

The birds of Tetepare Island, Solomon Islands

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Summary. Tetepare Island, in the Western Province of the Solomon Islands, hosts a significant avifauna of 80 species, including several species of conservation concern and evolutionary interest. The high abundance of fruit-eating pigeons on Tetepare is an indicator of the ecological values of this large uninhabited and unlogged island. Establishment of a field research station and ecolodge supported by trained local guides makes Tetepare a significant location for observing and researching Melanesian birds. Detection rates for birds from different locations on Tetepare are provided.

Introduction

The Solomon Islands archipelago is renowned for its high avifaunal endemism, including the text-book examples of geographic differentiation demonstrated by the white-eyes *Zosterops* spp. (Mayr & Diamond 2001). Like other island avifaunas (Olson & James 1982; Steadman 1989), many Solomon Islands birds are restricted in distribution and threatened by environmental changes, with the principal threat there considered to be industrial logging. Widespread unsustainable logging has devastated much of the lowland forests of the Solomon Islands, and also affected the marine and social environments in adjacent areas (Read 2011). Tetepare Island (8°45'S, 157°32'E; Figure 1) is the largest uninhabited and unlogged island (11 880 ha) in the South Pacific, and is increasingly recognised as a conservation icon of the Solomon Islands (Read *et al.* 2010).

The Tetepare Descendants' Association (TDA) was formed in 2002 to represent the customary landowners of the island and enable them to pursue their goals of conserving Tetepare's resources. TDA employs rangers to patrol a marine and terrestrial protected area with a 14-km coastline, and has constructed a field station and ecolodge within this protected area to attract scientists and ecotourists to Tetepare. Tetepare landowners benefit directly from TDA's conservation agenda through employment as rangers, guides, hospitality and construction workers, by selling locally grown or caught produce and handicrafts to the ecolodge and tourists, and through scholarships and sustainable livelihood initiatives coordinated by TDA.

An initial survey of the birds of Tetepare Island recorded 75 species, including the endemic Tetepare White-eye *Zosterops (kulambangrae) tetiparius*, usually considered to be a subspecies but perhaps worthy of full species status (Read & Moseby 2005). This study updates the Tetepare avifaunal inventory and provides data on detection rates, abundance and behaviour of key bird species.

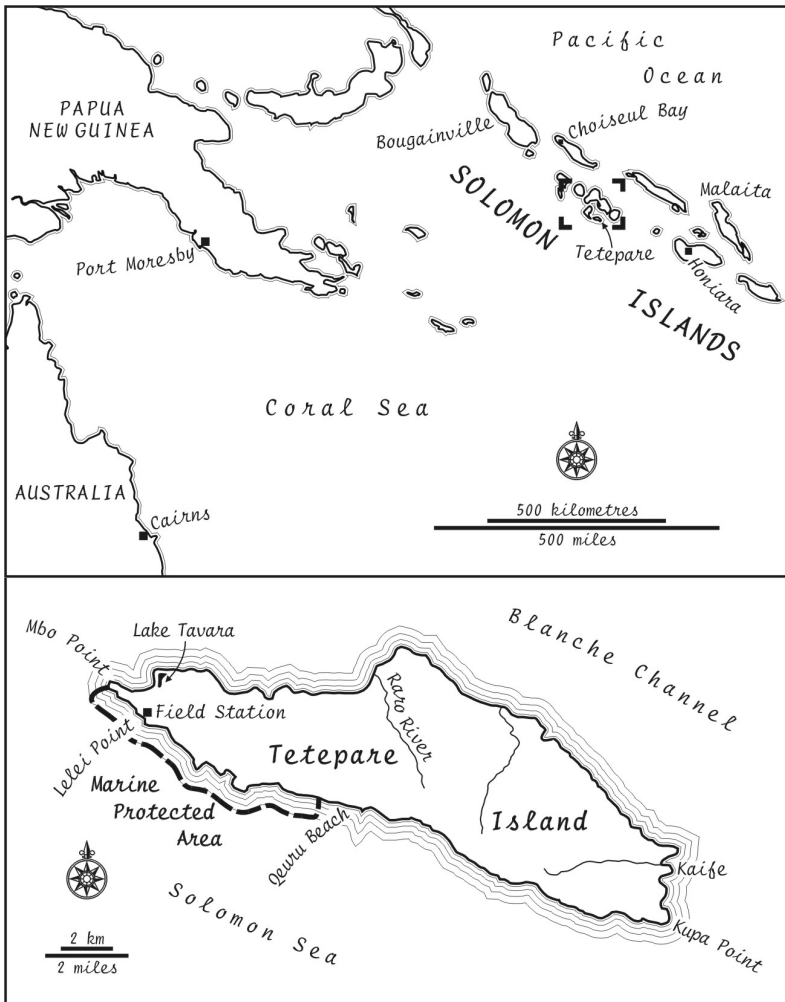


Figure 1. Tetepare Island, Solomon Islands.

Methods

Inventories were compiled for all bird species seen or heard at four localities on Tetepare Island from 2003 to 2010. Birds were recorded in six consecutive 10-minute periods at both Lake Tavara ($8^{\circ}42'S$, $157^{\circ}27'E$), a freshwater lake situated by the coast in a regrown Coconut *Cocos nucifera* plantation, and Lelei Ridge ($8^{\circ}43'S$, $157^{\circ}27'E$), a ridge of primary forest dominated by two large strangler fig *Ficus* sp. trees. Most recording periods at Lake Tavara occurred between 0900 and 1100 h, and at Lelei Ridge they were evenly spread through dawn (0600–0800 h) and dusk (1700–1900 h) periods. At both localities, a prominent tree was climbed to provide views of the surrounding landscape. Additional inventories were compiled from canoe-based surveys on the lower reaches of the Raro River ($8^{\circ}42'S$, $157^{\circ}32'E$), and from six 2–3-week visits to the Field Station and Ecolodge ($8^{\circ}43'S$, $157^{\circ}27'E$). Avifaunal observations at the Tetepare Field Station were augmented by mist-net

surveys, targeting Tetepare White-eyes, conducted in May 2004, November 2005, October 2006, November 2007, October 2008 and March 2010. At all sites, birds were recorded only if they could be seen or heard from the vantage points; in the case of the Field Station records, this typically encompassed a 200 m × 200 m area.

In addition to these semi-quantitative surveys, opportunistic records were made at other regions of Tetepare and around the Field Station and Ecologde. Of particular value were the observations made by TDA rangers in their daily log sheets, by two experienced birdwatcher guides, Twomey Ben and Johnson Donga, while guiding tourists on Tetepare, and by Philip Vurane, chief ranger for the adjacent Hele Islands (~10 km east from the eastern tip of Tetepare).

Results

New records since 2003

Five additional species—Yellow-legged Pigeon *Columba pallidiceps*, Eastern Great Egret *Ardea modesta*, Common Noddy *Anous stolidus*, Sacred Kingfisher *Todiramphus sanctus* and Common Myna *Sturnus tristis*—were added to the 75 species recorded for Tetepare to 2003 (Read & Moseby 2005) (Appendix 1). The Yellow-legged Pigeon, which is considered to be Vulnerable to extinction (BirdLife International 2012), is otherwise known from the New Georgia group (Western Province) only by old specimen records from Vella Lavella. Four large dark pigeons, with sheen like a starling, were flushed from the ground in regrowth coconut plantation between the Tetepare Field Station and Lake Tavara. Upon alighting in nearby trees, their white heads and brilliant yellow legs were clearly visible through binoculars (Twomey Ben pers. comm.).

Observations

The Vulnerable Sanford's (Solomons) Sea-Eagle *Haliaeetus (leucogaster) sanfordi* defies its name by principally being a forest hunter, even in coastal regions, with flying-fox *Pteropus* sp., Northern Common Cuscus *Phalanger orientalis*, Metallic Starling *Aplornis metallica* and a snake recorded as prey from Tetepare. These prey types are broadly consistent with predation or attempted predation observed by Pikacha *et al.* (2012), on Solomons Flying-foxes *Pteropus rayneri*, Prehensile-tailed Skink *Corucia zebrata* and soaring Glossy Swiftlets *Collocalia esculenta*. However, on two occasions Sea-Eagles were also observed on Tetepare harassing and stealing prey from Eastern Ospreys *Pandion cristatus*, which are far more efficient at catching fish (pers. obs.). Although no Sea-Eagle nests have yet been located on Tetepare, nesting behaviour (including pairs of Sea-Eagles carrying sticks, and vocalising incessantly) has been witnessed in April. Circumnavigations of Tetepare suggest that at least two pairs each of Sanford's Sea-Eagles, Ospreys and Brahminy Kites *Haliastur indus* are resident on the island.

Nests of the Solomons taxon of the White-throated Nightjar *Eurostopodus (mystacalis) nigripennis*, recently proposed to be a full species (Solomons Nightjar; Dutson 2011), have been recorded on Kaife, Kororo, Saromana and Nabonibao beaches, which suggests that Tetepare may be an important refuge for this ground-nesting species. These beaches are occasionally used by pig hunters and other visitors, and nightjar chicks are vulnerable if the adult is disturbed.

On one occasion a chick was swarmed and killed by invasive fire-ants *Wasmania aureopunctata* within minutes of its parent being flushed. There are no other recent published records of this (sub)species away from Tetepare Island with, for instance, no records from Bougainville since the 1930s (Hadden 2004). The dearth of recent records and this species' apparent dependence on undisturbed beaches suggest that it is threatened. Eggs of Island Imperial-Pigeons *Ducula pistrinaria*, Black-naped Terns *Sterna sumatrana* and Crested Terns *Thalasseus bergii* have been harvested by landowners or visitors, although the incidence of egg harvesting from Tetepare is very low (Moseby *et al.* 2011).

Patterns of field abundance

Seventy species from the island's inventory of 80 bird species have been recorded from the Tetepare Field Station and Ecolodge site (Appendix 1). Noteworthy absentees from the Field Station inventory include the Oriole Whistler *Pachycephala orioloides* (previously considered as a subspecies of the Golden Whistler *P. pectoralis*) and Variable Dwarf Kingfisher *Ceyx lepidus*, which appear largely restricted to primary forest. Another inhabitant of primary forest, the Kolombangara Monarch *Symposiarchus browni*, was recorded from the Field Station on only a single occasion.

Pacific Black Duck *Anas superciliosa* were regularly recorded in nearshore environments adjacent to the Field Station, where they fed on food scraps, and in the shallow higher reaches of the Raro River (Appendix 1), but were never sighted on the freshwater Lake Tavara, possibly related to high densities of Saltwater (Estuarine) Crocodiles *Crocodylus porosus* there. Other birds which appeared to benefit from anthropogenic resources at the Field Station include the Melanesian Megapode *Megapodius eremita*, Purple Swampphen *Porphyrio porphyrio*, Willie Wagtail *Rhipidura leucophrys*, and Pacific Swallow *Hirundo tahitica*. The sole record of a lone Common Myna *Sturnus tristis* was also from the Field Station site, where it resided for several days in 2010 before succumbing to TDA's biosecurity management.

The abundance and breeding productivity of Island Imperial-Pigeons on Tetepare are a feature of the regional faunal assemblage. On 21 November 2007, >13 300 pigeons (probably all Island Imperial-Pigeons) were counted from 0615 until 1645 h, flying to Tetepare from the nearby Hele Islands (Figure 2) where they nest. These counts probably underestimate numbers by several thousand, and do not include the hundreds (possibly thousands) of Island Imperial-Pigeons that do not fly to the Hele Islands, but feed and/or nest on Tetepare and its offshore islets. Although the peak nesting season is believed to be austral summer, thousands of these pigeons also fly daily to and from Tetepare in other months, including April and October. Many Island Imperial-Pigeons remain on Tetepare throughout the day, and nests are also frequently recorded on Tetepare (including the adjacent Sarumana islet) from April to August, in addition to the major summer nesting event on the Hele Islands. Frequent records of both adult and juvenile Nicobar Pigeons *Caloenas nicobarica* in Tetepare's primary forest also reinforce the importance of the island for this Near Threatened species, which nests colonially on Ngirasa Island in the Hele group. The peak breeding season for

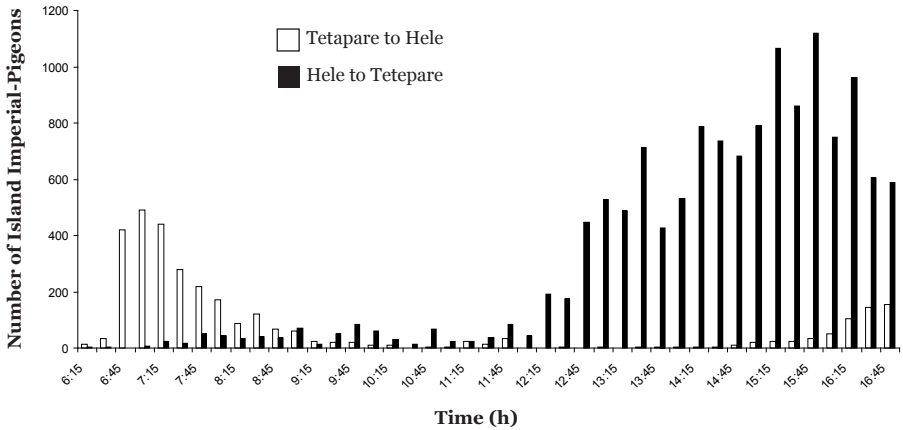


Figure 2. Number of Island Imperial-Pigeons counted flying between Tetepare Island and the Hele Islands in 15-minute blocks on 21 November 2007.

Nicobar Pigeons on Ngirasa Island is also November–January, although this may be delayed by a month or more if the regional Ngali Nut *Canarium salomonensis* crop is delayed (Philip Vurane pers. comm.).

Banding studies suggest that Tetepare White-eyes demonstrate a high degree of site fidelity, with 30 of 72 birds banded between 2003 and 2006 being recorded at their banding location in successive years. Furthermore, of 26 Tetepare White-eyes banded in October 2003, two still inhabited the same area in April 2010, and one was recorded in October 2011, 8 years after banding. These data suggest that Tetepare White-eyes are sedentary and perhaps defend resources, which in part explains why they have remained isolated from their sister species, the Rendova White-eye *Zosterops (kulambangrae) rendovae*, which lives <3 km away. These two (sub)species are a classic example of speciation (Mayr 1965), and are believed to represent one of the most rapid speciation events ever recorded in birds, a factor partly attributed to fast generation times (Moyle *et al.* 2009). Although generation times may be independent of longevity, life spans of banded Tetepare White-eyes exceeding 8 years suggest that additional factors may also influence this rapid speciation.

Discussion

Dove and pigeon abundance and diversity, particularly the presence of the Yellow-legged Pigeon, are indicative of the ornithological value of Tetepare's large expanse of primary forest. Colonial nesting of two pigeon species (Island Imperial-Pigeon and Nicobar Pigeon) on offshore islands suggests an important ecological connectivity between Tetepare and other islands in the region. Frugivorous pigeons are important dispersers of seeds in tropical forests, and their demise through hunting may precipitate 'cascades of extinctions' (Rathcke & Jules 1993). Protection of breeding colonies of these pigeons therefore probably plays an important role in maintaining local ecosystems, particularly those dependent

upon seed dispersal during rehabilitation from intensive logging operations that have affected most of the lowland forests in the region (Read 2011).

Speciation of the Tetepare White-eye and potential differentiation of other forest taxa such as the Kolombangara Monarch *Symposiarchus browni meeki*, which also occurs on Rendova Island, highlight the high degree of endemism characteristic of the Western Solomons avifauna (Mayr & Diamond 2001).

Together with adjacent smaller islands, the lowland rainforests of Tetepare are internationally significant sites for the Nicobar Pigeon and Island Imperial-Pigeon, and potentially the Red-knobbed Imperial-Pigeon *Ducula rubricera* and Yellow-legged Pigeon. As rainforests in the region are progressively cleared for logging, Oil Palm *Elaeis guineensis* plantations or to provide gardens for the burgeoning population, the intact forests of Tetepare are predicted to become an increasingly important Melanesian conservation site.

The establishment of a successful ecododge within Tetepare's protected area, defended by strict local laws and patrolled by rangers, has dramatically improved accessibility to this valuable site for researchers and tourists. Trained and knowledgeable guides, with recorded local nomenclature and routine environmental data collection, further enhance the value of Tetepare as a birdwatching destination.

Acknowledgements

This study was conducted under the Tetepare Descendants' Association science research permit issued by the Solomon Islands Ministry of Education. The manuscript benefitted greatly from the ornithological skills of Chris Filardi, Twomey Ben and Katherine Moseby, along with observations from several Tetepare rangers. Chris Filardi, Damon Oliver, Stephen Debus, Guy Dutson and an anonymous referee are thanked for constructive criticism of the manuscript.

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Appendix 1. Birds of Tetepare Island: list of species and their detection rates (see text), compiled from the Tetepare inventory of Read & Moseby (2005), semi-quantitative surveys and observations in the current study at Lelei, Tavara, the Tetepare Field Station (TFS) and the Raro River (see Figure 1) (number of counts in parentheses), and opportunistic observations elsewhere. Species in bold were not detected by Read & Moseby (2005); * = breeding detected, X = species recorded outside the survey periods; status: NT = near threatened, V = vulnerable (IUCN 2012). The nomenclature and taxonomy follow Christidis & Boles (2008) or the most recent regional text (Dutson 2011); for subspecies, see Dutson (2011).

<i>Common name (and status)</i>	<i>Lelei (78)</i>	<i>Tavara (48)</i>	<i>TFS (6)</i>	<i>Raro (8)</i>	<i>Comments</i>
Melanesian Megapode <i>Megapodius eremita</i>	44	21	100*	38	Common resident
Pacific Black Duck <i>Anas superciliosa</i>	0	0	100	50*	Attracted to food scraps
Yellow-legged Pigeon (V) <i>Columba pallidiceps</i>	0	0	0	0	
Nicobar Pigeon (NT) <i>Caloenas nicobarica</i>	0	0	17	13	Colonially nests on Ngirasa Island
Crested Cuckoo-Dove <i>Reinwardtoena crassirostris</i>	0	0	0	0	Vagrant
Stephan's Ground-Dove <i>Chalcophaps stephani</i>	0	4	67*	38	Common resident
Claret-breasted Fruit-Dove <i>Ptilinopus viridis</i>	8	4	83	63	Common resident
Superb Fruit-Dove <i>Ptilinopus superbus</i>	0	0	17	0	Resident

Appendix 1 cont.

<i>Common name (and status)</i>	<i>Lelei (78)</i>	<i>Tavara (48)</i>	<i>TFS (6)</i>	<i>Raro (8)</i>	<i>Comments</i>
Red-knobbed Imperial-Pigeon (NT) <i>Ducula rubricera</i>	50	21	67	75	Common resident
Island Imperial-Pigeon <i>Ducula pistrinaria</i>	41	98	67*	100	Nests in Mar., Jul., Aug., Nov., Dec.
White-throated Nightjar <i>Eurostopodus (mystacalis) nigripennis</i>	0	0	X	0	Beach-nester Mar., May, Sep.
Moustached Treeswift <i>Hemiprocne mystacea</i>	1	0	50*	13	Nesting visitor
Glossy Swiftlet <i>Collocalia esculenta</i>	36	13	67	75	Common resident
Uniform Swiftlet <i>Aerodramus vanikorensis</i>	23	2	X	13	
Lesser Frigatebird <i>Fregata ariel</i>	6	10	67	25	
Great Frigatebird <i>Fregata minor</i>	0	0	0	0	Vagrant?
Brown Booby <i>Sula leucogaster</i>	0	0	X	0	
Little Pied Cormorant <i>Microcarbo melanoleucos</i>	0	8	0	0	Vagrant
Black Bittern <i>Ixobrychus flavicollis</i>	0	0	0	0	
Eastern Great Egret <i>Ardea modesta</i>	0	4	0	0	Vagrant
Striated Heron <i>Butorides striata</i>	0	0	33*	75	Grey morph
Eastern Reef Egret <i>Egretta sacra</i>	0	0	50	25	Grey morph predominant
Nankeen Night-Heron <i>Nycticorax caledonicus</i>	0	2	67	25	Common resident
Eastern Osprey <i>Pandion cristatus</i>	9	0	83	38	Common resident

Appendix 1 cont.

<i>Common name (and status)</i>	<i>Lelei (78)</i>	<i>Tavara (48)</i>	<i>TFS (6)</i>	<i>Raro (8)</i>	<i>Comments</i>
Pacific Baza <i>Aviceda subcristata</i>	1	2	50	25	Common resident
Brahminy Kite <i>Haliastur indus</i>	12	8	100	25	Common resident
Sanford's (Solomons) Sea-Eagle (V) <i>Haliaeetus (leucogaster) sanfordi</i>	18	4	83	38	Common resident
Variable Goshawk <i>Accipiter hiogaster</i>	1	0	33	13	
Pied Goshawk <i>Accipiter albogularis</i>	0	0	X	13	
Purple Swampphen <i>Porphyrio porphyrio</i>	0	15	83*	13	Common resident
Beach Stone-curlew (NT) <i>Esacus magnirostris</i>	0	0	67	0	Breeds on several beaches
Pacific Golden Plover <i>Pluvialis fulva</i>	0	0	X	0	Seasonal migrant
Lesser Sand Plover <i>Charadrius mongolus</i>	0	0	0	0	Seasonal migrant
Whimbrel <i>Numenius phaeopus</i>	0	0	50	13	Seasonal migrant
Common Sandpiper <i>Actitis hypoleucos</i>	0	0	50	75	Seasonal migrant
Grey-tailed Tattler <i>Tringa brevipes</i>	0	0	17	0	Seasonal migrant
Red-necked Stint <i>Calidris ruficollis</i>	0	0	0	0	Seasonal migrant
Common Noddy <i>Anous stolidus</i>	0	0	33	0	
Black Noddy <i>Anous minutus</i>	0	0	X	0	
Bridled Tern <i>Onychoprion anaethetus</i>	0	0	X	0	
Black-naped Tern <i>Sterna sumatrana</i>	0	0	17	0	Nests on rocky islets

Appendix 1 cont.

<i>Common name (and status)</i>	<i>Lelei (78)</i>	<i>Tavara (48)</i>	<i>TFS (6)</i>	<i>Raro (8)</i>	<i>Comments</i>
Crested Tern <i>Thalasseus bergii</i>	0	0	50	13	
Finsch's Pygmy-Parrot <i>Micropsitta finschii</i>	0	0	X	0	Occurs in primary forest
Eclectus Parrot <i>Eclectus roratus</i>	21	6	33	75	Common resident
Song Parrot <i>Geoffroyus heteroclitus</i>	5	15	100	0	Resident
Cardinal Lory <i>Chalcopsitta cardinalis</i>	77	56	100	100	Abundant, regrown plantation
Rainbow (Coconut) Lorikeet <i>Trichoglossus haematodus massena</i>	5	0	17	25	
Solomons Cockatoo <i>Cacatua ducorpsii</i>	64	42	100	75	Common resident
Buff-headed Coucal <i>Centropus milo</i>	49	52	67	88	Common resident
Eastern Koel <i>Eudynamys orientalis</i>	5	4	67	0	
Channel-billed Cuckoo <i>Scythrops novaehollandiae</i>	0	0	17	0	Summer migrant?
Shining Bronze-Cuckoo <i>Chalcites lucidus</i>	0	0	17	0	Migrant/vagrant Apr. 2010
Common Kingfisher <i>Alcedo atthis</i>	0	19	50	88	Common resident
Little Kingfisher <i>Ceyx pusillus</i>	0	0	33	25	Cryptic
Variable Dwarf Kingfisher <i>Ceyx lepidus</i>	0	0	0	13	Occurs in primary forest
Sacred Kingfisher <i>Todiramphus sanctus</i>	21	4	X	13	Seasonal
Collared Kingfisher <i>Todiramphus chloris</i>	22	4	33	50	Common resident

Appendix 1 cont.

<i>Common name (and status)</i>	<i>Lelei (78)</i>	<i>Tavara (48)</i>	<i>TFS (6)</i>	<i>Raro (8)</i>	<i>Comments</i>
Beach Kingfisher <i>Todiramphus saurophagus</i>	0	15	50	13	Common resident
Dollarbird <i>Eurystomus orientalis</i>	0	0	17	13	Visitor
Blyth's Hornbill <i>Rhyticeros (Aceros) plicatus</i>	27	6	50	75	Common resident
Crimson-rumped Myzomela <i>Myzomela eichhorni</i>	13	40	100*	13	Common resident
White-bellied Cuckoo-shrike <i>Coracina papuensis</i>	0	13	100	38	Common resident
Barred Cuckoo-shrike <i>Coracina lineata</i>	5	0	67	25	Common resident
North Melanesian Cuckoo-shrike <i>Coracina welchmani</i>	0	0	17	0	
Cicadabird <i>Coracina tenuirostris</i>	6	0	67	0	Common resident
Oriole Whistler <i>Pachycephala orioloides</i>	0	2	0	0	Resident of primary forest
Rufous Fantail <i>Rhipidura rufifrons</i>	0	0	X	0	
Willie Wagtail <i>Rhipidura leucophrys</i>	1	23	67*	50*	Common resident
Cockerell's Fantail (NT) <i>Rhipidura cockerelli</i>	5	0	67	0	Resident
Steel-blue Flycatcher <i>Myiagra ferrocyanea</i>	13	15	83*	25	Common resident
White-capped Monarch <i>Monarcha richardsii</i>	54	21	100*	75	Common resident
Kolombangara Monarch (NT) <i>Symposiachrus browni</i>	0	0	X	0	Uncommon
Tetepare White-eye <i>Zosterops (kulambangrae) tetiparius</i>	79	60	83*	88	Common resident

Appendix 1 cont.

<i>Common name (and status)</i>	<i>Lelei (78)</i>	<i>Tavara (48)</i>	<i>TFS (6)</i>	<i>Raro (8)</i>	<i>Comments</i>
Pacific Swallow <i>Hirundo tahitica</i>	0	0	50*	0	Breeding visitor
Brown-winged Starling <i>Aplornis grandis</i>	6	0	83*	25	Breeding resident
Singing Starling <i>Aplornis cantoroides</i>	0	0	X	0	Nested in landslide debris, typically uncommon
Metallic Starling <i>Aplornis metallica</i>	5	4	100	13	Common resident
Yellow-faced Myna <i>Mino dumontii</i>	78	44	83*	50	Common resident
Common Myna <i>Sturnus tristis</i>	0	0	X	0	Introduced vagrant
Olive-backed Sunbird <i>Nectarinia jugularis</i>	6	79	100*	100*	Common resident
Total number of species	35	36	58	48	

Received 8 May 2012

