in his field guide, *Birds of Melanesia*.

Here, we present information that adds to our knowledge of occurrence and elevational abundance of select bird species on Isabel. These data stem from field work on Isabel during a survey of the land vertebrates of the Solomon Islands led by the Univ. of Kansas, the

ISSN-2513-9894 (Online)

Figure 2. Examples of mossy montane forest on the Kubonitu-Sasari massif, Isabel Island, Solomon Islands (Lucas H. DeCicco)

Univ. of New Mexico, and Ecological Solutions Solomon Islands in 2018. The information we present improves our knowledge of distribution, abundance and ecology of birds in the region, and on Isabel.

Methods

We spent three weeks on Isabel at three sites: the headwaters of the Kolosita River (7–15 June; 08.159°S, 159.546°E, 550–650 m elevation), Gnulahage and Kolomola villages (6 June and 15–20 June; 08.129°S, 159.538°E, 0–30 m), and the Kubonitu-Sasari massif (12 June and 22–26 June 2018; 10.564°S, 161.905°E, 1,050–1,160 m). These sites permitted us to survey three general habitats: lowland riparian and gardens / coconut plantations (Gnulahage and Kolomola villages), mid-elevation primary hill forest (headwaters of the Kolosita River), and mossy montane forest (above 1,000 m on the Kubonitu-Sasari massif). We accessed the Kubonitu-Sasari massif via Kolomola village, 5.5 km north-northwest of the massif. Our surveys consisted of daily field observations, audio recordings and daily mist-netting using up to 25 12-m nets per site.

We reference audio recordings made during our field work and archived at the Cornell Lab of Ornithology's Macaulay Library (www.macaulaylibrary.org). Specimens and their associated genetic material and parasites taken during this work are deposited at the Univ. of Kansas Natural History Museum, Lawrence, and the Museum of Southwestern Biology, Univ. of New Mexico, Albuquerque. These specimen vouchers provide a manifold record of the avifauna and will be used in ongoing work on the systematics and evolutionary biology of avifauna of the Solomon Islands. We follow the nomenclature and taxonomy of Gill & Donsker (2019).

ISSN-2513-9894 (Online)

Results

Our observations over three weeks of field work recorded 64 species of birds on Isabel Island, from coastal and disturbed lowland habitats to mature mid-montane forest and mossy montane forest above 1,000 m. Our observations from the highlands are of particular note because they provide (1) a modern assessment of the avifauna of this poorly known area and (2) comparison to our observations of the avifauna of mature mid-elevation hill forests. Contradictory reports in the literature claim the highest point on Isabel is either Mt. Sasari or Mt. Kubonitu (e.g. Whitmore 1969, *cf*. Webb 1992). To limit further confusion, we follow Whitmore (1969) and refer to the highest single area as the Kubonitu-Sasari massif and the highest elevation as 1,186 m based on SRTM elevation raster data (USGS) accessed using the R (R Core Team 2014) package 'elevatr' (Hollister & Shah 2017). On Isabel, approximately 4.2 km^2 of land lies above 1,000 m and just 0.7 km^2 of land is above 1,100 m in a single area centred on the Kubonitu-Sasari massif (calculated using a custom script in R; Fig. 1). We noted distinct habitat transitions around 1,000 m at which point the forest structure changed, with smaller trees and dense moss growing on tree trunks and branches. Above 1,000 m, moss and epiphytic growth thickened and trees were shorter and the canopy more open. At *c*.1,100 m habitat transitioned to stunted mossy montane forest including large ferns with a dense contiguous layer of moss covering all surfaces from outer tree branches to the forest floor (Fig. 2). Dense native scrambling bamboo tangles (see Whitmore 1969) were common in openings at this elevation and there was thick understorey growth. Topographically this area was extremely steep, a characteristic also noted by Drowne (1927: 196): 'All this country consists of knife-like ridges and deep canyons…'. The one exception was around the summit itself where there was a small plateau no more than 50 m wide in any direction.

Species accounts

IMITATOR GOSHAWK *Accipiter imitator*

LHD observed a single pied morph on 25 June 2018 at 1,100 m in mossy montane forest on a ridge leading to the summit of the Kubonitu-Sasari massif. He obtained good views using binoculars and recorded >5 minutes of its vocalisations, a series of high-pitched *keek* notes typical of the genus (ML117225041). This rare and elusive species is reported to occur to 1,000 m (e.g. Ferguson-Lees & Christie 2001, Dutson 2011, Debus *et al*. 2019), making ours the highest-elevation report available. Kratter *et al*. (2001) considered the species uncommon in the lowlands of Isabel, and Webb (1992) reported two sightings between Bara and Kologaru villages in July 1988 (but see Debus 1995). *A. imitator*, which occurs on Isabel, Choiseul and Bougainville, is listed as Vulnerable (BirdLife International 2018) and both Dutson (2011) and Gregory (2017) considered it rare and poorly known. Vocalisations were described by Webb (1992) but his identification was questioned by Debus (1995; see also Webb 1995). Kratter *et al*. (2001) also described the vocalisations based on observations from lowland Isabel and audio recordings archived at the Univ. of Florida bioacoustic collection. However, Dutson (2011: 266) still considered the voice of the species 'poorly known', presumably due to discussion and contradictions in the literature. The field identification of *A. imitator* vs. Pied Goshawk *A. albogularis* is not straightforward and the two occur in sympatry on some islands, but *A. albogularis* has not been confirmed on Isabel (see LeCroy *et al*. 2001 for a full discussion on the status of *A. imitator* and *A. albogularis*, plumage morphs of both species, and summary of vocalisations). The pied-morph *A. imitator* that LHD observed in 2018 had white underparts with a black back, head and bib. Although both *A.*

ISSN-2513-9894 (Online)

imitator and *A. albogularis* are polymorphic, only *A. imitator* is known to have a pied morph with a black bib; other pied morphs of both species possess a white throat. Our observation of *A. imitator* at 1,100 m is the highest documented for the species and our audio recordings should clarify some of the confusion regarding the species' vocalisations.

CRESTED CUCKOO-DOVE *Reinwardtoena crassirostris*
We detected a single vocalising individual (ML118125161) on 26 June 2018 at 1,050 m on a ridge leading to the summit of the Kubonitu-Sasari massif. We did not find the species at lower elevations. On Isabel, Webb (1992) reported the species to occur from the lowlands to 400 m and Kratter *et al*. (2001) considered the species to be uncommon in lowland forest. Our record at 1,050 m provides evidence that it occurs at nearly all elevations on Isabel. This is unsurprising as the species is known at similar, or higher, elevations on other islands throughout its range (e.g. Dutson 2011, Gregory 2017) and was considered to be a bird of hill and montane forests by Mayr (1945).

WHITE-RUMPED SWIFTLET *Aerodramus spodiopygius reichenowi*
We observed this species uncommonly around the villages of Kolomola and Gnulahage at *c*.40 m elevation, generally associated with flocks of Uniform *A. vanikorensis* and Glossy Swiftlets *Collocalia esculenta* foraging over open coconut plantations and gardens. Webb (1992) reported the species to be confined to elevations above 700 m on Isabel, but others have also reported it in the lowlands (e.g. Kratter *et al*. 2001) and elsewhere *A. spodiopygius* occurs at all elevations (Dutson 2001, Gregory 2017) making our observations expected.

FINSCH'S PYGMY PARROT *Micropsitta finschii nanina*
M. finschii was observed from *c*.40 m to at least 650 m in the Kolosita River drainage, but nowhere was it numerous. Our observations agree with those of Kratter *et al*. (2001), who found the species in lowland forests of Isabel, but not with previous suggestions that the species is confined to montane habitat above 900 m (e.g. Webb 1992, Mayr 1945). SH described the species nesting in arboreal termitaria, corroborating Forshaw & Cooper (1989) and Kratter *et al*. (2001). We observed *M. finschii* vocalising near an arboreal termitarium that contained a cavity, but did not observe individuals visiting this termitarium.

BLACK-FACED PITTA *Pitta anerythra anerythra*
Uncommon at the Kolosita River site around 600 m, where we estimated up to five individuals daily. During our visit (7–15 June 2018) the species was very vocal both morning and evening (ML11848441, ML118478931) and was strongly associated with dense leafy undergrowth—typically ginger thickets on gentle slopes of drainage bottoms. Endemic to Buka, Bougainville, Choiseul and Isabel, Black-faced Pitta is rare throughout its range (Dutson 2011) and treated as Vulnerable (IUCN). On Isabel, it has been found regularly near Tirotonga village (Dutson 2011); however, Kratter *et al*. (2001) stated that the species is rare in the lowlands and Webb (1992) did not mention it. On Bougainville, *P. anerythra* is thought to be possibly extirpated (Hadden 2004: 180).

RED-CAPPED MYZOMELA *Myzomela lafargei*
Rare in hill forests along the Kolosita River at 500–700 m where we detected three individuals during nine days of field work. We did not observe the species in the lowlands around Gnulahage and Kolomola villages. In stark contrast, it was one of the most numerous species above 1,000 m on the Kubonitu-Sasari massif where we estimated up to 20 individuals daily. Nearly a century ago, Drowne reported a similar pattern of elevational

ISSN-2513-9894 (Online)

abundance: 'the honeysucker [*Myzomela*] being much more common at above 3,000 feet than below it' (Drowne 1927: 196–197). Kratter *et al*. (2001) reported the species to vary from rare to common depending on year in the lowlands of Isabel, Webb (1992) thought it ubiquitous and common, primarily in mid-elevation and lowland areas, and Dutson (2011) reported the species as rare on the island. Given this inconsistency in the literature, we suggest that *M. lafargei* is numerous in montane habitat above 1,000 m with possible seasonal or irruptive movements to lower elevations. These potential movements into the lowlands could have been in response to mature flowering trees, which may no longer exist due to recent, large-scale logging across lower and middle elevations on Isabel.

ORIOLE WHISTLER *Pachycephala orioloides orioloides*
Common in mid-elevation forests of the Kolosita River drainage at *c*.600 m and present to 1,160 m on the Kubonitu-Sasari massif, where it was less numerous than at lower elevations. We did not find the species in disturbed lowland forests around the villages of Kolomola and Gnulahage. Kratter *et al*. (2001) reported *P. orioloides* to be uncommon in the lowlands and Webb (1992) asserted that it is confined to above 900 m. Our observations corroborate Kratter *et al*. (2001), who suggested that the species is uncommon to common at all elevations on Isabel but is probably restricted to intact forest.

RUFOUS FANTAIL *Rhipidura rufifrons commoda*
We detected just one during nine days of field work along the Kolosita River around 600 m, suggesting that the species is rare in mature hill forest. We did not find it in disturbed coconut plantations and gardens around the villages of Kolomola and Gnulahage. Above 1,000 m along ridges leading to the Kubonitu-Sasari massif the species was common and we estimated up to five individuals daily. Kratter *et al*. (2001) described *R. rufifrons* as rare in the lowlands of Isabel, but Webb (1992) considered it common in lowland forests. Drowne (1927) did not note any change in abundance between the lowlands and highlands of Isabel. These conflicting reports suggest that the species is patchily distributed or has vacated lower elevations in recent years.

STEEL-BLUE FLYCATCHER *Myiagra ferrocyanea ferrocyanea*
Rare in mid-elevation hill forests of the Kolosita River drainage with singles recorded twice during our nine days at this site. It was much more regular on ridges leading to the Kubonitu-Sasari massif at 1,050–1,160 m, where up to three were detected daily. Our observations suggest the species is commoner at higher elevations on Isabel. Webb (1992) and Kratter *et al*. (2001) considered the species to be uncommon in lowland and montane forests.

ISLAND LEAF WARBLER *Phylloscopus maforensis becki*
We found up to four in mossy montane forest around the Kubonitu-Sasari massif between 1,080 and 1,186 m on 12 and 22–26 June 2018. Three of the four were seen only above 1,100 m and were encountered daily during 22–26 June; all were singing and not associated with one another. These three appeared territorial as they were well spaced and only two could be heard at any one time, they were not seen paired, and were present in the same general areas on a daily basis. Non-vocal *Phylloscopus* were not detected. Based on these observations, we estimated at least four territorial, presumably male, *P. maforensis* within the surveyed area (a single ridge leading to the summit, and the summit of the Kubonitu-Sasari massif). LHD obtained nine audio recordings of the birds' songs (ML118513481, ML118354981, ML118354401, ML118256811, ML118256401, ML118152721, ML118152641,

ISSN-2513-9894 (Online)

ML118126171, ML118125311). These are the first recordings for the species on Isabel, but no vocal comparison to populations on other islands has been made. None was mist-netted, despite effort. Based on LHD's observations of four individuals over six days, *P. maforensis* is restricted to mossy montane forest above 1,000 m on Isabel, and primarily above 1,100 m. Surveys at lower elevation (7–15 June, *c*.600 m) did not detect the species. The species was previously known on Isabel from a single specimen (AMNH 218146) collected by R. H. Beck on 19 August 1927 on or near the summit of the Kubonitu-Sasari massif (Beck 1927, Drowne 1927). Despite surveys of the Kubonitu-Sasari massif by the Whitney South Sea Expedition six days after Beck's visit (e.g. Drowne 1927) and by Webb (1992) the species was not observed (see Mayr 1945, Webb 1992, Kratter *et al*. 2001, Mayr & Diamond 2001, Dutson 2011). Clement *et al*. (2018) and Dutson (2011) stated that no recent records are available from Isabel. Our records are the second on Isabel and suggest that it is restricted to mossy montane forest above 1,000 m, an area of less than 5 km^2 around the Kubonitu-Sasari massif (Fig. 1). Hartert (1929) described, based on plumage differences, the subspecies *becki* from specimens collected on Guadalcanal in July 1927 and restricted this taxon's distribution to Guadalcanal; he did not mention the Isabel specimen, also collected in 1927. Mayr (1935) described, again based on plumage, three additional subspecies of what was then *P. trivirgatus* in the Solomon Islands, still without mentioning its presence on Isabel. A decade later, Mayr was the first to note the species' occurrence on Isabel, when he extended the range of *P. m. becki* to include Guadalcanal, Malaita and Isabel (Mayr 1945: 253). Due to a paucity of specimen material, a thorough taxonomic review of the species in the Solomon Islands is lacking. We refer to the species as *P. maforensis* following Gill & Donsker (2019), although other authorities have split the taxon into multiple species resulting in the Solomons' populations taking the name *P. poliocephalus* (Pratt & Beehler 2015). Clarity in nomeclature and systematics of this complex demands further study.

Discussion

Our data increases our understanding of some rare and poorly known bird species in the Solomon Islands, particularly on Isabel. Our observations from the highlands of Isabel (above 1,000 m) provide a modern perspective on elevational abundance of species in this under-studied and remote region. We found some interesting parallels with Drowne's (1927) observations, patterns that have been largely unrecorded in the literature (e.g., greater abundance of *Myzomela lafargei* in the highlands). Our observations of *Phylloscopus maforensis* provide the first documentation of the species on Isabel since its discovery in 1927. The lack of information concerning this species is symptomatic of our poor understanding of Isabel's montane avifauna.

Mossy montane forest on Isabel is restricted to an area of *c*.4.2 km^2 and an elevational envelope of <200 vertical metres. These montane habitats are a product of atmospheric conditions, especially lower temperatures and consistent immersion in the cloud layer (e.g. Still *et al*. 1999, Foster 2001, Hermes *et al*. 2018), and are highly susceptible to the effects of climate change. Given the specialised fauna we documented (Univ. of Kansas unpubl. data), the small area, and threat of habitat reduction from climate change, the Kubonitu-Sasari massif should be of special conservation concern. Future surveys of montane fauna in the Solomon Islands, particularly on Isabel, are required to adequately describe the biodiversity in this unique habitat. Modelling and measuring changes in habitat, and habitat association of species, are needed to determine how species distributions may shift in response to climatological factors.

It is important to continue updating our basic knowledge of the distribution and abundance of birds in the Solomon Islands as this provides the building blocks for ongoing

ISSN-2513-9894 (Online)

and future research in the region. Contributions like the present publication provide a record of change in the status and distribution of the archipelago's avifauna and can inform local conservation work aimed to protect critical habitat. Pressure from logging and mining continues to threaten natural habitats across the Solomons, with a dramatic increase in logging licenses and activities since 2000 (Katovai *et al*. 2015) and proposals for nickel mines on Isabel starting in 2016 (Allen & Porter 2016). Much of our knowledge of the Solomons avifauna is restricted to species presence or absence on islands, with few data on elevational abundance, ecology, or more detailed aspects of a species' natural history (Diamond 1975, Mayr & Diamond 2001). Additional documentation of basic natural history information is needed, not only on Isabel, but also for the Solomon Islands and Melanesia as a whole.

Acknowledgements

We thank members of the communities of Gnulahage and Kolomola for their assistance in the field, guidance, hospitality, and willingness to share their invaluable knowledge of their communal lands, namely: Japhet Tofa, Zephanial Kokili, Eward Fonea, Garoldine Teiara, Alfon Chanal and Donald Kotimana. We thank Agatha Pogha and Leonard Sati for allowing access to communal Veranitu land including the Kubonitu-Sasari massif. We thank Anne Pogha and Delma Ragoso for general assistance of our work on Isabel. Bryce Robinson, Jonathan Hruska and Emily Ostrow kindly provided editorial comments on this note, for which it is much improved. Reviews and edits by Bruce M. Beehler, an annonymous reviewer, and Guy Kirwan were appreciated and greatly improved this manuscript. This work was supported by National Science Foundation grants to RGM (DEB-1557053) and MJA (DEB-1557051) and conducted under research permit RP/2017/001 issued by the Solomon Islands government.

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ISSN-2513-9894 (Online)