



SURVEYS OF THREATENED BIRDS AND FLYING-FOXES IN THE SANTA CRUZ ISLANDS, SOLOMON ISLANDS, SEPTEMBER – OCTOBER 2014



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CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS3

EXECUTIVE SUMMARY3

1 BACKGROUND AND OBJECTIVES4

2 TIMETABLE55

3. THE SURVEYED SITES AND METHODS USED5

4 RESULTS8

 4.1 Basapine – Vanikoro Flying-fox.....8

 4.2 Mako – Temotu Flying-fox.....11

 4.3 Vakavaktia – Santa Cruz Ground-dove13

 4.4 Vlumba – Palm Lorikeet.....16

 4.5 Upulalir – Santa Cruz Shrikebill.....17

 4.6 Other birds18

 4.7 Amphibians and reptiles18

 4.8 Invasive species19

 4.8 Other values and threats identified with the community19

5 DISCUSSION AND RECOMMENDATIONS.....22

ACKNOWLEDGEMENTS.....23

REFERENCES24

APPENDICES25

Frontespiece – Tinakula, located 29 km north of Nendo, is rat-free and home to several threatened species.

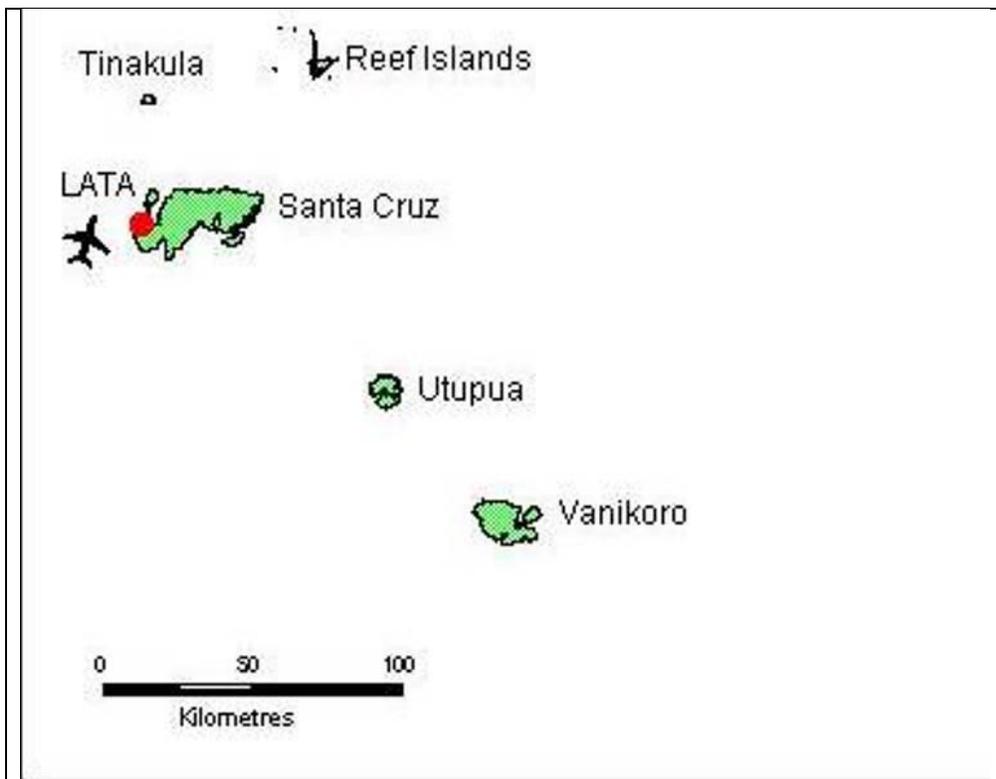


Fig 1 – Map of Santa Cruz Islands, Solomon Islands
List of acronyms and definitions

Basapine	Vanikoro flying-fox
Biosecurity	Actions that prevent invasive species from arriving at Santa Cruz, Tinakula etc
BirdLife	BirdLife Pacific based in Suva, Fiji
CEPF	Critical Ecosystem Partnership Fund
Endemic	Being confined to a place e.g. Basapine is endemic to Vanikoro
GPS	Global Positioning System using satellites for fixing positions etc
IAS/Invasive	Invasive alien species e.g. rats, yellow crazy ant, little fire ant, Singapore daisy
IUCN red list	International Union for the Conservation of Nature’s list of threatened species
m asl	Metres above sea level
Mako	Temotu flying-fox
Monitoring	Repeated surveys to measure change in a specie’s abundance
PFF	Pacific flying-fox
Primary forest	Unmodified or old-growth forest
Rodents	Rats and mice, which are dangerous invasive species in the Pacific region
Roost	A site where birds or bats spend their non-active period, e.g. tree roost of bats
Secondary forest	Modified or cut-over forest that is regenerating
Status	Distribution and abundance of a species, often referring to IUCN red list
Upulalir	Santa Cruz shrikebill
Vakavakatia	Santa Cruz ground-dove
Vertebrate	Animal with backbone, e.g. bird, mammal, amphibian, reptile, fish
Viable population	Any dead individuals in a population are replaced by young ones
Vlumba	Palm lorikeet
YCA	The yellow crazy ant <i>Anoplolepis gracilipes</i> , an invasive species

EXECUTIVE SUMMARY

A survey of IUCN red-listed vertebrate species was undertaken on the islands of Vanikoro, Nendo and Tinakula of the Santa Cruz Islands (Temotu Province), Solomon Islands, in September-October 2014. The survey focused on two fruit-bat species - the Vanikoro flying-fox (CR) and Temotu flying-fox (EN) – and three bird species – the Santa Cruz ground-dove (EN), Santa Cruz shrikebill (EN) and palm lorikeet (VU). All five species were located during this survey and with apparently viable population numbers. The Vanikoro flying-fox, known locally as basapine, was found in coconut groves on the island of Tevai at Vanikoro and is reported by locals also to occur commonly on the main island of Vanikoro and less commonly on Utupia. The Temotu flying-fox, known locally as mako, is widespread and moderately common in primary and secondary forests on Nendo and present in low numbers on Tinakula. The Santa Cruz ground-dove known locally as vakavakatia was found on the forested volcanic island of Tinakula where it is moderately common but wary of humans. The Palm lorikeet (VU) was also found only at Tinakula where it is abundant. The Santa Cruz shrikebill known locally as Upulalir was found only in primary forest on Nendo where it was uncommon. A pivotal finding of the surveys was that Tinakula is rat-free, which explains the persistence of ground-doves there.

The key recommendation is to secure Tinakula as a rat-free sanctuary. This will require working with and supporting the Tinakula community (relocated to Malo or Temotu Neo following a volcanic eruption on Tinakula in 1971) to improve awareness of Tinakula’s values and the need for heightened biosecurity. Options for the formal protection of Tinakula also need to be explored with the community under the Protected Area Act. Further research is also needed at Tinakula to estimate the total ground-dove population and other threatened species and to better understand the threats of invasive ants. Some follow-up survey work on the Vanikoro flying-fox is needed to better determine status and threats. Forests on Vanikoro and Nendo are threatened by environmentally unsustainable logging by Asian companies and further work with communities is needed to recognize and map the natural values and benefits of primary forest to fauna (including Mako and Upulalir), clean water and sustainable harvesting of timber and food species.

1 BACKGROUND AND OBJECTIVES

Temotu Province comprises the Santa Cruz Islands in the south-east of the Solomon Islands. The largest island is Nendo (Santa Cruz) at 600 km² and with a population of over 5000, while Vanikoro (Vanikolo, 189 km²) is also of some size, but with a small human population. These islands contain extensive indigenous broadleaf and Pacific kauri forest, much of it old growth and with threatened species including Pacific kauri (*Agathis macrophylla*) (EN) and rosewood (*Pterocarpus indicus*) (VU). Meanwhile Tinakula has been uninhabited, due to active volcanism, since 1971 when the human population was evacuated to Malo adjacent to Santa Cruz Island. There are many smaller islands and atolls to the north comprising the Reef Islands and the Duff Islands, Utupua, Tikopia and Anuta to the east, all with sizeable human populations.

Overall the forests of the Santa Cruz islands support many endemic species of birds and mammals including flying foxes (fruit bats), ground-doves, monarch flycatchers and white-eyes, details of which are provided in Table 1.1 below. In general the status of the threatened species is poorly known, e.g. Vanikoro flying-fox (CR) has been considered technically extinct as none have been documented since collection in the 1920s, but surveys in the 1990s obtained anecdotal evidence of their survival (Leary and Aujare 1994, IUCN 2014). Meanwhile some authors have questioned whether Santa Cruz Ground-dove continues to survive in the Santa Cruz Islands at all (Bouchet et al 2011, Dutson 2011).

Table 1.1 – Distribution and IUCN status of threatened and endemic birds and megabats at Temotu as documented before this survey. IUCN classifications are: EX? Extinct?, CR Critical, EN Endangered, VU Vulnerable, NT not threatened. Scientific names are provided in Appendix 1. Green shading indicates islands surveyed during the current study.

Species	IUCN Status	Nendo	Vanikoro	Tinakula	Utupua	Duff	Reef Is
Vanikoro flying-fox	CR/EX?		Extinct?				
Temotu flying-fox	EN	Present					
Sta Cruz Ground Dove	EN	?		Reported	Reported		
Palm lorikeet	VU	Reported				Reported	Reported
Sta Cruz Shrikebill	EN	Rare					
Sta Cruz white-eye	NT	Present					
Sanfords white-eye	NT	Present					
Vanikoro Monarch	NT		Common				
Vanikoro Flycatcher	NT		Common?				
Vanikoro white-eye	NT		Common?				

The key information needed for each endemic species above was as follows:

- a) Confirm status – island distribution, population estimates
- b) Confirm preferred habitat
- c) Identify current and potential threats (previously considered to be primarily hunting for the larger species, but increasingly habitat loss from logging and potentially also invasive species)
- d) Identify potential solutions for island managers to protect these species.

In addition to the Temotu endemic species listed in Table 1.1 above, a number of widespread bird species have subspecies present on different islands in the Temotu (Dutson 2011).

2. TIMETABLE

Surveys were undertaken at Vanikoro, Nendo and Tinakula. Specific locations and key activities are outlined in Table 2.1 below.

Table 2.1 – Dates, locations and key activities for Te Motu work

Date	Location	Key activities
September		
11-12	Cairns-Honiara	Travel
13-15	Honiara	Surveys of forest birds, meet DEC staff
16	Lata, Temotu	Fly Honiara to Lata, planning
17-18	Lata	Planning, bird and bat surveys in secondary forest
19-20	Lata-Vanikoro	Yacht travel, seabird and other marine surveys
21	Vanikoro	Visit village. Introductory bird and bat survey
22-28	Vanikoro	Transects for birds and bats through primary forest
28-29	Vanikoro-Nendo	Yacht travel, seabird observations
30	Nendo	Transects for birds and bats through gardens and secondary forest
October		
1	Nendo	Transects for birds and bats through secondary and primary forest
2	Nendo	Transects for birds and bats through primary forest
3-7	Lata, Nendo	Tinakula planning, Graciosa Bay talks, transects through gardens
8-12	Tinakula	Surveys for birds, bats, rats, ants
13	Malo	Meeting with Tinakula community
14	Lata-Honiara	Travel
15	Honiara	DEC meetings
16	Honiara-Cairns	Travel

3. THE SURVEYED SITES AND METHODS USED

3.1 Selecting survey sites

Nendo, Vanikoro and Tinakula were selected for survey simply because these were the three islands most likely to support the five red-listed species. For all three islands the first step was to consult with the local communities to learn of their knowledge of the target fauna, local names (Appendix 1) and known locations. This approach included discussion of the habitat type generally and more particularly the locations of primary forest which is considered to be a key requirement for some species, e.g. for Santa Cruz shrikebill (Dutson 2011). We then worked with local guides in surveying many of these sites for the target species. Key target sites at each island were:

- Vanikoro – Primary and secondary forest and coconut plantations above and near the village of Buma, Tevai Island, targeting Basapine

- Santa Cruz – Primary and secondary forest and gardens south and especially east of Graciosa Bay targeting Upulalir and Mako
- Tinakula - Primary and secondary forest around and above the former village site targeting Vakavaktia.

3.2 Survey methods

General survey approach

We used encounter rates on transects that followed current or old walking tracks through the forests and these were logged on a GPS. A series of one hour count periods was used simultaneously. We recorded all bird, mammal and reptile species seen or heard, but the focus was on the five red-listed species. Habitat at the stations was ranked for apparent age of forest. For target species we estimated the widths of the transects to enable density estimates to be made. This varied for each species, e.g. Basapine and Mako were detected out to about 10 m each side (20 m wide) but for Upulalir this was more like a 50-100 m wide transect.

Basapaine – Vanikoro flying-fox

Following consultations with the Buma community on the island of Tevai we made daytime surveys looking for roosting or feeding bats in primary forest using the same transect method as for birds. We traversed the forest to 450 m asl above Buma and also surveyed two forested valleys above and immediately to the west of the village. Later we also searched in coconut groves near the coast. The weather throughout was mainly clear, but forest surveys were undertaken during quite windy conditions.

Mako – Temotu flying-fox

Following consultations with the Graciosa Bay community at Nendo we made three x one day transect surveys as for Basapaine, but spanning primary forest, secondary forest and orchards. These are presented as GPS tracks in Fig 3.2. The weather conditions were typically overcast and days 2 and 3 in primary forest were accompanied by heavy rain showers, some lasting up to an hour and resulting in early cessation of surveys on the last day.

Vakavaktia - Santa Cruz ground dove

We checked all “ground-doves” that were flushed from the walking transects on Tinakula, which included old tracks and steep lava flows. We listened for the repetitive deep “oom oom” calling that we expected to hear if ground doves were present, consistent with calls of other species of ground doves (Guy Dutson pers. comm., RP pers. obs.). The weather throughout was fine with light winds.

Vlumba – Palm lorikeet

This species was searched for during the transect surveys described above on all islands, particularly listening for their soft calls coming from coconut trees.

Upulalir - Santa Cruz shrikebill

Surveys were as for the general survey and Mako approaches above, particularly targeting old growth forest as per Fig 3.2. Methods generally followed Dutson (2006, Bull BOC 126:299-308) except that we additionally tried loud whistling throughout the survey which was intended to illicit a response from the shrikebills which are territorial and vocal (Dutson 2006). The weather was overcast at all times in the old growth forest, often with heavy rain showers.

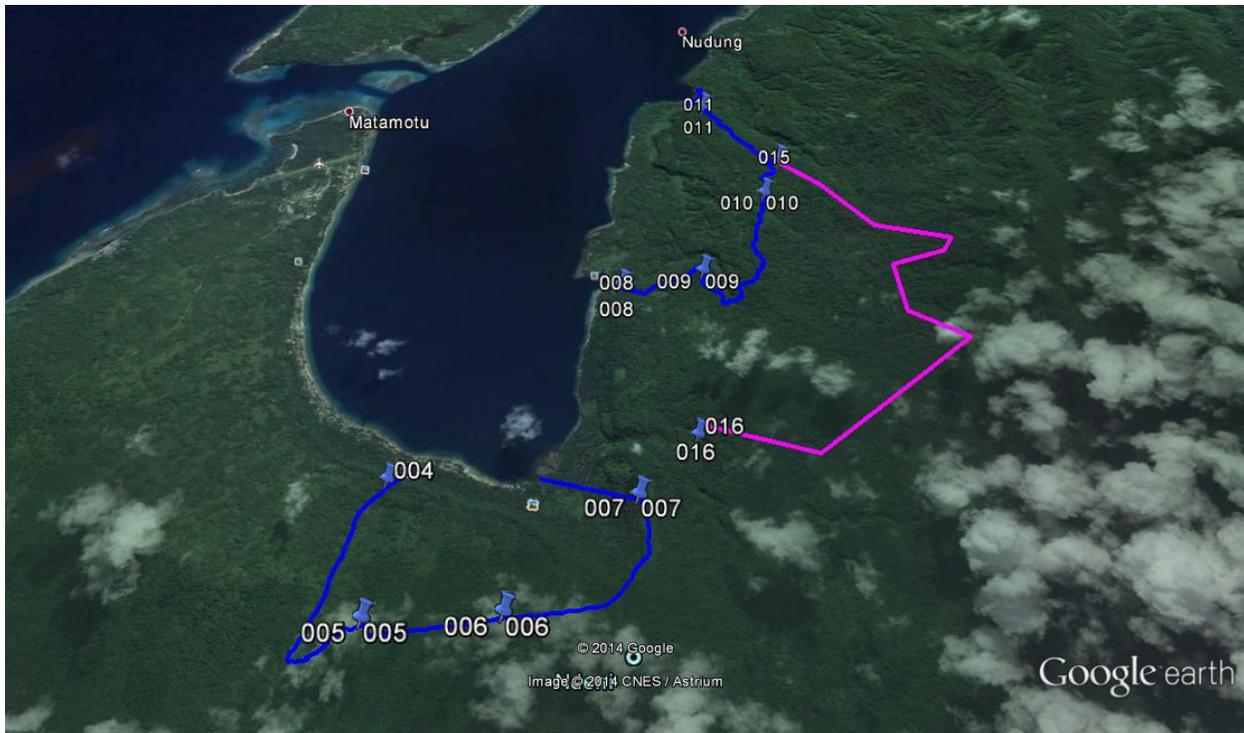


Fig 3.2 – Survey tracks undertaken for Mako and Santa Cruz Shrikebill; 04-07 Gardens and secondary forest, 08-016 mainly primary forest with some secondary. Maps are courtesy of Google.

Invasive species surveys

Rodent surveys were carried out by using Victor rat traps baited with cooked coconut at c.25 m intervals at Buma, Vanikoro. Up to 20 traps per site were tied to trees to avoid escapes and where possible trapped animals would be inaccessible to other scavenging rodents or crabs. All rats were measured according to international protocols. Sign of rats was noted at all sites. On Tinakula we searched for rat sign on hundreds of fruits of coconut (immature fruit), cut nut (*Barringtonia* sp. mature fruit), banana, mango, etc.

Other invasive species, e.g. cane toad and *Wedelia* daisy were recorded when seen. Invasive ants were conspicuous throughout so no ant lures were needed, but observations of distribution were made along the transects on each island. Representative ants were collected and preserved in 90% ethanol and for confirmation of identification.

4 RESULTS

4.1 Basapine - Vanikoro flying fox - *Pteropus tuberculatus* (CR)

Distinguishing features of Basapine

Basapine is a small flying fox about half the size of the Pacific flying fox (PFF), the latter of which is a common bat on Vanikoro and throughout the Santa Cruz Islands. Basapine are large-headed, small-eared flying foxes with a dark brown pelage (Fig 4.1). The name basapine means “big headed”.



Fig 4.1.1 and 2. Basapine roosting in broadleaf tree beside coconut trees on which it occasionally foraged.



Fig 4.1.3 – A Pacific flying fox captured for food at Vanikoro.

Habitat and encounter rates of Basapine

Survey results for Basapine are graphed as encounter rates per hour in Fig 4.1.4. Basapine was found only at Tevai Island, Vanikoro where they were seen primarily in coconut plantations. Coconuts were flowering at the time of our visit and this appeared to be a key food tree for Basapine at the time. Four Basapine was seen in primary forest during 14 hours of survey along forest transects.

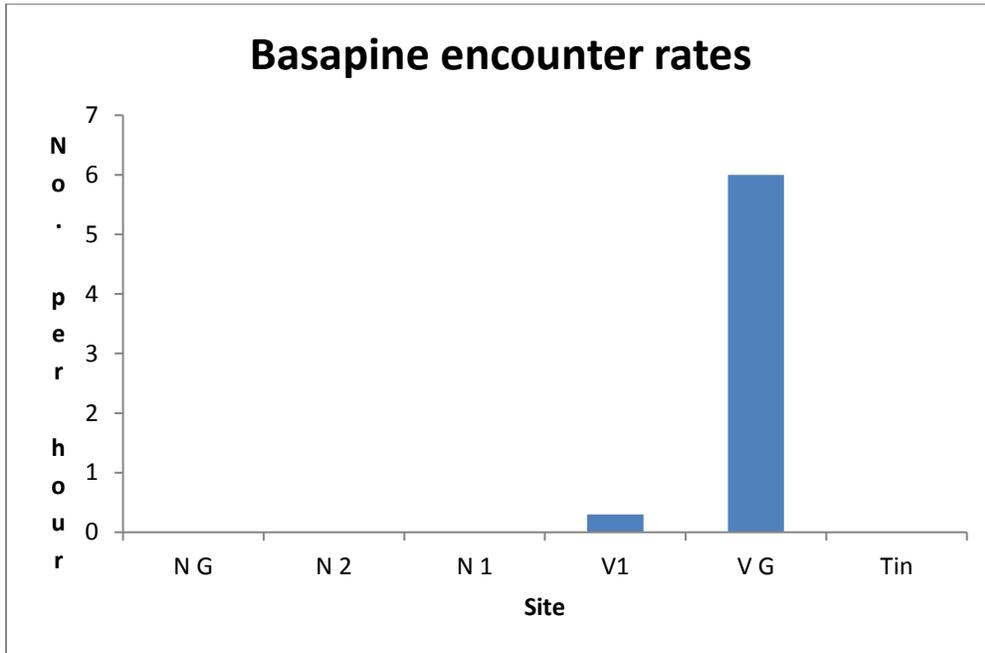


Fig 4.1.4 – Average encounter rates of Basapine per hour on Santa Cruz transects – N = Nendo, V = Vanikoro, T = Tinakula, 1 = Primary forest, 2 = secondary forest, G = gardens including coconuts.



Fig 4.1.5 – Vanikoro forest interior includes old growth kauri (Left), rosewood and dense undergrowth.

Distribution and Status

Basapine has not been officially recorded for nearly 100 years, but clearly continues to survive on Vanikoro where it is also well known to the local community. The species is found at Tevai and the main island of Vanikoro and also on the neighboring island of Utupua where it may be relatively rare (Joseph Gamou pers. comm.). The scarcity of coconuts around Vanikoro (restricted to relatively small groves within 100 m of the coast) together with the observations of Basapine focusing on coconut at the time of our survey, suggests that the species may number only in the many hundreds or low thousands. Further work is needed to determine precise numbers, particularly on the Vanikoro mainland.

Behaviour of Basapine

Unlike Pacific flying foxes (PFF) which are gregarious during the day and occupy communal roosts or camps, the basapine is primarily solitary, roosting individually and occasionally in pairs. Typically the roost sites were in the middle understorey of a food tree, e.g. coconut, mango, or in a tree that was close to a food tree, e.g. mangrove, breadfruit. All sites provided good overhead cover which would have minimized disturbance from PFF and reduced the chances of detection by potential predators, e.g. pied goshawk, which were present at Vanikoro. Basapine were particularly wary of PFF and invariably flew off as a larger flying fox approached.

Foraging was frequently seen during the day, peaking in the mid and late afternoon, probably an adaptation to avoid or minimize contact with PFF which typically emerged to feed closer to sunset. Foods seen being consumed by basapine included coconut flowers/nectar (both species) and fan palm flowers.

Threats to Basapine

The largest island of Vanikoro was extensively logged in the 1920s to 1960s (Lees 1990). Regeneration may be hindered by the presence of smothering vines, but this needs evaluating. Logging was commenced by a Malaysian company on the main island in early 2014 amid considerable local opposition, but it may require government intervention to bring this to an end. Opportunistic hunting has been considered a threat to this species (Leary et al 2008), but locals indicated that they are not currently hunted for food at Buma because they are said to be distasteful and/or too small for eating. Some are killed because they are thought to impact on coconut fruits. Observations of their feeding on nectar in September 2014 suggest that they may be an important pollinator of coconuts and several other species of garden and forest trees, especially if invasive ants continue to impact on other pollinators. *Pteropus* bats are considered generally to be important seed dispersers as well (Leary and Aujare 1994).

4.2 Mako - Temotu flying fox – *Pteropus nitendiensis* (EN)

Distinguishing features of Mako

Mako are similar to basapine in size, but have a rich golden pelage (Fig 4.2.1). Males are darker than females with crown, rump and back a golden brown (Leary and Aujare 1994).

Habitat and encounter rates of mako

Survey results for Mako are graphed as encounter rates per hour in Fig 4.2.2 using data from Appendix 3. We found Mako to be moderately common on Nendo, and reported from the neighbouring island of Malo or Temotu Neo, while small numbers were present at Tinakula 29 km to the north of Malo. In contrast to the restricted habitat of Basapine, Mako were encountered at relatively similar rates along all transects in each of gardens, secondary forest and primary forest.



Fig 4.2.1 – Mako roosting in breadfruit tree.

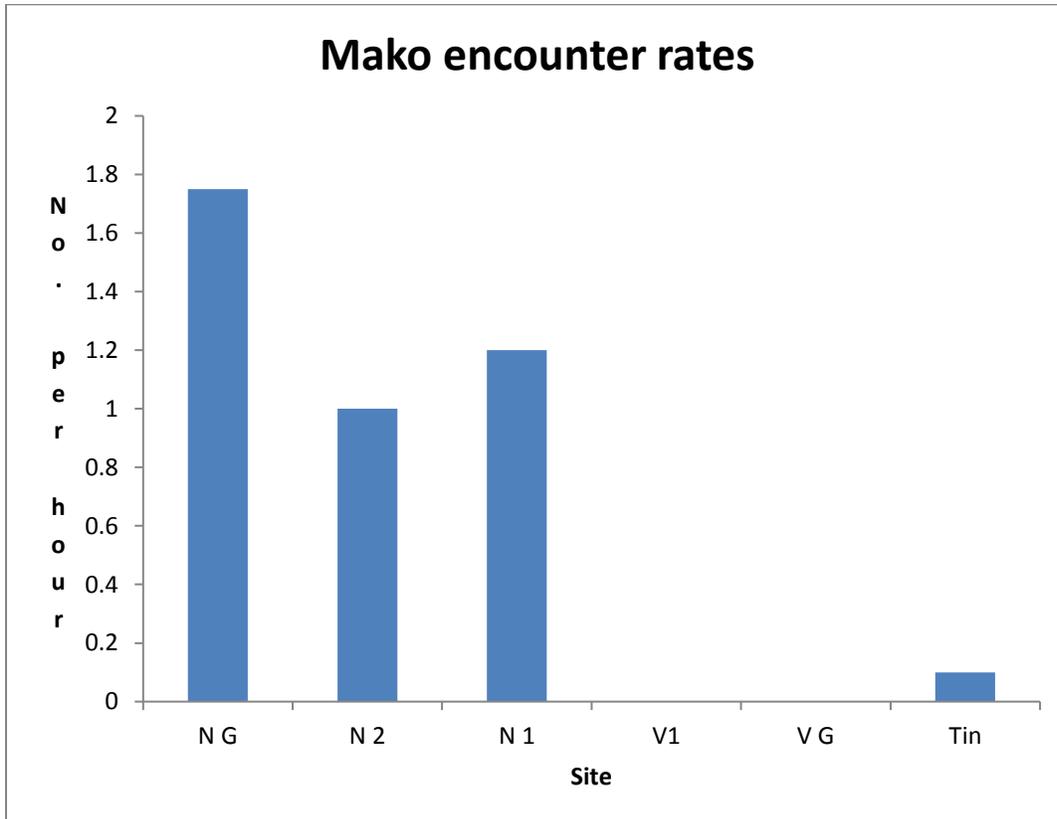
Status

Mako is currently listed as Endangered (IUCN 2014). The current survey provided an encounter rate of 0.55 individuals per km walked. The detection width of the survey transects was considered to be about 20 m based on observable distance to individuals (10 m) from the transect paths, giving a total sample area of c.50 ha. Some 14 individual mako, or 0.2 to 0.3 per ha, were observed. This density enables a crude population estimate to be calculated for Nendo which at 60000 ha would be total population of c.15000 individuals assuming equal distribution. If Mako are concentrated at altitudes below 300 m then this would still give an estimate of 7500+ individuals. These figures will assist the IUCN specialist committees to more accurately assess the status of Mako.

Behaviour of Mako

As with Basapine, Mako appear to be primarily solitary flying foxes, roosting individually and occasionally in pairs. The roost sites were primarily in the middle understorey of a food tree, e.g. coconut, mango, breadfruit, or in another tree that is close to a food tree. These roost sites all afforded good overhead cover. Like Basapine, Mako were intimidated by PFF, but were less inclined than Basapine to leave when a PFF approached and would do so only if the PFF approached closely and/or landed in the same tree.

As with Basapine, Mako foraging was frequently seen during the day, peaking in the mid and late afternoon. A variety of foods were seen being consumed by Mako and included coconut flowers/nectar, fan palm flowers and a range of fruits, including mango, breadfruit, wild apple and cutnut.



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 Fig 4.2.2 – Average encounter rates per hour of Mako on Santa Cruz transects – N = Nendo, V = Vanikoro, T = Tinakula, 1 = Primary forest, 2 = secondary forest, G = gardens including coconuts.

Threats to Mako

No immediate threats were apparent and none were noted by Leary and Aujare 1994. Mako occupies a variety of forest types and gardens. Hunting is localized because of the peripheral distribution of villages. Cyclones have been considered a significant threat (Leary et al 2008), but the presence of many deep valleys and ravines may afford sufficient shelter at those times.

4.3 Vakavakatia - Santa Cruz Ground-dove – *Gallicolumba sanctaecrucis* (EN)

Habitat and encounter rates of Vakavakatia

Forest surveys for Vakavakatia (Fig 4.3.1) were carried out on Vanikoro, Nendo (Santa Cruz) and Tinakula, during which several km of trails were walked searching for three species of forest birds. Results are summarized in Fig 4.3.3. Vakavakatia were found only at Tinakula at elevations of 60-260 m where encounter rates were a very respectable 1.1 per hour. Typically they were encountered in patches of old growth forest and regenerating forest recovering from the volcanic eruption of 1971. These areas were mixed fern-palm-broadleaf forest with dominant trees being tree ferns (*Cyathea* sp.), coconuts and *Pandanus*, but also a variety of other species spanning laurels, figs, rosewood, etc. (Fig 4.3.). The understorey was usually quite dense comprising a variety of ferns (e.g. *Asplenium*, *Phymatosurus*, *Polystichum*) and regenerating tree seedlings.



© del Hoyo et al (1992 ? 2000)

Fig 4.3.1 – Santa Cruz Ground-dove male - Courtesy



Fig 4.3.2 – NW coast of Tinakula and its regenerating forest (left) and lava flows (right)

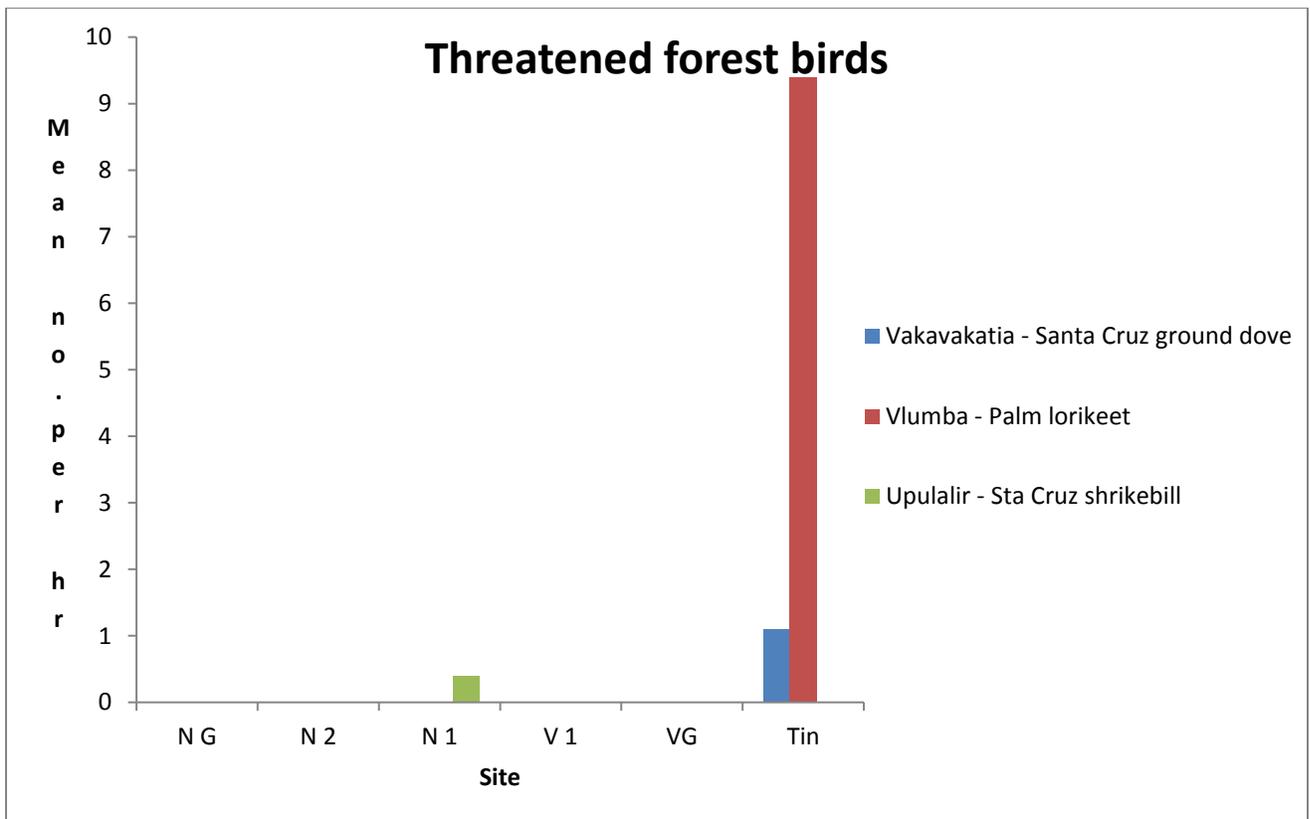


Fig 4.3.3 - Average encounter rates per hour of Vakavakatia, Vlumba and Upulalir on Santa Cruz Islands transects – N = Nendo, V = Vanikoro, Tin = Tinakula, 1 = Primary forest, 2 = secondary forest, G = gardens including coconuts.

Status

On Tinakula, ten ground-doves (five pairs) were encountered during 9 hours of transect surveys covering about 10 km of walking tracks and lava flows and some other pairs and individuals were encountered. From these data a crude estimate of density can be established. It was estimated that the detection zone spanned 15 m each side of the track so about 30 m of transect width in all with 10 km of transect giving a total of 30 ha of area sampled. From photographs and google earth, a total area of about 150 ha of regenerating and primary forest habitat may be available to Vakavakatia below about 200 m, of which we sampled about 20%. If distribution patterns of Vakavaktia are uniform this would equate to a very approximate 100 birds, but some birds were detected to 260 m asl. It seems reasonable to conclude therefore that over 100 individual birds are present on Tinakula.

No Vakavakatia were detected on other islands but their confirmed presence on Tinakula, means that some could disperse to other islands in the group. Villagers at Buma (Vanikoro) and Graciosa Bay (Nendo) often pointed to the female ground-dove in Plate 10 of Dutson (2011), but never to the male. I provisionally concluded that these were prompted by sightings of Pacific emerald doves which are widespread (Appendix 3) and which in good light can resemble the female ground dove and are more brightly colored than depicted. Observers were encouraged to photograph any future birds on their mobile phones and email in the pictures.

Behaviour of Vakavakatia

Typically we encountered male-female pairs. The birds probably ran a short distance before flying off at 1-2 m elevation through the forest, but usually we did not see them until they flew. It was difficult to get good views of these birds, but males appeared to display a range of facial and breast markings spanning typical plumage as depicted in HBW (2006) and Dutson (2011) and more white breasted forms although we could not verify this plumage variation precisely. Females appeared to be as portrayed in Dutson (2011). The furtive behavior may be brought about through frequent hunting.

Threats

Tinakula is rat-free and cat-free and so the key threat is invasion of the island by rats and/or cats. The former Tinakula residents now reside at the village of Minivi on Malo, Santa Cruz, from where they often visit Tinakula to hunt chickens, doves, crabs, etc. Sometimes people stay for extended periods on Tinakula to rear piglets on coconut flesh and then the pigs are boated back to Lata and subsequently on to the Honiara market. Other people from different villages at Malo and Santa Cruz sometimes land without the permission of the Minivi chief. Tourists occasionally also land at Tinakula. Once knowledge of the presence of ground-doves becomes known to the birding community, some increased visitor pressure might occur. During discussions with the chief and community and subsequently with Agriculture and Quarantine staff at Lata, a consensus was reached to try to improve the biosecurity of Tinakula to lessen the chances of rats and other invasive species arriving.

Existing Tinakula invasive species include the yellow crazy ant and fire ants (*Solenopsis* sp.) which have been present for an unknown but lengthy period of time, and these do not seem to affect recruitment of at least some doves and other birds. Hunting occurs over only a small part of Tinakula and is currently unlikely to be impacting the Vakavakatia population. During our four days ashore, our team set traps for Vakavakatia but succeeded in catching only chickens (red jungle fowl).

4.4 Vlumba – Palm Lorikeet – *Charmosyna palmarum* - (VU)

Habitat and encounter rates of Vlumba

Vlumba were common only on Tinakula with encounter rates of 9.8 per hour (Fig 4.3), the highest of any bird species on the island (Appendix 3). They were most common at lower altitudes (< 200 m asl) where the forest supported highest densities of coconut palms and where other palm tree species were also present. Two small flocks of small lorikeets (probably this species) were seen at Graciosa Bay, Nendo, flying SE in the evening of 3 October. None were detected during surveys in forests of Nendo and Vanikoro.

Vlumba are a highly mobile, possibly even irruptive, species (Dutson 2011). Part of the explanation for this behavior may be that they breed prolifically on rat-free Tinakula and any failing of food species there could result in significant dispersal to rat-infested islands in the Santa Cruz Islands. Some data are available from other Santa Cruz islands in the last 10 years (G Dutson pers. comm.).



Status

Fig 4.4.1 – Vlumba in coconut at Tinakula October 2014.

Behaviour of Vlumba

Typically Vlumba were seen or heard in coconut trees where they were feeding on coconut flowers, or calling as they flew low over the forest canopy.

Threats

Possibly rats as per Vakavakatir if they invade.

4.5 Upulalir – Santa Cruz Shrikebill – *Clytorhynchus sanctaecrucis* - (EN)

Habitat and encounter rates of Upulalir

Upulalir were detected only in primary forest at altitudes of 100 m and 230 m above the Bullet Point area of Graciosa Bay. Both sites were in steep-sided gullies with a dense understorey of *Cyathea* and palm trees and a ground layer of ferns. At 0.4 birds per hour, encounter rates in primary forest were low, but possibly affected by often heavy rain during the surveys. None were detected in secondary forest or gardens (Fig 4.3, Appendix 3).



Fig 4.5.1 – Ancient trees like this rosewood occur in the primary forests of Nendo

Status

The low level of detectability suggests that the Endangered status is currently appropriate. Further work is needed in other parts of Nendo to assess density and habitat preference.

Behaviour of Upulalir

The two groups encountered were probably pairs and were very vocal and initially detected at distances of 50+ m from the transect line. One male was subsequently observed closely for a short period of time and brief views had of two other birds.

Threats

Logging activities have been suggested before as a major threat (Lees 1990, Dutson 2006, IUCN 2014). Primary forest is still dominant on Nendo and there are currently no commercial activities. Communities undertake some sustainable logging of individual trees for buildings, canoes, etc., which is unlikely to impact Upulalir.

4.6 Other birds

Details of birds including recorded during the surveys are summarized in Appendix 2-4. The endemic species of white-eyes (three species) and monarchs (two other species) were recorded at Nendo and/or Vanikoro. Most forest species, particularly the dove and pigeon species) were common throughout. New species recorded in the Santa Cruz Islands were white-tailed tropicbird and pale-vented bush-hen, while other distributional additions on islands included spotless crane, Pacific emerald dove, uniform swiftlet and long-tailed cuckoo, all on Tinakula. Refer Appendix 4 for details of seabird transects.



Fig 4.6 – Collared kingfisher and Pacific pigeons on Tinakula

4.7 Amphibians and reptiles

Amphibian and reptile species recorded are summarized in Table 4.71. The only amphibian recorded was the cane toad which was common throughout the island of Tevai, Vanikoro, where it was introduced by the Australian Kauri Timber Company in 1945. Solomons tree snakes and South Pacific tree boa were present on Nendo with the former being commonly encountered, but rarely encountered on Vanikoro, where the cane toad may be having an impact on these species. The emerald tree skink was present in Nendo gardens, while Pacific black skink was abundant on Tinakula.



Fig 4.7 - Emerald tree skink (left) on Nendo and Pacific black skink (right) on Tinakula

Table 4.7.2 – Amphibians and reptiles noted during surveys

Island	Nendo	Nendo	Nendo	Vanikoro	Vanikoro	Tinakula
Forest type	Garden	Secondary	Primary	Primary	Coconut	Mixed
Dates September/October	S 18 30 th	S 30 th	S 30 th O 1 st	S 23-25 th	S 26-28 th	O 8-12 th
No. hours	4	6	8	14	6	9
Weather	Cloudy showers	Cloudy, showers	Cloudy, some rain	Fine	Fine	Fine
Cane toad <i>Bufo marinus</i>	0	0	0	0.1	10+	0
Solomon's tree snake <i>Dendrelaphis salomonis</i>	0.5	0.3	0	0.1	0	0
South Pacific tree boa <i>Candoia bibroni</i>	0	0	0.1	0	0	0
Oceanic gecko <i>Gehyra oceanica</i>	0	0	0	0.1	0	Common
Pacific black skink <i>Emoia nigra</i>	0.5	0	0	0	0	10+
Reef skink <i>Emoia atrocostata</i>	Common	0	0	Common	0	Common
<i>Eugongylus albofasciolatus</i>	1 dead	0	0	0	0	0
Emerald tree skink <i>Lamprolepis smaragdina</i>	0.75	0	0	0	0	0
Saltwater crocodile <i>Crocodylus porosus</i>	Wedelea River-mouth, 1 ad early Oct			0	0	0

4.8 Invasive species

Invasive species were present on all islands surveyed. Key environmental pest species are summarized in Table 4.8 below.

Table 4.8 – Key invasive species detected at Santa Cruz Islands

Species	Vanikoro	Nendo	Tinakula
Black rat <i>Rattus rattus</i>	Common	Common	Nil
Cane toad	Common	Nil	Nil
Yellow crazy ant	Common	Common	Common
Fire ant species	Common	Common	Common
Giant African snail	Reported/loggers	Nil	Nil
Singapore daisy <i>Wedelia</i>	Nil	Establishing	Nil



Singapore daisy (*Wedelia*) establishing on Nendo

4.9 Other forest values and threats identified with community

General

Meetings were held with the communities of Buma, Graciosa Bay and Minivi to discuss natural values and resources of the forests and some threats facing them. Up to 75 people attended each meeting. For each island there was a fairly consistent group of natural resources identified which were being utilized sustainably by the community. These included fresh water, timber, fruits and birds and other animals. Fresh water was available throughout the year at Vanikoro and Nendo, all courtesy of the forest cloak covering the islands. Timber was being sustainably harvested from all three islands for use in house building, furniture and canoe building. Fruits of the forest, e.g. breadfruit, cutnut and wild apple were used as foods at all three islands. Animals were being sustainably harvested from all islands and comprised PFF, doves (e.g. Pacific pigeon) and “ground-doves” along with wild chickens and crabs.



Fig 4.9.1 – Despite heavy rain, streams like these two in Nendo forests maintained high water clarity and supported eels and abundant invertebrates including crayfish.

Logging and invasive species

The threats to this sustainable harvest that were identified at meetings include unsustainable logging and invasive species. Logging unsustainability was highlighted by a 2014 venture at Vanikoro where a Malaysian company is using a dragline to bring logs to the foreshore for collection. Issues raised by the community were loss of water quality, loss of timber, loss of habitat and invasion by alien species. The invasive species concern was highlighted by the irresponsible introduction of Giant African snails by the logging company. The incursion was noted by a Quarantine officer who said that he removed them. Meanwhile Singapore daisy has established at Lata in recent years and is becoming very invasive in Graciosa Bay gardens. Equipment and vehicles associated with logging can easily bring in weeds like Singapore daisy and eggs and adults of animals like giant African snail. The highly invasive cane toad could also be easily transported from Vanikoro to Nendo via logging equipment and logs. There is a

widespread desire amongst communities to stop foreign companies and their unsustainable logging but they seem powerless to stop them. On top of this some of the targeted timber species are threatened, notably Pacific kauri (EN) and rosewood (VU).

Tinakula invasives

The key issue for Tinakula is the risk of rats and other invasive species getting ashore on the island. This one at least can be addressed by the local community at Minivi because they are located within view of Tinakula and have the authority to prevent illegal landings. They need support however in raising the awareness of values of and threats to Tinakula as well as help with biosecurity techniques.



Fig 4.9.2 – On calm days like this one, landing boats can be taken up on to the beach presenting significant risks of IAS getting ashore.

5. DISCUSSION AND RECOMMENDATIONS

Key findings on this survey were the discovery of the Vakavakatir or Santa Cruz ground-dove on rat-free Tinakula, plus apparently secure populations of Basapine (Vanikoro Flying-fox) at Vanikoro. Two of the other three species of target fauna (Mako and Vlumba) were also present in greater than expected numbers, but the third, Upulalir, needs additional targeted surveys, and during better weather than encountered on the present survey.

The biggest surprise of the survey was the finding that **Tinakula is free of rats and cats** as well as lacking all other vertebrate invasive species such as dogs, pigs, cane toads and Asian house geckos, all of which are present in the Santa Cruz Islands. The absence of rats and cats on Tinakula is the sole reason that Vakavakatir and other sensitive species still have a foothold in the Santa Cruz Islands. The chief from Minivi Village at Malo, is to be congratulated for being able to stop rats invading Tinakula. Crucially he also needs help from agencies and departments to ensure that rats, etc., never get to this pivotal island. If rats ever got to Tinakula a rat eradication programme would be needed and this would pose significant logistic problems (e.g. presence of non-target ground-doves, an active volcano and the fact that invading populations are less readily eradicated), let alone the need to raise 1-2 million dollars for an eradication programme. The most cost-effective solution therefore is to support a community awareness programme at Santa Cruz to support the chief in raising the profile of the island's natural values as well as prescribing biosecurity actions that need to be taken by everyone before and during visits there.

Surveys such as these do raise some additional questions on impacts of invasive species on key fauna. For example, two species of invasive ant on Tinakula appear to be impacting on the indigenous ant fauna but it is not known if they are impacting ground-doves, etc. The presence of many fledglings of a variety of species of birds in high density areas of little fire ants at Vanikoro, Nendo and Tinakula, suggest to me that the impacts of *Solenopsis* fire ants may not be as severe on the avifauna as for example, *Wasmannia*. Similarly, the scarcity of Upulalir on Nendo may well be a reflection of black rat impacts and this needs detailed study.

The following recommendations are offered:

1. Species Status
 - Review the IUCN threat status and/or situation for each of Basapine, Mako and Vakavakatir taking into account the revised population estimates and threat levels derived by this survey.
2. Tinakula
 - Support paramount chief Paul and the Minivi community at Malo in maintaining Tinakula as a rat-free island. This could involve Quarantine and Environment Departments providing immediate technical advice and support to the community, in conjunction with external support in the form of community awareness-raising (brochures, videos, meetings, etc.), plus technical equipment and training.
 - Explore options with Minivi community for making Tinakula a reserve, e.g. nature reserve, or other appropriate reserve, under the Protected Areas Act.
 - Undertake a longer and more detailed fauna and flora survey on Tinakula to document any additional sensitive animal and plant species that may be present, e.g. other bats, including the presumed extinct Nendo tube-nosed bat (*Nyctimene sanctacrucis*), spiders, seabirds and rails, and better document health of the Vakavakatir via camera traps and mist-netting.

3. Other surveys

- With appropriate communities, evaluate Duff and other islands in the Santa Cruz Group that could potentially provide sanctuaries for wildlife, either now if they are rat-free, or later following feasibility studies for removing rats and/or other invasives.
- Renew collection permit and collect flying-fox tissue material that may be held-over by communities at Buma (Basapine) and Nendo (Mako) for DNA and museum studies.
- Complete additional surveys of Upulalir to firstly characterize habitat and secondly derive a suitable simple monitoring technique, ideally based on current survey methods. Depending on these findings, undertake further targeted research on, e.g. rat impacts on Upulalir.
- Work with communities and Solomon Islands authorities to identify suitable primary forest habitat for protection of island endemic birds and bats and other fauna, particularly within Vanikoro and Nendo.
- Undertake research aimed at better understanding the impacts of invasive ants on threatened species, e.g. invasive *Solenopsis* ants on birds generally and ground-doves specifically at Tinakula.

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REFERENCES

- BirdLife International (2014) Species factsheet: *Clytorhynchus sanctaecrucis*. Downloaded from <http://www.birdlife.org> on 10/09/2014.
- Bouchet P, H le Guyader, Olivier Pascal. 2011. The natural history of Santo. IRD editions, Paris.
- del Hoyo, J., Elliott, A., & Sargatal, J. eds. (1997). Handbook of the Birds of the World. Vol. 4. Sandgrouse to Cuckoos. Lynx Edicions, Barcelona.
- Dutson G 2001. New distributional ranges for Melanesian birds. *Emu* 101: 237-248.
- Dutson, G. 2006. The Pacific shrikebills (*Clytorhynchus*) and the case for species status for the form *sanctaecrucis*. *Bulletin of the British Ornithologists' Club* 126(4): 299-308.
- Flannery T. 1995. Mammals of the South-west Pacific and the Moluccan Islands. Singapore.
- Gibbs, D. 1996. Notes on Solomon Island birds. *Bulletin of the British Ornithologists' Club* 116: 18-25.
- Government of Solomon Islands 2010. Protected Area Act 2010. (No. 4 of 2010).
- IUCN 2014. The IUCN Red List of Threatened Species. Version 2014.2. <www.iucnredlist.org>. Downloaded on 21 October 2014.
- Leary T., Aujare, I. 1994. Review of the status and distribution of *Pteropus* flying-foxes in the Solomon Islands and a preliminary assessment of fruit crop damage in Temotu Province. The Nature Conservancy, Honiara.
- Leary, T., Hamilton, S. & James, R. 2008. *Pteropus tuberculatus*. The IUCN Red List of Threatened Species. Version 2014.2. <www.iucnredlist.org>. Downloaded on 18 October 2014.
- Lees A. 1990. A representative protected forests system for the Solomon Islands. Maruia Society, Nelson.
- Mayr, E. 1933. Birds collected during the Whitney South Sea Expedition. XXIV. Notes on Polynesian flycatchers and a revision of the genus *Clytorhynchus* Elliot. *American Museum Novitates* 628: 1-21.
- McCoy M 2006. Reptiles of the Solomon Islands. Pensoft Publishers.
- Pratt, H. D.; Bruner, P. L.; Berrett, D. G. 1987. *A field guide to the birds of Hawaii and the tropical Pacific*. Princeton University Press, Princeton.

APPENDIX 1 – Bird and flying-fox species names mentioned in the text

English and scientific name	Temotu names from Graciosa Bay unless indicated
Red junglefowl <i>Gallus gallus</i>	-
Pacific black duck <i>Anas superciliosa</i>	Pirlanuir
Tropical shearwater <i>Puffinus bolloni</i>	-
White-tailed tropicbird <i>Phaethon lepturus</i>	-
Striated heron <i>Butorides striata</i>	Koabu
Pacific reef heron <i>Egretta sacra</i>	Koa
Great frigatebird <i>Fregata minor</i>	Sambo (Buma)
Red-footed booby <i>Sula sula</i>	-
Brown booby <i>Sula leucogaster</i>	-
Pied goshawk <i>Accipiter albogularis</i>	-
Pale-vented bush-hen <i>Amaurornis moluccana</i>	
Buff-banded rail <i>Rallus philippensis</i>	Birlak
Spotless crane <i>Porzana tabuensis</i>	-
Purple swamphen <i>Porphyrio porphyrio</i>	Tirklae
Pacific golden plover <i>Pluvialis fulva</i>	Nirla
Whimbrel <i>Numenius phaeopus</i>	Nirlatiupu
Grey-tailed tattler <i>Tringa brevipes</i>	Nirla
Wandering tattler <i>Tringa incana</i>	Nirla
Ruddy turnstone <i>Arenaria interpres</i>	Nirla
Brown noddy <i>Anous stolidus</i>	-
Black noddy <i>Anous minutus</i>	-
White tern <i>Gygis alba</i>	-
Great crested tern <i>Sterna bergii</i>	Nari, Bourao (Buma)
Sooty tern <i>Onychoprion fuscatus</i>	-
Black-naped tern <i>Sterna sumatrana</i>	-
McKinlay's cuckoo-dove <i>Macropygia mackinlayi</i>	Leo, Wako (Buma)
Pacific emerald dove <i>Chalcophaps longirostris</i>	Leibu, Bune (Buma)
Santa Cruz ground dove <i>Gallinucola sanctaerucis</i>	Vakavakatia, Leibu, Bune (Buma)
Red-bellied fruit dove <i>Ptilinopus greyii</i>	Nuan
Pacific pigeon <i>Ducula pacifica</i>	Bonakane
Coconut lorikeet <i>Trichoglossus haematodus</i>	Vlu
Palm lorikeet <i>Chamosyna palmarum</i>	Vlumba
Long-tailed cuckoo <i>Urodynamis taitensis</i>	Nongiabir
Eastern barn owl <i>Tyto javanica</i>	Kuba
Glossy swiftlet <i>Collocalia esculenta</i>	Mabola
White-rumped swiftlet <i>Aerodramus spodiopygius</i>	Mabola
Uniform swiftlet <i>Aerodramus vanikorensis</i>	Mabola
Collared kingfisher <i>Todiramphus chloris</i>	Penda
Cardinal myzomela <i>Myzomela cardinalis</i>	Mangavu
Polynesian triller <i>Lalage maculosa</i>	Teso
Melanesian whistler <i>Pachycephala caledonica</i>	-
White-throated whistler <i>Pachycephala vitiensis</i>	Utopia
Rufous fantail <i>Rhipidura rufifrons</i>	Upe
Sta Cruz shrikebill <i>Clytorhynchus sanctaerucis</i>	Upalalir
Vanikoro monarch <i>Mayornis schistaceus</i>	-
Vanikoro flycatcher <i>Myiagra vanikorensis</i>	-
Pacific swallow <i>Hirundo tahitica</i>	Nulabwa
Sta Cruz white-eye <i>Zosterops sanctaerucis</i>	Dirilirve
Vanikoro white-eye <i>Zosterops gibbsi</i>	-
Sanfords white-eye <i>Woodfordia lacertosa</i>	Wakio

Rusty-winged starling <i>Aplonis zelandica</i>	Pwatirbao
Temotu flying-fox EN <i>Pteropus nitendiensis</i>	Mako
Vanikoro flying-fox EX <i>Pteropus tuberculatus</i>	Basapine (Buma)
Pacific flying-fox <i>Pteropus tonganus</i>	Melepa; Lekele, Ebeleklot (Buma)
Microbats	Dilabi
Solomons treesnake <i>Dendrelaphis salomonis</i>	Ulu
South Pacific tree boa <i>Candoia bibroni</i>	Numa

Appendix 2 - Summary of birds and mammals observed September-October 2014

Common name	Summary of observations September-October 2014
Red junglefowl	Common on forests of Nendo and Tinakula
Pacific black duck	Two seen on Webelea River, Nendo, 5 October
Tropical shearwater	Few observed at sea, also heard over Tinakula at night 11 October
White-tailed tropicbird	Two adults about 5 km offshore at NE corner of Nendo 19 October
Striated heron	Several sightings at Graciosa Bay, Nendo and at Vanikoro
Pacific reef heron	Common, white morph outnumbered dark and intermediate morphs
Great frigatebird	Singles observed flying at Vanikoro and Nendo and up to 10 at Tinakula
Red-footed booby	Few singles at sea (Appendix)
Brown booby	Few singles and pairs at sea and at Tinakula in evening
Pied goshawk	Two singles at Vanikoro – one pied morph and one juvenile
Pale-vented bush-hen	One heard calling Webelela River edge evening of 30 September
Buff-banded rail	Common at Nendo in gardens, roadsides
Spotless crane	Seen and heard on rat-free Tinakula only
Purple swamphen	Common in gardens at Vanikoro and Nendo
Pacific golden plover	Few seen at Vanikoro
Whimbrel	Two seen at Graciosa Bay, Nendo, October
Grey-tailed tattler	One with wandering tattlers at Vanikoro on 27 September
Wandering tattler	Groups of up to 4 at Nendo and Vanikoro September-October
Ruddy turnstone	Up to 11 at Vanikoro on 22-27 September
Brown noddy	Few seen at sea off Nendo, one flying over Tinakula
Black noddy	Few seen at sea off Nendo
White tern	Few seen at sea off Nendo, one off Tinakula
Great crested tern	Few at sea and at Graciosa Bay, Nendo and up to 10 at Vanikoro
Sooty tern	Small flocks seen at sea near Nendo
Black-naped tern	One in Graciosa Bay, Nendo, October
McKinlay's cuckoo-dove	Common on Vanikoro, Nendo and Tinakula
Pacific emerald dove	Moderately common on Vanikoro, Nendo and Tinakula
Santa Cruz ground dove	Present on Tinakula
Red-bellied fruit dove	Common on Vanikoro, Nendo and Tinakula
Pacific pigeon	Common on Vanikoro, Nendo and Tinakula
Coconut lorikeet	Common on Vanikoro, Nendo and Tinakula
Palm lorikeet	Common on Tinakula, two small flocks at Nendo probably this species
Long-tailed cuckoo	Two seen on Tinakula
Glossy swiftlet	Common on Vanikoro and Nendo
White-rumped swiftlet	Common on Nendo
Uniform swiftlet	Common on Vanikoro, Nendo and one seen on Tinakula October
Collared kingfisher	Common on Vanikoro, Nendo and Tinakula
Cardinal myzomela	Common on Vanikoro, Nendo and Tinakula
Polynesian triller	Uncommon on Vanikoro, Nendo

Melanesian whistler	Common on Vanikoro
White-throated whistler	Common on Nendo and few at Tinakula
Rufous fantail	Common on Vanikoro, Nendo and Tinakula
Sta Cruz shrikebill	Three observed on Nendo October
Vanikoro monarch	Moderately common on Vanikoro
Vanikoro flycatcher	Common on Vanikoro
Pacific swallow	Common on Nendo and Tinakula
Sta Cruz white-eye	Moderately common on Nendo
Vanikoro white-eye	Moderately common on Vanikoro
Sanfords white-eye	Moderately common on Nendo
Rusty-winged starling	Rare on Vanikoro, common on Nendo
Polynesian starling	Common on Tinakula
Temotu flying-fox EN	Common on Nendo
Vanikoro flying-fox CR	Moderately common on Vanikoro
Pacific flying-fox	Common on Vanikoro, Nendo and Tinakula, camps typically of 100-300
Microbats	Common on Vanikoro and Nendo

Appendix 3 – Mean encounter rates per hour for flying-foxes and birds on different islands and habitats

Island	Nendo	Nendo	Nendo	Vanikoro	Vanikoro	Tinakula
Forest	Garden	Secondary	Primary	Primary	Coconut	Mixed
Dates September/October	S 18 th 30 th	S 30 th	S 30 th O 1 st	S 23-25 th	S 26-28 th	O 8-12 th
Km	6	8	11	12	5	10
No. hours	4	6	8	14	6	9
Weather	SE, cloud showers	Cloudy, showers	Cloudy, some rain	Fine	Fine	Fine
Vanikoro flying-fox EX	0	0	0	0.3	6	0
Temotu flying-fox EN	1.75 (7)	1 (6)	1.2 (9)	0	0	0.1
Temotu FF per km 0.88 (22/25 km)	1.2	0.75	0.8	0	0	0
Pacific flying-fox	1.25	0.3	0.25	0.2	3	0.2
Purple swamphen	0.25	0	0	0	0.4	0
Banded landrail	1	0.2	0	0	0	0
Spotless crane	0	0	0	0	0	0.3
Pied goshawk	0	0	0	0.1	0.2	0
McKinlay's cuckoo-dove	7.75	2.5	1.1	1.6	2.5	9.8
Pacific emerald dove	0.75	2.3	0	0.1	0	0.4
Santa Cruz ground dove EN	0	0	0	0	0	1.1
Red-breasted fruit dove	11.5	13.5	8.25	0.4	0.2	1.7
Pacific pigeon	15.25	7.7	18	0.9	3.5	9.5
Coconut lorikeet	16.25	6.5	2	0.3	1	3.1
Palm lorikeet VU	0	0	0	0	0	9.4
Collared kingfisher	4	2.4	1.25	0.5	1	2.2
White-throated whistler	1.75	4.3	3.5	0	0	0.3
Melanesian whistler	0	0	0	3.7	0.2	0
Polynesian triller	0	0	0.5	0	0	0
Rusty-winged starling	0	0	2	0.2	0	0
Polynesian starling	0	0	0	0	0	2.0

Cardinal myzomela	10	9.2	3.25	2.5	0.6	1.8
Rufous fantail	1	2.8	2.9	0	0	0
Sta Cruz shrikebill EN	0	0	0.4	0	0	0
Vanikoro monarch	0	0	0	0.8	0	0
Vanikoro flycatcher	0	0	0	1.7	0	0
Sta Cruz white-eye	1.75	0	1.75	0	0	0
Sanfords white-eye	0	0.7	0	0	0	0
Vanikoro white-eye	0	0	0	0.3	0	0

Appendix 4 – Seabird transects - totals per day

Date d/m/yr	19/9/14	20/9/14	29/9/14	8 & 12/10/14
Total hours	8	8	6	8
Location	Temotu N coast W to E	Utupua- Vanikoro	Utupua- Nendo	Lata-Tinakula
Time start	0730	0630	0600	1000
Average wind (1-4)	2	2	2	1
Average sea (1-4)	2	2		1
Average cloud (1-4)	4	3		1
Average viewing conditions (1-4)	3	2	3	4
Approximate speed (knots)	4	5	5	4
Tropical shearwater		2		
Re-footed booby	2	1		1
White-tailed tropicbird	2			
Sooty tern		200 incl Js		
Great crested tern	3			1
Brown noddy	3			1
White tern		1		1
Dolphin sp	35			
Green turtle	1			

Appendix 5 – Birds in Honiara area 13-15 September 2014

Birds observed in Honiara and Tuvaruhu River catchment near Honiara 13-15 September 2014

On the 14th observations were made from a ridge overlooking secondary forest of Tuvaruhu River's north bank 0700-0930 (2.5h). On the 15th observations were made from Tuvaruhu River and adjacent secondary forest on the south bank at 50-200 m elevation, 0630-0930 (3h)

Melanesian megapode *Megapodius eremita* Two in forest of tributary on true left of river 14th
Pacific black duck *Anas superciliosa* Two on Tavuruhu River 15th
Brahminy kite *Haliastur indicus* Adult and subadult over valley forest 14th
Swamp harrier *Circus approximans* One adult over grassland 14th
Solomons sea-eagle *Haliaeetus sanfordi* One juvenile over Tuvaruhu River and forest 15th
Variable goshawk *Accipiter hiogaster* One over port and town centre at Honiara 13th
Pale-vented bush-hen *Amaurornis moluccana* One calling in riverside tall grass 0700 15th
Great crested tern *Sterna bergii* Several in Port Crux, Honiara
Black-naped tern *Sterna sumatrana* Occasionally seen fishing in Port Crux 13th-14th
Stephen's Emerald dove *Chalcophaps stephani* 10+ heard, 2 seen in 3 h in secondary forest on 15th
Superb fruit dove *Ptilinopus superbus* A few heard calling and one seen on figs 14th, 12+ heard in 3 h 15th
Claret-breasted fruit dove *Ptilinopus viridis* Several heard calling 14th; 8 heard (1 seen) in 3 h 15th
Red-knobbed imperial pigeon *Ducula r rubricera* Few seen and heard 14th, 7 heard in 3 h 15th
Solomon's cockatoo *Cacatua ducorpsii* Several sightings of two birds 14th
Cardinal lory *Chalcopsitta cardinalis* Pairs and flocks of up to 30 over forest; also in Honiara
Yellow-bibbed lory *Lorius chlorocercus* Many sightings, each usually of two flying birds over forest
Coconut lorikeet *Trichoglossus h massena* Common
Eclectus parrot *Eclectus roratus* Two seen in secondary forest canopy 100 m elevation 14th; two heard 15th
Finch's pygmy parrot *Micropsitta f finsi* Few seen in forest canopy 14th
Buff-headed coucal *Centropus m milo* Three in secondary forest 100 m elevation 15th
Glossy swiftlet *Collocalia esculenta* Several Honiara 13th also c.20 hawking insects on Tuvaruhu River 15th
White-rumped swiftlet *Aerodramus spodiopygius* Common Honiara and open environs 13-15th
Dollarbird *Eurystomus orientalis crassirostris* One over Tuvaruhu River 15th
Blyth's hornbill *Aceros plicatus* 6 sightings each day of 1-2 birds flying over lowland secondary forest
Collared kingfisher *Todiramphus chloris* Several calling and two seen in forest and river edge
Black-headed myzomela *Myzomela melanocephala* One feeding on ginger flowers in secondary forest 15th
Solomon's cuckooshrike *Coracina h holopolio* Two in secondary forest canopy 14th; 4 15th
White-bellied cuckooshrike *Coracina papuensis perpallida* Several seen in and at forest edge 14th-15th
Barred cuckooshrike *Coracina lineata* two in secondary forest 15th
Olive-backed sunbird *Cinnyris jugularis flavigaster* Common in Honiara and forest edge
Midget flowerpecker *Dicaeum a aeneum* 2-6 birds on flowers of forest edge trees or isolated trees 14-15th
Willie wagtail *Rhipidura leucophrys* Common in town and gardens
Chestnut-bellied monarch *Monarcha castaneiventris* One in forest understorey 14th; 4 calling in 3 h 15th
White-billed crow *Corvus woodfordi* One calling as flew over secondary forest c.200 m elevation 15th
Pacific swallow *Hirundo tahitica* Two flying over Honiara near the port on 15th
Island leaf warbler *Phylloscopus poliocephalus* Two on forest edge 14th
Metallic starling *Aplonis metallica nitida* Common in Honiara and secondary forest
Singing starling *Aplonis cantoroides* Common in Honiara and secondary forest
Common myna *Acridotheres tristis* Common in Honiara and edges
Long-tailed myna *Mino kreffti* Several pairs in forest canopy and display flying 14th; c.10 birds in 3 h 15th