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A collaborative bird survey of East Kwaio, Malaita, Solomon Islands

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Abstract
We surveyed the birds of East Kwaio, Malaita, Solomon Islands from 20 October to 2 November 2018. We conducted 66 point counts and recorded or observed 58 species of resident landbirds, including 23 of the 24 passerine species known from the island of Malaita and 15 waterbird species. We collected some form of samples (e.g., whole specimens and/or blood samples) from 61 individuals of 17 species, including representatives of the four species-level endemics: Malaita Fantail *Rhipidura malaitae* (Mayr, 1931), Malaita Dwarf-Kingfisher *Ceyx malaitae* (Mayr, 1935), Malaita White-eye *Zosterops stresemanni* (Mayr, 1931), and Red-bellied Myzomela *Myzomela malaitae* (Mayr, 1931). We demonstrate the considerable potential for conservation of the Malaitan avifauna on traditional lands in the mountains of East Kwaio. The extensive knowledge of the local people was a key factor in the success of the expedition. To facilitate ongoing conservation efforts, we documented the local Kwaio names of the birds we encountered.

Keywords
Avifauna, *Ceyx malaitae*, eBird, endemic, *Myzomela malaitae*, *Rhipidura malaitae, Zosterops stresemanni*.

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Introduction

The fauna of islands has been fundamental to the development of our understanding of evolution and speciation (e.g., Darwin 1859; Wallace 1880). Solomon Islands in Northern Melanesia are no exception: "there is no other place in the world more favorable for the study of speciation in birds than the Solomon Islands" (Hartert in Mayr and Diamond 2001: vii). The Solomon Islands archipelago (including Bougainville Island) consists of six large (>500 km^2) islands and more than 900 smaller islands to the south-east of Papua New Guinea. Nearly 300 species of birds are known from the Solomon Islands (Dutson 2011), and even today, taxonomic revisions based on new molecular evidence have recognized many populations formerly considered conspecific with others as distinct species (e.g., Andersen et al. 2013, 2014). Eighty-five species are endemic to the Solomons archipelago (including Bougainville), many of which are confined to single islands (Gibbs 1996; Dutson 2011).

The island of Malaita, at 4225 km^2, is the second largest island in the Solomon Islands, and the province of Malaita has the largest human population at 137,000 (2009 census; http://www.statistics.gov.sb). Malaita is

about 190 km long and 30 km wide with low hills (up to about 600 m) in the north and south of the island. In the centre of Malaita, the mountains reach up to 1300 m. The island is predominantly composed of a basaltic core, covered by a sedimentary layer (limestone and chert), forming many caverns and sinkholes throughout the island (Ross 1973). Further, Malaita is somewhat separated from the rest of the island chain and has never been connected with Greater Bukida, for example, leading to relatively high levels of endemism (Mayr 1931b).

The Malaitan avifauna has received limited attention by western scientists, relative to the rest of the Solomon Islands (Mayr 1931b), evidenced by the fact that nearly all other islands were surveyed before Malaita (e.g., by Meek). This is, in part, because of the historically strained relationships between Malaitans and outsiders, with roots in colonial government oppression and the strident independence of Malaitans to continue cultural practices on their traditional land. As an example, in 1927 the British Colonial office authorized a "punitive expedition" to avenge the assassination of a colonial officer collecting the "native head tax". The mass atrocities that ensued have been dubbed the "Malaita massacre" (Keesing and Corris 1980). Since those times, outsiders, particularly Europeans, have been met with suspicion and are largely unwelcome on traditional lands (Lavery et al. 2018).

Much of the western scientific knowledge of the avifauna of Malaita comes from the Whitney South Sea Expedition undertaken by the American Museum of Natural History between 1920 and 1941 (Mayr 1931b). Mayr's (1931b) report on the expedition from Malaita stated that prior to the Whitney South Sea Expedition there was no mention of Malaita in the ornithological literature. Reflecting the colonial language and approach of the time, the report (Mayr 1931b: 1) stated that Malaita "was formerly considered a dangerous place on account of its very independent and savage natives". The Whitney Expedition collected 1,060 specimens of 62 species and resulted in the description of 18 new taxa (15 subspecies and 3 species) including four currently recognized as species endemic to Malaita (Mayr 1931b). Very few birders have visited Malaita since the Whitney Expedition of 1930. For example, although the global eBird database (Sullivan et al. 2009) contains more than 600 million observations contributed by over 400,000 observers, there have been only 16 complete checklists reported from Malaita prior to our trip. We know of only three recent expeditions by ornithologists since 2000 (DeCicco pers. comm; http://www.vertnet.org): (1) Filardi, from the University of Washington Burke Museum of Natural History and Culture (UWBM), collected 29 specimens in 2000; (2) University of Kansas Biodiversity Institute (KU) collected 70 specimens in 2008; and (3) KU collected 70 specimens in 2015. Over 90 % of Malaita's landmass is customary land defined as land collectively owned by a traditional tribe and handed from generation to generation. While government permission/permits may be required for access to land, these are often negated by traditional landowners who hold customary land title and are responsible for the maintenance of sacred sites and cultural heritage. Owing to the historical enmities and complexity of gaining permission to travel to the highlands, most of the aforementioned recent bird survey activity (i.e., birders and professional ornithologists) has been restricted to the lowlands of Malaita.

Because Malaita supports the highest human population of the Solomon Islands, most of the primary forest has been replaced by rotating subsistence gardens and secondary growth. In some locations, the most recent gardens may have been several hundred years ago, providing ample time for secondary growth forest to occur, as reported by the Whitney Expedition (Mayr 1931b). Substantial loss of the remaining forest is occurring due to timber harvesting throughout the Solomon Islands (and Malaita), which in 2018 accounted for 75% of exports of goods and 72% of Solomon Islands' government revenue (Workman 2019). Despite recognizing the negative impact that this deforestation has on natural ecosystems, there is pressure to continue unsustainable timber harvesting resulting in new logging licenses and further tree-felling (Workman 2018). The threat to the natural forests is of particular concern to the people who seek to maintain their traditional culture on their Kastom land, and several groups have recently established cultural centres as an initiative to shore up traditional practices (Esau and Kekubata 2017). One of the most established cultural centres in Malaita is the Kwainaa'isi Cultural Centre, which is teaching traditional activities, establishing sustainable conservation-based income streams and restoring peace amongst groups that have experienced long-term unrest (Esau 2015, 2018).

One important initiative of the Kwainaa'isi Cultural Centre was to spearhead the creation of conservation reserves by customary landowners to protect mammalian species recently rediscovered in the highlands of Malaita (Esau and Kekeubata 2017). This initiative involved philanthropic support and collaboration with scientists associated with the University of Kansas and Australian Museum. After many months of negotiation, in July 2018, the Kwainaa'isi Cultural Centre facilitated a peace and reconciliation process between the groups involved in the 1927 Malaita Massacre, paving the way for future collaborative work (Lavery et al. 2018). The Australian Museum Ornithology group was the first group of visiting scientists to partner with Kwainaa'isi Cultural Centre after the reconciliation process. This partnership presented an outstanding opportunity for a survey of the avifauna of East Kwaio. Our team from the Australian Museum and Kwainaa'isi Cultural Centre had three specific objectives. First, we wished to determine how effective the newly established Kwainaa'isi conservation reserve is in providing habitat for the landbirds of Malaita. Second, we sought to determine the current status of species of conservation interest,

including Malaitan endemics. Finally, we wanted to collect museum specimens (i.e., skins) and tissue samples so that high-quality genetic material is available for certain species that have previously been omitted from recent taxonomic revisions due to lack of fresh genetic material (e.g., Nyári et al. 2009; Andersen et al. 2014).

Methods

Study sites. This study was conducted predominantly in two areas of the East Kwaio region of Malaita, Solomon Islands (Fig. 1). Surveys of lowland ecosystems (predominantly 0–50 m) were based at Gala Island (08°51.42'S, 161°01.56'E near Atoifi, and took place in the periods 20–23 October, and 31 October–2 November 2018. All lowland mist-netting and most checklist surveys (N = 9) were situated on Gala, but additional observations (N = 7) were made while travelling to and from the island and on a one-day boat trip to `Olomburi and the nearby `Aa`aesina Cultural Centre (08°59.16′S, 161°05.64′E) which was between 0 and 150 m.

Surveys of highland ecosystems were based at Kwainaa'isi Cultural Centre (08°56.76′S, 161°00.66′E) and took place between 23 and 31 October. In addition to the surveys in the immediate surrounds of Kwainaa'isi (N = 23), a sequence of five-minute surveys (N = 21) were undertaken along a transect from Kwainaa'isi to Atoifi. Most highland bird captures occurred around Kwainaa'isi between 850 and 950 m, except for 15 individuals that were captured at two forest locations two hours walk away (08°58.80′S, 161°00.18′E; 08°59.80′S, 160°59.00′E), and individuals captured from a nearby cave (08°59.94′S, 161°0.90′E).

Lowland ecosystems comprised a mosaic of gardens, palms, and rainforest that was at various stages of regrowth following clearing for subsistence gardens. Extensive mangrove forests occurred along the coasts and intertidal areas around Gala, accessible mainly by boat. Highland ecosystems mostly comprised mature rainforest, interspersed with patches of regrowth vegetation at various stages of regeneration following clearing for gardens, with a transition to mossy montane forest.

Checklist surveys. Visual/audio surveys were conducted by one observer (CTC) accompanied by between one and eight assistants (Fig. 2). The eBird-survey method was used (Sullivan et al. 2009) by which a list of species seen or heard, and their estimated abundance, was recorded during each survey. Surveys employed either the stationary protocol (N = 36), with duration ranging from 5–35 minutes, or the travelling protocol (N = 27), with duration ranging from 25–160 minutes. Travelling protocol surveys ranged in distance from 0.1–8.05 km. The main focus was on documenting the avifauna surrounding the Kwainaa'isi Cultural Centre, and as such, for each species, the percentage of occurrence on a checklist survey was calculated as an index of commonness.

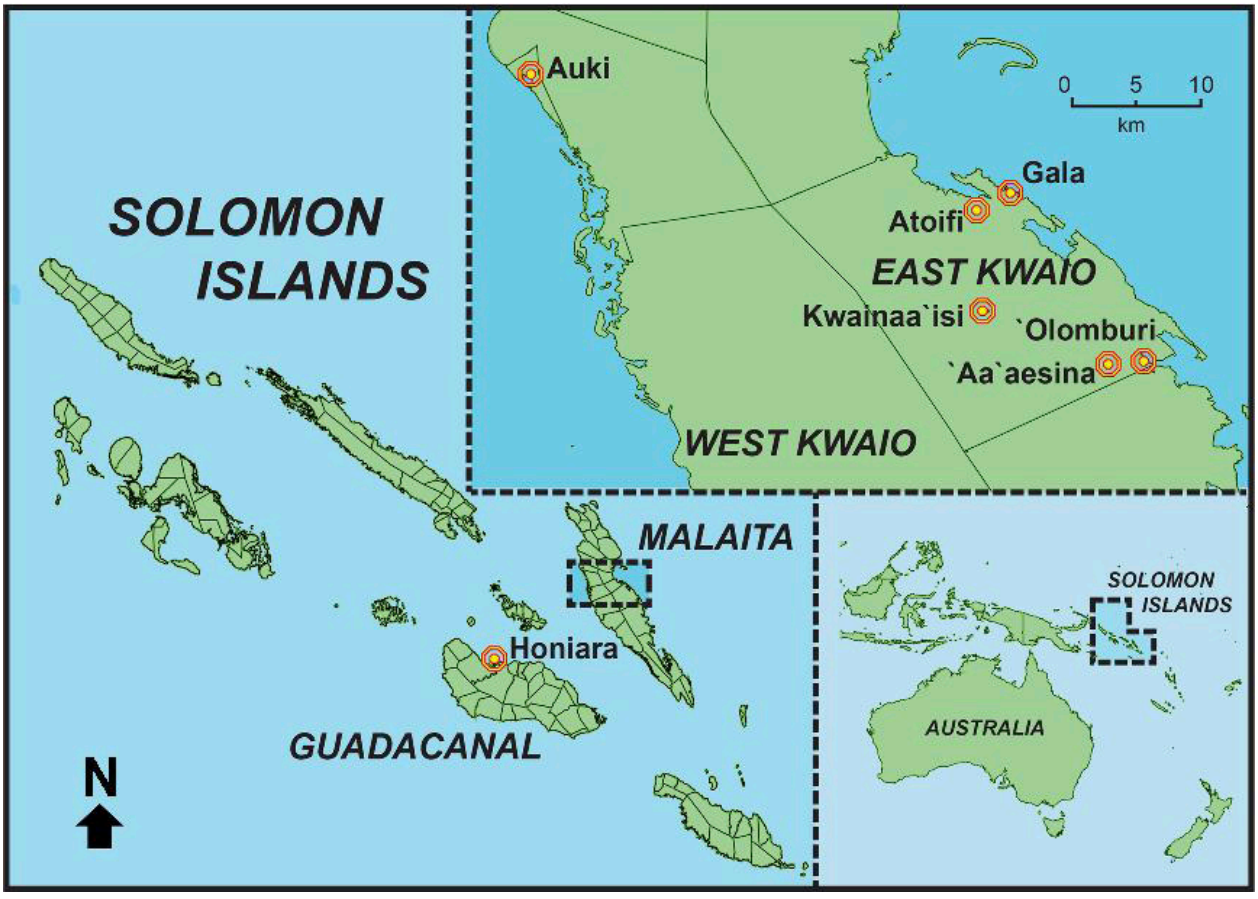

Figure 1. The location of survey sites in East Kwaio, Malaita, Solomon Islands.

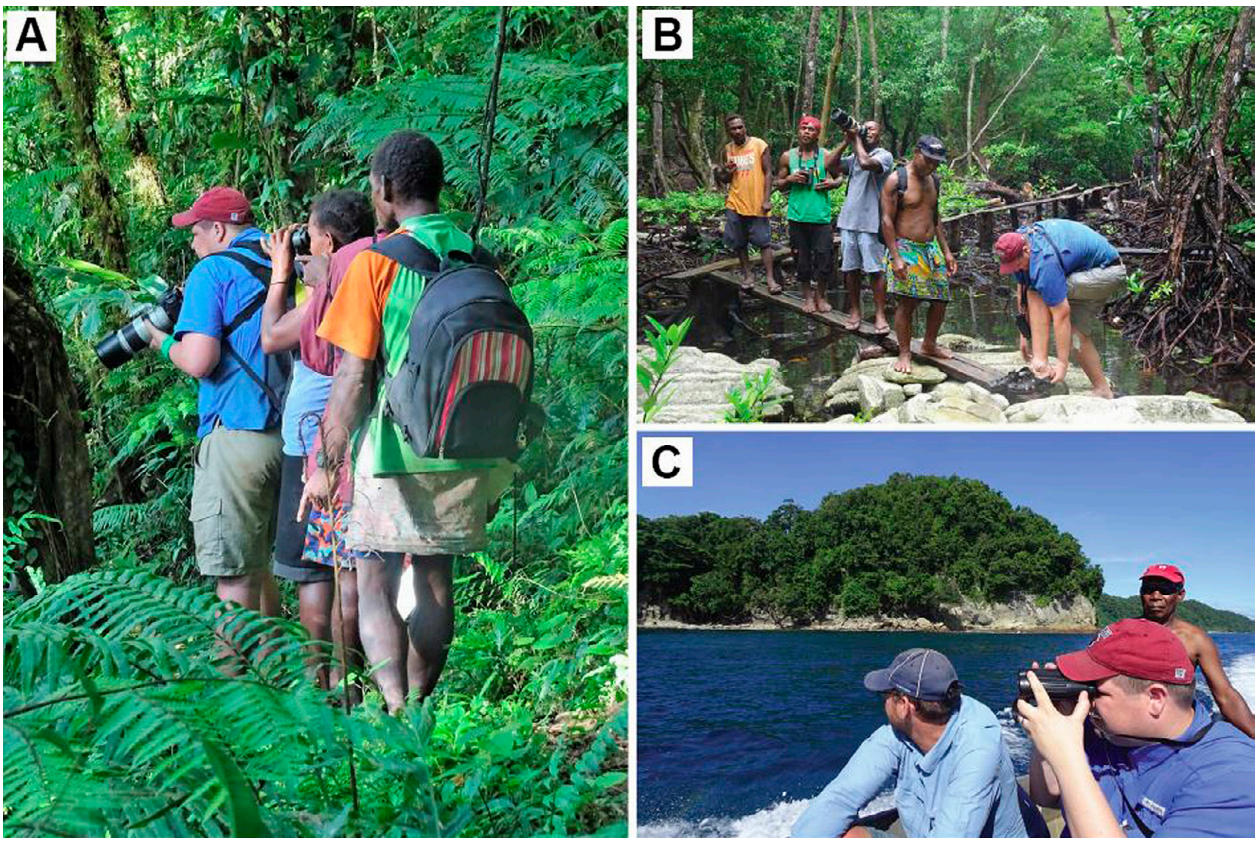

Figure 2. Surveying birds at **A.** Kwainaa'isi, **B.** Gala Island and while travelling to **C.** `Aa`aesina , East Kwaio.

Figure 3. Deploying a canopy mist net near the Kwainaa'isi Cultural Centre (**A),** with captured Rufous Fantail (**B)** and Malaita White-eye (**C**).

Capture surveys. Seven 18 m and two 15 m mistnets were deployed to catch birds for collection of samples and specimens (Fig. 3). Initially nets were located from ground level to 3 m but were progressively relocated to positions in the canopy through the course of the field trip. Nets were deployed between sunrise and sunset and

were checked continuously throughout the day. Our aim was to collect voucher specimens (i.e., skins) and associated tissue samples of one male and one female of each species. Tissue samples were stored in 100% ethanol. For all individuals captured but not taken as a voucher specimen we obtained photographs, measurements (weight, wing chord length, tail length, head plus bill length, culmen length, diagonal tarsus length), and 10–75 microlitres of blood stored in 100% ethanol. In addition to birds collected by mistnets, some specimens were collected by traditional hunting methods, including bow and arrow, throwing stick, and hand collection from a cave and roosts.

Surveys and collections were authorized under Bioresearch Permit RP/2018/003 and Animal Care and Ethics approval AM/19-06. The Kwainaa'isi Cultural Centre Council and tribal leaders on whose land the surveys and collections took place also authorized these activities. Museum voucher specimens were transported from the Solomon Islands according to Export Permit EX2018/144. We deposited specimens at the Australian Museum Ornithological collections, Sydney, NSW, Australia. Audio recordings and photos are archived at the Kwainaa'isi Cultural Centre and at the Macaulay Library, Cornell Lab of Ornithology, Ithaca, NY, USA, and are available online (http://www.macaulaylibrary.org). Observational data are archived on eBird (http://www.ebird.org). Taxonomy and nomenclature follow Clements et al. (2018). Species identifications were made in the field using Dutson (2011) and in consultation with relevant recordings from xeno-canto (https://www.xeno-canto.org/).

Results

We observed a total of 73 bird species, 58 landbird species and 15 waterbird species. The majority of waterbird species were observed while visiting sites around Gala (08°51.42′S, 161°01.56′E). All species were native, aside from Common Myna *Acroditheres tristis* (Linnaeus, 1766) which was observed in the small township of Atoifi. We found 41 species in the highland ecosystems (i.e., the surrounds of the Kwainaa'isi Cultural Centre at 850–980 m) and 66 species in the lowland ecosystems (i.e., the surrounds of Gala and `Olomburi and the nearby `Aa`aesina Cultural Centre at 0–80 m). Table 1 shows where the species were recorded or observed, but we note that these results are confounded by the unequal amount of time spent within each elevational range ecosystem, and our objective was not to compare community types between habitats. We collected 61 samples (38 skins, 21 blood samples, and 2 feather samples), deposited at the Australian Museum, of 17 species (Table 1; Appendix 1), including representatives of the four endemic species (Fig. 4A–E): Malaita Fantail *Rhipidura malaitae* (Mayr, 1931), Malaita Dwarf-Kingfisher *Ceyx malaitae* (Mayr, 1935), Malaita White-eye *Zosterops stresemanni* (Mayr, 1931), and Red-bellied Myzomela *Myzomela malaitae* (Mayr, 1931). These are some of only a few records of the Malaita Dwarf-Kingfisher (three were collected in 2015 by KU) since the species was split from the Variable Dwarf Kingfisher (Andersen et al. 2013) and the first specimen of the Malaita Fantail collected since 1930. In addition, we observed or recorded all 14 of the currently recognized endemic subspecies of Malaita: Yellow-bibbed Fruit-Dove *Ptilinopus solomonensis ambiguus*; Variable Goshawk *Accipiter hiogaster malaitae*; Solomons Boobook *Ninox jacquinoti malaitae*; Pacific Kingfisher *Todiramphus sacer mala*; Barred Cuckooshrike *Coracina lineata malaitae*; White-bellied Cuckooshrike *Coracina papuensis eyerdami*; Solomons Cuckooshrike *Edolisoma holopolium tricolor*; Oriole Whistler *Pachycephala orioloides sanfordi*; Cockerell's Fantail *Rhipidura cockerelli coultasi*; Rufous Fantail *Rhipidura rufifrons brunnea*; Black-and-white Monarch *Symposiachrus barbatus malaitae*; Steel-blue Flycatcher *Myiagra ferrocyanea malaitae*; Brown-winged Starling *Aplonis grandis malaitae*; and Midget Flowerpecker *Dicaeum aeneum malaitae*.

Annotated list. We present an annotated list for all 73 species we encountered in East Kwaio, Malaita. Taxonomy and nomenclature follow *The eBird/Clements Checklist of Birds of the World* (Clements et al. 2018). Identification of forest birds in Malaita is generally straightforward because most genera only have one or two representatives. In some instances, we do include pertinent field marks (e.g., size, structure, feather coloration, morphological characteristics) noted in the field. In other instances, we note whether or not we consider that species to be distinct in the avifauna of Malaita. Table 1 provides reference to archived audio recordings or photos used for identification. When such material is present, we refer to these materials under the 'Identification' section in the annotated list. We referenced Dutson (2011) in the field. Not all species are annotated in depth, and for those which are annotated we reference the relative abundance (e.g., scarce, common, abundant) within lowland ecosystems compared with highland ecosystems (Fig. 1; Table 1).

Anseriformes

Anas superciliosa J.F. Gmelin, 1789. Pacific Black Duck

Uncommon in coastal lowlands. Found in mangroves. *Identification*: Large duck, with distinct facial pattern. Unlikely to be confused with other waterfowl. Table 1.

Columbiformes

Chalcophaps stephani E.P. Ramsay, 1882. Stephan's Dove

Common at all elevations. Frequently heard, but infrequently seen. *Identification*: Calls were checked with xeno-canto recordings in the field, confirming a monotonous repetitive low "woom, woom, woom", increasing in speed throughout its call.

Columba vitiensis Quoy & Gaimard, 1832. Metallic Pigeon

Seen in flight at field station at Kwainaa'isi Cultural Centre. Potentially scarce, but potentially difficult to

Table 1. A list of all species observed or recorded and their common and scientific name (from eBird/Clements taxonomy 2018), as well as their local Kwaio name. All birds were seen at East Kwaio, Malaita, Solomon Islands.

Common Name	Scientific Name	Kwaio Name	Survey area			Vouchers		
			East Kwaio	Kwainaa'isi	Gala	Spec.	Voice	Photo
Pacific Black Duck	*Anas superciliosa*	Dakidaki	Y		Y			ML121840261
Metallic Pigeon	*Columba vitiensis*	Keke'o	Y	Y				
Mackinlay's Cuckoo-Dove	*Macropygia mackinlayi*	Gouku	Y	Y		Y		
Crested Cuckoo-Dove	*Reinwardtoena crassirostris*	Goususu'a	Y	Y			ML122533371	
Stephan's Dove	*Chalcophaps stephani*	Lamu'o	Y	Y	Y			
Superb Fruit-Dove	*Ptilinopus superbus*	Faao alaga	Y	Y	Y	Y		ML121863801
Yellow-bibbed Fruit-Dove	*Ptilinopus solomonensis*	Faao buke (female); Faao lolodami (male)	Y	Y		Y		
Claret-breasted Fruit-Dove	*Ptilinopus viridis*	Faao 'ebu	Y	Y	Y			ML121867351
Red-knobbed Imperial-Pigeon	*Ducula rubricera*	Toriodu*	Y	Y	Y			ML121883631
Island Imperial-Pigeon	*Ducula pistrinaria*	Bolaniasi	Y		Y			ML121842261
Pacific Koel	*Eudynamys orientalis*	To'oa	Y	Y				
Brush Cuckoo	*Cacomantis variolosus*		Y					
Glossy Swiftlet	*Collocalia esculenta*	Faifailalo*	Y	Y	Y	Y		
White-rumped Swiftlet	*Aerodramus spodiopygius*	Faifailalo*	Y	Y				
Uniform Swiftlet	*Aerodramus vanikorensis*	Faifailalo*	Y	Y	Y	Y		
Moustached Treeswift	*Hemiprocne mystacea*	Kakabai'i	Y					
Lesser Sand-Plover	*Charadrius mongolus*		Y					
Whimbrel	*Numenius phaeopus*		Y		Y			
Ruddy Turnstone	*Arenaria interpres*		Y					ML121845591
Common Sandpiper	*Actitis hypoleucos*		Y					ML121838361
Gray-tailed Tattler	*Tringa brevipes*		Y					ML121846001
Brown Noddy	*Anous stolidus*		Y		Y			
Little Tern	*Sternula albifrons*		Y					
Black-naped Tern	*Sterna sumatrana*		Y					ML124677271
Common Tern	*Sterna hirundo*		Y					
Great Crested Tern	*Thalasseus bergii*		Y					ML121839311
Lesser Frigatebird	*Fregata ariel*		Y					
Pacific Reef-Heron	*Egretta sacra*	Tou	Y					ML121844251
Striated Heron	*Butorides striata*	Didiukokosu	Y		Y			
Osprey	*Pandion haliaetus*	'Arui'a	Y		Y			
Variable Goshawk	*Accipiter hiogaster*	Alagauu	Y					
Pied Goshawk	*Accipiter albogularis*		Y	Y				ML121862931
Brahminy Kite	*Haliastur indus*	Folowa'a	Y	Y	Y			ML121845731
Sanford's Sea-Eagle	*Haliaeetus sanfordi*	Faada	Y	Y				
Solomons Boobook	*Ninox jacquinoti*	Ko'oko'o*	Y					
Blyth's Hornbill	*Rhyticeros plicatus*	Burui	Y	Y				ML121860641

Common Name	Scientific Name	Kwaio Name	Survey area			Vouchers		
			East Kwaio	Kwainaa'isi	Gala	Spec.	Voice	Photo
Common Kingfisher	*Alcedo atthis*	'i 'i	Y		Y			ML121848361
Little Kingfisher	*Ceyx pusillus*	Du'u	Y		Y			ML121867571
Malaita Dwarf-Kingfisher	*Ceyx malaitae*	'i 'i nikafu	Y	Y		Y		ML121865431
Pacific Kingfisher	*Todiramphus sacer*	'Ii 'ii	Y	Y	Y		ML122524121	ML121842221
Beach Kingfisher	*Todiramphus saurophagus*	Kiokio	Y		Y			ML121843461
Dollarbird	*Eurystomus orientalis*	Kii kiritoa	Y	Y				
Peregrine Falcon	*Falco peregrinus*		Y					
Ducorps's Cockatoo	*Cacatua ducorpsii*	'Ege	Y	Y	Y			
Finsch's Pygmy-Parrot	*Micropsitta finschii*	Manukwakwala	Y					
Eclectus Parrot	*Eclectus roratus*	A'ala	Y	Y	Y		ML122522051	
Singing Parrot	*Geoffroyus heteroclitus*	Kilakila	Y	Y			ML122526451	ML121859881
Cardinal Lory	*Chalcopsitta cardinalis*	Kole'eniu	Y	Y	Y			
Yellow-bibbed Lory	*Lorius chlorocercus*	Kilori	Y	Y	Y		ML122521611	
Rainbow Lorikeet	*Trichoglossus haematodus*	Gwa'alabusi	Y		Y			
Red-bellied Myzomela	*Myzomela malaitae*	Subaa meku	Y	Y		Y	ML122526431	ML121859011
Barred Cuckooshrike	*Coracina lineata*	Kiokio fataia	Y	Y			ML122533381	
White-bellied Cuckooshrike	*Coracina papuensis*	Kwalafirifiri'a	Y	Y	Y			ML121864791
Solomons Cuckooshrike	*Edolisoma holopolium*	Mamakola (male); Gogosufue (female)	Y	Y			ML122531251	ML121865241
Common Cicadabird	*Edolisoma tenuirostre*	Kwikwi	Y	Y				ML121857661
Oriole Whistler	*Pachycephala orioloides*	Koteo	Y	Y		Y		ML121864831
Cockerell's Fantail	*Rhipidura cockerelli*	La'e totoki	Y	Y			ML122531321	ML121861971
Willie-wagtail	*Rhipidura leucophrys*	La'e	Y		Y	Y	ML122523371	ML121840191
Malaita Fantail	*Rhipidura malaitae*	La'e ni ile	Y	Y		Y		
Rufous Fantail	*Rhipidura rufifrons*	La'e biruae	Y	Y		Y		ML121863021
Chestnut-bellied Monarch	*Monarcha castaneiventris*	Kaakalasibiriu	Y	Y	Y	Y	ML122531201	ML121861641
Black-and-white Monarch	*Symposiachrus barbatus*	Kaakalasimanuburufo'a	Y	Y		Y		
Steel-blue Flycatcher	*Myiagra ferrocyanea*	Kotofikabi	Y	Y				ML121858751
Pacific Swallow	*Hirundo tahitica*	Si'siri	Y					ML121868671
Island Leaf Warbler	*Phylloscopus maforensis*	Kakalasi	Y	Y				
Malaita White-eye	*Zosterops stresemanni*	Didioko	Y	Y		Y		ML121858681
Metallic Starling	*Aplonis metallica*	Dodole*	Y	Y	Y			
Brown-winged Starling	*Aplonis grandis*	Kwadu	Y	Y	Y	Y		ML121864821
Singing Starling	*Aplonis cantoroides*	Dodole*	Y	Y	Y			ML121869801
Long-tailed Myna	*Mino kreffti*	Singeo	Y	Y	Y			ML121860021
Common Myna	*Acridotheres tristis*	Bitiri	Y					ML121868601
Midget Flowerpecker	*Dicaeum aeneum*	'Isufii	Y	Y		Y		ML121858241
Olive-backed Sunbird	*Cinnyris jugularis*	Susufunale	Y		Y	Y		

Common Name	Scientific Name	Kwaio Name	Survey area			Vouchers		
			East Kwaio	Kwainaa'isi	Gala	Spec.	Voice	Photo
Melanesian Scrubfowl†	*Megapodius eremita*	Keeke'o						
Buff-banded Rail†	*Gallirallus philippensis*	Koogeo						
Purple Swamphen†	*Porphyrio melanotus*	Gwii						
Pacific Imperial-Pigeon†	*Ducula pacifica*	Toriodu*						
Chestnut-bellied Imperial-Pigeon†	*Ducula brenchleyi*	Bolaruru						
Long-tailed Koel†	*Urodynamis taitensis*	Wigii						
Oriental Cuckoo†	*Cuculus optatus*	So'so'omonu						
Oriental Hobby†	*Falco severus*	Fiiu						
Barn Owl†	*Tyto alba*	Ko'oko'o*						
Duchess Lorikeet†	*Charmosyna margarethae*	Suri/Rikorikowasa						

* Denotes species which share the same Kwaio name.
† Denotes species that were not observed during the survey, but for which Kwaio names were recorded.

detect. *Identification*: Large pigeon with dark wings and a metallic sheen.

Ducula pistrinaria Bonaparte, 1855. Island Imperial-Pigeon

Common along coast only. Frequently observed sitting in the open on snags (i.e., dead standing trees) in mangrove habitats. *Identification*: Large, pale pigeon with distinctive booming call that increases in speed. Table 1.

Ducula rubricera (Bonaparte, 1854). Red-knobbed Imperial-Pigeon

One of the most abundant columbids seen on our surveys. Frequently seen in flight, also observed foraging in groups ranging from five to ten individuals. Common to abundant at all elevations. *Identification*: Distinctive, with a red 'knob' on its bill. Table 1.

Macropygia mackinlayi E.P. Ramsay, 1878. Mackinlay's Cuckoo-Dove

Uncommon. Observed and heard at mid to high elevations (~600 m–850 m). *Identification*: Fig. 5A. *Voucher registration number(s)*: O.78232 (skin).

Ptilinopus solomonensis (G.R. Gray, 1870). Yellow-bibbed Fruit-Dove

Common above 850 m in mature mossy montane forest. Belonging to the *ambiguus* subspecies. *Identification*: Fig. 5B. *Voucher registration number(s)*: O.78244 (skin)

Ptilinopus superbus (Temminck, 1809). Superb Fruit-Dove

The most abundant of the fruit-doves. At one point, a flock of ~30–50 individuals flew above us, mixed with other fruit-dove spp. Heard more often than seen. *Identification*: Fig. 5C, Table 1. *Voucher registration number(s)*: O.78245 (skin).

Ptilinopus viridis (Linnaeus, 1766). Claret-breasted Fruit-Dove

Commonly heard, but infrequently seen, at all elevations. *Identification*: Table 1.

Reinwardtoena crassirostris (Gould, 1856). Crested Cuckoo-Dove

Heard only at high elevation above 900 m. *Identification*: Gives very distinctive call that can be heard at great distances, of a single rising "woo woooo", where the first syllable is sometimes not audible. Call was referenced using xeno-canto recordings. Table 1.

Cuculiformes

Cacomantis variolosus (Vigors & Horsfield, 1827). Brush Cuckoo

Uncommon. Heard calling once in lowlands (0–50 m) from scrubby/brushy habitat. *Identification*: Calls were referenced in the field; the bird was not observed.

Eudynamys orientalis (Linnaeus, 1766). Pacific Koel

Uncommon. Heard only. Between 400 and 600 m. *Identification*: Identified by their distinctive 'koo-eee' call; calls were referenced in the field.

Caprimulgiformes

Aerodramus spodiopygius (Peale, 1849). White-rumped Swiftlet

Scarce. A small number observed once in mixed flock with Glossy and Uniform swiftlets. *Identification*: We identified this species based on its mostly darky/sooty upperparts, similar to Uniform Swiftlet, with no noticeable sheen observed. A smudgy white rump was clearly visible, with little contrast between the overall uniform dark/sooty upperparts and underparts, compared with the white 'rump' which more noticeably contrasted with the glossy plumage on Glossy Swiftlet.

Aerodramus vanikorensis (Quoy & Gaimard, 1832). Uniform Swiftlet

Common at all elevations. Often seen high above the canopy, and at one point observed an extremely large flock (~200 birds) of presumed Uniform Swiftlets along the coast. Potentially more common in lowland ecosystems than highland ecosystems. *Identification*: Overall darker and duller in color on dorsum than Glossy Swiftlet, with no apparent sheen observed, ruling out Glossy Swiftlet. Lacked any white rump, ruling out White-rumped Swiftlet. *Voucher registration number(s)*: O.78247 (skin).

Collocalia esculenta (Linneaus, 1758). Glossy Swiftlet

Common, but at lower abundance than Uniform Swiftlet. Habitat seemed to help separate Glossy Swiftlet from Uniform Swiftlet. Glossy Swiftlet was frequently observed foraging low, under the canopy, in dense forest, and in smaller numbers. *Identification*: 'Glossy' sheen observed in the sun, with dark-purple glossy wings. Small amounts of white contrasted starkly with the overall glossy plumage in flight, giving an apparent 'rump', although the dorsum was mostly dark gloss above, as the white did not complete a full rump patch. Compare with descriptions of Uniform Swiftlet and White-rumped Swiftlet above. *Voucher registration number(s)*: O.78250 (skin); O.78258 (skin); O.78260 (skin); O.78261 (skin); O.78265 (skin); O.78266 (skin); O.78267 (skin); O.78268 (skin).

Hemiprocne mystacea (Lesson & Garnot, 1827). Moustached Treeswift

Uncommon. Observed once in flight with Glossy Swiftlets, at mid-elevation (~200 m). *Identification*: Distinct, long wings, quick flight, compared with swiftlets. Light color on back contrasting with darker wings.

Charadriiformes

Charadrius mongolus Pallas, 1776. Lesser Sand-Plover

Observed once along the coast, but difficult to estimate relative abundance due to the paucity of time we spent in appropriate habitat. *Identification*: Plover-like bird, with relatively short bill compared to head length, ruling out Greater Sand-Plover, which would be a vagrant to the area.

Numenius phaeopus (Linnaeus, 1758). Whimbrel

Uncommon along the coast. Observed roosting on dead mangrove trees near Gala Island. *Identification*: Long, curved bill, distinct.

Arenaria interpres (Linnaeus, 1758). Ruddy Turnstone

Observed a group of three individuals in the wrack line, but difficult to estimate relative abundance due to the lack of time we spent in appropriate habitat. *Identification*: Table 1.

Actitis hypoleucos (Linnaeus, 1758). Common Sandpiper

Common along coasts, particularly within mangroves. *Identification*: Table 1.

Tringa brevipes (Vieillot, 1816). Gray-tailed Tattler

Observed once along the coast, but difficult to estimate relative abundance due to the lack of time we spent in appropriate habitat. *Identification*: Table 1.

Anous stolidus (Linnaeus, 1758). Brown Noddy

Observed once flying along coast, distant from shore. *Identification*: Tern-like flight, with chocolate brown overall plumage and small amount of white on head.

Sternula albifrons (Pallas, 1764). Little Tern

Observed near Atoifi. Potentially a common species in calm in-shore waters. *Identification*: Small tern (smaller than Common Tern), diving in water, with yellow bill and black cap.

Sterna sumatrana (Raffles, 1822). Black-naped Tern

Observed once in flight, at a distance from shore. *Identification*: Table 1.

Sterna hirundo (Linnaeus, 1758). Common Tern

Observed near Atoifi, in the harbor. *Identification*: Larger than Little Tern, with black bill in non-breeding plumage.

Thalasseus bergii (M.H.K. Lichtenstein, 1823). Great Crested Tern

Potentially common in-shore. Observed perched on bouys on multiple occasions. *Identification*: Table 1.

Suliformes

Fregata ariel (G.R. Gray, 1845). Lesser Frigatebird

Observed once from shore. *Identification*: Large black bird, with white 'armpits'.

Pelicaniformes

Egretta sacra (J.F. Gmelin, 1789). Pacific Reef-heron

Observed once flying to and from an offshore island that is only accessible at low tide where it potentially nested. *Identification*: Table 1.

Butorides striata (Linnaeus, 1758). Striated Heron

Common to abundant within mangrove ecosystems along the coast. Frequently seen from the boat. *Identification*: Small heron, grayish in color, with a shorter neck than Pacific Reef-heron.

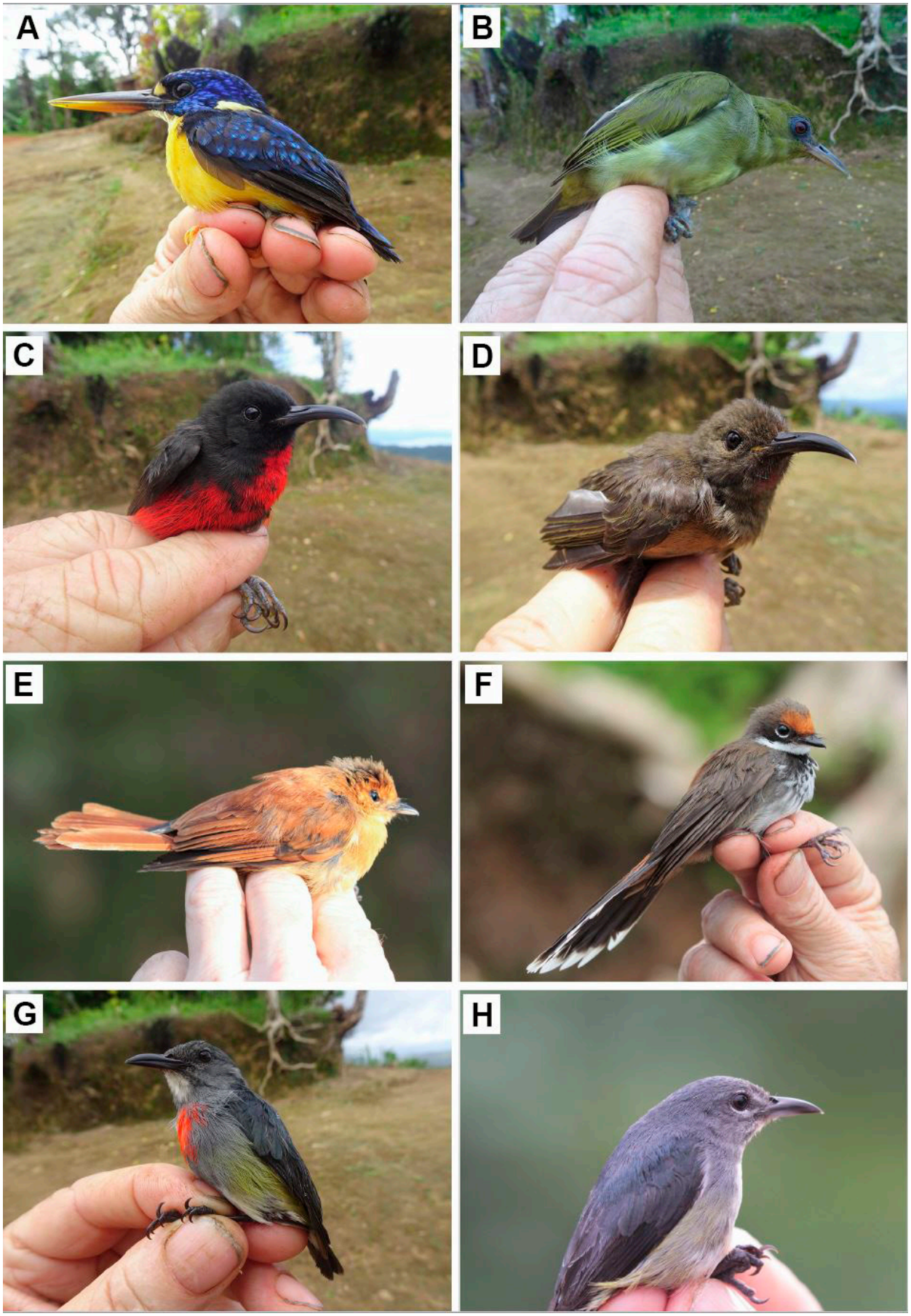

Figure 4. The four endemic passerines (**A–E**), and other species captured during the survey (**F–H**). **A.** Malaita Dwarf-Kingfisher *Ceyx malaitae*. **B.** Malaita White-eye *Zosterops stresemanni*. **C.** Red-bellied Myzomela *Myzomela malaitae* (male). **D.** Red-bellied Myzomela *M. malaitae* (female). **E.** Malaita Fantail *Rhipidura malaitae*. **F.** Rufous Fantail *R. rufifrons*. **G.** Midget Flowerpecker *Dicaeum aeneum* (male). **H.** Midget Flowerpecker *D. aeneum* (female).

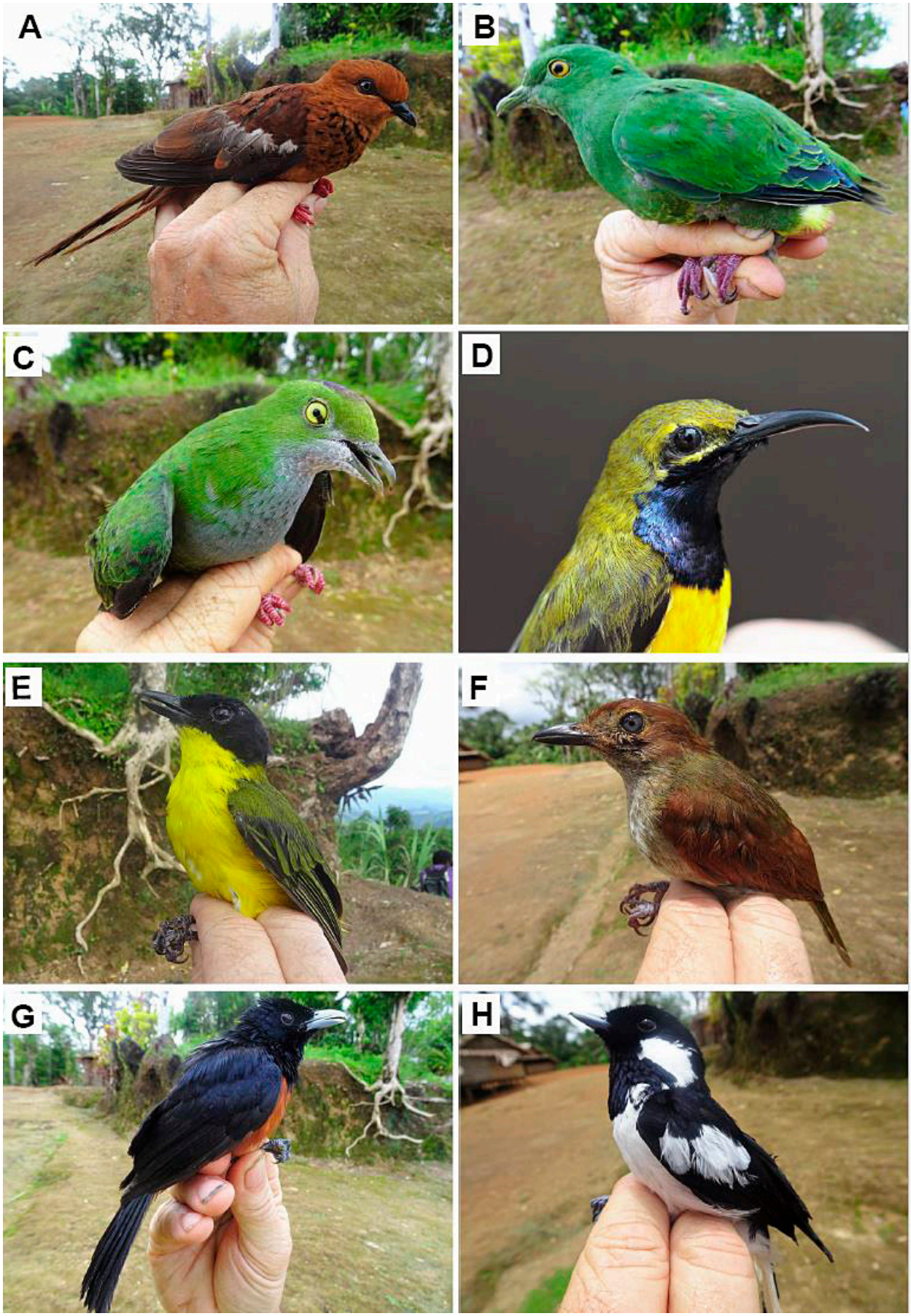

Figure 5. Selected species captured during the survey **A.** Mackinlay's Cuckoo-Dove *Macropygia mackinlayi*. **B.** Yellow-bibbed Fruit-Dove *Ptilinopus solomonensis*. **C.** Superb Fruit-Dove *P. superbus*. **D.** Olive-backed Sunbird *Cinnyris jugularis*. **E.** Oriole Whistler *Pachycephala orioloides* (male). **F.** Oriole Whistler *P. orioloides* (female). **G.** Chestnut-bellied Monarch *Monarcha castaneiventris*. **H.** Black-and-white Monarch *Symposiachrus barbatus*.

Accipitriformes

Pandion haliaetus (Linnaeus, 1758). Osprey

Common in the lowlands and along the coast. Observed foraging daily in a marine protected area near Gala Island. *Identification*: Distinct raptor, with white underneath and brown on top. No other species for confusion.

Accipiter hiogaster (Müller, 1841). Variable Goshawk

Uncommonly seen only in the lowlands (<100 m). Likely belonging to the *malaitae* subspecies. *Identification*: Accipiter seen in flight, and perched, with fine barring underneath and darkish gray on top and gray wings. Only other goshawk is Pied Goshawk, and this species was differentiated by the very fine barring underneath and darkish upperside.

Accipiter albogularis (G.R. Gray, 1870). Pied Goshawk

Uncommon. Both dark morph and pied morph were observed in the highlands. Seen in flight, and also perched. Harassed by Long-tailed Mynas while perched. *Identification*: Table 1.

Haliastur indus (Boddaert, 1783). Brahminy Kite

Common along the coast, and uncommon at higher elevations; observed from field station at Kwainaa'isi Cultural Centre at ~900 m. *Identification*: Table 1.

Haliaeetus sanfordi Mayr, 1935. Sanford's Sea-Eagle

Only observed on one occasion, from the field station at Kwainaa'isi Cultural Centre at ~900 m. Observed flying with Brahminy Kites. *Identification*: Distinct; the only eagle in the area.

Strigiformes

Ninox jacquinoti malaitae Mayr, 1931. Solomons Boobook

One young bird observed in local village (~750 m) which was recently found on the ground, suggesting recent breeding. Unknown abundance as we did not perform any dedicated surveys for owls. Belonging to the *malaitae* subspecies. *Identification*: Distinct.

Bucerotiformes

Rhyticeros plicatus (J.R. Forster, 1781). Blyth's Hornbill

Uncommon, but easily noticed and heard when present. Their large wing-flapping can be heard when they fly-over but generally remain unseen. *Identification*: Distinct. Table 1.

Coraciiformes

Alcedo atthis (Linnaeus, 1758). Common Kingfisher

Observed along the coast, overlapping in habitat with Little Kingfisher, but more catholic in habitat as they were found in mangroves and lowland forests. *Identification*: Table 1.

Ceyx pusillus (Temminck, 1836). Little Kingfisher

Appears to be common among mangrove ecosystems at sea-level. *Identification*: Table 1.

Ceyx malaitae (Mayr, 1935). Malaita Dwarf-Kingfisher

This is an endemic species to Malaita. This species was frequently caught in mist-nets, but has low detection probability during the day, as we were unable to detect any within the same forests in which they were caught in the mist-nets. However, we did observe one individual roosting ~ 8 m above the ground, and another was observed roosting ~15 m above the ground, both in trees. *Identification*: Table 1.; Fig. 4A. *Voucher registration number(s)*: O.78243 (skin); O.78251 (skin); O.78252 (skin); O.78280 (blood)..

Todiramphus sacer (J.F. Gmelin, 1788). Pacific Kingfisher

Common at all elevations and in many different habitats. Likely belonging to the subspecies *mala*. *Identification*: *Todiramphus* identification is difficult in the Pacific islands and likely remains a mystery throughout the Solomons and especially on Malaita, as Andersen et al. (2015) did not sample from Malaita when the recent split between *tristrami* and *sacer* was proposed. Based on Andersen et al. (2015), we presumed *sacer*/*tristrami* type birds were *sacer* and identification was not made with an effort to separate between these two species, but further genetic work could likely help to differentiate the status of *Todiramphus* on Malaita. We separated *sacer* from *sanctus* based on the overall pale coloration underneath, with little brown wash, as well as white 'headlights' above the bill compared to the more general brown in *sanctus*. The white extended along the back of the head with a black line separating white lines in some individuals. We note that we may have observed one *sanctus* but could not confirm this identification. Table 1.

Todiramphus saurophagus (Gould, 1843). Beach Kingfisher

Common along the coast, frequently observed along cliffs. *Identification*: Table 1.

Eurystomus orientalis (Linnaeus, 1766). Dollarbird

Uncommon. Observed at high elevation near Kwainaa'isi Cultural Centre (~950 m) on one occasion. *Identification*: Distinct.

Falconiformes

Falco peregrinus Tunstall, 1771. Peregrine Falcon

Observed once when a pair was seen hunting bats as they exited a cave at dusk near 08°55.25'S, 161°6.51'E. These are the first observations for Malaita. *Identification*: The large, robust, bulky size was noticeable from a distance, and broad wings were evident. As we approached closer, an individual flew directly over the boat giving great views, which showed a relatively dark (given the poor light conditions) falcon, but with a noticeable white throat and black bars under the body, typical with *ernesti* subspecies. The habitat was open ocean/cliffs (typical of Peregrine Falcons in the Solomon Islands region) compared with open gardens (typical of Oriental Hobby). The size, behavior, habitat, and

contrasting throat and bars under the body helped to eliminate Oriental Hobby.

Psittaciformes

Cacatua ducorpsii Pucheran, 1853. Ducorps's Cockatoo

Common, but in small numbers, at all elevations. Generally seen in groups of 2 or 3 individuals. *Identification*: Distinct.

Micropsitta finschii (EP Ramsay, 1881). Finsch's Pygmy-Parrot

One individual was observed in flight. *Identification*: Very small size and stout structure, typical of pygmy-parrots, and no long tail was noted which eliminated Meek's Lorikeet. As it flew, the bird gave a high pitch, buzzy call. Calls from xeno-canto were referenced for identification purposes, and they matched the high buzzy pitch given by the bird.

Eclectus roratus (Statius Müller, 1776). Eclectus Parrot

Uncommon in small numbers along the coast, and one observed at the Kwainaa'isi Cultural Centre, suggesting that they occur in highland ecosystems as well. *Identification*: Table 1.

Geoffroyus heteroclitus (Hombron & Jacquinot, 1841). Singing Parrot

Common in the highlands and uncommon in the lowlands. Often gregarious. *Identification*: Table 1.

Chalcopsitta cardinalis (GR Gray, 1849). Cardinal Lory

Uncommon in the lowlands and not observed in the highlands. *Identification*: Distinct.

Lorius chlorocercus Gould, 1856. Yellow-bibbed Lory

Common at all elevations, most numerous at Kwainaa'isi Cultural Centre where it was frequently heard and/or seen flying across the valley. *Identification*: Table 1.

Trichoglossus haematodus (Linnaeus, 1771). Rainbow [Coconut] Lorikeet

Common in lowlands but not observed in highlands. *Identification*: Distinct.

Passeriformes

Myzomela malaitae Mayr, 1931. Red-bellied Myzomela

Red-bellied Myzomela is an endemic species to Malaita and appears to be quite common within Kwainaa'isi conservation reserve. Only observed above 850 m elevation. *Identification*: Table 1.; Fig. 4C (male) & Fig. 4D (female). *Voucher registration number(s)*: O.78238 (skin); O.78257 (skin); O.78259 (skin); O.78262 (skin); O.78285 (blood); O.78286 (blood); O.78287 (blood); O.78288 (blood).

Coracina lineata (Swainson, 1825). Barred Cuckooshrike

Common above 850 m elevation. Usually observed in groups of three or four individuals. Subspecies *malaitae*. *Identification*: Table 1.

Coracina papuensis (J.F. Gmelin, 1788). White-bellied Cuckooshrike

Common at all elevations being quite catholic in their habitat choice. Subspecies *eyerdami*. *Identification*: Table 1.

Edolisoma holopolium (Sharpe, 1888). Solomons Cuckooshrike

Common only above 850 m elevation, not observed below this elevation. Frequently heard, but less frequently seen. Subspecies *tricolor*. *Identification*: Table 1.

Edolisoma tenuirostre (Jardine, 1831). Common Cicadabird

Uncommon above 250 m elevation. *Identification*: Table 1.

Pachycephala orioloides (Pucheran, 1853). Oriole Whistler

Uncommon, and restricted to higher elevations (above 850 m elevation). Appeared to be mainly restricted to mid-stratum level. Subspecies *sanfordi*. *Identification*: Table 1; Fig. 5E (male) and Fig. 5F (female). *Voucher registration number(s)*: O.78240 (skin); O.78248 (skin); O.78264 (skin); O.78290 (blood).

Rhipidura cockerelli (EP Ramsay, 1879). Cockerell's Fantail

Uncommon. Observed only above 900 m elevation. Observed perched quietly on a branch in dense forest, behavior very unlike other species of *Rhipidura*. Appears to be restricted to mid-forest stratum. Subspecies *coultasi*. *Identification*: Table 1.

Rhipidura leucophrys (Latham, 1801). Willie-wagtail

Common along the coast and in lowlands, but absent in highlands. *Identification*: Table 1. *Voucher registration number(s)*: O.78234 (skin).

Rhipidura malaitae Mayr, 1931. Malaita Fantail

This unique montane endemic was described by Mayr from a series of specimens collected by members of the Whitney South Sea Expedition (Mayr 1931b), known to be restricted to higher elevations, generally >1000 m. As far as we are aware, the Malaita Fantail has been observed only three times by westerners since the 37 specimens collected in 1930—once in 1994, once in 1997 (Birdlife International 2018), and once in 2016 (T. Lavery pers. comm.). However, the species is well known to members of the local community. We observed one individual at ~950 m elevation a couple of km from the Kwainaa'isi Cultural Centre in mossy montane primary forested habitat. Observed actively foraging in dense understory and flitting about in typical fantail manner. One individual was also captured at approximately 08°58.80′S, 161°00.18′E, >1000 m elevation and retained as a specimen. Based on our record and observation and those historical ones, we suggest that this species is uncommon above 950 m elevation in at least three geographic locations. *Identification*: A nondescript bird,

but with a noticeably large black eye. Fig. 4E. *Voucher registration number(s)*: O.78231 (skin).

Rhipidura rufifrons (Latham, 1801). Rufous Fantail

Abundant in highlands, but absent in lowlands, observed only above 850 m elevation. One of the most common passerines observed in and around the Kwainaa'isi Cultural Centre. Subspecies *brunnea*. *Identification*: Table 1.; Fig. 4F. *Voucher registration number(s)*: O.78237 (skin); O.78249 (skin); O.78256 (skin); O.78269 (blood); O.78270 (blood); O.78271 (blood); O.78276 (blood); O.78282 (blood).

Monarcha castaneiventris J Verreaux, 1858. Chestnut-bellied Monarch

Common at all elevations and associated with a number of different habitats (e.g., mangroves, montane forest, secondary forest). *Identification*: Table 1.; Fig. 5G. *Voucher registration number(s)*: O.78242 (skin).

Symposiachrus barbatus (Gould, 1850). Black-and-white Monarch

Uncommon, from above 600 m elevation. Subspecies *malaitae*. *Identification*: Fig. 5H. *Voucher registration number(s)*: O.78236 (skin); O.78254 (skin); O.78263 (skin); O.78272 (blood); O.78275 (blood); O.78278 (blood).

Myiagra ferrocyanea (E.P. Ramsay, 1879). Steel-blue Flycatcher

Common from above 400 m elevation. Most numerous above 800 m elevation. Found in secondary and mature forest habitats. Subspecies *malaitae*. *Identification*: Table 1.

Hirundo tahitica (J.F. Gmelin, 1789). Pacific Swallow

Common in Atoifi, also observed along the coast. *Identification*: Table 1.

Phylloscopus maforensis (AB Meyer, 1874). Island Leaf Warbler

Subspecies *becki*, endemic to the Solomon Islands, distributed on Guadalcanal, Santa Isabel, and Malaita. Scarce. Observed once, foraging with Red-bellied Myzomelas and Malaita White-eyes near the Kwainaa'isi Cultural Centre at 900 m elevation. Foraging in the canopy. Appears to be restricted to high elevations, but difficult to say given only one observation of the species. We believe this is the first published observation since it was first found on Malaita (Mayr 1931b). This species was also recently documented for the first time on Isabel since it's discovery in 1927 (DeCicco et al. 2019). *Identification*: Small bird with proportionately long bill, white supercilium, and dull yellowish wash underneath (apparently duller than photos of other subspecies) contrasting with a darkish back and wings. No wing bars noted. The only potential *Phylloscopus* on Malaita.

Zosterops stresemanni Mayr, 1931. Malaita White-eye

The Malaita White-eye is endemic to Malaita, and one of the most abundant passerines above 200 m elevation. This species is generally restricted to the canopy of large trees. *Identification*: Table 1.; Fig. 4B. *Voucher registration number(s)*: O.78233 (skin); O.78253 (skin); O.78274 (blood); O.78284 (blood); O.78289 (blood); O.78291 (blood).

Aplonis metallica (Temminck, 1824). Metallic Starling

Common at all elevations, mixing with Singing Starling at times. *Identification*: Distinct.

Aplonis grandis (Salvadori, 1881). Brown-winged Starling

Uncommon at all elevations, usually associated with fruiting trees. Subspecies *malaitae*. *Identification*: Table 1. *Voucher registration number(s)*: O.78235 (skin).

Aplonis cantoroides (GR Gray, 1862). Singing Starling

Seen at all elevations, but potentially more common in lowlands. Observed visiting a hollow in Atoifi, suggesting potential nesting. *Identification*: Table 1.

Mino kreffti (PL Sclater, 1869). Long-tailed Myna

Widespread and frequently encountered, but in small numbers, in both lowlands and highlands. *Identification*: Table 1.

Acridotheres tristis (Linnaeus, 1766). Common Myna

Only observed in Atoifi, the largest human settlement in East Kwaio. This species is introduced to the region. *Identification*: Table 1.

Dicaeum aeneum Pucheran, 1853. Midget Flowerpecker

One of the most abundant passerines observed on the island, but generally restricted to above 600 m elevation. Associated with both mature and secondary rainforests. Subspecies *malaitae*. *Identification*: Table 1.; Fig. 4G (male) and Fig. 4H (female). *Voucher registration number(s)*: O.78241(skin); O.78246 (skin); O.78255 (skin); O.78273 (blood): O.78277 (feather); O.78279 (feather); O.78281 (blood); O.78283 (blood).

Cinnyris jugularis (Linnaeus, 1766). Olive-backed Sunbird

Common in coastal lowlands, not observed at higher elevations. *Identification*: Table 1.; Fig. 5D. *Voucher registration number(s)*: O.78239 (skin).

Discussion

We recorded or observed 58 species of resident landbirds, including 23 of the 24 passerine species, known from the island of Malaita, and 15 waterbird species during our survey. In Kwainaa'isi specifically, we encountered 19 forest-associated species. These results suggest that the conservation area surrounding Kwainaa'isi Cultural Centre may be sufficiently protecting necessary habitat for the majority of the province's forest-associated species. Specifically, in these highland ecosystems surrounding Kwainaa'isi Cultural Centre, we found 12/14 of endemic subspecies to Malaita and all four endemic species. Three of these four endemic species were relatively

abundant. The Malaita White-eye was the most commonly recorded species, being present on 96% of the 23 surveys (Table 2). The Red-bellied Myzomela was also commonly observed (74% of surveys) and although not observed on our diurnal surveys, the Malaita Dwarf-Kingfisher was well known by the Kwaio members of our team and to the local people, who were able to locate three individuals by spotlighting at night. Three other Malaita Dwarf-Kingfishers were captured in mistnets. We observed only one Malaita Fantail in surveys around Kwainaa'isi Cultural Centre, but this species may be restricted to higher elevations (>1000 m) not extensively surveyed. However, the Kwaio members of our team and local people were familiar with the species and collected a specimen from a location approximately two hours walk from our base at Kwainaa'isi (see species account for more details).

Another significant observation was our observation of Peregrine Falcons, which have not previously been recorded from Malaita (Dutson 2011). While travelling back from `Olomburi by boat, we observed a pair of Peregrine Falcons hunting amongst a mass of swiftlets and bats that were emerging from a coastal cave at dusk. This observation is not unexpected, as this species is widespread throughout the Solomon Islands.

The conservation reserve at Kwainaa'isi, established by the leaders of the Kwainaa'isi Cultural Centre on their traditional customary land, appears to be particularly successful for providing habitat for passerine birds (Table 1). During our survey, we encountered 22/23 species of resident native passerines known from Malaita with 19 species present at Kwainaa'isi. The three native species that were not present at Kwainaa'isi tend to prefer more open habitats: Willie-wagtail, Pacific Swallow and Olive-backed Sunbird, and were only observed in the lowlands. Parrots were also well represented as we recorded or observed 7/9 (80%) of possible species (Table 1).

The threats to the avifauna of Malaita should be fully recognized, and establishment of conservation reserves such as the Kwainaa'isi Cultural Centre provide a viable mechanism to protect against these threats. A major threat to the entire avifauna of Malaita is that of deforestation from logging. The island of Malaita, as well as the Solomon Islands more generally, is at severe risk of deforestation resulting from increased logging pressure. The logging companies are decimating forests at 19 times the rate considered sustainable (Cannon 2018). This logging pressure is likely to place undue pressure on remaining primary forests of Malaita (e.g., Kwianaa'isi Cultural Centre) for which we demonstrated a vast majority of the native species depend. Concomitantly, climate change is likely to threaten montane specialists, such as the Malaita Fantail (Dirnböck et al. 2011), disproportionately, as habitats for such specialists are continuously shrinking.

In addition to the establishment of conservation areas, the knowledge of the local fauna held by the Kwaio people is a key resource for future conservation efforts to protect the avifauna of Malaita. For example, although the current IUCN priorities for protection of the Malaita Fantail include "re-survey the two known locations" and "survey other mountains in the vicinity", we discovered that the species was well-known to the local people in a different location. The IUCN priority "to discuss species' status and distribution with local villagers" proved to be the best approach. For example, by camera trapping for mammals—before our survey was conducted—the

Table 2. Recording frequency of birds at Kwainaa`isi Cultural Centre based on eBird surveys (*n* = 23). Scientific names presented in annotated list above.

Common Name	*N*	%	Common Name	*N*	%
Malaita White-eye	22	96	Black-and-white Monarch	4	17
Midget Flowerpecker	21	91	Blyth's Hornbill	4	17
Steel-blue Flycatcher	19	83	Pacific Kingfisher	4	17
Long-tailed Myna	18	78	Cockerell's Fantail	3	13
Red-bellied Myzomela	17	74	Crested Cuckoo-Dove	3	13
Red-knobbed Imperial-Pigeon	15	65	Barred Cuckooshrike	2	9
Glossy Swiftlet	14	61	Brahminy Kite	2	9
Chestnut-bellied Monarch	13	57	Stephan's Dove	2	9
Superb Fruit-Dove	13	57	Dollarbird	1	4
Yellow-bibbed Lory	13	57	Eclectus Parrot	1	4
Brown-winged Starling	11	48	Island Leaf Warbler	1	4
Ducorps's Cockatoo	11	48	Mackinlay's Cuckoo-Dove	1	4
Solomons Cuckooshrike	11	48	Malaita Dwarf-Kingfisher	1	4
Claret-breasted Fruit-Dove	10	43	Malaita Fantail	1	4
Oriole Whistler	10	43	Metallic Pigeon	1	4
Rufous Fantail	10	43	Metallic Starling	1	4
Singing Parrot	10	43	Pied Goshawk	1	4
Uniform Swiftlet	10	43	Sanford's Sea-Eagle	1	4
Common Cicadabird	8	35	Variable Goshawk	1	4
White-bellied Cuckooshrike	8	35	White-rumped Swiftlet	1	4
Yellow-bibbed Fruit-Dove	6	26			

Kwaio people documented the first known western-science record of Solomons Nightjar (*Eurostopodus nigripennis*) for Malaita (Alabai et al. 2019). The Kwaio people are well prepared to conduct further surveys to elucidate distribution and status of the birds of Malaita, as well as other taxa. A key facilitator of collaboration in this regard was the recognition and documentation of the local Kwaio names for the bird species of Malaita. With these names published for the first time (listed in Table 1) we believe that the stage is set for the international community to support the Kwaio people in cost-effective conservation of a remarkable fauna.

Acknowledgements

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Authors' Contributions

CTC, EK, JW, MA, TE, DM, and RE collected the data; CTC and RM wrote the text with input from all co-authors.

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Appendix

Table A1. List of specimen vouchers and field measurements registered at the Australian Museum. Specimen forms denoted by S=Skin, B=Blood sample, F=Feather sample. Weights are given in g, and Wing length, Tail length, Head-bill length, Bill length (exposed culmen) and Tarsus length are given in mm.

Reg No.	Form	Order	Family	Genus	Species	Coll. Date	Latitude	Longitude	Sex	Weight	Wing	Tail	Head	Bill	Tarsus
O.78250	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015							
O.78258	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015							
O.78260	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015		7.3	99.0	32.5	19.7	4.2	9.4
O.78261	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015		7.6	103.0	39.5	20.6	4.3	8.9
O.78265	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015							
O.78266	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015							
O.78267	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015							
O.78268	S	Caprimulgiformes	Apodidae	*Collocalia*	*esculenta*	29/10/2018	-8.999	161.015		7.8	101.0	40.0	20.3	3.9	9.1
O.78247	S	Caprimulgiformes	Apodidae	*Aerodramus*	*vanikorensis*	29/10/2018	-8.946	161.011		11.4	110.0	52.0	23.7	4.3	9.3
O.78232	S	Columbiformes	Columbidae	*Macropygia*	*mackinlayi*	29/10/2018	-8.980	161.003		94.0	151.0	150.0	38.6	13.5	18.4
O.78244	S	Columbiformes	Columbidae	*Ptilinopus*	*solomonensis*	29/10/2018	-8.946	161.011		77.0	116.5	68.5	42.2	15.4	17.4
O.78245	S	Columbiformes	Columbidae	*Ptilinopus*	*superbus*	30/10/2018	-8.946	161.011		111.0	126.5	79.0	40.4	13.5	17.7
O.78243	S	Coraciiformes	Alcedinidae	*Ceyx*	*malaitae*	29/10/2018	-8.980	161.003		18.3	59.0	25.0	59.5	34.7	9.6
O.78251	S	Coraciiformes	Alcedinidae	*Ceyx*	*malaitae*	25/10/2018	-8.946	161.011		17.5	58.5	20.0	57.6	33.8	8.9
O.78252	S	Coraciiformes	Alcedinidae	*Ceyx*	*malaitae*	25/10/2018	-8.946	161.011		18.3	63.0	26.5	54.9	28.9	9.8
O.78280	B	Coraciiformes	Alcedinidae	*Ceyx*	*malaitae*	28/10/2018	-8.946	161.011		19.4	57.0	21.5	58.1	32.8	9.3
O.78241	S	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	25/10/2018	-8.946	161.011	Female	8.5	47.5	24.5	27.3	12.0	12.6
O.78246	S	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	26/10/2018	-8.946	161.011	Male	8.6	55.0	27.0	28.8	12.4	13.0
O.78255	S	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	27/10/2018	-8.980	161.003	Female	8.0	50.0	22.0	27.3	11.5	12.1
O.78273	B	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	26/10/2018	-8.946	161.011	Male	8.9	49.5	23.5	27.7	11.9	13.7
O.78277	F	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	27/10/2018	-8.946	161.011	Female	7.4	49.0	20.0	27.2	11.8	12.9
O.78279	F	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	27/10/2018	-8.946	161.011	Male	9.5	51.0	24.0	28.9	12.8	14.1
O.78281	B	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	28/10/2018	-8.946	161.011	Male	8.6	51.5	20.0	28.2	11.9	13.0
O.78283	B	Passeriformes	Dicaeidae	*Dicaeum*	*aeneum*	28/10/2018	-8.946	161.011	Female	9.0	49.5	20.0	28.0	11.9	12.8
O.78238	S	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	27/10/2018	-8.980	161.003	Male	13.1	70.5	49.0	36.6	17.6	18.1
O.78257	S	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	28/10/2018	-8.980	161.003	Male	13.2	68.0	46.5	38.3	18.9	17.6
O.78259	S	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	28/10/2018	-8.980	161.003	Male	12.4	67.0	48.0	35.5	16.9	17.1
O.78262	S	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	26/10/2018	-8.946	161.011		15.5	64.0		36.4	17.7	18.3
O.78285	B	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	28/10/2018	-8.946	161.011		12.4	60.0	35.0	33.4	15.9	17.4
O.78286	B	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	29/10/2018	-8.946	161.011	Male	13.5	67.0	41.0	35.8	17.3	17.6
O.78287	B	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	29/10/2018	-8.946	161.011	Female	10.6	58.5	37.0	34.3	16.5	17.5
O.78288	B	Passeriformes	Meliphagidae	*Myzomela*	*malaitae*	29/10/2018	-8.946	161.011	Male	14.9	69.0	44.0	36.0	17.2	17.6
O.78236	S	Passeriformes	Monarchidae	*Symposiachrus*	*barbatus*	27/10/2018	-8.980	161.003		20.1	89.0	76.0	36.9	12.7	20.1
O.78254	S	Passeriformes	Monarchidae	*Symposiachrus*	*barbatus*	26/10/2018	-8.946	161.011		22.3	85.0	80.0	37.1	12.3	19.2
O.78263	S	Passeriformes	Monarchidae	*Symposiachrus*	*barbatus*	25/10/2018	-8.946	161.011		20.3	82.0		36.3	11.1	20.0
O.78272	B	Passeriformes	Monarchidae	*Symposiachrus*	*barbatus*	26/10/2018	-8.946	161.011		23.6	85.5	77.0	37.6	13.0	20.0

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Reg No.	Form	Order	Family	Genus	Species	Coll. Date	Latitude	Longitude	Sex	Weight	Wing	Tail	Head	Bill	Tarsus
O.78275	B	Passeriformes	Monarchidae	*Symposiachrus*	*barbatus*	26/10/2018	-8.946	161.011		20.7	80.0	74.0	37.3	12.1	19.1
O.78278	B	Passeriformes	Monarchidae	*Symposiachrus*	*barbatus*	27/10/2018	-8.946	161.011		21.4	86.0	81.5	37.7	12.3	19.8
O.78242	S	Passeriformes	Monarchidae	*Monarcha*	*castaneiventris*	26/10/2018	-8.946	161.011		28.7	87.0	73.0	41.5	15.3	20.1
O.78239	S	Passeriformes	Nectariniidae	*Cinnyris*	*jugularis*	21/10/2018	-8.857	161.026	Male	10.3	58.5	38.5	37.1	20.0	16.2
O.78240	S	Passeriformes	Pachycephalidae	*Pachycephala*	*orioloides*	27/10/2018	-8.980	161.003	Female	51.3	99.0	75.0	46.9	15.2	25.7
O.78248	S	Passeriformes	Pachycephalidae	*Pachycephala*	*orioloides*	29/10/2018	-8.980	161.003	Male	43.2	100.0	78.0	49.3	16.3	26.1
O.78264	S	Passeriformes	Pachycephalidae	*Pachycephala*	*orioloides*	26/10/2018	-8.946	161.011	Male	53.4	104.5		50.2	17.4	26.3
O.78290	B	Passeriformes	Pachycephalidae	*Pachycephala*	*orioloides*	30/10/2018	-8.980	161.003		46.8	98.0	74.0	50.2	17.0	26.0
O.78234	S	Passeriformes	Rhipiduridae	*Rhipidura*	*leucophrys*	21/10/2018	-8.857	161.026		28.8	99.0	99.5	41.2	14.0	26.9
O.78231	S	Passeriformes	Rhipiduridae	*Rhipidura*	*malaitae*	28/10/2018	-8.980	161.003		10.4	76.5	72.0	29.7	8.2	16.3
O.78237	S	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	26/10/2018	-8.946	161.011		13.3	76.0	88.0	30.5	9.7	20.0
O.78249	S	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	28/10/2018	-8.980	161.003		10.9	72.5	84.0	30.5	10.0	19.2
O.78256	S	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	26/10/2018	-8.946	161.011		10.8	68.5	79.5	28.9	8.5	18.9
O.78269	B	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	26/10/2018	-8.946	161.011		13.9	74.0	80.5	31.0	9.4	20.4
O.78270	B	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	26/10/2018	-8.946	161.011		11.6	70.5	78.0	29.9	9.1	19.3
O.78271	B	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	26/10/2018	-8.946	161.011		12.4	69.5	80.0	29.2	9.2	19.5
O.78276	B	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	27/10/2018	-8.946	161.011		12.2	73.5	85.5	29.2	8.9	18.9
O.78282	B	Passeriformes	Rhipiduridae	*Rhipidura*	*rufifrons*	28/10/2018	-8.946	161.011		11.7	69.0	80.0	29.0	9.0	18.5
O.78235	S	Passeriformes	Sturnidae	*Aplonis*	*grandis*	27/10/2018	-8.946	161.011		125	140.0	92.0	56.1	19.6	31.9
O.78233	S	Passeriformes	Zosteropidae	*Zosterops*	*stresemanni*	27/10/2018	-8.980	161.003		19.2	67.5	48.0	34.5	14.1	20.0
O.78253	S	Passeriformes	Zosteropidae	*Zosterops*	*stresemanni*	27/10/2018	-8.980	161.003		18.2	68.5	44.5	34.8	14.4	19.4
O.78274	B	Passeriformes	Zosteropidae	*Zosterops*	*stresemanni*	26/10/2018	-8.946	161.011		20.7	67.0	40.5	34.2	13.6	22.8
O.78284	B	Passeriformes	Zosteropidae	*Zosterops*	*stresemanni*	28/10/2018	-8.946	161.011		22.5	68.0	42.0	34.4	13.3	20.4
O.78289	B	Passeriformes	Zosteropidae	*Zosterops*	*stresemanni*	30/10/2018	-8.946	161.011		21.2	66.0	44.0	34.8	13.8	20.7
O.78291	B	Passeriformes	Zosteropidae	*Zosterops*	*stresemanni*	30/10/2018	-8.980	161.003		20.3	67.0		34.8	13.6	21.4