

Darwin Initiative Main Project Annual Report

Important Note: To be completed with reference to the Reporting Guidance Notes for Project Leaders:

It is expected that this report will be no more than 10 pages in length, excluding annexes

Submission Deadline: 30 April

Darwin Project Information

Project Reference	21-001
Project Title	Developing a conservation action plan for Samoa's little dodo- the Manumea or tooth-billed pigeon
Host Country/ies	Samoa, Australia
Contract Holder Institution	ANU
Partner institutions	MNRE and SCS
Darwin Grant Value	£229,842
Funder (DFID/Defra)	Defra
Start/end dates of project	1st May 2014 - 31st March 2017
Reporting period (e.g., Apr 2015 – Mar 2016) and number (e.g., Annual Report 1, 2, 3)	Annual report 2
Project Leader name	Rebecca Stirnemann/Robert Heinsohn
Project website/blog/Twitter	www.samonbirds.org
Report author(s) and date	Rebecca Stirnemann 15/4/16

1. Project Rationale

The Manumea or tooth-billed pigeon is found only in Samoa. It is currently listed as Critically Endangered by the IUCN. Our project aims to gain important knowledge on the species' ecology and conservation requirements, develop a plan to increase the number of Manumea and begin to put these measures in place. It will contribute to Aichi Target 12, which states that "by 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline has been improved and sustained." Saving the Manumea will also involve preserving native forest containing a rich fauna and flora of native species, thus contributing to Aichi Target 11. Thus project will contribute to the Convention of Biological Diversity (CBD) through the conservation of biological diversity it will also increase the sustainable use of components of biological diversity by reducing hunting pressure on the Manumea by working with the local communities hence contributing to Aichi Target 1.



2. Project Partnerships

The project partners in Samoa, the local NGO the Samoa Conservation Society (SCS) and the Government of Samoa - Ministry of Natural Resources and Environment (MNRE), are very active in this project and provide both planning and on the ground field support. Staff from all three organizations have planned what target actions should occur and how, when and where they should be implemented. This synergistic approach allows the expertise of all three organizations to be optimally used. For instance, MNRE leads on any interactions with local villages for village surveys.

The relationship between the partner organizations has strengthened over this year. The development of the relationships between the organizations was critical to the development and success of the project thus far.

Over time, the capacity of SCS has increased (Indicator 4). Additional partnerships are being discussed with the Durrell Wildlife Conservation Trust and Birdlife. These relationships would further build the capacity of the organization. Additional grant applications are both in development and submitted to increase the financial stability of the organization over the long-term. One of these is with Auckland Zoo who maybe able to contribute some funds towards long-term pest control of the target site. However these details are still being worked out.

3. Project Progress

Output 1

3.1 Progress in carrying out project activities

Activity 1.1 Manumea biology and threats established with sites for further conservation effort selected. And a monitoring program developed.

Sites and threats identified

Activity 1.1 is the biggest part of the project and the most complex. Surveys have identified areas where the Manumea are still present. Manumea have been found in three sites, two on Savaii and one on Upolu. These are considered of high priority for the species. All three sites are at a quite low elevation (<700m). Further studies are needed to determine if the species is utilizing the uplands of Savaii. The low elevation and closeness to human habitation places all these sites at high risk of logging and hunting pressure. Breeding activity in all three locations has been verified.

Development of a long-term monitoring plan for the species

We have been developing a monitoring program for the species. Automatic sound recorders have been key for detecting and monitoring this rare and cryptic species. We have ground truth tested the system – verifying with known birds their call and that the analysis of the recordings can produce reliable data on the presence/absence of the bird by virtue of recording its calls. Detectability was calculated both hourly and seasonally. The use of automatic sound recorders is now considered critical for monitoring the species.

This method will be used to monitor spatial use across the country. We will be placing 100 sound recorders across Samoa in appropriate habitats in June and July. These will be analyzed in partnership with Massey University, New Zealand using an automated detection process. The latter is still in development.

The biology of the species

Knowledge of the biology of the Manumea is constantly growing with a few substantial successes in the past year. Our surveys suggest that breeding occurs across most of the year. Juvenile's were seen in Dec (newly fledged), April and October. Museum specimen's collected in May also showed breeding activity,

Museum data from 75 birds have also been measured and recorded from specimens held in the Royal Ontario Museum, Zoologisches Museum Berlin, British Museum of Natural History and the New York Museum of Natural History. All the literature available on the species was also reviewed.

We have also conducted surveys of hunters. This has also added to the knowledge of the species and its ecological requirements. The results suggest that hunting is a key threat to the species. Consequently, the project staff undertook some studies clarifying why and how hunting was occurring. It is planned that these results will enable the development of a campaign to reduce hunting pressure on the manumea and other native seed dispersers (native bat and other pigeons).

Activity 1.2 Sites identified where further research/conservation can occur

Three key Manumea sites have been identified as part of this project, Malololelei Reserve in Upolu and Taga and Salelologa low lying forests in Savaii.

However, this species' movements are driven by fruiting trees and therefore spatial use is not as simple as it would be for a sedentary species. Information from the automatic sound recorder arrays (100 recorders are being put out simultaneously in the forest across Samoa) will be used to investigate preferred habitat features. Our results thus

far have shown that *Dysoxylum*, the fruiting tree previously considered the main driver of spatial movements, is only one of some species utilised by the Manumea. Furthermore, preliminary results from hunting surveys suggest forest phenological patterns have altered considerably in the last 5-10 years. The hunters reported changes in the seasonality of native tree fruiting in the low land. They reported fruiting phenology was previously observed to be tightly constrained to particular months. However in recent times, fruiting events occur more randomly. The impact of this on the species is not clear.

Activity 1.3 Radio tracking of Manumea

Transmitters have been designed, purchased, and are now ready to be attached to Manumea in the June- October. Methods of capture were refined with the aid of two expert teams from Auckland Zoo and Pacific Conservation. Initial attempts at capturing a bird and attaching a transmitter were unsuccessful, however since then breeding habitat has been identified. The second attempt at capture is planned from June onward with Auckland Zoo and New Zealand Department of Conservation staff joining the project for this period. We are also using a systematic array of sound recorders to answer key habitat questions. If we continue to be unsuccessful in capturing a bird, some key habitat information can still be collected using alternative methods in June and July.

Output 2

Activity 2.1 Sites selected for future conservation effort

Sites to best target conservation effort were selected. It was important to consider not only the presence of Manumea but also the ownership of the land, the quality of the forest, and accessibility of the site. Further surveys for more key sites for the species are ongoing.

Activity 2.2 Both cats and rats controlled in the 50ha area in the six week/ 2weeks before the start of the breeding season

A pest control plan is being developed developed with the MNRE, Auckland Zoo, Island Conservation, Secretariat of the Pacific Regional Environment Program (SPREP) and Kessels and Associates. Pest control of both cats and rats is now considered particularly critical because the juveniles spend considerable time on the ground where they are vulnerable to predation. Our results thus far suggest the species is breeding throughout the year with three juvenile Manumea seen during April and one in December. Museum results show that birds were also breeding in May and June.

Discussions with landowners, the government and SPREP, are planned shortly.

Output 3

Activity 3.1 Development of short educational program on Manumea and forest preservation

In partnership with the Samoan government, village consultations have been completed in 10 villages, 2 villages in Upolu and 8 in Savaii. This program has been undertaken at the same time as the hunting surveys and thus far there has been considerable interest from the participating villages.

Activity 3.2 Discussions with key village chiefs over the preservation of forest and reduction of pigeon hunting of specific sites

We combined activity 3.1 and 3.2. Results showed hunting was a key problem for the Manumea, which is shot either deliberately or as bycatch while hunting Pacific pigeons and bats. The consumer pathway has been isolated, and consumption of pigeon has been shown to be almost exclusively by the wealthiest percentile (top 10% eats 58% of all pigeons). Consumption was shown to occur throughout the country. The hunting surveys also collected information on areas or sale and market rates. We also clarified the reasons behind consumption and points of sale. We also collected information on where the different types of ammunition for weapons are sold, their price and the regulations restricting their access. We are now working with our partners to determine how we can reduce hunting pressure on Manumea.

Activity 3.3 A local native tree planting program established to benefit Manumea in collaboration with the forestry department

This activity still has to be implemented but does not occur until later in the project. A number of sites have been identified for replanting of trees the Manumea is reliant on.

Output 4

Activity 4.1 Additional staff hired and trained for SCS

The NGO has hired an additional staff member. Her skills have been increased during this project, and she has gained experience in conservation projects, fundraising and project management.

Activity 4.2

Funds were applied for to ensure the sustainable future of the organization

Six proposals for funds have been submitted. These have provided training for the NGO in obtaining small grants, thus providing extra revenue and motivation to apply for grants in the future. Staff have attended some training events to build capacity.

3.2 Progress towards project outputs

Output 1:	Manumea biology and threats established with sites for further conservation effort selected			Comments
	Baseline	Change recorded by 2016	Source of evidence	
Indicator 1.1	Revised recovery implementation plan which incorporates biological information on the species	Research on the biology of the species has been undertaken. Draft implementation plans are being written.	Peer reviewed publications, surveys, draft implementation recovery plan, maps, datasheets from museum outputs (annex 4, table 1)	This part of the project has worked really well
Indicator 1.2	Peer reviewed papers submitted on the biology of the Manumea	Gathering data on the basic biology of the species and its detectability.	Scientific papers are being written still, photos (annex 4, Fig 1-4)	This is a time consuming indicator and was expected to be

				completed only near the end or following completion of the project.
Indicator 1.3	At least 3 Manumea tracked with radio transmitters (this is possibly not the best indicator because it focuses on the method and not the end results that we aim to achieve which is to gather further information in the species)	Birds are not yet captured. Second attempt to be made.	Scientific papers and maps of spatial use and photos will be the output.	Capturing the species is difficult though we will continue to try we have an array of sound recorders to be put out to capture spatial usage.
Indicator 1.4	At least five new sites identified where Manumea conservation effort can be targeted.	Three sites are selected. Further sites to be identified.	Maps.	
Indicator 1.5	Methodology for a monitoring program for Manumea designed	Methodology has been developed. Surveys with 100 sound recorders planned.	Plan developed, photos (annex 4, Fig 1-4)	
Output 2:	Manumea biology and threats established with sites for further conservation effort selected			
Indicator 2.1	Sites established where monitoring can occur	3 sites selected	Maps (annex 4, Figure 5 map of proposed pest control), scientific paper/ conference abstract (annex 4, abstract 1)	Indicators have altered
Indicator 2.2	Invasive management trialled at one site	Rough draft of Management plan developed	Management plan	Indicators have altered
Indicator 2.3	Working paper outlining the success of the techniques submitted to MNRE	To be submitted	Working paper of management plan	Indicators have altered
Output 3:	Pigeon hunting bans and logging restrictions for key areas developed through participatory methods with key villages			
Indicator 3.1	Increased protection of sites	Consultations have been occurring	Maps, photos of consultations (annex 4, photos1-4)	Indicators have altered
Indicator 3.2	Consumer pathway has been determined and surveys completed on hunting impacts	Scientific paper on consumer pathway developed	Scientific paper written, presentation at regional	Indicators have altered to include this new indicator,

		being developed	meeting, surveys, graphs (Annex 4, Fig6-8)	(Annex 4, Abstract 2 Scientific conference abstract)
Output 4:	SCS improve capacity in working with threatened species conservation action and management			
Indicator 4.1	SCS capacity increased	Staff / Board experience and capacity increased	Tracking tool used as an indicator	

3.3 Progress towards the project Outcome

Outcome:	The establishment of methods based on sound ecological knowledge, which will halt the decline of the Manumea and its habitat and the support of the community to implement these methods.			Comments (if necessary)	
	Baseline		Change by 2016	Source of evidence	
Indicator 0.1	Knowledge of threats, biology and distribution of Manumea in Samoa enhanced	At least five new sites have been identified for future conservation of the manuema, >30% of forest has been surveyed, 3 manumea tagged, position of nest clarified	At least 3 sites have been identified, >30% of forest has been surveyed, spatial information on movement of manumea collected, breeding biology clarified	i.e. Annex 4, Abstract 2 Scientific conference abstract, More scientific papers currently being written	There might not be 5 key sites that the species is still using. We still hope to find more however. Manumea tagging is also difficult and instead evidence of spatial understanding of the species is suggested.
Indicator 0.2	Management techniques to produce suitable Manumea habitat in and around Manumea sites developed and trialed.	Management of invasive species trialed.	Management of invasive species will occur in the upcoming months.	i.e. Annex 4, Fig 5 map of proposed site.	Management plan is still being drafted.
Indicator 0.3	Local communities and relevant conservation organizations support Manumea conservation	Increased protection of sites from hunting and logging.	Community discussions have occurred about hunting and logging impacts. Though this is	i.e. Annex 4, Picture 1-4, Annex 4, Abstract 2 Scientific conference abstract	

	by setting aside conservation areas and reducing hunting pressure.		a difficult indicator to measure we feel progress towards this goal is occurring.		
Indicator 0.4	Capacity for the Manumea Conservation Programme in Samoa is increased	Number of experienced and trained staff has increased	Staff numbers have increased and tracking tools indicate progress		The tracking tool is considered a better indicator of progress

3.4 Monitoring of assumptions

The following assumptions have been made for this project:

- Assumption 1 Natural disasters (cyclones) do not prevent access to key sites and lead to the complete disappearance of the species and staff, turnover remains manageable
- Assumption 2 New invasive species present which wipes out Manumea population
- Assumption 3 Target communities remain open to working with the project
- Assumption 4 That we will receive the funds needed to do this work

All these assumptions hold true, and for the most part they are out of our control. We will, however, maintain sensitive staff management and continue to apply for additional funds, as they are required to prevent as best we can assumptions 1 and 4 becoming an issue. We will continue to work with the government to ensure the target communities remain open to working with us.

3.5 Impact: achievement of positive impact on biodiversity and poverty alleviation

This main target of this project is to build in mechanisms to save the Manumea. However, the goals of reducing hunting of pigeons and bats, improving forest conservation and implementing pest control plan will be beneficial to many other native and endemic species. These species include other threatened and endangered species such as the Mao, an endangered giant forest honeyeater.

We are working with the Samoan NGO SCS, and the MNRE to build local capacity and skills in terrestrial conservation management. The SCS and MNRE work together to ensure that sustainable development in the country (Samoa) is occurring.

4. Contribution to the Small Island Development Goals (SDGs)

Three SDG goals are contributed to by this project. These are:

Goal 12. Achieve the sustainable management and efficient use of natural resources

Goal 13. Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

Goal 15. Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands.

This project contributes to these goals by improving sustainable management of resources. The Manumea is an umbrella species which will encourage conservation of Samoa's forest ecosystems. To protect the species, sustainable management of forest resources (bats and pigeons and timber) will have to occur. Our project will indirectly affect the issues by increase awareness and encourage both village and government action. We will also directly contribute to these goals through forest restoration and ecosystem preservation.

5. Project support to the Conventions, Treaties or Agreements

Our project aims to save the Manumea, thus contributing to Aichi Target 12, which states that "by 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline has been improved and sustained." Saving the Manumea will also involve preserving native forest which contains a rich fauna and flora of native species, thus contributing to Aichi Target 11. Thus, this project will contribute to the CBD through the conservation of biological diversity it will also increase the sustainable use of components of biological diversity by reducing hunting pressure on the Manumea by working with the local communities hence contributing to Aichi target 1. We have worked to achieve our goals in partnership with the Government of Samoa - MNRE.

6. Project support to poverty alleviation

We are working with the Samoan NGO, SCS, and the MNRE to build local capacity and skills in terrestrial conservation management. The SCS and MNRE work together to ensure that sustainable development in the country (Samoa) is occurring.

7. Project support to Gender equity issues

This project works with both men and women in villages and within the environmental sector to ensure conservation action is not gender biased. Both sexes also have equal chances of developing skills through training of both MNRE and SCS staff.

8. Monitoring and evaluation

This past year has focussed on developing internal organizational systems to monitor the project and to develop indicators of the achievements. The project team have:

1. Incorporated the project activities into the annual work plans of the organizations involved on the ground (MNRE, SCS, and ANU)
2. Clarified roles within the project teams
3. Made a system for storing data internally

The project team has seen that meetings have to be held on a regular basis (once a quarter), and has incorporated this into the project annual work plan. The team also has formed a TAG team (with ANU, MNRE and SCS members) who meets every few months to advise the project and ensure that everybody is updated to the current state of affairs.

The project leader is undertaking interim evaluations during implementation as a first review of progress, a prognosis of a project's likely impacts, and as a way to identify necessary adjustments in project design. Terminal evaluations will be conducted with Professor Robert Heinsohn, ANU, at the end of each section of the project so that

appropriate adjustments can be made to the project plan with the new knowledge, which has been gained throughout the study.

9. Lessons learnt

The key lessons we have learnt from this project are (1) the need to find partners to collaborate with to ensure knowledge is shared and (2) the need to build in mechanisms which allow for flexibility in planning so results can determine the direction of the project. We are quite happy with the directions that the project has taken thus far.

10. Actions taken in response to previous reviews (if applicable)

The review of the previous report stated: *The project proposes to develop pigeon hunting bans and logging restriction as part of the project, but there is little information given about whether the livelihoods of communities who may be reliant on these resources has to be taken into consideration. Please provide more information on how you intend to engage with communities on this matter, beyond teaching them about the Manumea.*

We thank the reviewers for their well-considered comment. We have been undertaking research into the consumption of bats and pigeons. Results show the richest percentile consumers of the native pigeons and bats (Annex 4, Fig. 6-7). Our results also show village communities are not reliant on these resources since it only makes up a very small part of their diet (dietary usage available from the Household Income and Expenditure Survey dataset). The loss of these species is, however, affecting native tree seed dispersal and therefore recovery of native forests and freshwater ecosystems. When we engage communities, we work with them to determine what they would like to do in their area to achieve conservation outcomes and if banning shooting is best for their village.

11. Other comments on progress not covered elsewhere

NA.

12. Sustainability and Legacy

This project already had a strong profile in the country and internationally. Mongabay ran two stories about the plight of the species and other stories have been released in local newspapers and on ABC radio. We also have regular meetings with the local government.

There is considerable interest in this project. We have been approached by various organizations in ways they can aid the development of both the project and the NGO. Partnerships have resulted with SPREP, Conservation International, Durrell and Auckland Zoo.

The capacity of the NGO is also increasing, and its development continues to be a valid exit strategy for the project as long as we can find funds to continue supporting full-time staff and activities.

13. Darwin Identity

The project has been publicized at the small island development forum (SIDs), and in the newspapers, radio and websites as well as on social media sites. The Darwin

Initiative has been acknowledged in these media outputs. We have also been giving out Manumea t-shirts to hunters and chiefs during our talks to build support for the project. All t-shirts have the Darwin logo on them. This t-shirt worn for meetings and photographs.

Recently the project leader has begun blogging about the project and conservation. The Darwin program is always mentioned along with our partners.

The Darwin Initiative was seen as a distinct project but is enabling us to form a larger program with these funds in the core. The partners associated with the project all have a good understanding of the Darwin Initiative. Other NGOs also seem to be familiar of with it. We have added Darwin to our tweets on the project and will continue to do so.

14. Project Expenditure

Please expand and complete Table 1.

Table 1 Project expenditure during the reporting period (1 April 2015 – 31 March 2016)

Project spend (indicative) since last annual report	2015/16 Grant (£)	2015/16 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Others (see below)				
TOTAL				

Highlight any agreed changes to the budget and **fully** explain any variation in expenditure where this is +/- 10% of the budget. Have these changes been discussed with and approved by Darwin?

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2015-2016

Project summary	Measurable Indicators	Progress and Achievements April 2015 - March 2016	Actions required/planned for next period
<p>Impact</p> <p>This project aims to reduce biodiversity loss in Samoa by preventing the continual decline of the Manumea and its associated forest habitat.</p>		<p>Sites containing Manumea have been located and threats isolated. Consultations with landowners and villages have been occurring to discuss conservation and hunting impacts. Partnerships have been formed, and the NGO has developed.</p>	
<p>Outcome</p> <p>The establishment of methods, based on sound ecological knowledge, which will halt the decline of the Manumea and its habitat and the support of the community to implement these methods.</p>	<p>Outcomes Indicators</p> <p>1) At least five new sites have been identified for future conservation of the Manumea, >30% of forested areas in Samoa will be surveyed for Manumea, More than 3 Manumea have been tagged, and radio-tracked, position of nests have been identified</p> <p>2) Management of invasive species trialed in 1 area</p> <p>3) An increased number of sites given increased protection from hunting and logging agreed upon by community groups.</p> <p>4) The number of experienced and trained permanent staff has increased</p>	<p>Three key sites containing Manumea have been located (Malololelei area, Salelologa low-lying forest area, and Taga low-lying forest areas). Knowledge of the biology of the species has increased. 1) The timing of breeding has been established. 2) Key foods have been determined, 3) Some key threats have been isolated.</p> <p>A method to monitor Manumea has been developed.</p> <p>Two potential sites (Malololelei and Salelologa) were selected where pest control and management can occur. A pest control plan has been drafted. Discussions with landowners and government are still required.</p> <p>The pigeon and bat consumer pathway have been investigated. Methods to reduce hunting impacts on Manumea are currently being investigated.</p>	<ol style="list-style-type: none"> 1) Monitor Manumea spatial use across the country using 100 sound recorders 2) Meeting to discuss pest control implementation, validation of method and publicity and outreach exercise. Plans for longer-term funding for this area are being discussed. Pest control implemented. 3) Meeting to discuss strategy for reducing hunting pressure on Manumea. 4) Continue building the NGOs capacity. 5) Attend the Oceania Conservation Biology conference to present our work
<p>Output 1. Research into the biology of the Manumea and threats to the species is currently being undertaken</p>	<p><i>Peer reviewed publications, surveys, project report, videos, Recovery plan, maps</i></p>	<p><i>We are currently working on selected peer-reviewed publications (these include maps and the survey results). Results will also be used to develop a strategy document for the recovery of the species for practical implementation.</i></p> <p><i>We have not ended up making a video of the project.</i></p>	
<p>Activity 1.1 Manumea surveys were undertaken and monitoring plan developed</p>		<p>Initial surveys have been undertaken, and a monitoring plan has been developed. The research was undertaken on the detectability of the species and factors that</p>	

		affect call rate. We are planning on a nationwide survey using automatic sound recorders to establish the spatial use of Manumea in the up coming months.
Activity 1.2 Sites identified where further research/conservation can occur		Initial sites have been identified.
Activity 1.3 Radio tracking of Manumea		The second attempt at capture will occur in the up coming months. An alternative method to collect ecologically important spatial data has also been developed and will be implemented in the next few months.
Output 2. Management of invasive species (targeted species established in output1)is to be trialed and management plan established	<i>Management plan, surveys, project report</i>	<i>These continue to be good indicators though some like the scientific peer reviewed publications will take time to produce. We published a scientific paper on Compounding effects of habitat fragmentation and predation on bird's nests.</i>
Activity 2.1. Sites selected for future conservation effort		Sites established.
Activity 2.2. Both cats and rats controlled in the 50ha area in the sixweeks/ two weeks before the start of the breeding season		The pest control implementation plansare being developed.
Output 3. Pigeon hunting bans and logging restrictions for key areas developed through participatory methods with key villages.	<i>Videos, village meeting notes, project report, videos, village's report</i>	These indicators are not all valid. Villages do not tend to take meeting notes or make reports. We took survey notes during the meetings. The indicators below are preferred. <i>Survey results, graphs (See Annex 4, Fig 6-8) photos, conference abstract, scientific papers</i>
Activity 3.1 Development of short educational program on Manumea and forest preservation		We altered our educational approach and matched it with the hunting surveys.
Activity 3.2 Discussions with key village chiefs over the preservation of forest and reduction of pigeon hunting of specific sites		Initial discussions have taken place in nine villages/areas. (Aopo, Taga, Gataivai, Fa'ala, Palauli, Tafua, Salelologa – Sakalafai, Sapulu and Falefia, Falease'ela and Malololelei.). 2 new sites proposed as KBAs and IBAs.
Activity 3.3 A local native tree planting program established to benefit Manumea in collaboration with the forestry department		This activity is not yet scheduled to occur. However, a list of key species has been developed.
Output 4. The capacity for the local conservation NGO (the Samoan Conservation Society) is enhanced	<i>Project report, meeting notes</i>	We are now using a tracking tool to monitor NGO development.
Activity 4.1An additional staff member has been hired by the NGO.		This activity has occurred, and we are now developing her skills while we try to get funds to gain an additional staff member.
Activity 4.2, Funds applied for to ensure the sustainable future of the organisation		We have applied for additional grants to develop this project, conservation within Samoa and build the capacity of the NGO.

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Annex 2. Project's full current logframe

Project Summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal: Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.</p>			
<p>Outcome: The establishment of methods, based on sound ecological knowledge, which will halt the decline of the Manumea and its habitat and the support of the community to implement these methods.</p>			
<p>Outputs: 1. Manumea biology and threats established with sites for further conservation effort selected</p>	<p>1a. Revised recovery plan methods which incorporate biological information on the species</p> <p>1b. Peer reviewed papers submitted on the biology of the Manumea</p> <p>1c. At least 3 Manumea tracked with radio transmitters</p> <p>1d. At least five new sites identified where Manumea conservation effort can be targeted</p>	<p>1a. surveys undertook, recovery plan written, maps presented, newsletter, sound recordings of birds</p> <p>1b. Peer reviewed publications</p> <p>1c. Peer reviewed publications, project report, videos, Recovery plan, maps, photos</p> <p>1d. Recovery plan, maps, Peer reviewed publications</p>	<p>1) Natural disasters (cyclones) do not prevent access to key sites and lead to the complete disappearance of the species.</p> <p>2) Staff turnover remains manageable.</p>
<p>2. Management of invasive species (targeted species established in output1) trialed and management plan established</p>	<p>2a. Sites established where monitoring can occur</p> <p>2b. Invasive management trialed at one site</p> <p>2c. Working paper outlining the success of the techniques</p>	<p>2a. <i>maps</i></p> <p>2b. maps, management plan, photos</p> <p>2c. Working plan</p>	<p>1) New invasive species present which drives Manumea population to extinction</p>

	submitted to the Ministry of Natural Resources		
3. Pigeon hunting bans and logging restrictions for key areas developed through participatory methods with key villages.	3a. Increased protection of sites	3a. <i>surveys, project report, photos, conference abstract, scientific papers</i>	1) Target communities remain open to working with the project, 2) Hunting is still a problem for this species
4. The capacity for the local conservation NGO (the Samoan Conservation Society) is enhanced	4. SCS improve capacity in working with threatened species conservation action and management	4a. <i>Tracking tools</i>	1) Staff turnover remains manageable.
<p>Activities (each activity is numbered according to the output that it will contribute towards, for example, 1.1, 1.2 and 1.3 are contributing to Output 1)</p> <p>Output 1 Activity 1.1 Manumea surveys were undertaken Activity 1.2 Site identified where further research/conservation can occur Activity 1.3 Radio tracking of Manumea</p> <p>Output 2 Activity 2.1 Sites selected for future conservation effort Activity 2.2 Both cats and rats controlled in the 50ha area in the six week/ 2weeks before the start of the breeding season</p> <p>Output 3 Activity 3.1 Development of short educational program on Manumea and forest preservation Activity 3.2 Discussions with key village chiefs over the preservation of forest and reduction of pigeon hunting of specific sites as well Activity 3.3 A local native tree planting program established to benefit Manumea in collaboration with the forestry department</p> <p>Output 4 Activity 4.1 Additional staff hired and trained for SCS Activity 4.2 Funds applied for to insure the sustainable future of the organization</p>			

Annex 3 Standard Measures

Table 1 Project Standard Output Measures

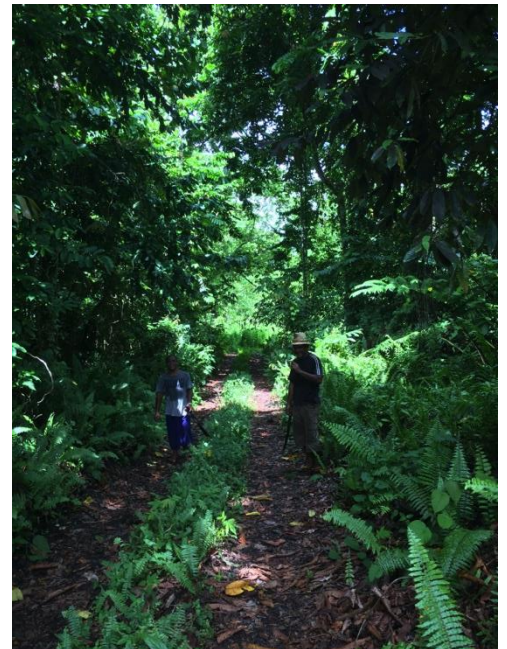
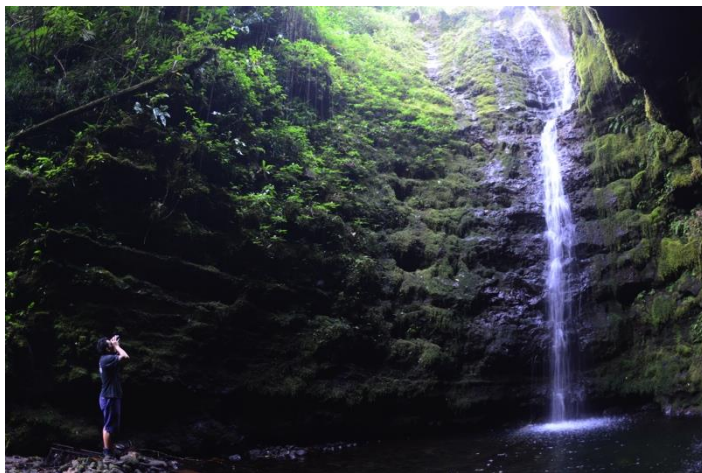
Code No.	Description	Gender of people (if relevant)	Nationality of people (if relevant)	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
5	Training in fieldwork surveys and grant writing	F3, M1	Samoan	1	1		2	1
9	Revised Manumea recovery plans			0	0		0	1
11B	Scientific Papers			1			1	>2
12A	Computer database on Manumea locations			0			0	1
14B	MNRE and local university seminars			1	4		3	>2
14A	Conference attendance			1	2		2	>3
23	Additional funding leveraged			2	1		2	>3
4D	Participatory conservation meetings		Samoan	0	10		10	5

Table 2 Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)
Discovery breeds hope for the little dodo	Blog story	Rebecca Stirnemann & Tiffany Straza 2016	F	NZ	Medium, online	https://medium.com/@rebeccastirne mann/new-discovery-breeds-hope-for-the-little-dodo-400ef80ed233#adsx864if
2015 Manumea Xmas	Newsletter	Rebecca Stirnemann 2016	F	NZ	Email	rstirnemann@gmail.com

Newsletter						please ask for Newsletter
Samoanbirds.org	Website	Rebecca Stirnemann 2016	F	NZ	website	www.samoanbirds.org
Eating the little dodo: Loss in the South Pacific	Conference abstract	Presenter: Rebecca Stirnemann 2016	F	NZ	Conference/ Brisbane for the Society for Conservation Biology 4th Oceania Congress, currently being written up as a scientific paper	*Annex 4, Abstract 2
	Conference abstract	Presenter: Moeumu Uili	F	Samoa	Conference, Nature Round Table 9 and 10 July, Fiji	
Compounding effects of habitat fragmentation and predation on bird's nests	Scientific Journal and Conference abstract	R. L. Stirnemann , M. A. Potter, D. Butler, E.O. Minot	F	NZ	Austral Ecology, Presented at Ecological society of Australia conference, Received the Mike Bull award for best Austral Ecology paper	*Annex 4, Abstract 1

Annex 4 Onwards – supplementary material (optional but encouraged as evidence of project achievement)



Figures 1-4, Undertaking fieldwork a) placing automatic sound recorders in the field, b) Undertaking village surveys of local knowledge and providing education on conservation options for the villages, c) looking for Manumea and d) out surveying Aopo with the local hunters.

		Tip of Bill to Lores (mm)	Tarsus (mm)	Wing chord (mm)	Tail (mm)	Metatarsus anterior to posterior diameter at mid- tarsus(mm)
	count	74	73	74	57	30
All birds	Average	22.70	37.54	194.22	118.32	6.17
	Min	17.55	25.32	156	80	5.26
	max	25.63	44.06	220	147.44	6.72
	<i>n</i>	17	17	17	16	11
Female adult	Average	22.23	34.58	191.26	120.26	5.99
	Min	21.35	25.32	181	110.57	5.26
	max	25.63	41	203	147.44	6.64
Male adult	n	20	20	20	19	14
	Average	23.35	35.94	198.58	123.62	6.30
	Min	22.40	28.15	187.00	108.07	5.30
	max	24.95	43	210.5	138.85	6.68

Table 1. Summary morphometric data from Manumea specimens in museums.

Abstract 1. Austral Ecology Scientific paper:

Stirnemann, R. L., Potter, M. A., Butler, D. and Minot, E. O. (2015), Compounding effects of habitat fragmentation and predation on bird nests. *Austral Ecology*, 40: 974–981. doi: 10.1111/aec.12282

Compounding effects of habitat fragmentation and predation on bird nests

Habitat fragmentation and invasive species are two of the greatest threats to species diversity worldwide. This is particularly relevant for oceanic islands with vulnerable endemics. Here, we examine how habitat fragmentation influences nest predation by *Rattus* spp. on cup-nesting birds in Samoan forests. We determined models for predicting predation rates by *Rattus* on artificial nests at two scales: (i) the position of the bird's nest within the landscape (e.g. proximity to mixed crop plantations, distance to forest edge); and (ii) the microhabitat in the immediate vicinity of the nest (e.g. nest height, ground cover, slope). Nest cameras showed only one mammal predator, the black rat (*Rattus rattus*), predating artificial nests. The optimal model predicting nest predation rates by black rats included a landscape variable, proximity to plantations and a local nest site variable, the percentage of low (<15 cm) ground cover surrounding the nest tree. Predation rates were $22 \pm 13\%$ higher for nests in forest edges near mixed crop plantations than in edges without plantations. In contrast, predation rates did not vary significantly

between edge habitat where the matrix did not contain plantations, and interior forest sites (>1 km from the edge). As ground cover reduced, nest predation rates increased. Waxtags containing either coconut or peanut butter were used as a second method for assessing nest predation. The rates at which these were chewed followed patterns similar to the predation of the artificial nests. Rural development in Samoa will increase the proportion of forest edge near plantations. Our results suggest that this will increase the proportion of forest birds that experience nest predation from black rats. Further research is required to determine if rat control is needed to maintain even interior forest sites populations of predator-sensitive bird species on South Pacific islands.

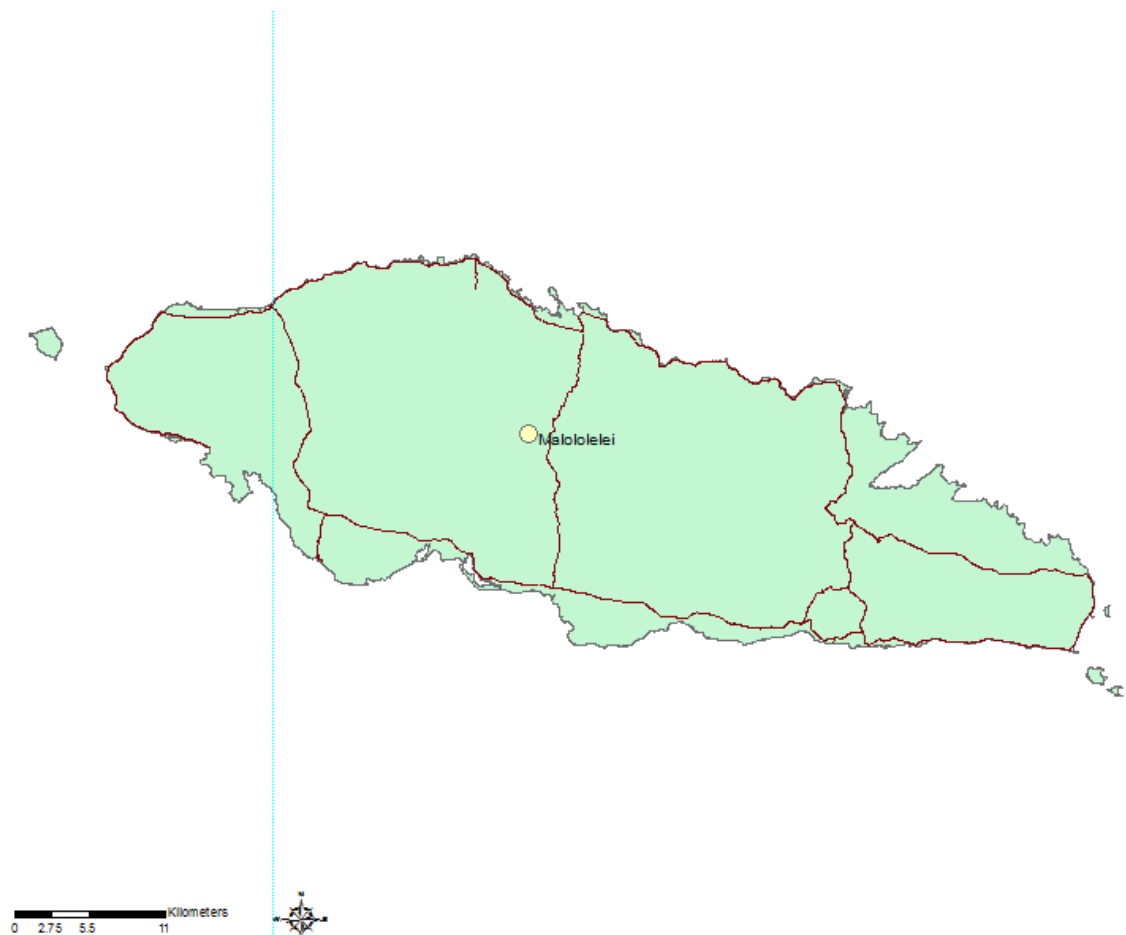


Fig. 5. Showing the location of Malololei in Upolu, Samoa where the rat control is planned and some of the research on the species has occurred.

Abstract 2, Conference abstract submission, SCBO Brisbane 2016

Eating the little dodo: loss in the South Pacific

Bushmeat can drive biodiversity loss. We highlight the previously unrecognized scale of hunting of the Samoan and Tongan fruit bats and three Samoan pigeon species, the Pacific pigeons, white-throated pigeon and the Manumea or toothbilled pigeon in Samoa. We describe the commodity chain in Samoa for bushmeat trade. Our research indicates that hunting plays an important role in the continual decline of the Manumea. The off take estimated in this project raises serious conservation concerns for native pigeon and bat species, while the commodity chain identified in this study may offer possible points for management intervention.

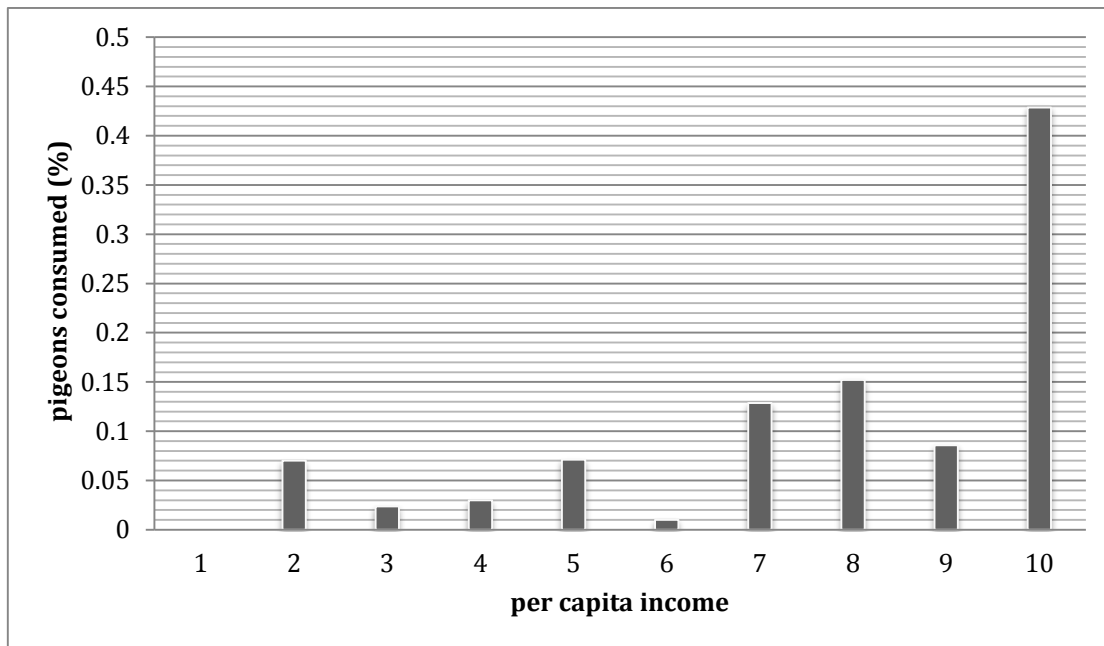


Figure 6. Percentage of native pigeons consumed in Samoa verses income ranked from 1 lowest- 10 highest income

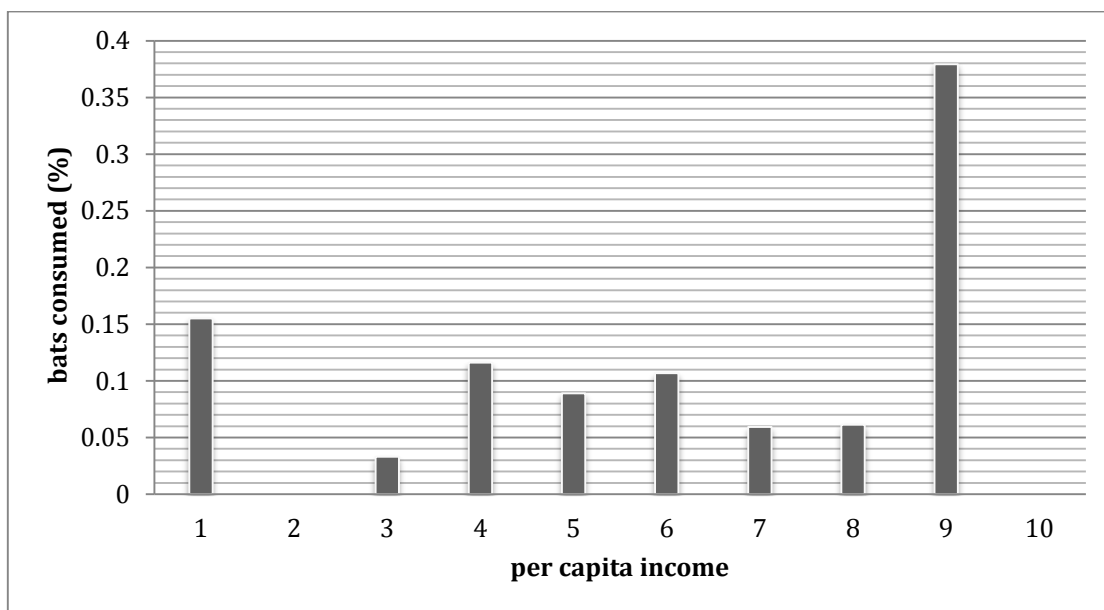


Figure 7. Percentage of native bats consumed in Samoa verses income ranked from 1 lowest- 10 highest income

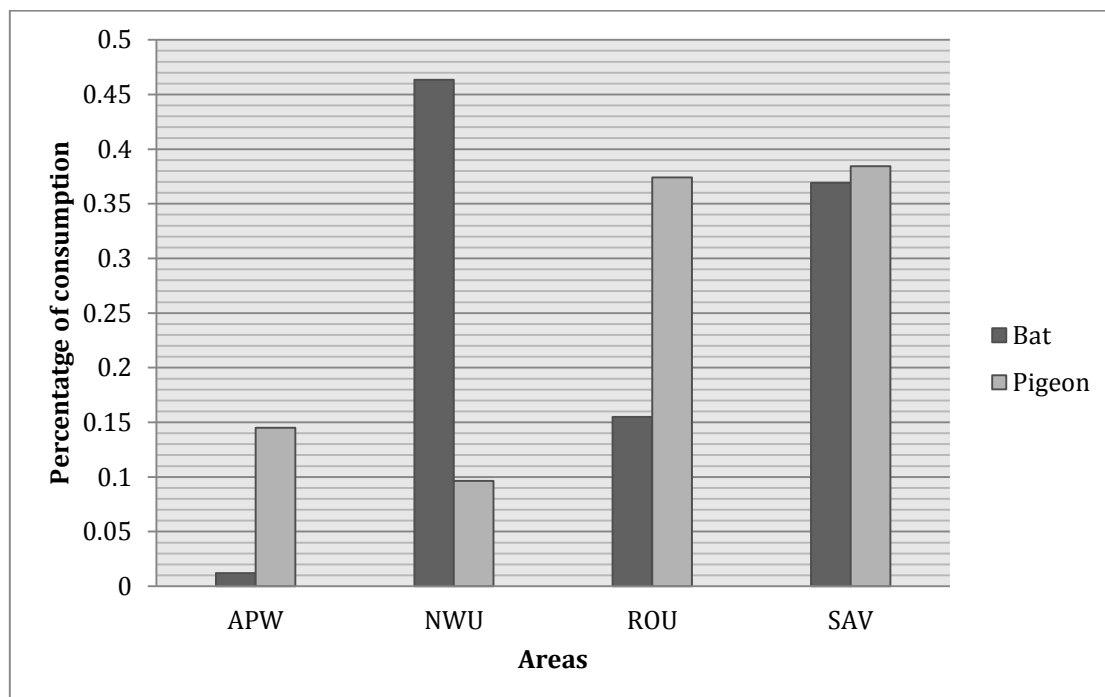


Figure 8. Consumption ranked by area (but with out taking into account population in each region) APW- is Apia the urban area.

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	x
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	x
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	yes
Have you completed the Project Expenditure table fully?	
Do not include claim forms or other communications with this report.	