

**REPORT ON THE  
BIODIVERSITY MONITORING  
ACTIVITY ON NUUTELE  
ISLAND, 6<sup>TH</sup> – 8<sup>TH</sup> AUGUST 2007.**

27<sup>th</sup> September 2007

*Prepared by:*

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Moeumu Uili (Terrestrial Conservation Officer)**

# REPORT ON THE BIODIVERSITY MONITORING ACTIVITY ON NUUTELE ISLAND, 6<sup>TH</sup> – 8<sup>TH</sup> AUGUST 2007.

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## 1. Introduction:

Nuutele Island hosts a diverse range of plant species, significant populations of land and seabirds, fruit bats, coconut crabs and turtles. It is a small island with a total land mass of about 108ha and located south east of Upolu Island at 1.8km off the Aleipata coast. It is an important offshore island on this part of Samoa because not only does it hold a diversity of species but one of the first islands to include or part of a Marine Protected Area. As a protected area it should be free of invasive species and destructive human activities and making sure that the island's uniqueness still remains.

This report explains the results of the monitoring work carried out on the dates as planned and coordinated by the Terrestrial Conservation Section (TCS) of the Division of Environment and Conservation (DEC). It shows updated information particularly on birds, plants and rats found on the island. It was necessary and important to implement this activity to check back the information recorded from the monitoring work that was carried out in 2000 and 2001 which was also organized by DEC. This report also contains monitoring of the pig populations on the island as there was work done to eradicate pigs before the rat eradication occurs.

The biodiversity monitoring exercise did not target all fauna such: as reptiles and insects but only targeted three components as mentioned above: rats, birds and plants. The results of this activity will help provide some knowledge on the status of the island biodiversity and the type of *Rattus* species that exists on the island, in order that strong evidence can be provided to proceed with the eradication which is proposed to happen next year, 2008.

The survey team consisted of 7 people: 4 staff, 1 National Parks & Reserve Casual and two Locals from the MPA Committee. They were all allocated to each activity as recorded below. Thanks also need to give out to these members who make this work possible and achievable.

**Team members:** Talie Foliga (*Team Leader - Birds/Plant Activity*)  
Susau Siolo (*Rat/Plant Activity*)  
Moeumu Uili (*Rat/Plant Activity*)  
Eti Malolo (*Birds/Plant Activity*)  
Manu Lesiva (*Plants/Rats Activity*)  
Natapu Tupalu (*Plant/Rat Activity*)  
Ioane Saili (*Plant/Rat Activity*)

The team left their places early at 5am on Monday morning and arrived at Nuutele Island at 9am. After a little break and sorting of camping spaces and materials the team started working by setting up the survey stations.

## **2. Objective:**

The main objectives of the survey are:

1. To monitor the distribution of rats on Nu'utele Island.
2. To confirm the species of rat found on the island
3. Monitor plant species diversity and distribution
4. Monitor bird species found on the island

## **3. Methodology:**

The survey stations as mentioned followed the birds stations that the bird survey team set up on the island during the friendly ground dove survey conducted in September 2005. We only found some labels of these previous birds' stations but not all. The stations (transect line) are 200m in length starting from Vini Beach side (about 20m from the camping site) up on the mountain along the trail and down Nuutele beach side and end up at a 1600m. There were 9 stations set up and everything was done on these stations.

The rat and wax plots started off at a distance of 20m on the first station (200m) unfortunately because of the limited numbers of rat traps we then decided to set up five traps and wax plots on the remaining stations (8). A total of 45 traps were set up along the 1600m transect on all stations on the island.

The plant plots and bird stations were also set up along this same transect at every 200m. There were 9 plant plots and so as the bird counts stations. Of the nine plant plots two were measured at a 10m x 10m whereas the rests were 20m x 20m area. The difference in sizes of the plant plots was a result of the not enough flagging tape available on the field to mark all the trees and the plots.

### **3.1 Birds**

The result of the current bird monitoring recorded 15 land birds and 8 seabirds from the island of Nuutele. There are more land birds recorded in this survey than the previous one of the same kind carried out on the island. Surprisingly, the number of seabirds decreases as compared to the 1998 lowland survey, which recorded 15 seabirds in total. Perhaps time and the duration of the survey are the factors behind population changes considering the fact that some of the seabirds are either vagrant or regular summer migrant species. One of the vagrant seabirds *Tala Great Crested Tern* (*Sterna bergii*) spotted two times on the summit on big trees like *alaa* (*Planchonella garberi*) and *talie* (*Terminalia catappa*). Few of the regular summer birds like *tuli: lesser golden plover* regularly sighted along Vini and Nuutele beaches. The rare and the most threatened ground doves were heard along the summit but were actually sighted two times at Nuutele coastal forest together with the remaining pigs. The wattle honeyeater seems to be the most abundant passerines, followed by the Samoan whistler, Polynesian and Samoan starlings. Survey data revealed the presence of the wattle honeyeaters in all the eight stations even within the areas that lack fruit trees for these birds. The pacific pigeon seems abundant mostly on the ridge slopes and

along the flat near Vini where trees like maota *Dysoxylum samoense*, mosooi *Cananga odorata*, maali *Canarium vitiense*, and magau *Garuga floribunda* are present. The asi, *Syzygium clusiifolium* flourished heavily along the summit but no pigeon recorded feeding on this species. The chickens were also present on the island mainly at Vini beach and surrounding area where they were previously domesticated by a single family of Ulutogia village. Unlike in the past visits, the chickens are now unfriendly to humans maybe as a result of the pig shooting operation early in 2007. There is no evidence of any harmful effect of the chickens on the island ecosystem apart from their aggressive digging habit that leads to soil exposition in few places. It is important to continue monitor not only the impact of domestic chickens but the status of birds from time to time.

### 3.2 Flora

The forest vegetation types of Nuutele Island falls under two main categories known as littoral and lowland forest categories. Littoral vegetation occurs mostly on narrow sandy beaches at Vini and Nuutele; where species whose presence and distribution are affected either directly or indirectly by sea. Plant species found in these areas are; littoral vines, most typically *Ipomea pes-caprae* (*fuemoa*), *Vigna marina* (*fuefuesina*) and *Lepturus repens*, a littoral grass. The *Chamaesyce chamissonis* (*pulutai*) is found in small patches near Vini beach however, this herb does not compete well with prostrate vines, possibly because they are covered over and shaded out by them.

Others refer to as littoral shrubland vegetation grows in association with sandy shore species include; *Pandanus tectorius* (*fasa*) *Scaevola taccada* (*toitoi*), *Dendrolobium umbellatum* (*laulala*), *Ficus scabra* (*mativao*), *Clerodendrum inerme* (*aloalotai*), *Tacca leontopetaloides* (*masoa*) and *Morinda citrifolia* (*nonu*). Two ferns *Asplenium nidus* (*laugapapa*), and *Phytosorus grossus* (*lauauta*) dominate the ground cover of the littoral shrubland but the former seems common in both areas.

Apart from coconut the most common littoral forest trees on the island are; *Barringtonia asiatica* (*futu*), *Terminalia catappa* (*talie*), *Pisonia grandis* (*puavai*), *Calophyllum inophyllum* (*fetau*), *Neiosperma oppositifolium* (*fao*), *Hernandia nymphaefolia* (*pua'a*) and *Erythrina variegata* (*gatae*). Less common species included here are: *Thespesia populnea* (*milo*), *Guetarda speciosa* (*puapua*), *Pandanus tectorius* (*fasa*), *Ficus scabra* (*mativao*), *Tournefortia argentea* (*tausuni*) and *Allophylus timoirensis*. At Vini area, the dominant tree tree was *Macaranga harveyana* (*laupata*) (see table 1.) which is a short-stature secondary tree. This is an indication of the disturbance caused by the two cyclones in 1990 and 1991. Without this disturbance, the forest would be dominated by *Terminalia catappa* (*talie*), *Calophyllum inophyllum* (*fetau*) and *Hibiscus tiliaceus* (*fau*). The floor of the littoral forest at Nuutele beach is typically open and easily traversed. Shrubs are virtually absent since those species adapted to littoral conditions are usually restricted to sunny forest margins. Ground cover is also minimal because of the dense shade of the canopy, the dry rocky or sandy soil, and the salty sea air. The dominant ground cover is typically *Asplenium nidus* (*laugapapa*) with a minimal population of *Psychotria insularum* (*matalafi*), and seedlings of littoral trees such as *Neiosperma oppositifolium* (*fao*), and *Barringtonia asiatica* (*futu*).

The lowland forest vegetation along the island ridges is dominated by a single species *Syzygium clusifolium* (*asivai*). Its dominance in both numbers and relative dominance (see Table. 4.5.6.7.) is indicative of the soil and weather suitability for the establishment of the said species. Large trees like *Canarium vitiense* maali, *Garuga floribunda* magau, *Cananga odorata* mosooi, *Terminalia catappa* talie, and *Inocarpus fagifer* ifi are common along the eastern and western ridge slopes where they were frequent by fruit bats. There are lesser number of ferns found on the island and the most common are the *Asplenium nudus* laugapapa and *Phytosorus grossus* lauauta. The *Asplenium* dominates the ground cover mostly at Vini area and along the western slopes. The said species is also found along the eastern slopes towards Nuutele but mostly scattered and sometimes appear in large pockets. The presence of this large fern is significant as nesting place for low flying birds like the friendly ground doves. On the summit and along the ridges the dominant species of plants are seedlings of big trees such as *Syzygium clusifolium* asivai, *Diospyros samoensis* anume, *Diospyros elliptica* auauli *Planchonella garberi* alaa, and *Terminalia catappa* talie. The most common shrub in almost every part of the island is *Aidia cochinchensis* olamea, a vigorous and durable woody species of the coastal and lowland forests.

### 3.3 Rats

Records from the last survey of rats carried out on the island in 2000/2001 by Ian Stringer and team indicated that only *Rattus exulans* is found on the island.

Since it is about 7 years now, DEC particularly the Terrestrial Conservation Section coordinating the Rat Eradication Operation has provided update information on this invasive species to establish its distribution and abundance on the island before the operation takes place, also to establish if any other species of *Rattus* is present on the island. Thus, the purpose of this survey as recorded in this report.

There were 45 death traps set up to capture rats, forty five wax blocks used as indicators to provide information on rat presence and absence.

Below is a table showing the activities that happened on the 45 traps and wax blocks.

**Figure 3.3.1 Summary of where Rats where found**

	Day - Checks 1	Day - Checks 2	Total
<b>Transect #</b>	1, 2, 3.	1, 2, 3.	
<b>Station #</b>	1.4, 1.6, 1.8, 2, 2.1, 2.2, 2.5	1.4, 1.5, 2.2, 2.5, 3.3	
<b>Block</b>	7	6	
<b>Trap</b>	7	6	
<b>Sex</b>	6 Female, 1 Male	5 Male, 1 Female	
<b>Species</b>	<i>Rattus exulans</i>	<i>Rattus exulans</i>	
<b>Total</b>			<b>13</b>

Analysis of the data collected showed that rats are present on the island but only on one side. The results identified that rats are only present on the Vini side from lowland and up close to the ridge (est. 500m). It is really hard to say a final

conclusion on the presence of rats all over the island as this monitoring only surveyed a part of Nuutele and there is still a need to establish more rat stations to provide a representative coverage of the island and by which will provide a strong results of the rat's presence and absence.

## **5. Recommendation**

- Consider the continuousness of this activity to make sure that there is adequate information to record the present situation of Nuutele island biodiversity before the actual eradication.
- Schedule some other monitoring at least within 2 months interval to confirm whether rats are only present along the western slope and Vini area.
- Suggest for the next monitoring to set traps along the southeast ridges of the island to ensure a good coverage of the area and provide more proof of rats presence/absence on these areas as the previous survey did not show any positive results
- Recommend another pig /chickens shooting operation for the remain culprits on the island
- It is recommendable to revisit permanent plant plots soon for the establishment of permanent corner pegs and demarcate them using spray paint.
- The permanent sample plots can be revisit in 3 – 5years time to monitor the changes in their physical appearance overtime
- Explore opportunity to capture and breed the very last population of the friendly ground dove before extinction.
- It is significant to re-schedule or redesign the baiting exercise/eradication based on the result of the later monitoring.
- Continue to include members of the MPA Aleipata in this survey for them to understand how much we care about our natural environment.

## Appendix

**Table 1: Nuutele Rat Monitoring Result**

Transect #	Station #	Time		Block		Trap		Sex	
		Check 1	Check 2	Check 1	Check 2	Check 1	Check 2	Check 1	Check 2
1	1.1	7:32	7:20	R	A, R	NA	NA		
	1.2	7:33	7:24	A	A, R	TNC	TNC		
	1.3	7:34	7:31	A, R	NA	TNC	TNC		
	1.4	7:37	7:32	A, R	R	R	R	F	M
	1.5	7:38	7:38	A	P.B	NA	R		M
	1.6	7:40	7:42	NA	A	R	R	F	M
	1.7	7:45	7:45	A, C	C	NA	NA		
	1.8	7:49	7:46	NA	A	R	NA	M	
	1.9	7:53	7:51	NA	A	NA	NA		
2	2	8:00	7:52	A	A	R	NA	F	
	2.1	8:03	7:56	A, R	NA	R	NA	F	
	2.2	8:06	7:59	R	A	R	R	F	F
	2.3	8:08	8:03	A, R	A	NA	NA		
	2.4	8:10	8:06	NA	A	NA	NA		
	2.5	8:24	8:12	R	A	R	R		M
3	3.1	8:28	8:16	NA	A	NA	NA	F	
	3.2	8:31	8:19	A	A	NA	NA		
	3.3	8:34	8:24	NA	NA	TNC	R		M
	3.4	8:42	8:30	NA	A	NA	C		
	3.5	8:43	8:33	NA	NA	NA	NA		
4	4.1	8:51	8:36	A	NA	NA	NA		
	4.2	8:52	8:38	NA	NA	NA	NA		
	4.3	8:53	8:41	NA	NA	C	NA		
	4.4	8:55	8:44	A	A	TNC	TNC		
	4.5	8:52	8:58	A	A	NA	NA		
5	5.1	9:00	9:15	NA	A	NA	TNC		
	5.2	9:02	9:17	NA	NA	NA	NA		
	5.3	9:03	9:19	NA	NA	NA	NA		
	5.4	9:04	9:20	NA	A	NA	NA		
	5.5	9:14	9:22	A	NA	NA	NA		
6	6.1	9:17	9:28	A	NA	NA	NA		
	6.2	9:18	9:23	NA	NA	NA	NA		
	6.3	9:20	9:31	A	NA	NA	NA		
	6.4	9:23	9:33	NA	NA	NA	NA		
	6.5	9:32	9:35	NA	R	NA	NA		
7	7.1	9:34	9:40	A	A, R	NA	NA		
	7.2	9:40	9:49	A	A	NA	NA		
	7.3	9:45	9:54	A	C, R	NA	NA		
	7.4	9:54	9:59	A	A	NA	NA		
	7.5	9:56	10:03	A	A	NA	NA		

8	8.1	9:59	10:06	A	A	NA	NA		
-	8.2	10:03	10:11	A	A	NA	NA		
-	8.3	10:05	10:14	A	C, A	NA	NA		
-	8.4	10:06	10:17	A, C	A, C	NA	NA		
-	8.5	10:09	10:28	A	A	NA	NA		

<b>Key:</b>	A	B	C	R	G	NA	U	TNC
	ant	bird	crab	rat	gone	no activity	unknown	trip no catch

**Table 2: Plant Monitoring Result**

Plot 1.

Size: 20 x 20m

Location: Nuutele Is

Bearing 150° Southeast

Elevation: 10m

Slope: 0°

Coordinates:

Distance: 0m

Scientific Name	Local Name	Field Measurement	Nearest 10 (cm)	Cross-sectional Area (cm <sup>2</sup> )	# of Trees
Macaranga harveyana	Laupapata	7.1	7	38	
		9	9	64	
		12.7	13	133	
		7.5	8	50	
		14.4	14	154	
		7	7	38	
		10.2	10	78	
		7.6	8	50	
		6	6	28	
		6.4	6	28	
		5.7	6	28	
		7.1	7	38	
		9.8	10	79	
		10.5	11	95	
		16.5	17	226	
		9.5	10	79	
		8.7	9	64	
		7.7	8	50	
		9.2	9	64	
		5.5	6	28	
		5.1	5	19	
		12.1	12	113	
		6.1	6	28	
		8.3	8	50	
		7.1	7	38	
		9.8	10	79	
		7.5	8	50	



		14.6	15	177	
		5.7	6	28	
		9.4	9	63	
		7.7	8	50	
		11	11	95	
		14.4	14	154	<b>33</b>
Cocos nucifera	Niu	29.5	30	707	
2		32.2	32	804	
3		25.4	25	491	
4		24	24	452	
5		23.1	23	415	
6		26.1	26	530	<b>6</b>
Flueggea flexuosa	Poumuli	34.6	37	1074	<b>1</b>
<b>Total Basal Area</b>				<b>6829</b>	<b>40</b>

**Table 2.1: Plant Monitoring Result**

Plot.2.

Size: 20 x 20m

Location: Vini Beach

Bearing: 105

Elevation 135m asl

Slope: 0°

Coordinates: 0761810-5444893

Distance: 200m

Scientific Name	Local Name	Field Measurement (cm)	Nearest 10 (cm)	Cross-Sectional Area (cm <sup>2</sup> )	# of Trees
Kleinhova hospita	Fuafua	35.5	36	1017	
		24.4	24	452	
		13.4	13	133	
		15.2	15	177	
		23.2	23	415	
		25.8	26	531	
		14.6	15	177	
		30.7	31	754	
		52.2	52	2123	
		16	16	201	
		31	31	754	
		22.3	22	380	
		7	7	38	
		33.5	34	907	
		17	17	227	15
Macaranga harveyana	Laupapata	36.8	37	1075	
		26.4	26	531	2
Garuga floribunda	Magau	8.8	9	64	
Disoxylum samoense	Maota mamala	18.3	18	254	
		28.1	28	615	
		29.3	29	660	
		22.7	23	415	
		30	30	707	5
Psychotria insularum	Matalafi	5	5	20	

		6.2	6	28	2
Cocos nucifera	Niu	32.4	32	804	1
Sterculia fanaiho	Fanaio	9	9	64	
		14.5	15	177	
		5.3	5	20	
		43.9	44	1519	4
<b>TOTAL BASAL AREA</b>				<b>15239</b>	<b>29</b>

**Table 2.3: Plant Monitoring Result**

Plot.3.

Plot Size: (10 x 10m)

Location: Nuutele Is

Bearing: 50°

Elevation: 135m asl

Slope: -28°

Coordinate: 0761998 - 5444802

Distance: 400m

Scientific Name	Local Name	Field Measurement (cm)	Nearest 10 (cm)	Cross-sectional Area (cm <sup>2</sup> )	# of Trees
Myristica fatua	Atone	8.2	8	50	
		10.3	10	79	
		8.6	9	64	
		9.6	10	79	
		8.2	8	50	
		17.4	17	227	6
Kleinhova hospita	Fuafua	17.8	18	254	
		37.1	37	1075	
		23	23	401	
		9.3	9	64	4
Sterculia fanaiho	Fanaio	8.2	8	50	1
Garuga floribunda	Magau	5.2	5	20	1
<b>Total Basal Area</b>				<b>2413</b>	<b>12</b>

**Table 2.4: Plant Monitoring Result**

Plot. 4.

Size: 10 x 10m

Location Nuutele Is

Bearing: 223°

Elevation: 194m asl

Slope: -1° (top of the ridge)

Coordinates: 0762076 - 5444734

Distance: 600m

Scientific Name	Local Name	Field Measurement (cm)	Nearest 10 (cm)	Cross-sectional Area (cm <sup>2</sup> )	# of trees
Syzygium clusifolium	Asivai	7.9	8	50	
		11.2	11	95	
		26.1	26	531	
		25.9	26	95	
		6.2	6	28	

		14.1	14	154	
		6.6	7	38	
		6.2	6	28	
		13.3	13	133	
		13.5	13	133	10
Diospyro eliptica	Auauli	16.6	17	227	1
Neiosperma oppositifolium	Fao	13.2	13	133	
		16.9	17	227	2
Planchonella	Alaa	18	18	254	
		6.2	6	28	
		8	8	50	
		23.8	24	452	4
Hibiscus tiliaceus	Fau	48.4	48	615	
		11.8	12	113	
		15.4	15	177	
		10.5	11	95	4
Diospyros samoense	Anume	5.5	6	28	1
Myristica	Atone	7.5	8	50	1
	Olamea	5.1	5	20	1
<b>Total Basal Area</b>				<b>3754</b>	<b>24</b>

**Table 2.5: Plant Monitoring Result**

**Plot.5.**

**Size: 20 x 20m**

**Location: Nuutele Is**

**Bearing: 234°**

**Elevation: 185m asl**

**Slope:-14°**

**Coordinates: 0762199 - 5444847**

**Distance: 800m**

Species	Local Name	Field Measurement (cm)	Nearest 10 (cm)	Crosssectional Area (cm <sup>2</sup> )	#of trees
Syzygium clussifolium	Asivai	10.8	11	95	
		22.4	22	379	
		14.2	14	153	
		12.2	12	113	
		5.5	5	19	
		15.3	15	176	
		9.2	9	63	
		6.2	6	28	
		8.7	9	63	
		14	14	153	
		19.7	20	314	
		5.2	5	19	
		5	5	19	13
Planchonell garberi	Alaa	6.4	6	28	1
Neiosperma oppositifolium	Fao	12.3	12	113	1
Kleinhovia hospita	Fuafua	5.3	5	19	1
Hibiscus tiliaceus	Fau	13.5	13	124	
		16.4	16	200	

		9	9	63	3
Diospyros samoensis	Anume	12.5	12	113	
		19.5	19	283	2
<b>Total Basal Area</b>				<b>2537</b>	<b>21</b>

**Table 2.6: Plant Monitoring Result**

Plot: 6.

Size: 20 x 20m

Location: Nuutele Is

Bearing: 154°

Elevation: 160m

Slope: -20°

Coordinates: 0762386 - 5444912

Distance: 1000m

Species	Local Name	Field Measurement (cm)	Nearest 10	Crosssectional Area (cm <sup>2</sup> )	# of trees
Diospyros samoensis	Anume	8.9	9	63	
		9.8	10	78	
		29	29	660	
		5.4	5	19	
		6.6	7	38	
		6.1	6	28	6
Diospyros elliptica	Auauli	23.5	23	415	
		13.9	14	153	
		17.5	17	226	
		26.9	27	42	
		18.1	18	254	
		20.2	20	314	
		5.2	5	19	
		21.2	21	346	
		7.4	7	38	9
Terminalia catappa	Talie	65.8	66	3419	
		27.5	27	572	2
Syzygium clusifolium	Asivai	5.8	6	28	
		8.4	8	50	
		5.2	5	19	
		9.6	10	78	
		7.8	8	50	
		8.8	9	63	
		9.4	9	63	
		12.2	12	113	
		7.8	8	50	
		5.5	5	19	
		5.8	6	28	
		15.6	16	200	
		8.4	8	50	
		21.5	21	346	
		8.4	8	50	
		9.1	9	63	

		6.6	7	38	
		10.4	10	78	
		5.8	6	28	
		13.8	14	153	
		7.4	7	38	
		5.8	6	28	
		7.2	7	38	
		6.6	7	38	
		5.5	5	19	
		7	7	38	
		7	7	38	
		17.4	17	226	
		7.9	8	50	
		8.7	9	63	
		7.7	8	50	
		8.4	8	50	
		8.3	8	50	
		14	14	153	
		5.4	5	19	
		9.4	9	63	
		11.6	12	113	
		9.6	10	78	
		16	16	200	
		6.1	6	28	
		8	8	50	
		9.2	9	63	
		5.7	6	28	
		7.9	8	50	
		7.4	7	38	
		6.8	7	38	
		8.4	8	50	
		6.6	7	38	
		5.2	5	19	
		7.5	7	38	
		21	21	346	
		11.3	11	94	
		12.1	12	113	
		5.8	6	28	
		5.6	6	28	
		8.1	8	50	56
<i>Psychotria insularum</i>	Matalafi	7.1	7	38	
		5.4	5	19	
		5.5	5	19	3
<i>Inocarpus fagifer</i>	Ifi	45.4	45	1589	
		42.4	42	1384	
		16.5	16	200	3
<i>Sterculia fanaio</i>	Fanaio	10.6	11	94	1
<i>Planchonella garberi</i>	Alaa	10.5	10	78	
		12.5	12	113	2
<i>Neiospermum oppositifolium</i>	Fao	9.4	9	63	1
<i>Aidia cochinchinensis</i>	Olamea	6	6	28	1

Total Basal Area				14327	84
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**Table 2.7: Plant Monitoring Result**

Plot. 7. Elevation: 118m asl  
 Size: 20 x 220m Slope: 33°  
 Location: Nuutele Is Coordinates: 0762530 - 5444890  
 Bearing: 50° Distance: 1200m

Species	Local Name	Field Measurement (cm)	Nearest 10 (cm)	Crossectional Area (cm <sup>2</sup> )	# of trees
Syzygium clusifolium	Asivai	9.2	9	63	
		15.6	16	200	
		5.7	6	28	
		6.1	6	28	
		15	15	176	
		23.4	23	415	
		5.5	5	19	
		11.2	11	94	
		5.5	5	19	
		6.7	7	38	
		7.9	8	50	
		16.1	16	200	
		6.1	6	28	
		6.6	7	38	
		22.3	22	379	
		6.7	7	38	
		6.3	6	28	
		7.5	7	38	
		8.8	9	63	
		5.2	5	19	
		17.3	17	226	
		5.4	5	19	
		5.6	6	28	
		6.6	7	38	
		7.7	8	50	
		5	5	19	
		7.8	8	50	
		5.4	5	19	
		23.2	23	415	
		5.7	6	28	
		5.6	6	28	
		18.2	18	254	
		9.2	9	63	
		15.6	16	200	
		11.4	11	94	
		5.5	5	19	
		7.1	7	38	

		6.3	6	28	
		6.2	6	28	
		13	13	132	
		5.5	5	19	
		11.2	11	94	
		15	15	176	
		5.5	5	19	
		8.4	8	50	
		14.2	14	153	
		11.6	12	113	
		9	9	63	48
Diospyros samoensis	Anume	8.7	9	63	
		8.9	9	63	
		22	22	379	
		18.1	18	254	
		21	21	346	5
Diospyros elliptica	Auauli	7.7	8	50	1
Inocarpus fagifer	Ifi	36.5	36	1017	
		38.5	38	1133	
		18.8	19	283	3
Planchonella garberi	Alaa	24.8	25	490	1
Hibiscus tiliaceus	Fau	5.6	6	28	1
Ficus prolixa	Aoa	77.5	77	4654	1
Disoxylum samoense	Maota	22.7	23	415	
		21.6	22	379	
		67	67	3523	
		41.1	41	1319	4
Polycias sp	Tagitagivao	7.3	7	38	1
Sterculia fanaiho	Fanaio	10.4	10	78	1
				<b>18936</b>	<b>66</b>

**Table 2.8: Plant Monitoring Result**

**Plot. 8.**

**Size: 20 x 20m**

**Loction: Nuutele Is**

**Bearing: 240°**

**Elevation: 35m asl**

**Slope: 31°**

**Coordinates: 0762622 - 5444758**

**Distance: 1400m**

Species	Local Name	Field Measurement (cm)	Nearest 10 (cm)	Crossectional Area (cm <sup>2</sup> )	# of trees
		24.9	25	490	
		22.5	22	379	
		20	20	314	3
Barringtonia asiaticas	Futu	9.7	10	78	
		16.8	17	226	
		10.7	11	94	
		22.5	22	379	
		13.1	13	132	

		23.4	23	415	
		19.9	20	314	
		13.7	14	153	
		22	22	379	
		14.6	15	176	
		15.7	16	200	
		25.4	25	490	
		14.7	15	176	
		9.9	10	78	
		14.7	15	176	
		6	6	28	
		24.3	24	452	
		18.1	18	254	
		28	28	615	
		20.9	21	346	
		15.3	15	176	
		30.6	31	754	
		24.4	24	452	
		20.3	20	314	
		6	6	28	
		45	45	1589	
		13	13	132	
		7.5	7	38	
		11.1	11	94	
		6.5	6	28	
		7.3	7	38	
		10.5	10	78	
		13.9	14	153	
		12.3	12	113	
		8.5	8	50	
		10.4	10	78	
		10.9	11	94	
		8.4	8	50	
		6.1	6	28	
		11.1	11	94	
		18.4	18	254	
		34.4	34	907	
		32	32	803	43
<i>Terminalia catappa</i>	Talie	17.9	18	254	
		15.4	15	176	
		13.8	14	153	
		13	13	132	
		36	36	1017	
		67.1	67	3523	
		47.3	47	1734	
		47	47	1734	8
<i>Macaranga haveyi</i>	Laupata	10	10	78	1
<i>Neiospermum oppositifolium</i>	Fao	5.7	6	28	
		6.3	6	28	
		11.1	11	94	
		17.8	18	254	



		7.8	8	50	5
<b>Total Basal Area</b>				<b>21944</b>	<b>60</b>

**Table 2.9: Plant Monitoring Result**

**Plot. 9.**

Size: 20 x 20m

Location: Nuutele Is

Bearing: 248<sup>2</sup>

**Elevation: 12m asl**

Slope: 0°

Coordinates: 0762604 - 5444600

Distance: 1600m

Species	Local Name	Field Measurement (cm)	Nearest 10 (cm)	Crossectional Area (cm <sup>2</sup> )	# of trees
<b>Pisonia grandis</b>	Puavai	17	17	226	
		7	7	38	
		14.5	14	153	3
<b>Kleinhovia hospita</b>	Fuafua	31	31	754	1
<b>Barringtonia asiatica</b>	Futu	9	9	63	
		6	6	28	
		7	7	38	
		9	9	63	
		6	6	28	
		7	7	38	
		8	8	50	
		6	6	28	
		12.1	12	113	
		5.8	6	28	
		5.9	6	28	
		5.9	6	28	
		9.6	10	78	
		17.6	18	254	
		7.85	8	50	
		14.8	15	176	16
<b>Disoxylum samoense</b>	Maota	20	20	314	
		16.7	17	226	
		22.6	23	415	
		22.2	22	379	
		14.4	14	153	
		7.8	8	50	6
<b>Garuga floribunda</b>	Magai	24	24	452	
		15	15	176	
		12.6	13	132	
		6.4	6	28	
		18	18	254	
		23.7	24	452	
		27.1	27	572	7
<b>Ficus scabra</b>	Mativao	6	6	28	
		6	6	28	
		6.8	7	38	

		10.2	10	78	
		8.1	8	50	
		6.85	7	38	
		11.95	12	113	
		14.2	14	153	
		13.65	14	153	9
Morinda citrifolia	Nonu	5.8	6	28	
		5.6	6	28	
		11.25	11	94	
		6.9	7	38	4
Cocos nucifera	Niu	27	27	572	1
Sterculia fanaiho	Fanaio	12.35	12	113	1
Allophyllus timoriensis		5	5	19	1
Neiospermum oppositifolium	Fao	14.5	14	153	
		16	16	200	
		10.5	10	78	
		16.8	17	226	
		8.25	8	50	
		11.6	12	113	
		19.2	19	283	
		17.5	17	226	
		5.6	6	28	
		13.9	14	153	
		12.6	13	132	
		6.65	7	38	
		5.8	6	28	13
Guettarda speciosa	Puapua	6.5	6	28	1
Polycias sp	Tagitagivao	6.4	6	28	1
Erythrina variegata	Gatae	19.85	20	314	1
Psychotria insularum	Matalafi	7	7	28	1
Hibiscus tiliaceus	Fau	8	8	50	1
Hernandia	Pua	13.3	13	132	1
<b>Total Basal Area</b>				<b>9724</b>	<b>68</b>

**Summary of Plants Survey Results:**

**Nuutele Plot 1. Table.1**

<b>Species</b>	<b>Samoan Name</b>	<b>Number of Trees</b>	<b>Total Basal Area</b>	<b>Relative Dominance</b>
Macaranga haveyana	Laupata	33	2356	34%
Cocos nucifera	Niu	6	3399	49%
Flueggea flexuosa	Poumuli	1	1074	15%
		<b>40</b>	<b>6829</b>	

**NUUTELE PLOT 2. Table 2.**

<b>Species</b>	<b>Samoan Name</b>	<b>Number of Trees</b>	<b>Total Basal Area</b>	<b>Relative Dominance</b>
Kleinhovia hospita	Fuafua	15	8286	54%
Macaranga harveyana	Laupata	2	1606	10%
Garuga floribunda	Magai	1	64	0.4%
Disoxylum samoense	Maota	5	2651	17%
Psychotria insularum	Matalafi	2	48	0.3%
Cocos nucifera	Niu	1	804	5%
Sterculia faniho	Fanaio	4	1780	11%
		<b>30</b>	<b>15239</b>	

**NUUTELE PLOT 3. Table 3**

<b>Species</b>	<b>Samoan Name</b>	<b>Number of Trees</b>	<b>Total Basal Area</b>	<b>Relative Dominance</b>
Myristica fatua	Atone	6	549	3%
Kleinhovia hospita	Fuafua	4	1794	11%
Sterculia fanaiho	Fanaio	1	50	0.3%
Garuga floribunda	Magai	1	20	0.1%
		<b>12</b>	<b>2413</b>	

**NUUTELE PLOT 4. Table 4**

<b>Species</b>	<b>Samoan Name</b>	<b>Number of Trees</b>	<b>Total Basal Area</b>	<b>Relative Dominance</b>
Syzygium clusiifolium	Asivai	10	1285	8%
Diospyros elliptica	Auauli	1	227	1%
Neiospermum oppositifolium	Fao	2	360	2%
Hibiscus tiliaceus	Fau	4	1000	6%
Diospyros samoensis	Anume	1	28	0.1%
Myristica fatua	Atone	1	50	0.3%
Aidia cochinchinensis	Olamea	1	20	0.1%
		<b>20</b>	<b>2970</b>	

NUUTELE PLOT 5. Table 5

Species	Samoan Name	Number of Trees	Total Basal Area	Relative Dominance
<i>Syzygium clusiifolium</i>	Asivai	13	1594	10%
<i>Planchonella garberi</i>	Alaa	1	28	0.1%
<i>Neiospermum oppositifolium</i>	Fao	1	113	0.7%
<i>Kleinhovia hospita</i>	Fuafua	1	19	0.1%
<i>Hibiscus tiliaceus</i>	Fau	3	387	2%
<i>Diospyros elliptica</i>	Anume	2	396	2%
		<b>21</b>	<b>2537</b>	

NUUTELE PLOT 6. Table 6

Species	Samoan Name	Number of Trees	Total Basal Area	Relative Dominance
<i>Diospyros samoensis</i>	Auauli	6	886	5%
<i>Diospyros elliptica</i>	Anume	9	1807	11%
<i>Terminalia catappa</i>	Talie	2	3991	26%
<i>Syzygium clusiifolium</i>	Asivai	56	4018	26%
<i>Psychotria insularum</i>	Matalafi	3	76	0.4%
<i>Inocarpus fagifer</i>	Ifi	3	3173	20%
<i>Sterculia fanaiho</i>	Fanaio	1	94	0.6%
<i>Planchonella garberi</i>	Alaa	2	191	1%
<i>Neiospermum oppositifolium</i>	Fao	1	63	0.4%
<i>Aidia cochinchensis</i>	Olamea	1	28	0.1%
		<b>84</b>	<b>14327</b>	

NUUTELE PLOT 7. Table 7

Species	Samoan Name	Number of Trees	Total Basal Area	Relative Dominance
<i>Syzygium clusiifolium</i>	Asivai	48	4424	29%
<i>Diospyros elliptica</i>	Anume	5	1105	7%
<i>Diospyros samoensis</i>	Auauli	1	50	0.3%
<i>Inocarpus fagifer</i>	Ifi	3	2433	15%
<i>Planchonella garberi</i>	Alaa	1	490	3%
<i>Hibiscus tiliaceus</i>	Fau	1	28	0.1%
<i>Ficus prolixa</i>	Aoa	1	4654	30%
<i>Disoxylum samoense</i>	Maota	4	5636	36%
<i>Polyscias</i> sp	Tagitagivao	1	38	0.2%
<i>Sterculia fanaiho</i>	Fanaio	1	78	0.5%
		<b>66</b>	<b>18936</b>	

NUUTELE PLOT 8. Table 8

Species	Samoan Name	Number of	Total Basal Area	Relative Dominance
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**Trees**

<i>Cocos nucifera</i>	Niu	3	1183	7%
<i>Barringtonia asiatica</i>	Futu	43	11506	75%
<i>Terminalia Catappa</i>	Talie	8	8723	57%
<i>Macaranga harveyana</i>	Laupata	1	78	0.5%
<i>Neiospermum oppositifolium</i>	Fao	5	454	2%
		<b>60</b>	<b>21944</b>	

**NUUTELE PLOT 9. Table 9**

<b>Species</b>	<b>Samoan Name</b>	<b>Number of Trees</b>	<b>Total Basal Area</b>	<b>Relative Dominance</b>
<i>Pisonia grandis</i>	Puavai	3	417	2%
<i>Kleinhovia hospita</i>	Fuafua	1	754	4%
<i>Barringtonia asiatica</i>	Futu	16	1091	7%
<i>Disoxylum samoense</i>	Maota	6	1537	10%
<i>Garuga floribunda</i>	Magau	7	2066	13%
<i>Ficus scabra</i>	Mativao	9	679	4%
<i>Morinda citrifolia</i>	Nonu	4	188	1%
<i>Cocos nucifera</i>	Niu	1	572	3%
<i>Sterculia faniho</i>	Fanaio	1	113	0.7%
<i>Allophylus timoriensis</i>		1	19	0.1%
<i>Neiospermum oppositifolium</i>	Fao	13	1708	11%
<i>Guetarda speciosa</i>	Puapua	1	28	0.1%
<i>Polyscias sp</i>	Tagitagivao	1	28	0.1%
<i>Erythrina variegata</i>	Gatae	1	314	2%
<i>Psychortria insularum</i>	Matalafi	1	28	0.1%
<i>Hibiscus tiliaceus</i>	Fau	1	50	0.3%
<i>Hernandia</i>	Pua	1	132	0.8%
		<b>68</b>	<b>9724</b>	