

Conservation Leadership Program Project Final Report

Project ID: 06141613
Samoa's little Dodo – Saving the Tooth-billed pigeon

Abstract

Tooth-Billed Pigeon (*Didunculus strigirostris*) is endemic to Samoa (formerly Western Samoa). A recovery plan was produced in 2006 for this species. A number of searches since that time (including surveys undertaken through the current project) have indicated that numbers appear to be critically low. Consequently, and following a recommendation by the Samoan Government's Environment department, it has recently been upgraded to the IUCN's Critically Endangered list. This study undertook searches at 24 sites in Samoa, but was only able to confirm Tooth-billed Pigeon at one site (with a photograph of a juvenile) and possibly at 3 other sites – using calls as the means of identification. The next steps for conservation action are discussed.

**Samoa,
01 June 2013 – 31 July 2014.**



Compiled by: Moeumu Uili
Ministry of Natural Resources and Environment
12/23/2014

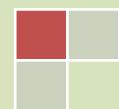


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Acknowledgements

We appreciate and acknowledge the greatest support and the most invaluable assistance from our project stakeholders throughout implementation of the objectives and achieving the expected outcomes of the project.

Thank you very much to the Conservation Leadership Program team for the well organized program and making available resources required for equipping the project team to understand the project more.

Thank you to the team at Samoa Conservation Society for the field work support and technical advice and also to Conservation International Pacific for lending equipment for field work.

Sincere gratitude to the local communities of Salelologa, Faala and Tafua including all communities we ever visited at Vaoala, Tiapapata, Tafatafa, Matafaa, Uafato and Aopo for your kind support and responses to our request to enter your lands as in searching for Tooth-billed pigeon.

Lastly the team wishes to thank the Forestry Division and the Forest Preservation Program; a project funded by the Government of Japan (JICS) for assistance through helping the team with identification of possible sites with tooth-billed pigeon. Also thanks to Technical Division of the Ministry of Natural Resources and Environment for producing maps for use by the project.

Special thanks to Mark O'Brien who is the Project Advisor and James Atherton for always taking the time to join the team in the field, much appreciated. Also a big thanks to M. Rothman for a great painting and help with the birds in the museum.

Thank you all to those whose names are not listed here but contributed by all means to the project. Your input has lead to the success of the project. God Bless.

Section One

1.1. Summary

A fund from the Conservation Leadership Program has assisted Samoa in its current project “To save Samoa’s Dodo- the Tooth-billed pigeon” (MNRE 2006), and collate new information vital for future conservation decision making on the species. Project priorities includes information collection using local communities to provide their existing knowledge on Tooth-billed Pigeon, surveying sites to locate surviving populations, identifying the breeding season and collect data on all native fruiting trees that are important food sources for the Tooth-billed Pigeon. Three sites have now been highlighted as important for this species with two additional sites possibly also being important but requiring further surveys. The three key sites face many threats including forest loss, invasive pests (trees reducing native food plants and invasive mammals) and hunting pressure. Local knowledge suggests the species breeds on the ground and thus rats, cats, dogs and pigs may all impact nesting success. This project also enabled us to work closely and build support with the local communities who are keen to take conservation to the next level. Their understanding and commitment have lead to the enforcement of the BAN on shooting birds in the wild in local communities and development of village by-laws to strengthen the protection of threatened species and habitats. Importantly, the findings of this project has re-confirmed to us that tooth-billed pigeon still exists and breeds successfully in our lowland forests highlighting efforts is urgently needed to implement conservation actions to save the species.

1.2. Introduction

The Tooth-billed pigeon or Tooth-billed pigeon is found only in Samoa. Its Conservation Status has been recently upgraded to Critically Endangered by the IUCN (2014), although recent surveys in upland and lowland forest on both Upolu and Savaii confirm that Tooth-billed numbers are extremely low it is important to isolate the position of the remaining populations. A major cyclone (cyclone Evan) in December 2012 is likely to have further affected Tooth-billed pigeon, and other native bird, populations. It is essential that the locations of any remaining populations of Tooth-billed pigeon are identified so conservation efforts can be focused. As stated in the Tooth-billed pigeon recovery plan (MNRE, 2006) it is also critical that information on the basic breeding biology (e.g. whether nesting occurring low to the ground or in trees) and the spatial requirements of this species are determined so threats can be established and conservation management can be implemented. We aim to provide a detailed analysis of the status, distribution and ecological requirements of this globally threatened species. Available traditional knowledge is vital to understanding the patterns of species survival and the trend in the decreasing population.



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Because the majority of land in Samoa is under customary ownership local consultations and education on the Tooth-billed pigeon is critical to enable conservation to occur. Furthermore because both habitat loss and hunting of Tooth-billed pigeon are likely to be contributing to the Tooth-billed pigeon's decline, it is critical to engage the support of village matai (chiefs) in order to limit local hunting in key areas and protecting key forest. A few communities have indicated that they would like to be involved with Tooth-billed pigeon conservation, but they currently have no means, or understanding, by which to begin to address this. This project includes consultations with key individuals in local villages and conservation education to develop a sustainable plan of action to empower them to be involved with Tooth-billed pigeon conservation.

The recovery of the Tooth-billed pigeon will take time and needs ongoing support and commitment from our partners to ensure conservation measures are in line with our existing legislations to strengthen actions on the ground and save the species from extinction.

1.3. Project team members and other Authors

Project team leader: Ms Moeumu Uili.

Occupation: Senior Parks and Reserves Officer, Ministry of Natural Resources and Environment.

Roles and Responsibilities: overall field supervision; liaise with local communities/land owners;; awareness education, Reporting.

Project assistant: Mr Fialelei Enoka

Occupation: Parks and Reserves Officer

Roles and Responsibilities: field assistant, awareness education, equipment and tool personnel

Project assistant: Vaa Anoifale

Occupation: Casual worker

Roles and Responsibilities: field assistant

Project assistant: Fini Male

Occupation: Casual worker

Roles and Responsibilities: field assistant

Project assistant: Talie Foliga

Occupation: Principal Parks and Reserves Officer

Roles and Responsibilities: liaison and awareness education

Project assistant: Faleafaga Toni Tipamaa

Occupation: ACEO-DEC

Roles and Responsibilities: liaison and awareness education

Project assistant: Czarina Iese

Occupation: Senior Terrestrial Conservation Officer

Roles and Responsibilities: field assistant, awareness education

Project assistant: Rebecca Stirnemann

Occupation: Volunteer

Roles and Responsibilities: co-leader, awareness education, ornithologist

Project assistant: James Atherton

Occupation: Environmental Consultant and GIS Specialist

Roles and Responsibilities: field assistant, technical advice

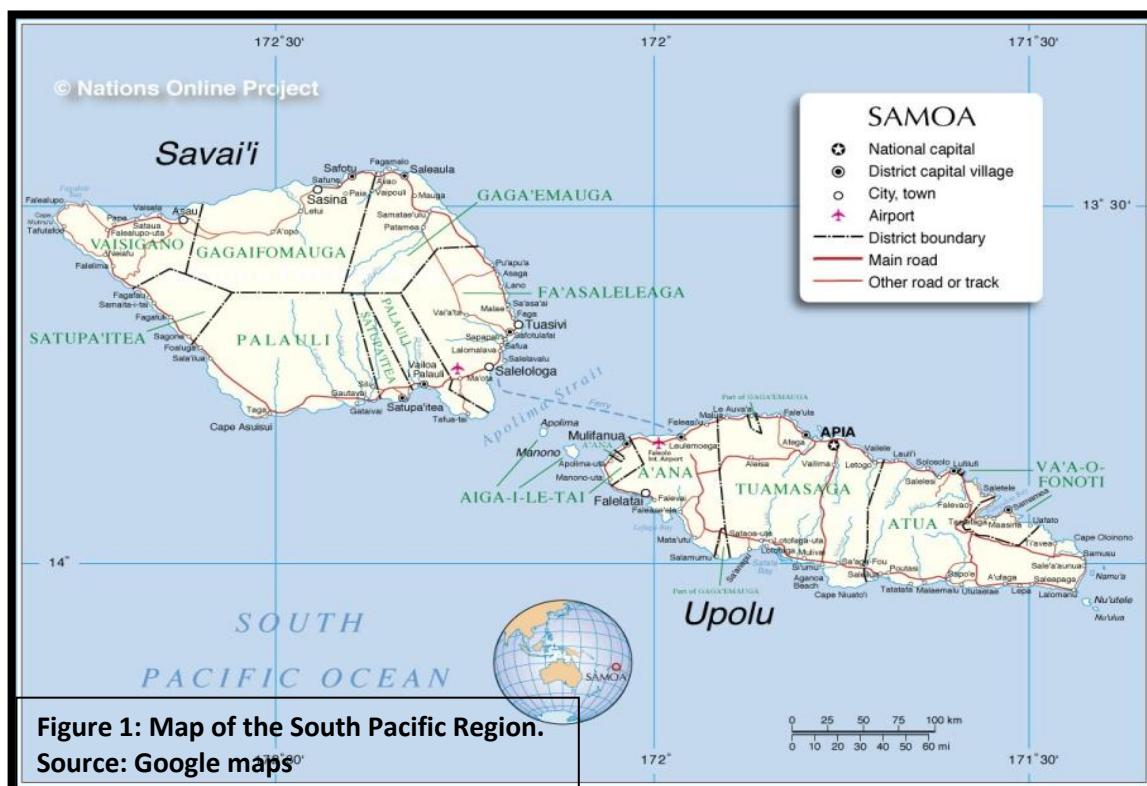
Project assistant: Mark O'Brien

Occupation: BirdLife

Roles and Responsibilities: Project Advisor, provide technical advice for field and report writing methodologies

1.1.1. Project Site.

Samoa is located in the South Pacific region on latitude $13^{\circ}45.5417$ and longitude $172^{\circ}6.2777$ east



of Australia (fig 1). It has a total population estimate of 194,320 (2012) people with a total land area of 2,842km² including nine small islands scattered west to east towards the American Samoa island group. Since human habitation began, about 80% of the lowland forest has been lost. Bird endemism is fairly high for Samoa compared to other pacific island nations (Watling 2001). Eight of 35 land birds of Samoa is endemic to Samoa and includes the Tooth-billed Pigeon.

Section Two

2.1. Overall Aim

To aid recovery of the Tooth-billed pigeon.

2.2. Project Purpose:

To gather necessary biological and ecological information required to make informed decisions on the conservation of tooth-billed pigeon.

2.3. Objectives: (The following objectives have been revised in July 2014 as part of our team project logframe review exercise).

1. Existing habitats of tooth-billed pigeon are identified and recorded
2. Development of a monitoring technique to guide management of the remaining Tooth-billed pigeon population
3. Food sources for tooth-billed pigeon is identified and phenology (i.e. time when the trees start to fruit) is clarified
4. Breeding season is identified
5. Work closely with local communities and individuals and collect information on hunting and traditional knowledge on the species. Support for the protection of the bird is developed in key sites.
6. Knowledge on natural predating by rats and cats.

2.4. Methodology

2.4.1. Interviews/questionnaire

We undertook individual and group interviews to establish our 25 sites where we then undertook more detailed surveys. People such as local hunters or people with forest near their plantations were in particular targetted to establish if they (1) could identify a pigeon species and (2) what pigeon species they had seen in the area. During each interview we were careful to avoid showing a bias towards reports of the Tooth-billed pigeon. This process allowed us to establish how well the local people knew the birds and to therefore rank the likihood of a sighting being correct. If Tooth-billed pigeon had been observed we asked for more details including position, if its was hunted, what it was doing, how often it was seen if there was more than one bird and if the local people hunted them. Often people would tell us anecdotal information about behavoiur which we also recorded. A questionnaire was designed for use by the team when conducting interviews (see questionare in the appendix). The objectives of the survey determines: a) If they have seen tooth-billed pigeon, b) If they can identify what it looks like, c) where and when they have seen the bird, and d) knowledge on native fruiting trees and nesting grounds. The aim was to obtain key insight to where tooth-billed can be found but also allows collection of data on other bird species. The results of these surveys help the team determine key areas for further

targetted conservation management and research. We ranked peoples observations of the birds by 1) their knowledge on birds 2) if they had seen or heard the bird and 3) How well they had seen the bird.

This is a key step towards finding sites where we can find tooth-billed pigeon in addition we were able to make notes of the habitats at which other native bird species used. The importance of this process allowed the team to gather and review opinions of local hunters, land owners and people at all levels from those with greater interest and understanding to those with very little knowledge on birds.

2.4.2. Site selection/monitoring

Project sites were selected using stratified sampling techniques in Upolu, Savaii and Nuutele Island. Stratified smapling was used to avoid bias in selecting only the sites that we know have the best likelihood of finding tooth-billed pigeon. To select sites we worked closely with the Forestry Division and the Forest Preservation Program to identify and maximize our search to include additional important forest areas which contained good forest but where surveys had not previously occurred. To do this we used the JIC Samoa forest data from 2011-2014 to map forest cover (see Map). We also included significant sites named and identified in the Samoa Key Biodiversity Areas (CI *et al.* 2010) which are also the same sites identified for tooth-billed pigeon in the Species Recovery Plan (MNRE 2006); these areas are automatically included in our monitoring surveys as important sites for threatened and endangered birds such as tooth-billed pigeon.

A total of 25 sites have been selected (*table 1*) and visited for tooth-billed monitoring activities and surveys. A request made for one site at Uafato was declined by the Uafato community due to previous related programs involving other organizations which ultimately overpromised the unachievable; consequently we have been advised by the village mayor to refrain from visiting this site until the issue is sorted.

Table 1: Summary list of sites covered in the surveys where, (a- site visited for survey, b- hours team spent searching and surveying sites, c- distance covered during survey.)

(a) Site	(b) manhours spent in field	(c) Distance walk (estimate in km)
1. Tafua crater	19	2
2. Aopo coastal lowland	27	6
3. Salelologa coastal lowland	25	4
4. Faala lowland	26	3
5. Mauga o Salafai (Mt Salafai) National Park	32	8
6. Tiavi ridge (southern side)	10	2
7. Tiapapata	4	1
8. Malololelei	4	1

9. Lake Lanoto'o	7	2
10. Siumu	7	1
11. Alaoa valley	4	2
12. Aleisa	4	1
13. Matafa'a coastal hills	29	4
14. Afulilo Dam	8	2
15. Nuutele island	20	3
16. Solaua/Sauniatu	27	2
17. Vaoala	6	1
18. Tafatafa	8	2
19. Togitogiga OLPP National Park	3	1
20. Magjagi	4.5	2
21. Laulii	7	2
22. Solosolo	6	1.5
23. Lalomauga	4	1
24. Mt Salafai 2	24	3
25. Mt Silisili track	20	6
TOTAL	335.5	63.5

2.4.3. Ground based surveys

All targeted sites have been covered by foot at least two times a day. Bird Surveys and general observations for native fruiting trees were conducted.

- i. We conducted 5 minute point count and distance transects for all species of birds for all sites. This enabled us to get a species list for all birds in the area as well as searching for the Tooth-billed pigeon.
- ii. Observations of the native fruiting trees and food sources for tooth-billed pigeon: *Dysoxylum spp*, *Dioscorea bulbifera* and *Faradaya amicorum* were recorded. Data was collected on the distribution and fruiting phenology of *Dysoxylum spp*.
- iii. Automatic sound recorders were placed in appropriate locations for up to two months to capture bird calls which can determine its presence or absence of Tooth-billed pigeon even retrospectively. This is important since knowledge on the calls of Tooth-billed pigeon is still not confident.
- iv. Observations on potential threats from rats and cats.
- v. Traditional knowledge on tooth-billed pigeon and Tooth-billed pigeon hunting is also collected

2.4.4. Data Analysis

We used the Audacity software to edit the recordings from the field to confirm Tooth-billed pigeon calls. Information collected from all sites visited are managed in a database where raw data can be extracted for future reference and use.

Because of the uncertainty with ID calls; calls which we are confident are tooth-billed pigeon were given a low ranking compared to sightings.

2.4.5. Awareness education

Educational awareness materials were prepared and produced to advocate awareness and provide people with more information about the project to save tooth-billed pigeon. There were community consultations, workshops and public talks highlighting the importance of saving our native and endemic species with a focus to advocate conservation of tooth-billed pigeon. We also educated the local hunters on this species to try and reduce their impact on birds in the wild and to have a direct conservation impact immediately.

The most effective and efficient way to conduct awareness education and outreach programs with our targeted stakeholder is through Face-to-Face community consultation. Representatives includes all four core categories within a village community. This includes Matai or high chiefs, womens group, aumaga or family caretakers and youth groups. Such program works on a win-win situation where both parties benefit from the discussion. The effectiveness of this method is the presence of hunters and workers who does the work in the field and idecision makers who makes final decision for the community.

Requests were made through to the Ministry of Education Sport and Culture inviting schools to participate in our awareness such as school Manumea poster competition and educational presentations on the importance of conservation to our native and endemic fauna and flora. Biodiversity with a focus on edemic species i.e. Tooth-billed pigeon is included in the schools curriculum which makes learning ideal for the students.

Outreach materials are very vital not only that it provides education in a very proactive way but also work as a form of token for people's appreciation and support on the project.

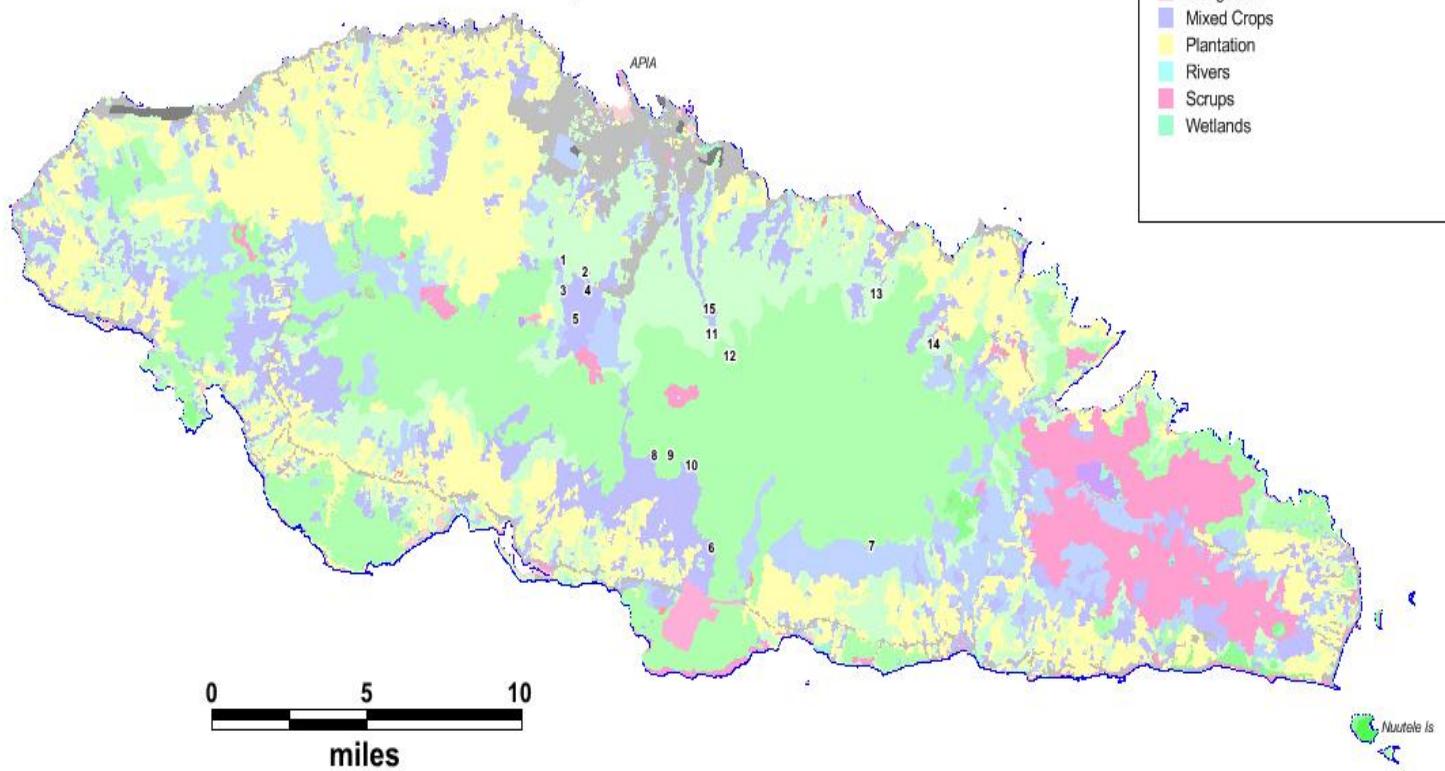
2.5. Outputs and Results

Objective 1: Existing habitats of tooth-billed pigeon are identified and recorded

Tooth-billed pigeon have been sighted and heard approximately 24 times (Map 2 and 3) with most sightings occurring in two sites. In all sites where Tooth-billed pigeon was observed there were *Dysoxylum sp* present.

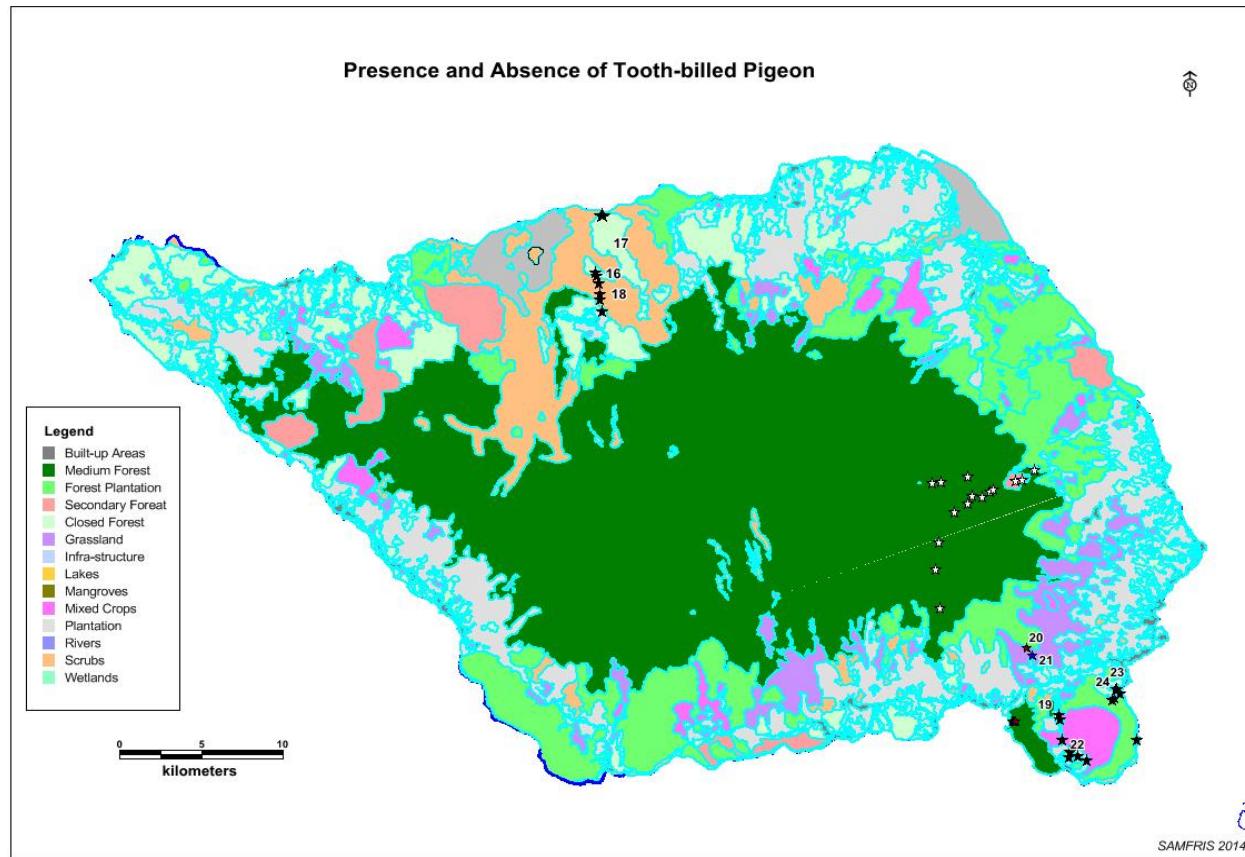
Presence and Absence of Tooth-Billed Pigeon

UPOLU ISLAND



Map 2: Presence and absence of Tooth-billed pigeon in Upolu Island.

SAMFRIS 2014



Map 3: Presence and Absence of Tooth-billed pigeon in Savai'i Island

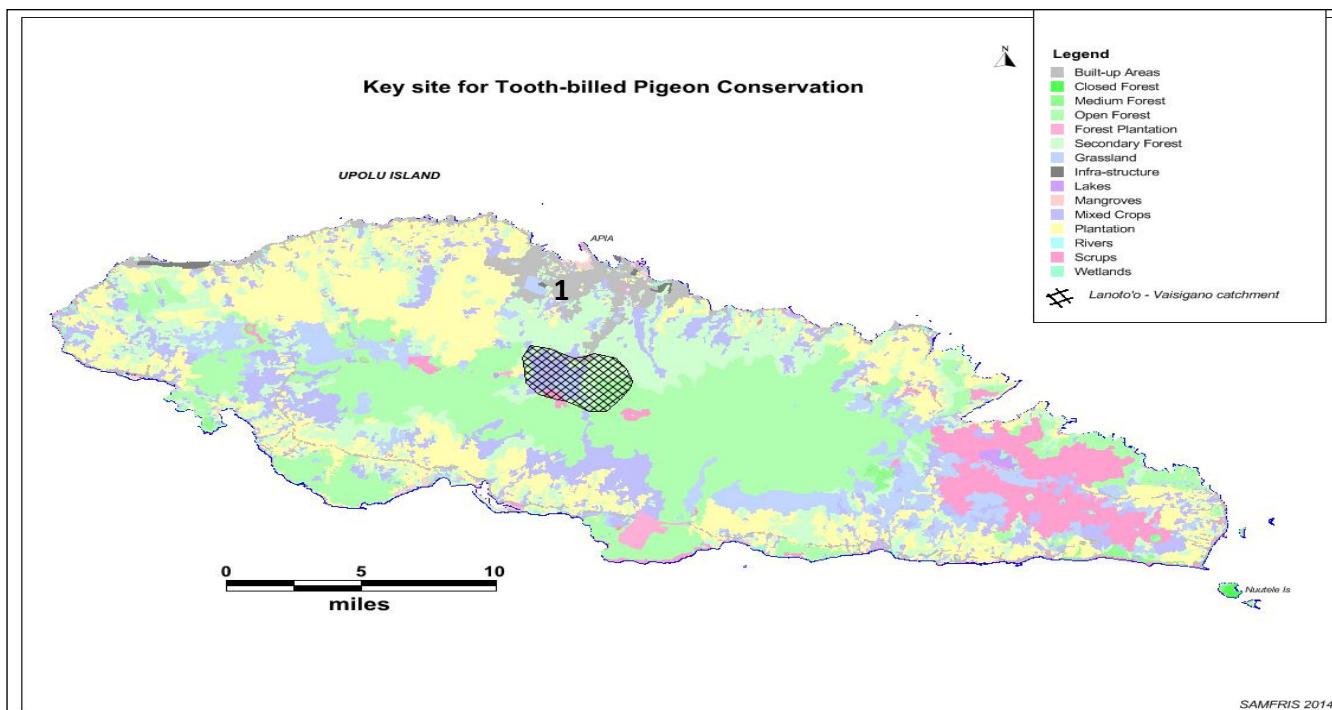
The table below (table 2) provide details on the percentage of confidence we are with the reported sightings and audio records of Tooth-billed pigeon based on what has been collected during the recent surveys and also results of interviews with the local communities.

Table 2: % of confidence with reported sightings and audio for Tooth-billed pigeon.

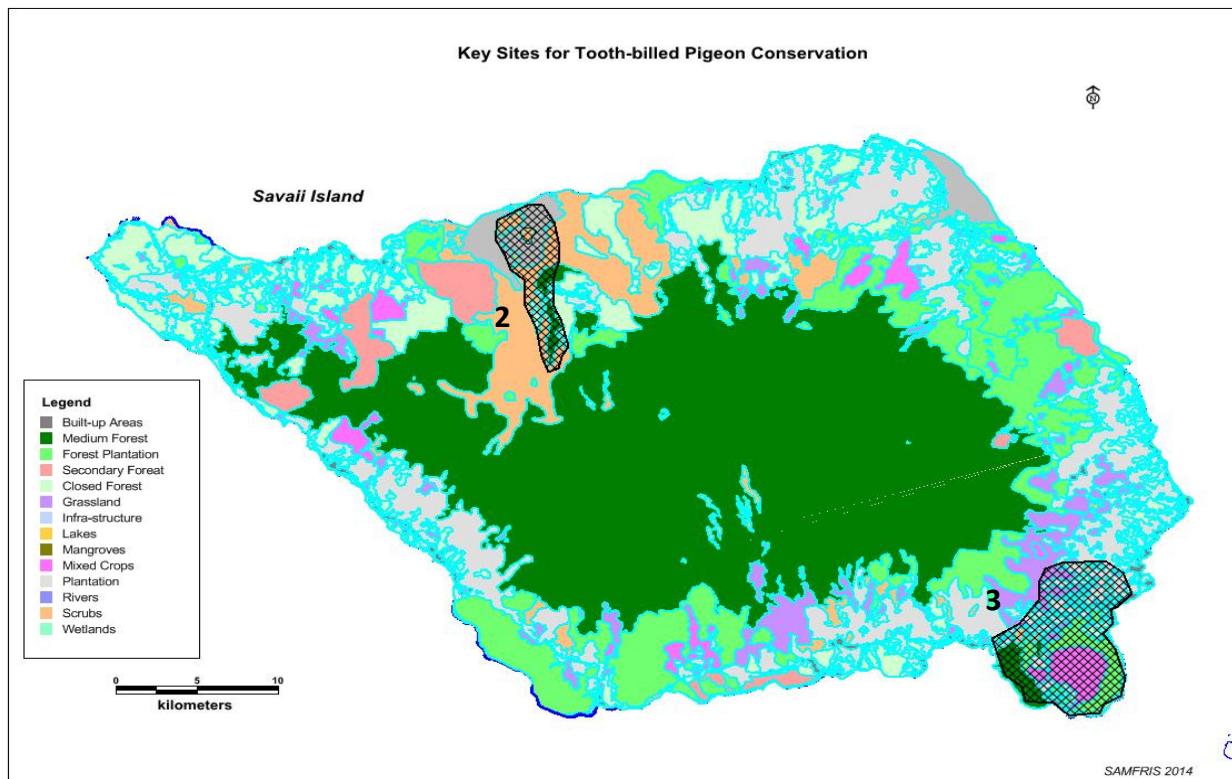
Site no.	Site name	Observer	% of confidence with Tooth-billed pigeon presence or absence	Bird Observation	Year
1	Tiapapata	Alex – local farmer	60	Sighting	2012
2	Tiapapata	Lani – resident	40	Sighting	2013
3	Tiapapata	Foreign birder	80	Sighting	2013
4	Tiapapata	German man – resident	80	Sighting	2013
5	Tiapapata	Rebecca Stirnemann	40	Sighting	2013
6	Togitogiga National Park	Rebecca Stirnemann	100	Sighting	2013
7	Tafatafa	Tavita – local hunter	60	Sighting	2012
8	Siumu	Local resident	50	Sighting	2012
9	Siumu	Kuleni	50	Sighting	2011, 2012
10	Siumu	Mathew	70	Sighting	2013
11	Magiagi	Rebecca	100	Sighting	2012

12	Magiagi	Local	30	Sighting	2012
13	Laulii	Mark and Moe	50	Audio	2014
14	Solosolo	Mark and Moe	50	Audio	2014
15	Alaoa	Local hunter	30	Sighting	2013
16	Aopo	Local hunter	50	Audio, sighting	2011
17	Aopo	MNRE	30	Audio	2014
18	Aopo	BIORAP	30	Audio	2012
19	Faala	MNRE	30	Audio	2014
20	Faala	Local hunter	50	Audio, Sighting	2014
21	Faala	Local hunter	30	Audio	2014
22	Faala	MNRE	50	Audio	2014
23	Salelologa	MNRE	40	Audio	2014
24	Salelologa	MNRE	100	Sighting	2013

This project has thus allowed us to identify three important core sites for the Tooth-billed pigeon: 1) the Vaisigano catchment and the Lake Lanato'o wetland, 2) Aopo forest and 3) the Faala to Salelologa areas. These sites are highlighted in map 4 and map 5. Both sites are under threat from development into plantations and face hunting pressure. Furthermore there is many invasive tree species in both sites reducing the number of native fruiting trees available to the Tooth-billed pigeon. This means that the Tooth-billed pigeon probably has to cover a larger area to access the remaining native fruiting trees. The value of each mature native fruiting tree is thus increased if this species is to be maintained in these areas. Two additional sites appear to be present in Aopo and Tafatafa but further sightings are needed in these sites to confirm the presence of breeding birds. We also need to get more sightings of the Tooth-billed pigeon in the Aopo and Laulii sites to gain further confidence in the presence of Tooth-billed pigeon in these sites.



Map 4: Key Sites for Tooth-billed Pigeon conservation in Upolu



Map 5: Key Sites for Tooth-billed pigeon conservation in Savaii

Thus far no Tooth-billed pigeon have been observed in sites over 1000 meters in elevation despite multiple expeditions into the uplands (+4 weeks with +5 ornithologists Savaii and Upolu). It is possible the Tooth-billed pigeon may be a lowland species which is reliant on the last remaining lowland forest in Samoa. Alternatively it may only seasonally use high elevation forest but spend the majority of its time in the lower forests where the phenology of the trees it feeds on has a longer fruiting period. Only by catching some birds and using radio transmitters will be able to gain an understanding of the importance of low elevation forest for this species.

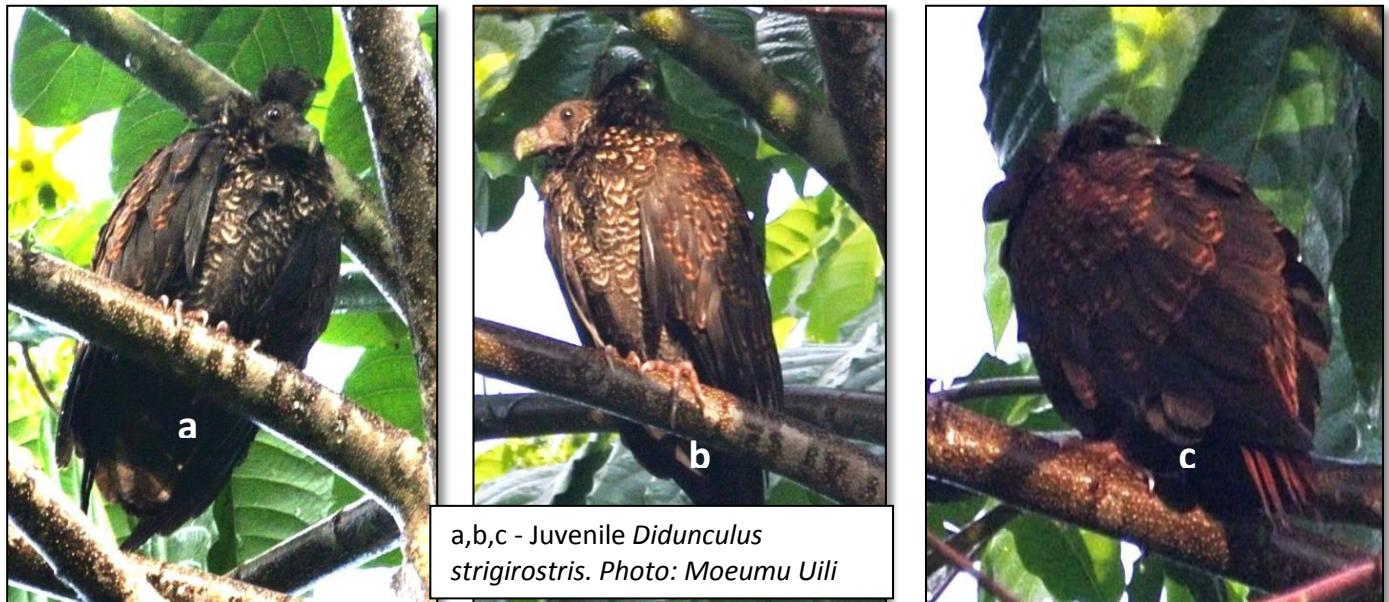
Objective 2: An estimate of the current surviving population

An estimate of the current surviving population has not been possible because numbers were so low. The bird is now becoming so rare that majority of people have only seen it over 4 four years ago. Although we have established one individual successfully breed no more juveniles were seen. Because detectability is so low we need more time and knowledge of the species to get an accurate population estimate.

A successful effort lead the team to the discovery of only one juvenile which was photographed by the team in 2013 (fig 5,6,7). One adult was also seen in this area flying below the canopy and entered into an undergrowth further inland southward towards the same direction the juvenile was flying to in the evening of the day before.

We counted what we think was Tooth-billed pigeon calls along the Faala coastal forest. Calls appeared to vary from 1-3 individuals within the 1km² of suitable habitat surveyed. We had carefully listened and counted the unique coo calls of what we know were of tooth-billed pigeon within the Salelologa, Tafua and Faala forest. Between Tafua and Faala was where we counted calls between 1-3 individuals calling at the same time within an estimated distance of 100m as if they were singing or communicating to

each other. Salelologa varied from 1-2 individuals and Aopo we only heard a single call from a single location.



Importantly, the availability of a museum specimen photograph (d) was compared with the above photos (a,b and c) confirming identification of the juvenile found.



However what is not fully understood is how wide an area can tooth-billed pigeon cover during its normal day foraging activity.

Table 3: Details of juvenile Tooth-billed pigeon found in Salelologa, Savaii.

Description	Seen OR Heard	Distinction from other Pigeons	Observers	Site	Date
1. Juvenile pigeon of approx. 26cm (beak to tail). Distinct chestnut brown body color, a combination with dark brown on its wing flight and rump. Chest and breast is light brown and orange. Brown peak with orange nostril. Long reddish orange legs with long tarsus.	Seen	Color of appearance as described in second column. Clear photos of juvenile and adult Tooth-billed pigeon provided by Natural History Museum online helped us determine the bird is a juvenile Tooth-billed pigeon. The hook bill also is a distinctive feature of Tooth-billed pigeon and this is what we aimed to see thus it was very clear from its distance.	Fialelei Enoka first saw the bird when he went to hang his wet clothes on the line just in-front of our rooms. He then calls out to the rest of the team to help identify if this was the Tooth-billed pigeon. He first noticed it when he heard bird wings flapped noisily on the perfume tree assuming it was just landing. Quickly we got binoculars and a camera and started to search in detail every parts of the body but first we needed to identify the hooked bill. Moeumu Uili started to take pictures and together as a team we went to the laptop after the bird flew back into the forest and compared our picture with the one in the Natural History Museum.	Salelologa	9 Dec, 2013
2. Adult Tooth-billed pigeon	Seen	Under the shadowed trees it looks dark brownish and as	We followed a coo call we thought coming from under the tall mature	Salelologa	9 Dec, 2013

Objective 3: Food sources.

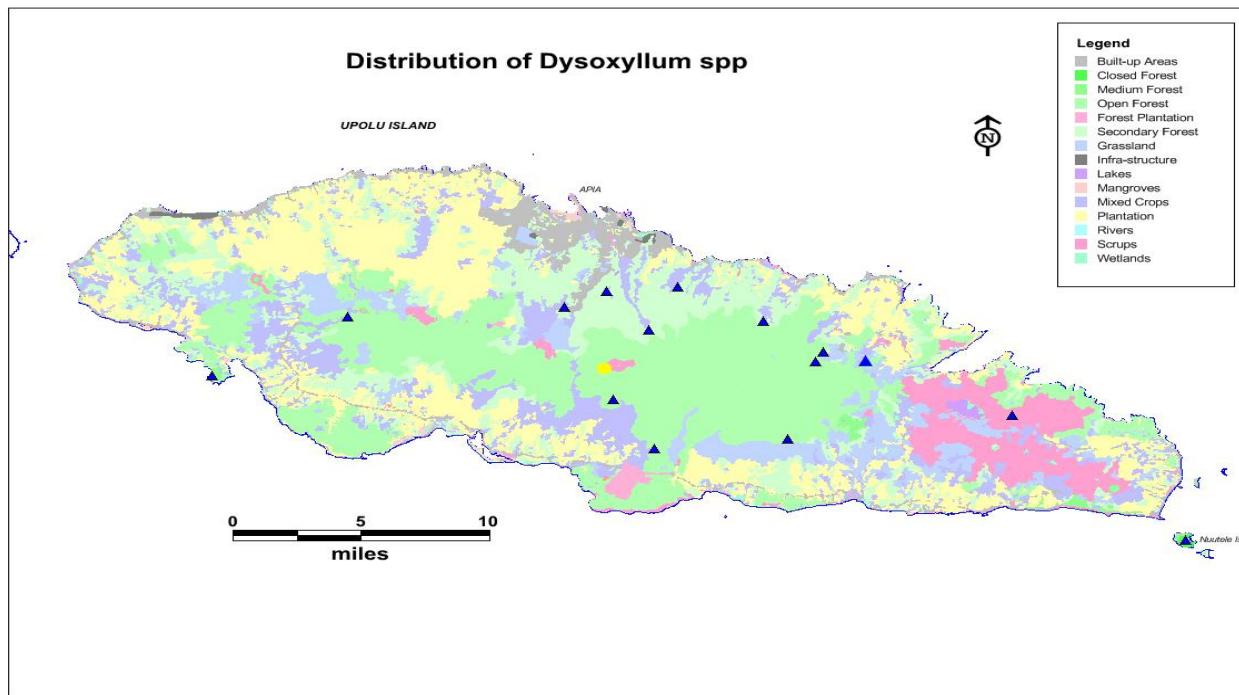
To identify trees that tooth-billed feed on, we did a desk search of all available information and collected information from the local hunters interviewed. Tooth-billed pigeon have been observed feeding on fruits of the *Dysoxylum spp*, *Canarium samoensis*, *Dioscorea bulbifera* (Soi) and *Planchonella torricellensis* as food sources for the bird. We collected information on the distribution of the *Dysoxylum spp* in the areas we surveyed. We also monitored the Dysoxylum trees whether they were fruiting or not in areas the birds maybe present (table 3).

Table 4: Distribution of Dysoxylum trees

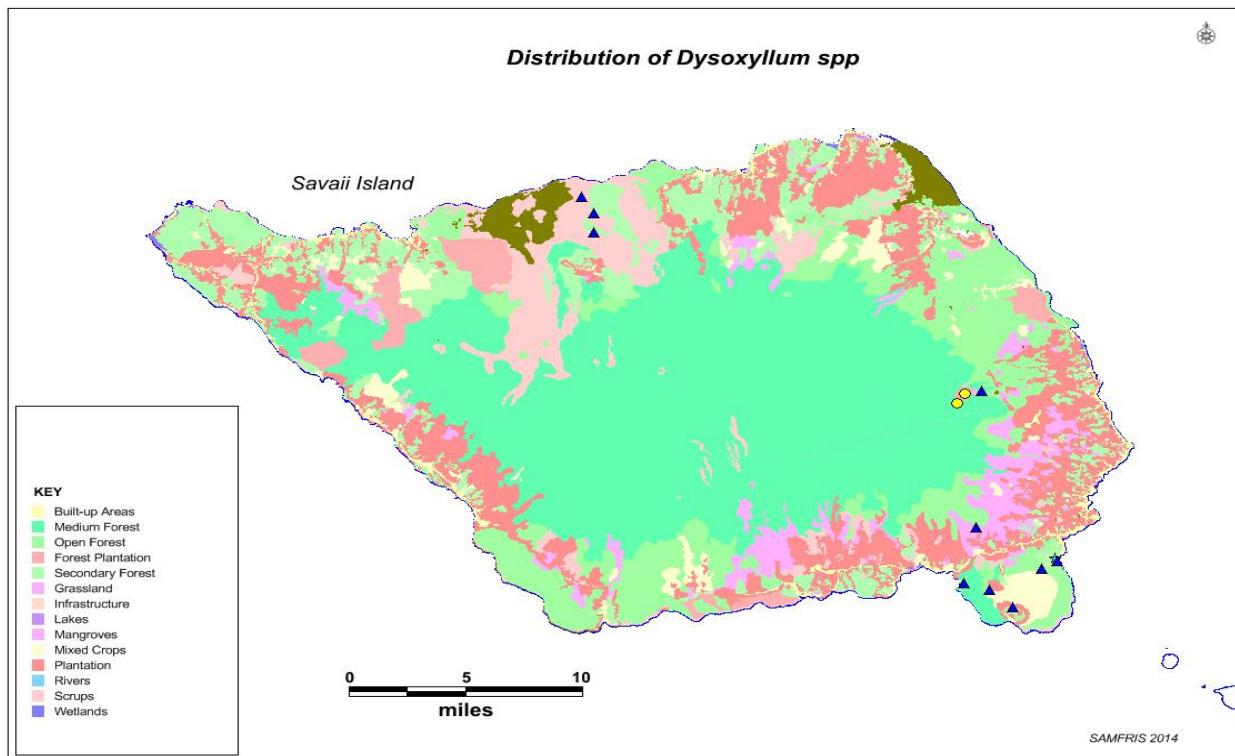
Dysoxylum	Date	Site
Presence	May-13	siumu
Presence	May-13	Tiapapata
Presence	May-13	Magiagi

Presence	May-13	Afulilo
Presence	May-13	Aleisa
Presence	Jun-13	Tafatafa
Presence	Jun-13	Togitogiga NP
Presence	Aug-13	Alaoa
Presence	Aug-13	Matafaa
Absent	Aug-13	Tiavi
Presence	Sep-13	Sauniatu
Presence	Oct-13	Nuutele
Presence	Nov-13	Mt Salafai NP
Presence	Nov-13	Faala
Presence	Dec-13	Salelologa
Presence	Dec-13	Lusia Lagoon
Presence	Apr-14	Tafua
Presence	Jun-14	Aopo
Presence	Ju-14	Laulii
Presence	Jul-14	Solosolo
Presence	Jul-14	Lalomauga

Map 6 and 7 shows the distribution of *Dysoxylum* trees throughout the islands in the sites we visited. Blue coloured triangles are the areas we visited where *Dysoxylum* is also present and Yellow coloured circles indicate no *Dysoxylum* trees found.



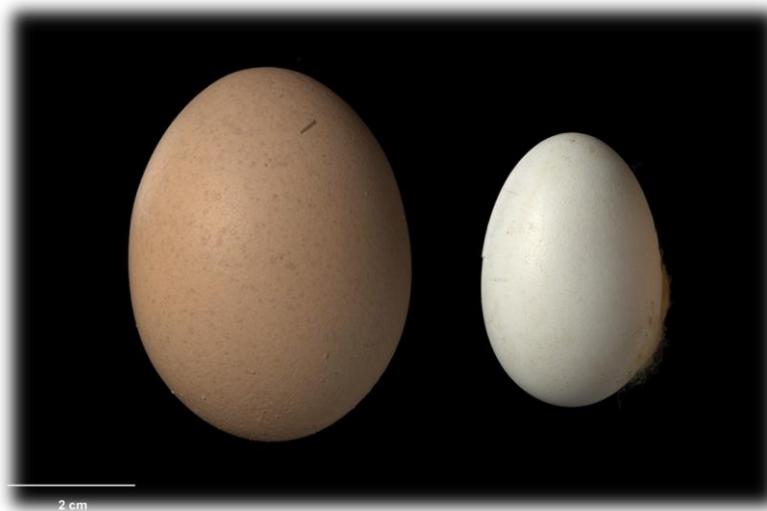
Map 6: *Dysoxylum* distribution on Upolu Island



Map 7: *Dysoxylum* distribution on Savai'i Island

Objective 4: Establish breeding season and breeding information

Based on our review of available literatures and information collect from specimens in the museums (New York NHM), tooth-billed pigeon starts to breed in May until November (Whitmee 1874). Though they may also breed outside this time. Visiting museums also enabled us to gain knowledge on the egg of the Tooth-billed pigeon when one was discovered in the Wellington Natural history collection. Information on the egg (white egg in the figure below featured beside a chicken egg) can now be used to identify it in the field when we find a nest.



Objective 5: Work closely with local communities and individuals

a. Community Education Consultation:



Figure 3: Top: Community of Faala
Middle: Community of Tafua
Bottom: Community of Salelologa

There are three community consultation education awareness conducted in the month of February 2014 for the communities of Salelologa, Tafua and Faala on the island of Savaii. Priority was given to these communities since the re-discovering of the tooth-billed pigeon in December 2013 at Salelologa and at the same time calls have been recorded from Tafua and Faala. The aim was to inform the communities of the result of surveys conducted by the team and to build good relationships for the cause of sustainable management of lowland forest for tooth-billed pigeon habitat conservation. A total of 258 community representatives participated in the program including high chiefs and decision makers, hunters and planters, women representatives and youth groups. At the end of the programs each community voice their concerns over the loss of biodiversity and the importance of community participation in the protection and conservation of Samoa's natural resources. Priorities raised were for

the government to work together with the communities providing official agreements be made for the protection of this remaining habitats for tooth-billed conservation before it is too late.

b. Local Schools Awareness Education

Ten (10) Local Primary Schools have been invited to participate in a School Poster Competition as one of the main events for celebrating the International Year of Biodiversity in June 2014. The competition was designed to advocate the significance of native and endemic bird conservation in Samoa with a special highlight on Tooth-billed pigeon. Each school have been asked to draw and paint one picture for the competition (appendix 4). Each school competed were awarded prizes as a compliment for their effective participation and support. The program was a success in terms of educating students on the importance of tooth-billed pigeon in maintaining the native forest and the forest ecosystems including knowledge on its unique features and how to differentiate it from other birds in the wild.

c. Community native seedling propagation

One of the recommendations from the community consultations was the need for propagation and distribution of native tree seedlings to assist local communities with forest replanting efforts to help improve the health of their community forest. Two seedling collection programs have been conducted by the team in collaboration with the Ministry of Natural Resources and Environment throughout Samoa. A total of 1000 native and endemic tree seedlings have already been collected and propagated at the nursery operated by the Division of Environment and Conservation. These seedlings are to be distributed to the communities in 2015 to help communities with their forest restoration programs.

d. Local guides trained in bird watching

One or two local field guides attached to join the project team when conducting bird surveys. We have had 5 locals trained in basic bird count while traveling and camping with the team in the forest.

e. Extra knowledge gained on species in relation to traditional knowledge and beliefs

Comments made during the consultations in February 2014 with three local communities on Savaii Island where the old aged community representatives told us what they had heard of the behaviour by tooth-billed pigeon when it is in its breeding and about to lay eggs. During this time the bird is said to have come down quietly to a low tree branch and eventually made its way on the ground where it covers its body with dead leaves while making its nest in the ground to lay eggs. During this time the bird would stay quiet and would hardly move or make noise. As was explained this is because the birding is already feeling heavy and weary. There is a Samoan expression that says in translation "Ufiuia manugase" which is originated from the tooth-billed pigeon behaviour in the wild explaining that when the bird is soon to lay eggs, she would be very much inactive throughout the day and tend to come low to the ground to build its nest using dead leaves while at the same time covering itself to hide from predators. This rather make sense if the bird starts to breed from around April-May the they would not make much calls where in November-December young have already fledged and adults mating which would make them call more to attract partners. Representatives from the communities have told and shared the same story regardless of its originality; it is what they learned from their forefathers who were great hunters thus it is becoming a strong belief for locals. The passion of the people in telling their

stories builds us 100% confidence that the story contributes to improving our knowledge of the species and what they have been told is true.



Figure 4: a,b,c,d - Working together with local communities

f. Hunting of birds in the wild

The existing ban on shooting native birds in the wild is currently in place for Samoa. Despite this there are still people hunting for pigeons either for fun or food. All the sites we visited and asked if shooting birds is still exercised in the villages the response was always “shooting is banned under the government law and is also ban by the village council”. However there are still people caught shooting in the local communities and they are given penalty fees direct to village council rules and if they refused and continue will then be sentenced to a court case interfering with the government law. Overall the behaviors of more hunters questioned have changed due partly to village law enforcements and effectiveness of awareness education programs.

Objective 6: Knowledge on natural predating by rats and cats.

Invasive species is an ongoing threat observed in all the areas we ever visited. Rats, cats, yellow crazy ant and wild pigs are all present in the four sites with tooth-billed pigeon. No observation of any nests was found on the ground or on trees to monitor the effects of invasive rats or cats on nests. Sadly, in all four sites with tooth-billed pigeon and majority of all sites we have visited, we also found bullet cases from shooting. It is not confirmed whether they were from wild pig hunting or literally bird hunting. The ban on shooting wild birds as well as flying foxes is currently in place for all of Samoa.

Achievements and Impact

Project priorities includes information collection using local communities to provide their existing knowledge on Tooth-billed Pigeon, surveying sites to locate surviving populations, identifying the breeding season and collect data on all native fruiting trees that are important food sources for the

Tooth-billed Pigeon. Three sites have now been highlighted as important for this species with two additional sites possibly also being important but requiring further surveys.

1. The most significant achievement of the project is the relocation and identification of a juvenile tooth-billed pigeon from Salelologa coastal forest.
2. Three sites are now given conservation priority for future management consideration as a result of our site based surveys
3. Established closed collaborations with local communities where the searches have been conducted for tooth-billed pigeon. These communities in particular include Faala, Tafua and Salelologa of Savaii Island.
4. Executed awareness education and outreach programs successfully with schools and local communities
5. Produced outreach materials to assist advocating tooth-billed pigeon conservation

This project has contributed tremendously to the pool of information required to make decision making efficient for implementing conservation actions on our threatened bird species. The involvement of our local communities has enabled us to gather more information of where the bird is found and its habitat. The more we work together with local communities the higher the chance of seeing the tooth-billed pigeon and finding its nesting grounds.

a. Project Team Conservation Leadership (CLP) Training

Training was conducted for the project team members from the Division of Environment and Conservation and Samoa Conservation Society based on the modules of Leadership and Project management and how to effectively plan and implement the project for saving the rare tooth-billed pigeon. A review of the projects aim and objectives was discussed using materials and resources provided from the online resource kit on the CLP website, cardboards, power-point presentations, markers, printout notes and outdoor activities related to the project. The evaluation of the lessons learnt from the training indicated the interest and appreciation of the modules and how it has helped in expanding the knowledge of the team members about the focus of the project and what to achieve in the end.

b. Integrated bird conservation program into ministerial and national events.

- The team had conducted one power-point presentation for the Forestry Preservation Program team (JICS Project) lead by the Forestry Division in August 2013, providing basic information on tooth-billed pigeon for all field researchers to aid data collection and site observation. The result of this group effort helped us identified tooth-billed pigeon site at Tafua which is now one of the recommended important sites for tooth-billed pigeon conservation. There are other secondary forests recommended by the Foresters which will be included in the plans for future site monitoring activities.
- A tooth-billed pigeon education program with the Primary Schools was also one of the main events for the commemoration of the International Day for Biodiversity celebrated by Samoa on the 5th June, 2014 with the national theme: "*Embracing the importance of Samoa's Biodiversity*". The celebration earmarked the commitment and support of local communities in protection and conservation of Samoa's biodiversity. Tooth-billed pigeon was also recorded from the Nuutele Island in 2006 but has not been recorded in our recent surveys. However to strengthen the knowledge of the local communities on the importance of effective means of conservation for the islands; 10

Primary schools from Aleipata were invited to join a Tooth-billed pigeon drawing poster competition. The event was a success in terms of providing schools and students' information about the features and characteristics of the bird and who to contact when a bird is seen or heard.



c. Awareness materials produced

These materials are very essential for efficient and effective education awareness programs especially working with schools and local communities.

Table 5: Awareness materials produced for project.

Quantity	Item	Target audience	Funded by
2	Pull-up banners	All	CLP
1	Bus paint	All	MNRE
20	Printed A3 posters	Students, foreign visitors	CLP
10	Students drawing posters (school arts competition)	Students, local communities	MNRE
-	Tooth-billed information sheets	Students, journalists, researchers	CLP
50	Tooth-billed pigeon embroidered caps	All	CLP
300	Tooth-billed digital printed shopping bags	All	CLP
2	Advertising cartoon video clips - Tooth-billed pigeon song - Field team adz	Fundraisers, donors, researchers, investors, students	CLP
2	Radio live talk back - Samoa Radio 2AB - Radio Australia	All	CLP
1	Samoa TV1 live show on LALI program	All	CLP
200	Tooth-billed pigeon T-shirts	SIDS Conference 2014	MNRE

Section Three

3.1. Problems encountered and lessons learnt

Working with the local communities is always a challenging experience. The team had planned to visit important sites that are identified in the Tooth-billed pigeon Recovery Plan however one of the selected sites include lands that are customarily owned unfortunately the Uafato community had refused further activities on their lands.. The confusion of previous environmental related programs by other organizations overpromising the community with a range of initiatives that are long overdue and unachievable are some of the circumstances the team faced when visiting land owners.

In all three community consultation programs conducted in Savaii, requests for monetary incentives have been the major subject of community motivation for issuing consent for the protection of the remaining tooth-billed habitats. Interestingly the overall pressure on the preservation of these lowland forests is in the hands of each community chiefs. Thus the decision comes from the agreement of the community executive meeting.

There is a need to develop capacity building in terms of partnership and building relations with relevant organizations that provide support to local communities financially.

3.2. Next Step Forward

- Consultation to initiate establishing community conservation area for the existing tooth-billed pigeon proposed habitat conservation.
- Intense field survey finding nesting trees, operate mist nets for capturing and radio tagging.
- Control mechanisms for invasive rats and cats for tooth-billed pigeon area and closely monitored
- Discussions for ex-situ conservation and/or in-situ conservation
- Plans to progress through discussions for captive breeding facility
- Liaise with interested individuals and organizations to improve actions for tooth-billed conservation
- Propose for available government land at Salelologa to preserve for tooth-billed pigeon and other wildlife

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Appendices

1. BIRD SURVEY QUESTIONNAIRE.

The key aim of this questionnaire is to obtain indications of where Tooth-billed Pigeon are found but it also allows collection of data on other species. This survey is designed for an interview situation which should proceed as below.

Date: _____ Interviewee: _____

Interviewer: _____ Sex: _____

Village: _____ Age range: _____

Coordinates: South: _____ West: _____

Questions	Responses/Answers
1. What do you know about the national bird of Samoa? If known GO to 2.	
2. Do you know the name of the bird?	
3. Have you seen this bird? If YES GO to 4	
4. Where and when?	Where: _____ When: _____
5. How can you be sure it was tooth-billed pigeon you have seen?	
6. When was the last time you heard or seen this bird?	
7. Can you describe what you know about this bird?	
8. Do you know what tree(s) does it feed on?	
9. Do you know the call of the bird? Explain	
10. Do you know the behavior of the bird? Explain	
11. Do you know other people who may know of the bird?	
12. What is your opinion about birds?	
13. Do you know if people are still shooting/hunting birds?	
14. Have you heard or participated in previous or current programs/projects to save birds of Samoa or relevant?	
15. Would you be willing to help the team and other programs which aim at conserving and protecting birds and their habitats?	
16. If YES, how would you do so?	
17. Any other comments?	

2. PHOTO PLATES OF TEAM IN THE FIELD.



3. PHOTO PLATES OF JUVENILE TOOTH-BILLED PIGEON FOUND ON SALELOLOGA, SAVAII ISLAND.



4. PHOTO PLATES OF SCHOOL TOOTH-BILLED PIGEON POSTER COMPETITION

Lima ALOFA ma le MAFANAFANA,
'o le MALUĀPAPA mo le GATA'AGA

