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**REPORT ON FRIENDLY (SHY)
GROUND DOVE (*Gallicolumba stairi*)
WORK ON NU'UTELE ISLAND
AND UPOLU ISLAND, SAMOA**

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INTRODUCTION

Between the 5th and 17th of August 2006 RP was contracted by Dave Butler to carry out a survey of the Samoan subspecies of the friendly (shy) ground dove (*Gallicolumba stairi stairi*). This was to assess whether there were sufficient birds on Nu'utele and Nu'ulua Islands, Aleipata Islands to capture them, and protect them in captivity while rodents were eradicated from these islands. Butler (2006) had previously attempted to capture some friendly ground doves on Nu'utele Island but only saw one bird. He concluded that there are perhaps no more than 5 – 10 pairs there, and that catching sufficient birds immediately prior to the rat eradication was impractical. However, he deemed it worthwhile to carry out this additional survey. In addition, the present survey also included searching an area on Upolu Island (Vaisigano River, accessed through Maagiagi village), where a friendly ground dove had been previously seen (D. Butler pers. comm.). The latter part of this survey was to assess whether sufficient birds were present at Vaisigano River to translocate them onto the Aleipata Islands after the rodent eradication if few were present on these islands, or if catching them there proved difficult. It would also allow an assessment of how critical the Aleipata Islands populations were to the survival of the taxon in Samoa, and thus, what effort should be made to protect them from possible poisoning during the rat eradication. Finally, a request was made to attempt to capture a bird on Nu'utele Island and obtain a feather(s) for DNA analysis.

Butler (2006) has summarised all the published and unpublished data on friendly ground dove sightings throughout its range in Fiji, Wallis & Futuna, Tonga, American Samoa and Samoa (Annex 3). He recorded the following information for Samoa:

- Survey of uplands of Upolu and Savai'i 1996. Only recorded at three sites, all on Savai'i: Aopo, Silisili, Salailua.
- Survey of key lowland sites 1991 (Park, 1992). Only recorded on the Aleipata Islands as follows: Only one friendly ground dove heard on Nu'ulua. Nu'utele – friendly ground doves were seen and heard along summit ridge (no numbers given) and our observations suggest a small, possibly stable population.
- Recent expeditions to Aleipata Islands.
 - 25 – 29, 31 July 2000 (Stringer et al. 2003(a)). Nu'utele: three seen, top 2/3rds of island (caldera side). Nu'ulua: one seen, no location given.
 - 4 – 9 June 2001 (Stringer et al. 2003(b)). Nu'utele: two seen (1 at old leper site ruins and 1 halfway up hill on track). Nu'ulua: None.
 - 16 – 22 June 2003 (Parrish et al. 2004). Nu'utele: two seen, one near top of hill from Vini and one on a plateau on lower part of stream before large figs (near Nu'utele Beach). Nu'ulua: two seen, one on flat behind campsite (northern end of beach) and one on summit of island on a flat area.
- Other studies: Not recorded during three year residency of an Australian ornithologist in Samoa (1994 – 97, Tarburton, 2001).

- A female bird was found dead after Cyclone Heta (January 2004) off Cross Island Road on Upolu Island.

The reported sightings of friendly ground doves, above, on Nu'utele and Nu'ulua Islands, suggest that they are spread over much of the two islands and do not appear to favour any particular habitat and that they occur on flat land and very steep slopes.

The following personnel participated in the present survey:

- Vaisigano River on the 5 August 2006: RP, Dave Butler, Scott Hooson, Toni Tipamaa.
- Nu'utele Island 8 – 10 August 2006: RP & ST.
- Vaisigano River 15 – 16 August 2006 RP & ST.
- Nu'utele Island 18 – 20 August 2006 ST, Natasha Doherty, Filipino Siu & Susa Siolo.

METHODS

On Nu'utele Island on 9 August, we walked from Vini Beach up to the ridge, along the ridge to the west and south until we struck dense vine tangles with bluffs on the crater side. We then backtracked and descended to the forested flats behind Nu'utele Beach. We searched the area of the flats, then climbed back up to the ridge, reaching it 50 m downhill from where we first ascended earlier that day. We then descended to Vini again. We proceeded very slowly trying to be as quiet as possible with frequent stops to listen for friendly ground doves. Notes on other species of wildlife were made. On 19 August, we walked from Vini, up to the ridge and then east down the ridge and then down onto Nu'utele Beach flats. The return was made via climbing back up on the same route.

On the first visit to Nu'utele Island four mist nets (40 mm dimension mesh) totalling 45 m in length were set on the Vini flats near where the track starts up the hill. They were erected in a site where previously first a male had been seen and then a female. On the second visit three mist nets were set at the same site.

In the Vaisigano River valley, about a 1 km was searched while walking on three occasions in a similar manner to that used on Nu'utele Island. There is a pipeline running along the valley floor at this location that supplies an electric power station. The sides of this valley are forested but forest has been largely cleared from the valley floor. This is mostly covered in grass grazed by cattle.

RESULTS

On Nu'utele Island, the first friendly ground dove, a male, was seen in the late afternoon of 8 August at Vini flat, near where the track starts up the hill. During the main search over the island on 9 August friendly ground doves were present at the following locations: a female was seen half way up the hill track and a male was heard calling 50 m further up from this. A female was seen just where we met the flats behind Nu'utele Beach; it was followed towards the beach. A male was seen on the flats after a pig (*Sus scrofa*) flushed it. On our return to Vini flats, a female flew

in near where we had seen a male earlier in the day. The locations where all these friendly ground doves were observed are shown on Map 1.

As the male and the female at Vini flats had approached us closely on each occasion, we decided to erect the mist nets there. They were set for 1½ hours on the evening of 9 August before being checked at 1930h. One Samoan whistler (*Pachycephala flavifrons*) was caught. We then left the nets set overnight so they could catch birds from first light the following morning. Two friendly ground doves were in the nets when they were checked at 0730h on 10 August. However, as we approached the nets, both birds struggled and escaped, one towards the beach and the other uphill. One person followed the bird uphill in the hope of flushing it back down into the net. The other person remained at the net. Two males and one female were in view simultaneously at one point up the hill but none could be induced to fly towards the nets.

On the second visit, three nets were set in the same location at 1730h on 18 August (Fig. 1). These were checked at 2000h but no birds were caught, so the nets were left set overnight. A female was seen in the net at 0620h on 19 August but it escaped. The net was kept set and several times friendly ground doves were seen close by: three pairs were estimated as being present. After 30 minutes a male became trapped. It was left for five minutes before an approach was made, and this time the bird remained trapped. One feather was removed from the chest and one from the tail; they have been sent away for DNA analysis.

During a walk over the island on the 19 August a male was seen on the ridge to the east and two females and one male were seen on the forested flats behind Nu'utele Beach (Fig. 1). Table 1 gives the total number of friendly ground doves seen, where and when. At Vaisigano River, two birds, presumably males, were heard calling on 5 August at 1430h. These birds were both on the true right side of the river and were up on very steep slopes. On 15 August a bird was heard calling at 1600h on the true left of the river. Another bird was heard the following morning at 0800h but the call was soft and indistinct and its position could not be ascertained (Fig. 2).

Table 1: Records of friendly ground doves seen on Nu'utele Island.

Date	Time	Number	Sex	Location
8/8	1730	1	M	Vini flat
9/8	0745	1	F	Half way up hill from Vini.
9/8	0750	1	M (heard)	Two thirds up hill from Vini.
9/8	1330	1	F	Nu'utele Beach flats.
9/8	1350	1	M	Nu'utele Beach flats.
9/8	1630	1	F	Vini flat.
10/8	0730	2	Unknown	Vini flat.
10/8	0745	3	2 M, 1 F	Vini flat.
19/8	0620	1	F	Vini flat.
19/8	0635	c. 3 pairs	M & F	Vini flat.
19/8	0650	1	M	Vini flat.
19/8	1130	3	2 F, 1 M	Nu'utele Beach flats.
19/8	1320	1	M	Ridge, northern arm.

Other wildlife seen on Nu'utele Island and at the Vaisigano River location are given in Appendices 1 and 2 together with comments. This includes ants, believed to be yellow crazy ants (*Anoplolepis gracilipes*), which were found on 9 August in the leper colony ruins at the southern end of Nu'utele Beach flats. Specimens were collected for later confirmation but the vial containing them was misplaced. Further specimens of these ants were collected on 19 August and were confirmed as yellow crazy ants by several different entomologists.

DISCUSSION

The total of ca. 23 friendly ground doves recorded on Nu'utele Island is by far the largest number seen by any previous expeditions. It is difficult to give the total number of individuals, as some were likely to have been seen more than once. However, we estimate there are three pairs on Vini flats, one pair half way up the hill to the ridge and two pairs on Nu'utele Beach flats. Then there was a single bird seen on the northern arm of the ridge. The number seen is in particular contrast with the recent conclusion by Butler (2006) that the population is very small, however, he did consider that there may be no more than 5 - 10 pairs on the island. Why this expedition found so many birds is unknown. Previous visits (Stringer et al. 2003a&b, Parrish et al. 2004, Butler 2006) reported birds in the Nu'utele Beach catchment, on the track up the hill from Vini and close to the ridge. None were previously sighted on the Vini flats. Why is this? The present visit was in August whereas previous visits were in June and July (Stringer et al. 2003a&b; Parrish et al. 2004) and September (Butler 2006) so it seems unlikely to be the time of year as all of these visits were during the dry season. The only thing that appears to have changed at Vini is the frequency of visits by humans. Taro and other crops were cultivated up to 2003 and then cultivation ceased and associated visits declined. This may have allowed friendly ground doves to (re)occupy the area, although there is no proof of this. Butler (2006) speculated that the presence of Pacific rat (*Rattus exulans*) and pigs had probably contributed to the decline of these birds, but both pest species are still present. While they may be having a detrimental effect on friendly ground doves, clearly they alone are not the cause of differences in survey outcomes.

We have no data on what the natural (pre human) density of friendly ground doves was, so we can make no comment on whether the present numbers observed indicate a high or low population. Masibalavu & Dutson (2006), in a survey of Fiji, estimated a density of one bird per km², mostly from calling males. On Nu'utele Island (100 ha), using Butler's (2006) estimate of 5 - 10 pairs, pairs occupy 10 - 20 ha each. Our results indicate there are at least six pairs. In addition a single bird was seen on the crater rim on its northern side. Previous expeditions have reported seeing birds on the track half way down to Nu'utele Beach (Stringer et al. 2003a&b, Parrish et al. 2004). This indicates a population similar to that of Butler (2006), of 5 - 10 pairs. The southern flanks and ridge behind Nu'utele Beach catchment have not been surveyed by any of the previous expeditions. Further survey work may well find additional birds elsewhere on the island.

The highest number of friendly ground doves seen on Nu'ulua Island was two (Parrish et al. 2004). Based on the estimated density on Nu'utele Island, it is likely that Nu'ulua Island contains three pairs. Given that there may only be a total population of 16 to 26 birds on both islands, we recommend that attempts should be

made to capture as many birds from both islands before the pest eradication operation proceeds. While we are not certain that friendly ground doves will feed on the rat baits, this is considered likely. Significant mortality (40 - 80%) of a smaller ground dove (*Geopelia striata*) occurred when rats were eradicated on four islands in the Seychelles (Merton et al. 2002).

Clearly there are populations of friendly ground dove on both main islands of Samoa. The present survey at the Vaisigano River showed that some friendly ground doves survive there, and it is also possible that the dead female friendly ground dove found off Cross Island Road after Cyclone Heta in 2004 (Butler, 2006) may have been from this catchment. Butler (2006) also reported four sightings on Savai'i. Surveys of intact forests on both islands need to be conducted before the status of this Vulnerable (C2 AR) sub-species (Anon, 2000) can be determined. Butler (2006) concluded that the population of friendly ground doves was very low on Nu'utele and Nu'ulua Islands. After this survey, it appears the islands support the most significant and densest population of friendly ground doves known in Samoa. The population on Nu'utele Island may well be the densest population surviving throughout the birds' range given Masibalavu & Dutson (2006) figures (see review by Butler, 2006). On present knowledge, the Vaisigano River and other populations on the two main islands may not provide sufficient birds for a translocation if the birds on the islands were lost through poisoning. Therefore, protection of the friendly ground doves on the islands is vital. A strategy for the protection of Nu'utele and Nu'ulua Islands friendly ground dove population is provided in Appendix 3.

Clearly, a mesh net size of 40 mm is too small for effectively catching friendly ground doves. Advice from Ralph Powlesland and Graeme Taylor (*pers. comm.*) is that 60 mm mesh mist nets should be used. Setting the nets before dawn seems to be the best time to catch the friendly ground doves.

The finding of yellow crazy ants on Nu'utele Island at the old leper colony ruins means that pest eradication plans will now need to include this site. Our observations appear to indicate the ants currently cover a relatively small area but a survey is required to confirm their distribution elsewhere on the island.

Ogle (2001), Parrish et al. (2004) and Stringer et al. (2003a&b) all called for a hygiene (biosecurity) plan for Nu'utele and Nu'ulua Islands. No plan has as yet been written. On this visit our equipment lay in the office of DEC for some time prior to our departure. The eradication of Pacific rats and hopefully yellow crazy ants at Nu'utele Beach flats will cost a lot of money, but will benefit all native species living on the islands. Obviously, reinvasion by these two pests or any new pests will negate all the benefits achieved. A biosecurity plan must be written for the islands and implemented as a matter of priority.

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APPENDIX 1: Wildlife observed on Nu'utele Island

Species	Comments
Brown booby <i>Sula leucogaster</i>	A few seen off Vini Beach.
Greater frigatebird <i>Fregata minor</i>	A few seen circling summit of island.
Reef heron <i>Egretta sacra</i>	Seen on both Vini and Nu'utele beaches.
Banded rail <i>Rallus phillipensis</i>	Heard on Vini flats.
Wandering tattler <i>Tringa incana</i>	Seen on both Vini and Nu'utele beaches.
Common noddy <i>Anous stolidus</i>	Many seen flying off Vini Beach.
Black noddy <i>A. minutus</i>	A few seen off Vini Beach.
White tern <i>Gygis alba</i>	A couple seen flying near island summit.
Barn owl <i>Tyto alba</i>	One flushed inside forest on Nu'utel Beach flats.
Friendly ground dove <i>Gallicolumba stairi</i>	Total of ca. 23 seen or heard.
Pacific pigeon <i>Ducula pacifica</i>	A few seen flying over canopy.
Crimson-crowned fruitdove <i>Ptilinopus porphyraceus</i>	Many heard.
Many-coloured fruitdove <i>P. perousii</i>	Many heard.
Flat-billed kingfisher <i>Todirhampus recurvirostris</i>	Two heard/seen on Nu'utele Beach flats.
White-rumped swiftlet <i>Aerodramus spodiopygius</i>	Common over canopy at Vini flats.
Samoan whistler <i>Pachycephala flavifrons</i>	Several seen throughout.
Wattled honeryeater <i>Foulehalo carunculata</i>	Common throughout.
Samoan starling <i>Aplonis tabuensis</i>	Common throughout.
Samoan fruitbat <i>Pteropus samoensis</i>	Several seen flying over canopy.
Tongan fruitbat <i>P. tonganus</i>	Few heard at night, presumably this species which is nocturnal.
Pacific black skink <i>Emoia nigra</i>	Common but patchy distribution.
Samoan skink <i>E. samoensis</i>	Frequent but patchy distribution.
White-bellied skink <i>E. cyanura</i>	One seen up on ridge in small clearing.
Yellow crazy ant (<i>Anoplolepis gracilipes</i>)	At leper colony, identification still to be confirmed.

APPENDIX 2: Wildlife recorded at Vaisigano River

Species	Comments
White-tailed tropicbird <i>Phaethon lepturus</i>	A few seen flying.
Purple swamphen <i>Porphyrio porphyrio</i>	One seen in long grass beside track.
Banded rail <i>Rallus phillippensis</i>	Several seen and heard on grassy flats.
Black noddy <i>Anous minutus</i>	Common, several seen perched on branches and epiphytes. Maybe breeding.
White tern <i>Gygis alba</i>	Several seen flying.
White-throated pigeon <i>Columba vitiensis</i>	Two seen perched in tree.
Friendly ground dove <i>Gallicolumba stairi</i>	Four separate calls heard, minimum of 3 individuals.
Pacific pigeon <i>Ducula pacifica</i>	Several seen
Crimson-crowned fruitdove <i>Ptilinopus porphyraceus</i>	A couple seen and many heard.
Many-coloured fruitdove <i>P. perousii</i>	Many heard.
Flat-billed kingfisher <i>Todirhampus recurvirostris</i>	A couple heard.
White-rumped swiftlet <i>Aerodramus spodiopygius</i>	Common.
Samoan broadbill <i>Mylagra albiventris</i>	One seen.
Samoan whistler <i>Pachycephala flavifrons</i>	Frequent.
Polynesian triller <i>Lalaga maculosa</i>	Common on the grassy flats.
Wattled honeryeater <i>Foulehalo carunculata</i>	Common.
Ma'o <i>Gymnomyza samoensis</i>	Frequent. A significant local population.
Cardinal myzomela <i>Myzomela cardinalis</i>	Frequent.
Samoan fantail <i>Rhipidura nebulosa</i>	Common.
Scarlet robin <i>Petroica multicolor</i>	One male seen.
Samoan starling <i>Aplonis tabuensis</i>	Common.
Polynesian starling <i>A. atrifusca</i>	Two seen.
Common myna <i>Acridotheres tristis</i>	Flock of c30 present on grassy flats on 15 th .
Jungle myna <i>A. fuscus</i>	A couple seen.
Red-vented bulbul <i>Pycnonous cafer</i>	A couple seen.
Samoan fruitbat <i>Pteropus samoensis</i>	A few seen.
Pacific black skink <i>Emoia nigra</i>	A few seen on track on way in.
Freshwater crayfish	One seen in pool in river.

APPENDIX 3: A strategy for the protection of friendly ground doves on Nu'utele and Nu'ulua Islands during operations to eradicate Pacific rats and to eradicate or control yellow crazy ants.

Background

Butler (2005) examined various options for protecting friendly ground doves during the proposed aerial drop of toxic baits for the eradication of rats and control of yellow crazy ants. He was firmly in favour of holding the birds in captivity on site during the operation and until such time as it was deemed safe to release them. He concluded that the baits would take at least 7 days to break down so the birds will need to be held for much longer than this. Some birds will be caught up to a week before the drop occurs, therefore, the holding operation needs to be planned for a minimum of three weeks.

The present report shows that there is a significant population of friendly ground doves on Nu'utele and Nu'ulua Islands and that they can be caught in mist nets.

Therefore, I fully support the option recommended in Butler (2005) and this strategy is based on that option.

Minimum number of birds/pairs needed

Ideally, the protection project should aim to catch as many friendly ground doves as possible. Our estimate is that up to 13 pairs reside on the islands. The aviaries used by Butler (2006), which are still in Samoa, had six compartments. This meant up to six pairs could be held, however, it is not known if a pair can be safely confined in a small area. It may be that each individual requires a compartment. Therefore, at least three more sections of six compartments will be needed.

Timetable

The aerial drop is scheduled to occur in November 2006. Capture of birds needs to commence one week before the drop occurs. Determining the exact date to capture birds will be difficult, as the aerial drop will be determined by weather forecasts. In addition, the birds need to be held for a minimum of two weeks until the baits decay. This means some birds will be held for up to 3 weeks, but this will be longer if the drop is delayed by bad weather. Provision must be made for suitably qualified husbandry personnel to remain at Vini for the entire period (a minimum of three weeks).

Methods

Capture

I recommend using three teams to capture the birds: one based at Vini, one at Nu'utele Beach and one on Nu'ulua Island. Each team needs to consist of two people. Each team requires a minimum of two mist nets 12 m long. The mist net mesh size should be 60 mm. The nets should be set in sites where birds have been seen eg. within a pair's territory. The nets should be set before first light, if necessary, they can be left set overnight.