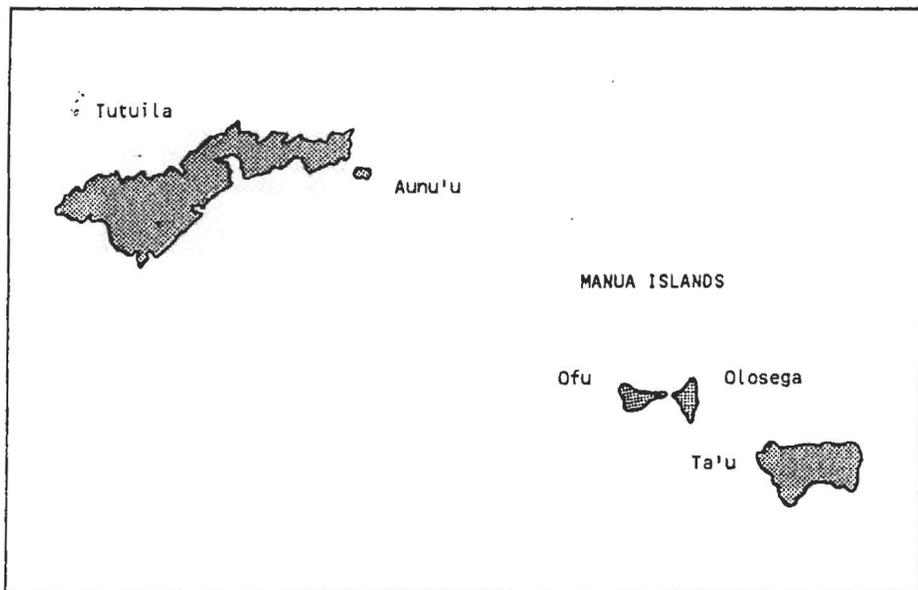


A 1986 SURVEY OF THE FOREST BIRDS
OF
AMERICAN SAMOA



FISH AND WILDLIFE SERVICE

DEPARTMENT OF INTERIOR

1989

A 1986 SURVEY OF THE FOREST BIRDS
OF
AMERICAN SAMOA

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This study was conducted
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U.S. FISH AND WILDLIFE SERVICE

Department of the Interior

DISCLAIMER

The opinions and recommendations expressed in this report are those of the authors and do not necessarily reflect the views of the U.S. Fish and Wildlife Service, unless so designated by other authorized documents.

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A 1986 SURVEY OF THE FOREST BIRDS
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INTRODUCTION

The U.S. Fish and Wildlife Service has initiated two major surveys of terrestrial communities in American Samoa. The first of these began in the early 1970's, when a contract to survey wildlife and wildlife habitat was awarded to Environment Consultants, Inc., of Dallas, Texas. Field work for the project was conducted in 1975-76. The objectives of the survey were to 1) define the major ecological plant communities; 2) to prepare maps of these communities; 3) to describe the roles of disturbance and succession as determinants of the existing plant and animal communities; 4) to identify threatened or endangered species; and, 5) to provide management recommendations and describe future research needs. Results of this survey were published by the Fish and Wildlife Service in a two-volume report (Amerson et al. 1982).

The 1975-76 Samoa survey provided a wide spectrum of ecological data that was previously unavailable or was widely scattered in the scientific literature. Because of the general nature of the survey it was not possible to obtain large sample sizes for specific taxa. In 1986, the U.S. Fish and Wildlife Service, in cooperation with the American Samoan Office of Marine and Wildlife Resources, conducted a survey designed specifically for native forest birds. The field methods and data analysis methods used had been developed during forest bird surveys recently completed elsewhere in the Pacific (Engbring et al. 1982, Engbring and Ramsey 1984, Scott et al. 1986). These methods allowed us to collect larger sample sizes than was possible in 1975-76 and to apply current, powerful programs to analyze survey data.

Objectives of the 1986 survey were to: 1) survey forest birds on each of the major islands and to calculate densities in various habitat types and at various elevational zones; 2) collect incidental information on seabirds, waterbirds, introduced species, and migratory birds; 3) compare results of the 1986 survey to the 1975-76 survey and to identify and analyze population trends; 4) identify species that are threatened or endangered and the factors responsible for causing the endangered status; and, 5) to provide management recommendations.

SETTING

American Samoa is an unincorporated Territory of the United States administered by the U.S. Department of the Interior. It is located in the South Pacific at about 14° S., 170° W., and comprises seven main islands: Tutuila, Aunu'u, Ofu, Olosega, Ta'ū, Swains, and Rose (Table 1 and Figure 1). Access is via the international airport on Tutuila; small commuter airports are located on Ofu and Ta'ū. About 32,000 people live in American Samoa. Six islands are inhabited except Rose. Tutuila, with nearly 75% of the land area, is the governmental and population center. Aunu'u, readily accessed by boat from Tutuila, is an islet 2 km off the southeast coast of Tutuila. Ofu, Olosega, and Ta'ū, commonly referred to as the Manu'a group, are located about 100 km east of Tutuila. Ofu and Olosega are separated by a narrow channel, now spanned by a bridge. Swains is an inaccessible islet located north of Tutuila; only a few families have lived here in recent years and at times has been uninhabited. Rose is an isolated atoll located in far eastern Samoa.

With the exception of Swains and the small uninhabited island of Rose, the islands are "high" volcanic islands and are steep and rugged. The highest point, 965 m, is on Ta'ū. Total land area of American Samoa is 197 sq. km. Geography, geology, soils, climate, land use, scientific history, the biological environment, and demographics are discussed by Amerson et al. (1982) and Wingert (1981).

Table 1. Characteristics of major islands in American Samoa (Wingert 1981, Amerson et al. 1982). At the closest points, Tutuila is about 67 km from Apolua, Western Samoa.

	Area (sq. km)	Maximum elevation (m)	Population in 1980	Distance from Pago Pago, Tutuila (km)
Tutuila	141.97	653	30,212	-
Ta'ū	38.72	965	1,146	146
Ofu	6.56	494	340	123
Olosega	4.81	639	254	126
Swains	3.26	9	30 (est.)	443
Aunu'u	1.46	88	414	14
Rose Island	.04	3	0	326
Total	196.82		32,396	

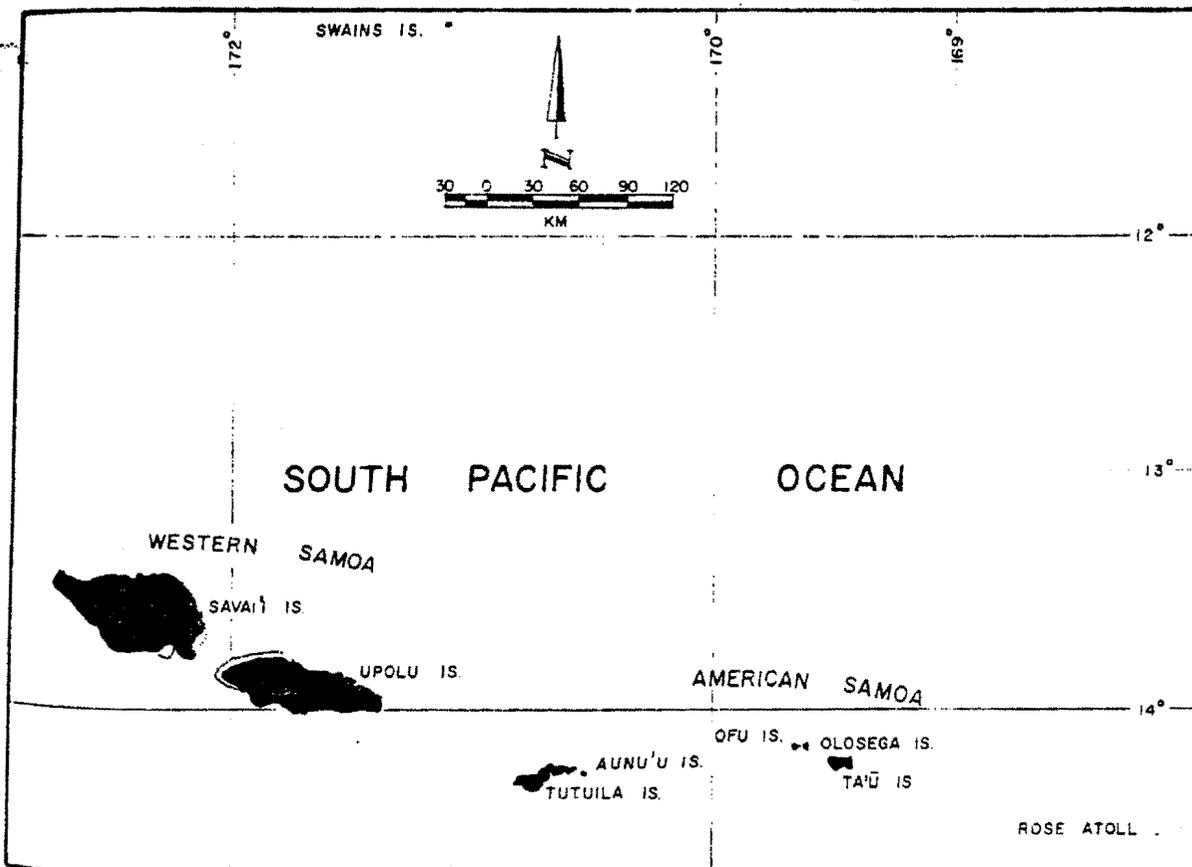
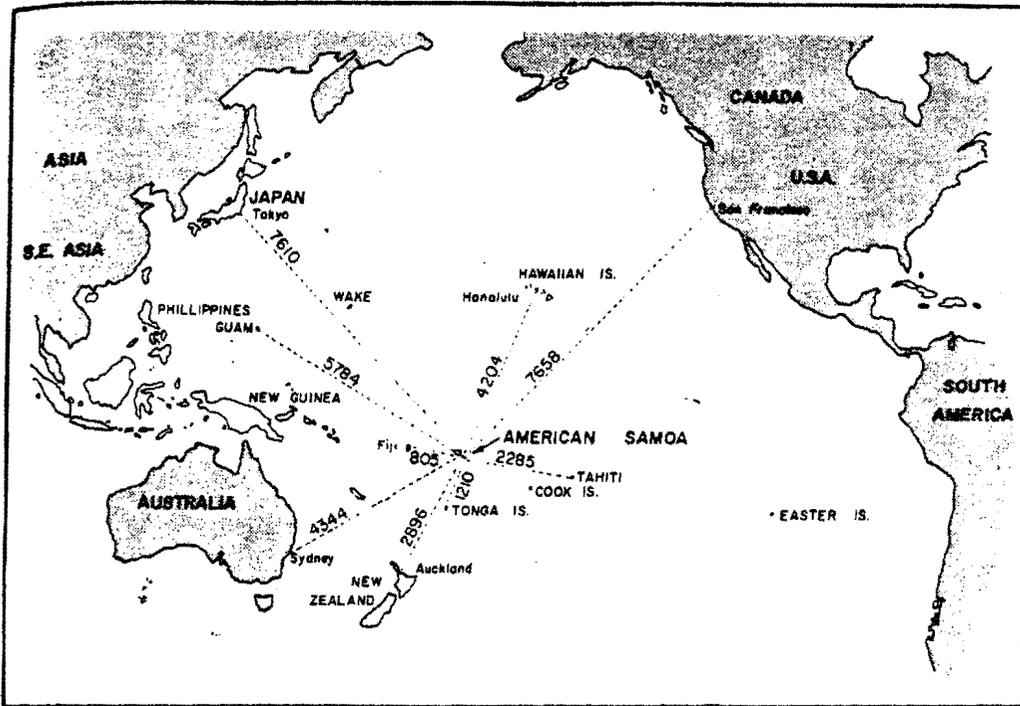


Figure 1. America Samoa and its location in the Pacific. General location (above) and Samoan Archipelago (below). Distances to other locations are in km. Figures from Amerson et al. (1982).

CLIMATE

Samoa is within the tropics and is warm and humid. The annual average temperature is about 23° C and there is little annual or daily variation. Yearly rainfall averages about 340 cm at the airport on Tutuila, but this varies greatly depending on location (Wingert 1981, Amerson et al. 1982). On the upper ridges of Tutuila rainfall is 750 cm annually, and in the cloud forest on Ta'ū it may exceed 1,000 cm per year (Amerson et al. 1982). Prevailing winds throughout the year are the easterly tradewinds.

VEGETATION

The natural vegetation consists of tropical rain forest which is characterized by tall, broadleaf, evergreen trees, abundant woody vines, and ubiquitous epiphytes (Amerson et al. 1982). Within this broad classification are a number of plant communities that reflect differences in slope, elevation, microclimate, soil type and exposure to salt water. Amerson et al. (1982) describe 13 different plant communities. The most extensive of these include cultivated land (40% of all land, consisting mostly of agroforest), rain and ridge forest (26%), and secondary forest (20%).

METHODS

STUDY AREA

The study area consisted of the four largest islands, Tutuila, Ofu, Olosega, and Ta'ū (Figures 2-4). With the exception of the Tafuna Plain on Tutuila, each of these islands in its entirety was used in estimating population sizes of birds. The Tafuna Plain, about 23 sq. km in size, is primarily a residential and industrial area with few forest birds. In addition to surveying these four islands, we visited Aunu'u. Here we resurveyed four study plots established by Amerson et al. (1982).

VARIABLE CIRCULAR PLOT METHOD

The variable circular plot method (Ramsey and Scott 1979, Reynolds et al. 1980) was used in the survey. This method was developed to determine density of terrestrial vertebrates in structurally complex vegetation types with rugged terrain. The method consists of marking stations ("points") along transects in the study area and conducting counts at each station. During each count all birds heard or seen and their lateral distance from the observer are recorded. The data are analyzed by determining an effective detection distance (or area) for each species, and ultimately calculating densities (Ramsey and Scott 1981). In calculating densities, adjustment factors are incorporated for differences among observers and for differences

in the detectability of birds at each station. Population sizes are calculated by multiplying densities by the study area size.

Transects and stations were marked with the use of a compass and a hip chain. Stations were placed every 150 m apart along each transect and 8-minute counts were conducted at each station. Each station was surveyed simultaneously by two observers who were separated by a distance of 20 m (for purposes of data analysis these were not considered to be independent samples). Counts began at sunrise and, with the exception of a few early afternoon counts on Ta'ū, lasted for up to 5 hours after sunrise. Counts were made under favorable weather conditions; i.e., little or no rain and wind usually less than 4 on the Beaufort scale.

Selection of Transects

Transects were chosen and marked on maps prior to the survey. With many steep, impassable ridges throughout the interior of most islands, it was not feasible to select transects in a completely random fashion. Rather, islands were divided into various habitat types and elevational zones, and transects were then selected through areas with a maximum of a 25 degree slope. The transects chosen provided coverage of cloud forest, ridge and rain forest, secondary forest, and coastal forest in approximate relation to their relative areas. Stations were also placed in agroforest on plantation land, but at a lower density than in the other habitat types surveyed.

In addition to the transects selected for the survey, a number of study plots established by Amerson et al. (1982) were resurveyed. This allowed us to directly compare our results with those obtained by Amerson et al. (1982).

Analysis of Data

Different variables were incorporated into the calculation of effective detection areas for each species. To determine which variables were to be used in the effective area calculations we examined scatter plots of each of several variables against the logs of the effective detection area for each species. Variables examined included the observer, time of day, visibility from the station, slope, weather (cloud cover and rain), and sound-modifying features at each station.

Where possibly important variables were identified by scatter plots, a model was fit by multiple linear regression of the log of the effective detection area on the environmental factors and on observer indicators (see Ramsey et al. 1987). The square of the hour variable was included in the analysis. Those factors not contributing significantly were dropped from the model. Thus, each model contains only factors which are significant for that species.

Model parameters were then used to adjust detection areas. The adjusted detection areas were used in a non-parametric estimation procedure for determining effective area surveyed under standard conditions (Wildman and

Ramsey 1985). Densities were then calculated for each station. Densities calculated for the two observers at each station were averaged to determine the final density at each station.

To better identify distribution and general habitat preferences, densities and population estimates were calculated for several different regions, elevational zones, and habitat types (see tables in the Appendix). On Tutuila, which is a long, narrow island, densities were calculated for three different regions, a West, Central, and East region (Figure 2). On Ta'ū, densities were calculated separately for Liu Bench, a unique and inaccessible forest on the southern portion of the island (Figure 4).

SURVEY SCHEDULE AND PARTICIPANTS

Scoping for the survey was conducted 21-29 June 1985 by F. Ramsey and J. Engbring, and the survey was conducted 19 June to 28 July 1986. The survey team, consisting of J. Engbring, Celestino Aguon, Philip Ashman, and Peter Pyle spent 19 June to 13 July on Tutuila (with the night of 9 July on Aunu'u); 13-18 July on Ofu and Olosega; and 18-26 July on Ta'ū. Before beginning the survey observers spent several days practicing field identification and distance estimation, following a training program described by Kepler and Scott (1981). Compared to many areas, particularly continental land masses, American Samoa has a relatively simple avifaunal community and there are few identification problems.

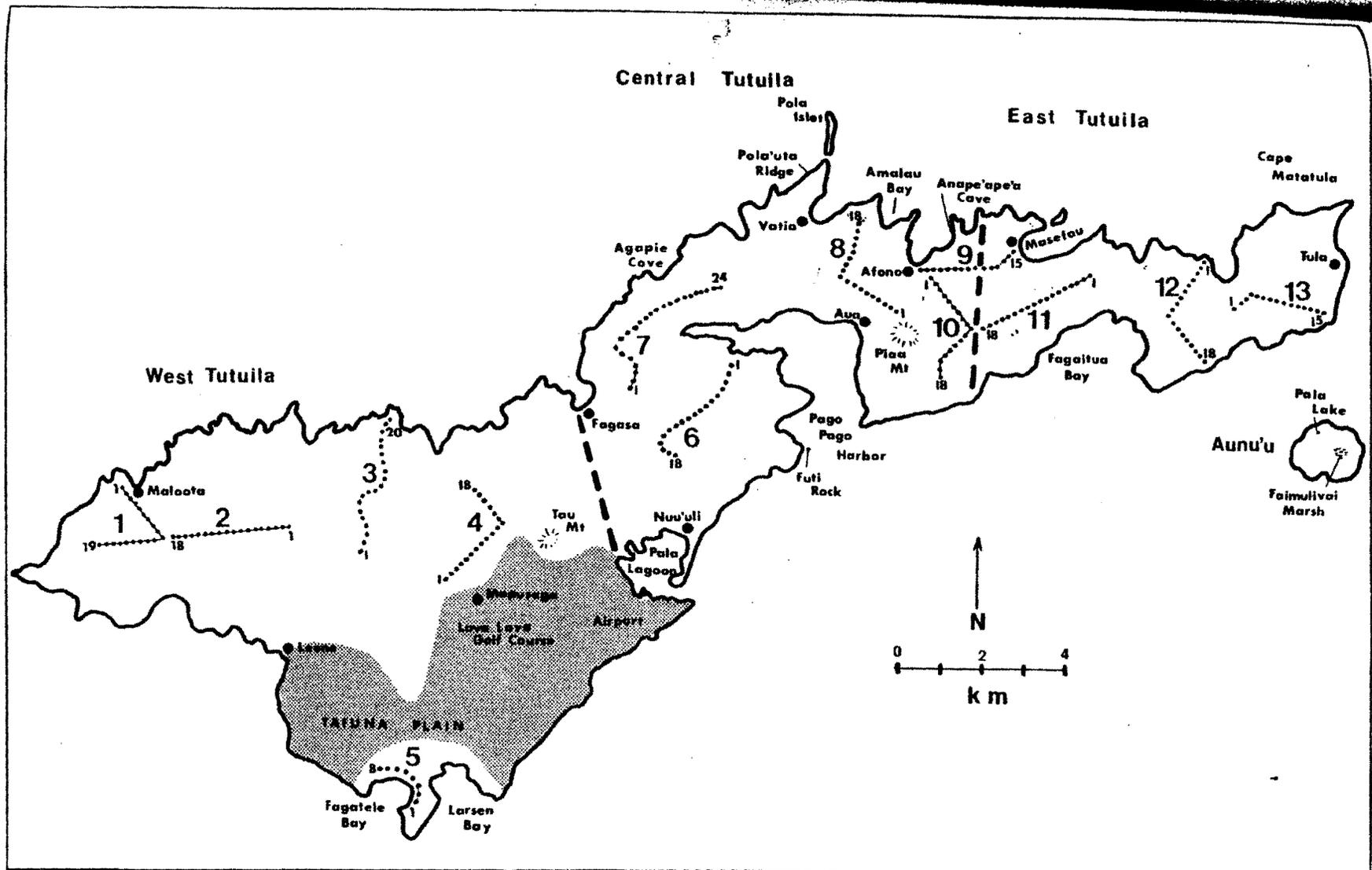


Figure 2. Tutuila, showing transects surveyed during the 1986 forest bird survey. Transects are numbered 1-13; stations are numbered at the beginning and end of each transect. The shaded area is the Tafuna Plain and was excluded from the study area.

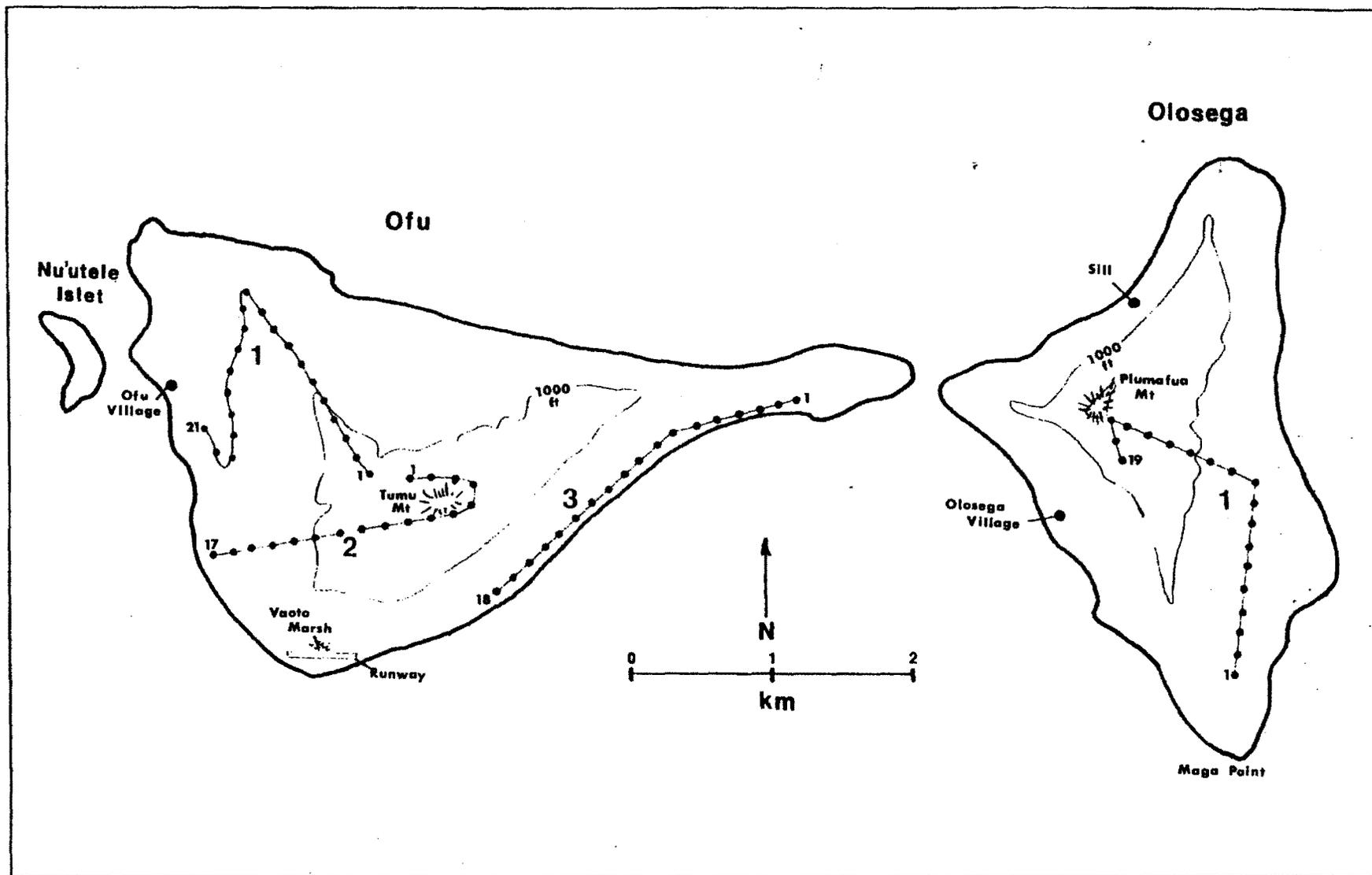


Figure 3. Ofu and Olosega, showing transects surveyed during the 1986 forest bird survey. Three transects were surveyed on Ofu and one was surveyed on Olosega. The first and last station numbers are shown on each transect.

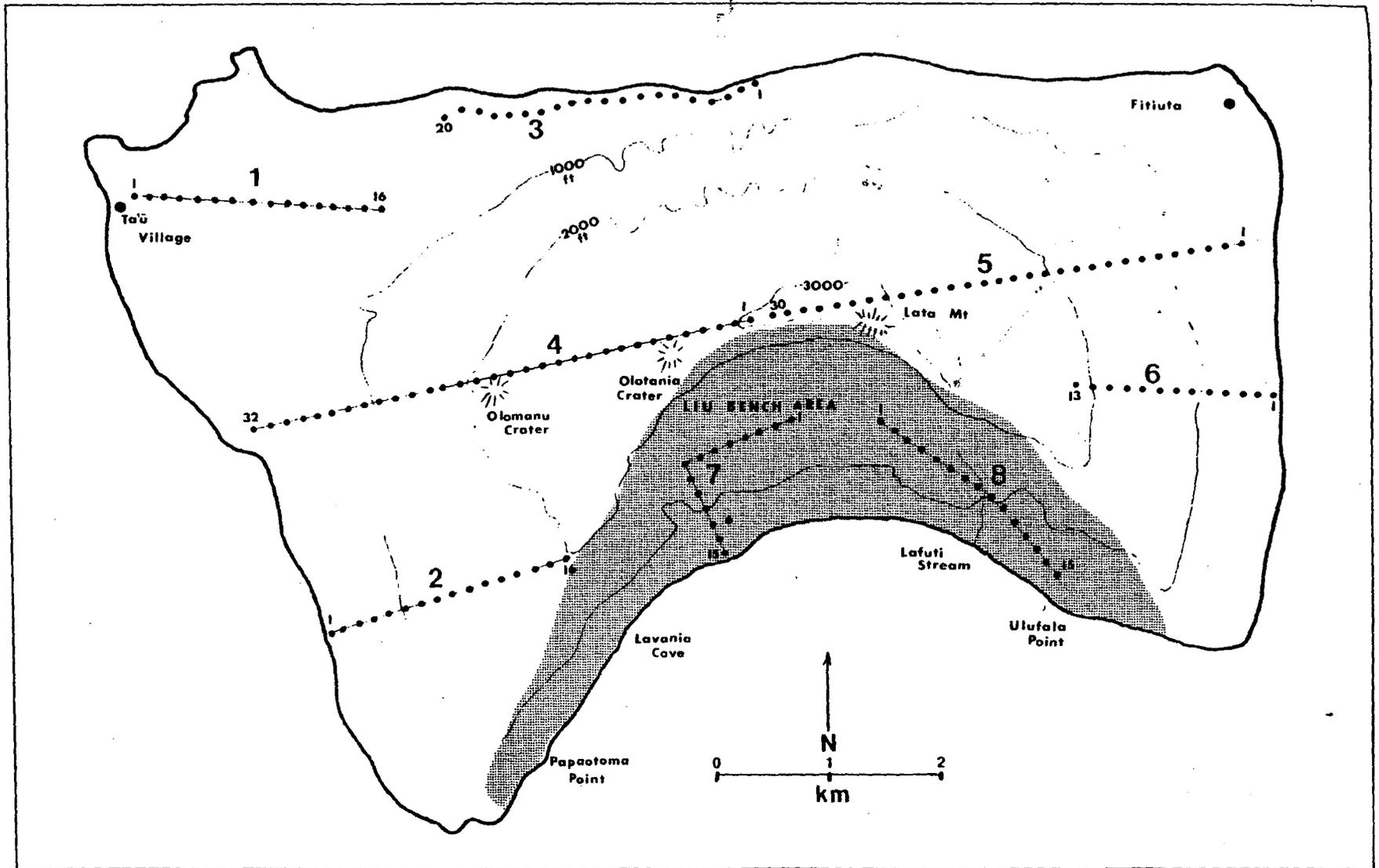


Figure 4. Ta'u, showing the eight transects surveyed during the 1986 forest bird survey. Transects and the first and last station on each transect are numbered. The shaded portion is the Liu Bench area, for which densities were calculated separately.

AVIFAUNA

Amerson et al. (1982) discuss the ornithological history and the biogeographical origins of the avifauna of American Samoa. Fifty-nine species of birds have been recorded from American Samoa (Tables 2 and 3). Of these, 44 are considered resident species (breeders or potential breeders) and 15 are migratory or vagrant. Of the 44 resident species, 19 are land or waterbirds, 20 are seabirds, and 5 are introduced. Of the land and waterbirds, at least one, the Mao, may be extirpated and one other, the Gray Duck, may also no longer breed in American Samoa. Of the five introduced species, breeding status of the Rock Dove, the Red Junglefowl, and the newly introduced Jungle Myna is uncertain; it is not known if they have self-sustaining, feral populations. The other two introduced species, the Red-vented Bulbul and the Common Myna, have established populations on Tutuila.

Of the 15 migratory or vagrant species, 6 are migratory shorebirds, 5 are seabirds, and 4 are land or wetland birds. Most of the migratory shorebirds recorded from American Samoa originate from the New World. Shorebirds are typically most abundant during the boreal winter, although some commonly oversummer. One of the migrant land birds, the Long-tailed Cuckoo, breeds in New Zealand and migrates north to Samoa. We consider two of the wetland vagrants, the Cattle Egret and the Snowy Egret, as hypothetical records.

Of the 25 seabirds recorded from Samoa, 20 are resident and 5 are migrants or visitors. Two of the five migrants, the White-necked Petrel and the Short-tailed Shearwater, have been recorded only at sea. The status of migratory seabirds in Samoan waters is poorly known.

There are four species of birds that have been previously reported from American Samoa, but for which the reports are believed to be in error (Amerson et al. 1982). These are the Rufous Night-Heron, White-browed Rail, Samoan Wood Rail, and White-throated Pigeon. We do not include these four species in our tally of 59 total species for American Samoa.

Table 2. Birds of American Samoa as reported by Amerson et al. (1982) and this survey. Species in brackets are considered to have been reported erroneously.

Status Symbols

- E - Extinct population of formerly breeding species.
- H - Hypothetical record.
- I - Introduced species.
- M - Migrant species.
- R - Resident, native species with breeding population.
- S - Seabird visitor, not known to breed but may roost on the island and/or use offshore waters.
- V - Vagrant. Non-migratory species or species occurring well out of normal migratory range.
- ? - Status questionable.

Island Symbols

- Tu - Tutuila
- Au - Aunu'u
- Of - Ofu
- Ol - Olosega
- Ta - Ta'u
- Sw - Swains
- Ro - Rose

Common name	Scientific name	Occurrence						
		Tu	Au	Of	Ol	Ta	Sw	Ro
SHEARWATERS, PETRELS		PROCELLARIDAE						
White-necked Petrel	<u>Pterodroma externa</u>	(Recorded only at sea)						
Tahiti Petrel	<u>Pterodroma rostrata</u>	R			R?	R		
Herald Petrel	<u>Pterodroma arminjoniana</u>					R		
Collared Petrel	<u>Pterodroma leucoptera</u>					R?		
Short-tailed Shearwater	<u>Puffinus tenuirostris</u>	(Recorded only at sea)						
Wedge-tailed Shearwater	<u>Puffinus pacificus</u>	R?				R?		
Christmas Shearwater	<u>Puffinus nativitatis</u>					R?		
Audubon's Shearwater	<u>Puffinus lherminieri</u>	R				R		
STORM-PETRELS		HYDROBATIDAE						
White-throated Storm-Petrel	<u>Nesofregatta albigularis</u>					R?		
TROPICBIRDS		PHAETHONTIDAE						
Red-tailed Tropicbird	<u>Phaethon rubricauda</u>						S	R
White-tailed Tropicbird	<u>Phaethon lepturus</u>	R	R	R	R	R	R	R

Table 2, continued.

Common name	Scientific name	Occurrence						
		Tu	Au	Of	Ol	Ta	Sw	Ro
BOOBIES	SULIDAE							
Masked Booby	<u>Sula dactylatra</u>	S			S			R
Brown Booby	<u>Sula leucogaster</u>	R	R	R	R	S	S	R
Red-footed Booby	<u>Sula sula</u>	R	S	R?	S	S	S	R
FRIGATEBIRDS	FREGATIDAE							
Great Frigatebird	<u>Fregata minor</u>	R?	S	S	S	S	S	R
Lesser Frigatebird	<u>Fregata ariel</u>	R?	S	S	S	S	S	R
HERONS, EGRETS	ARDEIDAE							
White-faced Heron	<u>Ardea novaehollandiae</u>			V	V			
Reef Heron	<u>Egretta sacra</u>	R	R	R	R	R	R	R
Snowy Egret	<u>Egretta thula</u>							H
Cattle Egret	<u>Bulbulcus ibis</u>	H						
[Rufous Night-Heron]	<u>Nycticorax caledonicus</u>							
DUCKS	ANATIDAE							
Gray Duck	<u>Anas superciliosa</u>	R?	E?	E?	E?	E?	E?	
PHEASANTS	PHASIANIDAE							
Red Junglefowl	<u>Gallus gallus</u>	I	I	I	I	I		
RAILS, SWAMPHENS	RALLIDAE							
Banded Rail	<u>Rallus philippensis</u>	R	R	R	R	R		
[White-browed Rail]	<u>Poliolimnas cinereus</u>							
Spotless Crake	<u>Porzana rabuensis</u>						R	
Purple Swamphen	<u>Porphyrio porphyrio</u>	R	R	R	R	R		
[Samoan Wood Rail]	<u>Pareudiastes pacificus</u>							
PLOVERS	CHARADRIIDAE							
Lesser Golden-Plover	<u>Pluvialis dominica</u>	M	M	M	M	M	M	M

Table 2, continued.

Common name	Scientific name	Occurrence						
		Tu	Au	Of	Ol	Ta	Sw	Ro
SANDPIPERS, WADERS		SCOLOPACIDAE						
Bristle-thighed Curlew	<u>Numenius tahitiensis</u>	M			M	M	M	M
Bar-tailed Godwit	<u>Limosa lapponica</u>	M						M
Wandering Tattler	<u>Heteroscelus incanus</u>	M	M	M	M	M	M	M
Ruddy Turnstone	<u>Arenaria interpres</u>	M	M	M	M	M	M	M
Sanderling	<u>Calidris alba</u>	M					M	M
TERNS, NODDIES		LARIDAE						
Black-naped Tern	<u>Sterna sumatrana</u>						S	S
Gray-backed Tern	<u>Sterna lunata</u>	R	R					R
Bridled Tern	<u>Sterna anaethetus</u>	S						
Sooty Tern	<u>Sterna fuscata</u>	S					S	R
Crested Tern	<u>Sterna bergii</u>	S						
Blue-gray Noddy	<u>Procelsterna cerulea</u>	R	R	R	R	R		
Brown Noddy	<u>Anous stolidus</u>	R	R	R	R	R	R	R
Black Noddy	<u>Anous minutus</u>	R	S	S	S	R	R	R
White Tern	<u>Gygis alba</u>	R	R	R	R	R	R	R
PIGEONS, DOVES		COLUMBIDAE						
Rock Dove	<u>Columba livia</u>	I						
[White-throated Pigeon]	<u>Columba vitiensis</u>							
Many-colored Fruit-Dove	<u>Ptilinopus perousii</u>	R	R?	R	R	R		
Purple-capped Fruit-Dove	<u>Ptilinopus porphyraceus</u>	R	R	R	R	R		
Pacific Pigeon	<u>Ducula pacifica</u>	R	R?	R	R	R		
Friendly Ground-Dove	<u>Gallicolumba stairi</u>			R				
LORIES		PSITTACIDAE						
Blue-crowned Lory	<u>Vini australis</u>	V		R	R	R		
CUCKOOS		CUCULIDAE						
Long-tailed Cuckoo	<u>Eudynamys taitensis</u>	M	M	M	M	M	M	M

Table 2, concluded.

Common name	Scientific name	Occurrence						
		Tu	Au	Of	Ol	Ta	Sw	Ro
BARN OWLS	TYTONIDAE							
Common Barn Owl	<u>Tyto alba</u>	R	R	R	R	R		
SWIFTLETS	APODIDAE							
White-rumped Swiftlet	<u>Collocalia spodiopygia</u>	R	R?	R	R	R		
KINGFISHERS	ALCEDINIDAE							
Collared Kingfisher	<u>Halcyon chloris</u>	R	R	R	R	R		
BULBULS	PYCNONOTIDAE							
Red-vented Bulbul	<u>Pycnonotus cafer</u>	I						
OLD WORLD FLYCATCHERS	MUSCICAPIDAE							
Fiji Shrikebill	<u>Clytorhynchus vitiensis</u>			R	R	R		
HONEYEATERS	MELIPHAGIDAE							
Mao	<u>Gymnomyza samoensis</u>	E						
Wattled Honey-eater	<u>Foulehaio carunculata</u>	R	R	R	R	R		
Cardinal Honey-eater	<u>Myzomela cardinalis</u>	R						
STARLINGS, MYNAS	STURNIDAE							
Polynesian Starling	<u>Aplonis tabuensis</u>	R	R	R	R	R		
Samoan Starling	<u>Aplonis atrifusca</u>	R	R	R	R	R		
Common Myna	<u>Acridotheres tristis</u>	I						
Jungle Myna	<u>Acridotheres fuscus</u>	I						

Table 3. Types of birds recorded in American Samoa.

Total species reported.....	63
Erroneously reported.....	4
Actual total.....	59
Birds extirpated.....	1 (possibly 2)
Hypothetical records.....	2
Resident species.....	44
Native land and wetland residents...	19
Resident seabirds.....	20
Introduced residents.....	5
Seabirds.....	25
Resident seabirds.....	20
Migrant or visiting seabirds.....	5
Migrants/vagrants/visitors....	15
Shorebirds.....	6
Seabirds.....	5
Land and wetland birds.....	4

Common English and Samoan Names

Wherever possible we follow nomenclature of the American Ornithologist's Union (AOU) (1983). For bird species not covered by the AOU check-list, we follow Pratt et al. (1987) and Watling (1982) for land birds, and Harrison (1983) for seabirds.

Common Samoan names are derived from Amerson et al. (1982), Muse and Muse (1982), and Watling (1982) (Table 4). In some cases different names are given by the three references for the same species. In these situations we use the name that we deem to be the most appropriate, and give reasons for our choice. Often, Samoan names given by the three references are similar but have differences in hamza and macron placement, differences in spelling, or differences in word division. Whenever possible, we referred to a Samoan dictionary (Milner 1978) to resolve these differences. Based on our knowledge of Samoan bird names, Amerson et al. (1982) and Watling (1982) deviate most from the names commonly used in Samoa today, while Muse and Muse (1982) are correct in most cases.

A number of birds in the same taxon are known by a single, generic Samoan name. For example, all shearwaters and petrels are called Ta'i'o; boobies are Fua'o; most migratory shorebirds are Tuli; and noddies and terns are various types of Gogo.

Samoan names for Laridae are confusing, and the generic term Gogo could probably be used for all except for the familiar White Tern, which is commonly known as Manusina (but occasionally as Gogosina), and the Blue-gray Noddy, which is known as Lala. The other seven species of Laridae recorded from American Samoa are variously referred to as Gogo, Gogo'uli (literally, black tern), or Gogosina (literally, white tern). Part of the problem in standardizing common Samoan names for Laridae stems from the fact that many of the species are uncommon, seldom seen, and several species look alike.

Table 4. Samoan bird names, as recorded by Amerson et al. (1982), Muse and Muse (1982), and Watling (1982).

English common name	Samoan name		
	Amerson et al.	Muse & Muse	Watling
White-necked Petrel	Ta'i'o	Ta'i'o	-
Tahiti Petrel	Ta'i'o	Ta'i'o	-
Collared Petrel	Ta'i'o	Ta'i'o	none
Short-tailed Shearwater	Ta'i'o	Ta'i'o	none
Wedge-tailed Shearwater	Ta'i'o	Ta'i'o	none
Christmas Shearwater	Ta'i'o	Ta'i'o	none
Audubon's Shearwater	Ta'i'o	Ta'i'o	none
White-throated Storm-Petrel	Ta'i'o	Ta'i'o	none
Red-tailed Tropicbird	Tava'e'ula; Tava'etoto	Tava'e'ula	Tave'e Ula; Tava'e Toto
White-tailed Tropicbird	Tava'e	Tava'e	Tava'e
Masked Booby	Fua'ō	Fua'ō	none
Brown Booby	Fua'ō	Fua'ō	none
Red-footed Booby	Fua'ō	Fua'ō	none
Great Frigatebird	Atafa	Atafa	'Atafa
Lesser Frigatebird	Atafa	Atafa	'Atafa
Reef Heron	Matu'u	Matu'u	Matū'u
Gray Duck	Toloa	Toloa	Tolōa
Red Junglefowl	-	Moa'ai Vao	Moa'aivao; Moa

Table 4, continued.

English common name	Samoan name		
	Amerson et al.	Muse & Muse	Watling
Banded Rail	Ve'a	Ve'a	Ve'a
Spotless Crake	none	none	none
Purple Swamphen	Manu Ali'i; Manu Sa	Manuali'i	Manu Āli'i; Manu Sā
Lesser Golden-Plover	Tulī	Tulī	Tulī
Bristle-thighed Curlew	Tulī	Tuli Olovalu	none
Bar-tailed Godwit	Tulī	Tulī	none
Wandering Tattler	Tulī	Tulī	none
Ruddy Turnstone	Tulī	Tulī Alomalala	none
Sanderling	Tulī	Tulī	none
Black-naped Tern	Gogosina	Gogosina	Fua'ō; Gogouli
Gray-backed Tern	Gogosina	none	none
Bridled Tern	Gogouli	Gogo	none
Sooty Tern	none	Gogo Uli	none
Crested Tern	none	Gogo	Tala; Tola
Blue-gray Noddy	Laia	Laia	Laia
Brown Noddy	Gogo	Gogo	Fua'o
Black Noddy	Gogo	Gogo Uli	none
White Tern	Manu Sina	Manu Sina	Manusina
Rock Dove	Lupe Pālagi	Lupe Pālagi	none

Table 4, concluded.

English common name	Samoan name		
	Amerson et al.	Muse & Muse	Watling
Many-colored Fruit-Dove	Manu Mā; Manu Lua	Manuma; Manulua (young)	Manulua (M); Manumā (F)
Purple-capped Fruit-Dove	Manu Tagi (adult); Manu Fili (young)	Manutagi	Manutagi
Pacific Pigeon	Lupe; Lotu; Mataisu	Lupe	Lupe
Friendly Ground-Dove	Tu'aimeo	Tu'aimeo (F) Tulautifa (M)	Tu'aimeo (F) Tu'autifa (M)
Blue-crowned Lory	Sega; Sega'ula Sega Samoa	Sega Vao	Sega; Segavao
Long-tailed Cuckoo	'Āleva	Aleva	'Alēva
Common Barn Owl	Lulu	Lulu	Lulu
White-rumped Swiftlet	Pe'ape'a	Pe'a Pe'a	Pe'a Pe'a
Collared Kingfisher	Ti'otala	Ti'otala	Tuitala
Red-vented Bulbul	Manu Pālagi	Manu Pālagi	Manu Pa Palagi Manu Faisope
Fiji Shrikebill	Segaolevau	Sega O Le Vao	none
Mao	Ma'oma'o	Ma'oma'o	Ma'u Ma'u
Wattled Honeyeater	Iao	'Iao	Iao; Jao Mosomoso
Cardinal Honeyeater	Segasegamau'u	Segasegā Mau'u	Sega Segamau'u; Segamau
Polynesian Starling	Miti Vao; Miti	Miti Vao	Miti Vao
Samoan Starling	Fuia	Fuia	Fuia

RESULTS

SUMMARY

We marked and surveyed 459 stations placed along 25 different transects (Figures 2, 3, and 4). Each transect had from 8 to 32 stations; there were 1 transects with 227 stations on Tutuila; 3 transects with 56 stations on Ofu; transect with 19 stations on Olosega; and 8 transects with 157 stations on Ta'ū. Because wind and surf noise were loud when we surveyed transect 3 on Ofu (18 stations total), we did not include the data from this transect in our final density calculations. At the 441 stations that were used in our final calculations, we conducted 882 8-minute counts and recorded 21,346 birds of 26 different species (Table 5). We also recorded two unidentified frigatebirds (probably Great Frigatebirds), one on Tutuila and one on Ofu, and six unidentified petrels (probably Herald and/or Tahiti petrels), all on Ta'ū. All native forest bird species were recorded during 8-minute counts except for the Friendly Ground-Dove, which was only recorded incidental to 8-minute counts. The majority of the birds recorded were native forest birds. We calculated density and population estimates for 18 species of birds (Table 6).

We also resurveyed 19 stations formerly established by Amerson et al. (1982). Data collected at these stations were not used in our final density calculations. Stations formerly established by Amerson et al. (1982) that we resurveyed include the following:

Island	Amerson et al. station numbers	Total stations surveyed
Tutuila	1,2,5,12,14,20, 21,26,29,33,41	11
Aunu'u	4,8,10,39	4
Ofu	11,16	2
Olosega	9,40	2
Ta'ū	none	0

Table 5. Number of birds recorded during 8-minute counts on the 1986 American Samoa Forest Bird Survey. A dash (-) indicates the species is not resident on that island.

	Tutuila	Ofu	Olosega	Ta'ū	Total
Number of stations	227	38	19	157	441
Counts completed	454	76	38	314	882
Species					
Tahiti Petrel	0	-	-	1	1
White-tailed Tropicbird	154	11	27	234	426
Red-footed Booby	22	-	-	-	22
Great Frigatebird	1	-	-	-	1
Reef Heron	1	0	0	0	1
Red Junglefowl	527	17	0	26	570
Banded Rail	163	22	16	75	276
Spotless Crake	-	-	-	1	1
Purple Swamphen	10	4	0	15	29
Blue-gray Noddy	1	0	0	0	1
Brown Noddy	65	1	0	359	425
Black Noddy	0	11	0	5	16
White Tern	331	88	17	60	496
Many-colored Fruit-Dove	10	0	0	2	12
Purple-capped Fruit-Dove	3,107	104	33	1,176	4,420
Pacific Pigeon	207	15	8	282	512
Blue-crowned Lory	-	65	79	533	677
Common Barn Owl	2	0	0	0	2
White-rumped Swiftlet	441	348	13	284	1,086
Collared Kingfisher	136	43	14	95	288
Red-vented Bulbul	95	-	-	-	95
Fiji Shrikebill	-	1	9	93	103
Wattled Honeyeater	3,748	875	457	2,779	7,859
Cardinal Honeyeater	621	-	-	-	621
Polynesian Starling	296	41	3	146	486
Samoan Starling	1,647	253	91	929	2,920
Total birds recorded	11,585	1,899	767	7,095	21,346

Table 6. Densities and population estimates calculated during the 1986 American Samoa Forest Bird Survey. A dash (-) indicates the species is not resident on that island.

Species	Density (birds/sq. km) and population estimates									
	Tutuila		Ofu		Olosega		Ta'ū		Total	
	Dens.	Pop. est.	Dens.	Pop. est.	Dens.	Pop. est.	Dens.	Pop. est.	Dens.	Pop. est.
White-tailed Tropicbird	9.7	1,169	7.3	63	23.3	89	22.7	991	14.7	2,312
Banded Rail	15.4	1,696	9.1	53	12.9	85	10.2	498	12.9	2,332
Purple Swamphen	1.3	143	4.1	21	0	0	3.1	149	2.1	313
Brown Noddy	7.7	849	.6	5	0	0	75.2	3,172	30.8	4,026
Black Noddy	0	0	3.1	27	0	0	.3	12	.4	39
White Tern	85.4	9,705	59.6	508	100.6	660	9.1	396	56.6	11,269
Many-colored Fr.-Dove	.7	78	0	0	0	0	.2	7	.4	85
Purple-capped Fr.-Dove	80.3	9,407	12.3	78	9.5	42	46.7	2,164	59.4	11,691
Pacific Pigeon	18.2	2,132	5.2	42	8.0	46	40.0	1,690	24.4	3,910
Blue-crowned Lory	-	-	70.2	580	190.5	980	149.7	6,946	67.6	8,506
White-rumped Swiftlet	208.3	23,576	593.7	4,433	169.0	592	148.5	6,719	218.5	35,320

Table 6, concluded.

Species	Density (birds/sq. km) and population estimates									
	Tutuila		Ofu		Olosega		Ta'u		Total	
	Dens.	Pop. est.	Dens.	Pop. est.	Dens.	Pop. est.	Dens.	Pop. est.	Dens.	Pop. est.
Collared Kingfisher	5.6	592	9.3	67	6.9	46	5.8	277	6.0	982
Red-vented Bulbul	12.5	1,655	-	-	-	-	-	-	6.5	1,655
Fiji Shrikebill	-	-	8.6	38	72.7	232	107.0	4,695	42.0	4,965
Wattled Honeyeater	868.0	99,505	1203.4	8,688	1460.6	8,142	1034.1	47,052	981.6	163,387
Cardinal Honeyeater	91.5	9,940	-	-	-	-	-	-	47.1	9,940
Polynesian Starling	79.1	9,357	56.2	384	16.0	107	66.3	3,168	69.8	13,016
Samoan Starling	362.4	40,777	381.3	2,604	268.7	1,598	367.3	17,317	361.7	62,296

SPECIES ACCOUNTS

WHITE-NECKED PETREL: Pterodroma externa

Samoan name: Ta'i'o

Other common names: White-naped Petrel

There are two subspecies of the White-necked Petrel, P. e. cervicalis, which breeds on the Kermadec Islands, and P. e. externa (also known as the Juan Fernandez Petrel), which breeds in the Juan Fernandez Islands off the coast of Chile (Harrison 1983). Pratt et al. (1987) consider the two forms as separate species. Both forms breed from December to June and migrate to the Central Pacific between the Equator and the Hawaiian Islands (King 1967). P. e. cervicalis is believed to be the form migrating through American Samoa, but specimens are needed for verification (Amerson et al. 1982).

Amerson et al. (1982) observed 11 White-necked Petrels at sea and regarded the species to be a very uncommon migrant in American Samoa. We did not observe this species.

TAHITI PETREL: Pterodroma rostrata

Samoan name: Ta'i'o

Distribution: In the past this species has only been reported from Ta'ū in American Samoa (Amerson et al. 1982). We recorded the Tahiti Petrel on Ta'ū, Tutuila, and possibly Olosega. Outside of American Samoa the Tahiti Petrel breeds in the Marquesas, the Society Islands, and in New Caledonia (King 1967, Harrison 1983). At sea small numbers have been recorded north of the equator, but the petrel's main wintering range is presumably west of the breeding islands to the eastern coast of Australia (King 1967).

Habits: The Tahiti Petrel nests in burrows along windy crests in the mountains. When overland it is active mostly at night, but individuals or pairs can sometimes be seen during the day. The call, given at night, is a short, upswept squeal or whine followed by a soft, somewhat raspy moan.

Survey Results and Status

R. S. Crossin (in Amerson et al. 1982) wrote that the number of calling birds on Ta'ū in April and May 1971 indicated that thousands were present. Amerson et al. (1982) reported the Tahiti Petrel to be uncommon, and estimated the population in the cloud forest of Ta'ū at 500 in October 1976. A forest

bird survey is not well suited for this species, and we recorded too few birds during 8-minute counts to make population estimates. Likewise, the incidental data that we collected was too meager to make meaningful population estimates.

We recorded birds on Ta'ū, where the petrel appears to be common. On 27 June 1985, we saw a group of 15-25 petrels wheeling above the crest of Ta'ū near Lata Mountain. These were seen from afar and were not certainly identified. They were probably Herald Petrels, but some were possibly Tahiti Petrels. We saw several petrels during the daytime on Ta'ū. From 19-26 July 1986. Some of these were Tahiti Petrels, but more than one species was observed. On the night of 24 July 1986 as we camped near Lata Mountain, petrels began calling after dark at 1840 hrs. These birds were flying swiftly along the upper cliff rim and most, but possibly not all, were believed to be Tahiti Petrels. On 25 July 1986 a Tahiti Petrel was heard calling from a burrow near this same vicinity (tr. 4, st. 3). Based on the number of birds we saw and heard on Ta'ū, the population could number in the hundreds or thousands on this island.

On Tutuila we found a single Tahiti Petrel in a burrow on the top of Tau Mountain on 3 July 1986 (Figures 5 and 6). This is the first record of this species from Tutuila. The burrow was located in scrubby montane forest under a dense mat of roots, ferns, and moss on the crest of a ridge at 340 m elevation. The bird was about 80 cm into the burrow and we were able to lift it out for examination. No eggs were found. The bird called as we approached, possibly in response to our presence. This was the only petrel that we located on Tutuila, and although there are several other mountain ridges that could potentially provide nesting habitat for the petrel, the population is evidently small on this island.

On Olosega we heard birds believed to be Tahiti Petrels as they flew along the high ridge behind Olosega Village. Birds were heard calling at 1930-2130 hrs on 16-17 July 1986. Only a few calls were heard, representing one or only a few individuals. The population is not thought to be large on Olosega, but we were far from the mountain top and the colony could be larger than the few birds we heard.

Status: Surveys designed specifically for this species have not been initiated, and population trends have never been determined. The mountain ridges on which the Tahiti Petrel nests are generally inaccessible, and nesting habitat is relatively secure. However, several roads have been built to the tops of mountains and along upper ridges, and such development could be a major threat. Once roads are built, the quality of the nesting habitat diminishes and birds would probably abandon the area. Barring this type of development, nesting populations of the Tahiti Petrel in American Samoa appear to be relatively secure. Rats introduced by humans have probably diminished populations that were once higher. A potential threat to the petrel is the introduction of predators, such as the small Indian mongoose (Herpestes auro-punctatus). The mongoose is believed to be responsible for the decimation of ground-nesting seabirds in Hawaii and Fiji.



Figure 5. Tahiti Petrel found in a burrow on Tau Mountain, Tutuila, on 3 July 1986.



Figure 6. Underparts of Tahiti Petrel pictured in Figure 5.

HERALD PETREL Pterodroma arminjoniana

Samoan name: Ta'i'o

Other common names: Trinidade Petrel

The Herald Petrel had not been recorded from Samoa prior to this survey, although it is known from several other South Pacific island groups including Tonga and French Polynesia. During the survey we heard and saw a number of petrels on Ta'ū that we could not positively identify (see the species account for Tahiti Petrel). Field marks suggested that these birds were either Kermadec Petrels (P. neglecta) or Herald Petrels. Work conducted on Ta'ū after our survey resulted in the collection of a Herald Petrel and a number of Herald Petrel sight records. Examination of the specimen collected indicates that most of the unidentified petrels that we saw were Herald Petrels. A more detailed account of these records will be published elsewhere (Pyle et al., in prep.).

COLLARED PETREL: Pterodroma leucoptera

Samoan name: Ta'i'o

Other common names: White-winged Petrel

This species is sometimes considered to be conspecific with Gould's Petrel (P. brevipes) (Harrison 1983). It breeds in Fiji and the New Hebrides, and is considered to be mostly sedentary (Watling 1982). In October 1976, Amerson et al. 1982) recorded petrels flying and settling into montane scrub on Ta'ū and tentatively identified them as Collared Petrels. Sight records of this species were also obtained at sea (Amerson et al. 1982). Specimens have not been collected, however, and further work is needed to clarify the status of this species in American Samoa. During the 1986 survey we heard birds on Olosega and Ta'ū which could have been this species. However, none of the petrels that we saw clearly during the 1986 survey were Collared Petrels. The color morph of the Herald Petrels that we observed closely resembles the Collared Petrel. Possibly, earlier accounts of the Collared Petrel in American Samoa actually refer to the Herald Petrel.

SHORT-TAILED SHEARWATER: Puffinus tenuirostris

Samoan name: Ta'i'o

Other common names: Slender-billed Shearwater, Mutton Bird

This species breeds off southern Australia and migrates north to Alaska and western coasts of North America (King 1967, Harrison 1983). It is reported to pass through waters around Samoa as it migrates back to Australia from the North Pacific around September and October (King 1967, Harrison 1983). Neither we nor Amerson et al. (1982) recorded the species.

WEDGE-TAILED SHEARWATER: Puffinus pacificus

Samoan name: Ta'i'o

This abundant shearwater breeds throughout most of the tropical Pacific (King 1967). It is listed as a breeding species in Samoa (King 1967), but colonies have not been described. Amerson et al. (1982) give second-hand accounts of nesting in the inaccessible montane scrub and rocky cliffs on Pioa (Rainmaker) Mountain and on the cliffs of Pola Islet, and speculate that the species may nest on Ta'ū as well. These accounts probably refer to other species of shearwaters, such as the Audubon's Shearwater, and documented nest records are needed.

Dark-plumaged birds of this species have been reported at sea around American Samoa in February, March, May, October, and November (Clapp and Sibley 1966, Amerson et al. 1982). We did not record the species during the 1986 survey.

CHRISTMAS SHEARWATER: Puffinus nativitatis

Samoan name: Ta'i'o

This species was recently reported from American Samoa (Amerson et al. 1982), but no details are given and more documentation is needed to verify these sight records. On 13 January 1976, Amerson et al. (1982) saw one Christmas Shearwater at dusk and heard several at night in the rain forest east of Laufuti Stream on the south side of Ta'ū. On 15 October 1976, they heard two at night in the cloud forest of Olotania Crater near the summit of Ta'ū. Six observations were also made at sea (Amerson et al. 1982). Amerson et al. (1982) regard the species as rare and report that it apparently nests on Ta'ū. We did not record this species during the 1986 survey.

AUDUBON'S SHEARWATER: Puffinus lherminieri

Samoa name: Ta'i'o

Other common names: Dusky-backed Shearwater

Distribution: The Audubon's Shearwater is reported to nest on Ta'ū in American Samoa (Amerson et al. 1982); we found colonies on Tutuila as well. Outside of American Samoa the species is widespread in the tropical Pacific, Atlantic, and Indian Oceans (Harrison 1983). The Audubon's Shearwater ranges at sea usually within 150 km of breeding islands and is believed to be a relatively sedentary species without major migrations (King 1967, Harrison 1983).

Habits: This shearwater forages over the open ocean during the day and returns to its nesting burrows just after dusk. Nests are placed in holes or crevices in the ground in the upper mountains. In the morning the shearwater usually departs for the ocean before first light, and it is rarely seen overland during the day. Colonies can be located at night by the loud calls of returning birds. The call is a series of loud, two-syllable cries; the first raspy syllable is followed by a high, clear scream. Calling is most active when birds return and depart from their burrows, although there is sporadic calling throughout the night.

Survey Results and Status: Amerson et al. (1982) observed one Audubon's Shearwater on land (over Ta'ū) and several at sea during the 1975-76 survey. R. S. Crossin (in Amerson et al. 1982) recorded this species calling at night near Olotania Crater on Ta'ū in April and May 1971. Amerson et al. (1982) regarded the species as uncommon and estimated that about 200 nested in the cloud forest on Ta'ū.

The forest bird survey was not designed to sample this species and we did not record the shearwater during 8-minute counts. We did, however, compile a number of incidental observations both on land and at sea.

Our first record of this species was near Olotania Crater on Ta'ū on 26 June 1985 as we camped in cloud forest at about 800 m elevation. Audubon's Shearwaters began calling at 1835 hrs, and a pair landed in a tree directly above us shortly after this. This was an active nest, as two adults and a begging young could be heard throughout the night. The nest was situated in a dense clump of ferns and epiphytes 5-10 m up in the tree. Trees are not normal nesting substrate for the Audubon's Shearwater, but this pair had evidently been able to locate a niche for nesting in the heavily overgrown tree. To our knowledge, this is the first record of an Audubon's Shearwater nesting in a tree.

We heard Audubon's Shearwaters calling at night on Ta'u from several other locations. On 20 July 1986, shearwaters were heard from campsites on Liu Bench on the south side of Ta'u (tr. 7, st. 10 and tr. 8, st. 1). Birds heard from these two campsites were believed to be using burrows along the upper ridge or in cloud forest on top. We heard shearwaters again from campsites on Lata Mountain on 24 July 1986 and on Olomanu Crater on 25 July 1986. The many observations on Ta'u lead us to believe that the shearwater population on this island is larger than the 200 estimated by Amerson et al. (1982).

On Tutuila we located two colonies of Audubon's shearwaters, one on Tau Mt. and the other on Pioa Mt. These are the first records of this species on Tutuila. Along the south side of Tau Mountain, birds could be heard and seen from the main road adjacent to the Mountain. We visited this site at dusk on 7 and 8 July 1986 and heard birds returning to the colony each night. Calling began at 1850 hrs and only lasted about 10 minutes before ceasing. This colony is near a busy road and residential area, and birds could occasionally be seen in the street lights. We estimate that no more than 10 birds were present. On 9 July at 0430 hrs we heard one or two Audubon's Shearwaters calling as they flew over Mapusaga Village about 1.5 km west of Tau Mountain. These birds possibly originated from the Tau Mountain colony. We visited the Tau Mountain colony again in July 1987, but heard no shearwaters calling.

In July 1987, with the help of Dr. Elizabeth Pierson, we located another colony at the top of Pioa (Rainmaker) Mountain. Audubon's Shearwaters could be heard just after dusk and before dawn along the north and west face of Pioa Mountain. At least 15-30 birds were present, but the colony could be much larger. We could hear the colony easily from the road passing along the north side of Pioa Mountain.

From 5-20 km off the southeast coast of Tutuila we observed 15-20 Audubon's Shearwaters on 11 July 1986. These birds were feeding in mixed flocks which included Brown Noddies, White Terns, Brown and Red-footed boobies, and White-tailed Tropicbirds.

Status: The population is believed to be stable. There is some human disturbance of potential nesting areas, but most nesting habitat is relatively isolated and secure. Rats may limit nesting to some extent. Food resources available for the shearwater may be influenced by commercial fishing operations, and studies that define this relationship should be started. (This could be said for all seabirds in American Samoa). Searches for colonies in other likely places, such as Pola Islet, should also be conducted.

WHITE-THROATED STORM PETREL: Nesofregatta albigularis

Samoa name: Ta'i'o

Other common names: Samoan, Sooty, Striped, or Polynesian Storm Petrel

This species breeds in the Line and Phoenix Islands in the Central Pacific and Fiji, the New Hebrides, and the Marquesas. It nests under overhanging grass or in rock crevices or crevices (Watling 1982). Although listed as breeding (King 1967) or perhaps breeding in Samoa (Harrison 1983), the status of this species in and around American Samoa is uncertain (Amerson et al. 1982). A number of records of sooty black petrels have been reported from sea and land, but most of these sightings are questionable. Amerson et al. (1982) saw an all-black storm petrel flying just above treetop level in the cloud forest southwest of Olotania Crater on Ta'ū on 18 January 1976, and saw two single birds at sea on 17 and 22 May 1976 which could have been this species. We did not record this species during the 1986 survey.

Only a single specimen is known from the archipelago. This specimen was reported to be deposited in the U.S. National Museum under the name Fregatta moestissima (Amerson et al. 1982), but Banks (1984) reported that it is actually in the British Museum of Natural History under the name N. albigularis.

RED-TAILED TROPICBIRD: Phaethon rubricauda

Samoa name: Tava'e'ula: Tava'etoto

This species is a rare resident on Rose Island, where nests and/or young have been reported in May, August, and October (Amerson et al. 1982). One specimen has been taken on Swains (Clapp 1968), but the species is not reported to nest there. The Red-tailed Tropicbird has not been recorded from Tutuila or the Manua Islands, nor did we find any during our survey. Older people claim that it once nested on Pola Islet and Olomoana Mountain (W. Knowles, pers. comm.).

WHITE-TAILED TROPICBIRD: Phaethon lepturus

Samoan name: Tava'e

Distribution: This species is reported from all the islands of American Samoa, including Swains and Rose (Amerson et al. 1982). Outside of American Samoa the White-tailed Tropicbird is found throughout most tropical oceans.

Habits: The tropicbird is generally found individually, in pairs, or in small groups of no more than a few birds. Birds often hover over forests and attempt to light in large trees, where they nest in cavities or fern clumps. It wanders far over the open ocean to feed. Calls consist of a sharp note or chatter, commonly voiced overland during courtship displays.

Survey Results and Status: (Appendix Table 1) Amerson et al. (1982) found the White-tailed Tropicbird on all the islands and regarded it as one of the most common seabirds on the main islands. We recorded a total of 426 birds, calculated an average density of 15/sq. km, and estimated the total population at 2,312. Our estimate was lower than the 3,700 birds estimated by Amerson et al. (1982). Populations are widespread in forested areas and appear to be in no immediate danger, although the continued loss of native forest might eventually limit nesting habitat.

MASKED BOOBY: Sula dactylatra

Samoan name: Fua'ō

Other common names: Blue-faced Booby

The Masked Booby is an uncommon resident on Rose Island, where nests and young have been observed throughout much of the year (Amerson et al. 1982). Population estimates on the island have ranged from 25 to 540. Amerson et al. (1982) also report five observations at sea in the vicinity of Rose.

We observed a pair of adult Masked Boobies flying along the cliffs of Pola Islet on 6 June 1986. These two birds were believed to have flushed from the cliffs. On 15 July 1986 we saw and photographed a single adult perched on Maga Point, Olosega, along with Brown Boobies and other seabirds. We believe that the Masked Boobies seen on Tutuila and Olosega were resting or roosting, not nesting. Both Pola Islet and Maga Point are potential nesting areas, however.

Although Amerson et al. (1982) state that there are no specimens of Masked Boobies from American Samoa, Banks (1984) reported that five were taken from Rose Island by the Whitney South Sea Expedition.

BROWN BOOBY: Sula leucogaster

Samoan name: Fua'ō

The Brown Booby is listed as an uncommon resident on Tutuila, Aunu'u, Ofu, and Olosega; a common resident on Rose; and a visitor to Ta'ū and Swains (Amerson et al. 1982). It is commonly seen at sea around American Samoa. We were able to visit several colonies described by Amerson et al. (1982), including Fagatele Bay and Pola Islet on Tutuila, Nu'utele Islet on Ofu, and Maga Point on Olosega.

Along Pola Islet, 21 June 1986, Brown Boobies were one of the most common seabirds seen over the water and flying about the cliffs. We estimate that 100-200 birds were in the area, most in juvenal plumage. We did not locate any eggs or downy young, though Pola Islet is described as a nesting site for Brown Boobies (Amerson et al. 1982). At Fagatele Bay, 25 June 1986, there were about a dozen Brown Boobies flying about and occasionally landing on the rock sea cliffs. We saw one downy young resting on a rock ledge. At Nu'utele Islet, Ofu, on 17 July 1986, we observed six Brown Boobies resting on the steep rock cliffs on the west side of the Islet and an equal number flying just offshore. No nesting was observed, though this is reported to be a nesting site. On 15 July 1986 we visited Maga Point, Olosega. Here we counted 53 Brown Boobies resting on the Point and five downy chicks. The nesting season is reported to be extended in American Samoa (Amerson et al. 1982).

A number of specimens have been taken from American Samoa (Amerson et al. 1982, Banks 1984).

RED-FOOTED BOOBY: Sula sula

Samoan name: Fua'ō

This uncommon resident is found on all islands and at sea, but it breeds only on Tutuila and Rose islands (Amerson et al. 1982). It is not normally recorded during forest bird surveys, but we compiled a number of incidental observations.

We visited the colony on Pola Islet, Tutuila, on 21 June 1986. Viewed from the ocean below the colony appeared to be small and widely dispersed; birds were scattered from Pola Islet along the cliffs of Pola'uta Ridge all the way to Agapie Cove. There were three main groups or subcolonies perched in trees along the upper cliffs in the steepest and most inaccessible portions. Because the birds were a considerable distance away, only white specks could be seen. These were presumably white phase adults, though some

could have been downy young. About 30 birds were counted, but most perched birds, especially brown-phase individuals, could probably not be seen and the colony is believed to be much larger. Also, most birds would typically be foraging at sea at mid-day, when we visited the colony. The birds were evidently nesting, though we did not climb the cliffs to examine nests.

Our observations correlate closely with those of Amerson et al. (1982). We regularly observed Red-footed Boobies in coastal waters offshore Tutuila and occasionally overland. At dusk, Red-footed Boobies often flew over the crest of Tutuila from the south, apparently heading for the Pola Islet colony. We saw a number of individuals and pairs flying through Afono Pass at dusk. On 23 June 1985, we observed a number of small groups flying east offshore the northeast tip of Tutuila, presumably coming from the colony at Pola Islet. A single white phase bird was seen in Fagatele Bay on 25 June 1985. On 11 July 1986, over 100 were seen off the southern coast of Tutuila. One of these was a white phase individual and all the others were either brown phase or juvenile plumage birds. On 10 July 1986, 10 birds were seen passing around the east side of Aunu'u. These were all brown phase individuals. On Olosega four juvenal-plumage individuals were observed landing at dusk on Maga Point on 15 July 1986, presumably to roost. We noted no nesting here.

Although we visited Nu'utele Islet, Ofu, we did not observe roosting or nesting birds here. A colony was once reported on the island, but is now gone (Amerson et al. 1982).

GREAT FRIGATEBIRD: Fregata minor

Samoa name: 'Ātafa

The Great Frigatebird is an uncommon resident that nests at Rose Island and possibly on Tutuila around Pola Islet (Amerson et al. 1982). The species commonly stays near seabird colonies, and Amerson et al. (1982) report a number of sightings soaring above various shores of the main islands and report it as roosting on Pola Islet and Pola'uta Ridge, Tutuila, on the northwest tip of Nu'utele Islet, Ofu, and on the rocks atop Maga Point, Olosega.

We observed scattered individuals at various sites about the main islands, most of them soaring high. These include an adult male over Pago Harbor on 22 June 1985; an adult male off the northwest coast of Tutuila near Maloata on 26 June 1986; three adult males over Aunu'u on 10 July 1986; and an adult female over Maga Point, Olosega, on 15 July 1986. We also recorded birds at sea, including six at sea off the south side of Tutuila on 11 July 1986. A number of unidentified frigatebirds that we saw were probably this species as well. Amerson et al. (1982) believed that the Great Frigatebird may nest at Pola Islet, Tutuila. Although we did not record any nests or

young there, the adult male seen flying near Maloata on 26 June 1986 had a reddish throat pouch, and was possibly nesting on Pola Islet.

LESSER FRIGATEBIRD: Fregata ariel

Samoan name: 'Ātafa

This uncommon resident nests on Rose and possibly Pola Islet, Tutuila, and has been reported as a visitor to all the other islands (Amerson et al. 1982). Individuals may roost at night in trees on the northwest tip of Nu'utele Islet, Ofu, and on the rocky top of Maga Point, Olosega (Amerson et al. 1982).

We recorded scattered individuals around Tutuila, including an adult male soaring over Afono on 23 June 1985, a pair of adults flying over Tula on 7 July 1986, an adult male off the south coast on 11 July 1986, and probable Lesser Frigatebirds at Pola Islet on 21 June 1986 and over Aunu'u on 10 July 1986.

Banks (1984) reports a single male specimen taken on Rose by the Whitney South Sea Expedition.

WHITE-FACED HERON: Ardea novaehollandiae

On 14 July 1986 we spotted a large gray heron, first in flight and then feeding in the short grass along the runway on Ofu (Figure 7). We were able to approach to within 50 m, flush the bird several times, examine it clearly, and obtain several photographs. It was grayish overall and had a distinct white patch around the base of the bill and whitish underwings. The bill was dark and the legs and feet were pale yellowish. A gray phase Reef Heron, which is about the same size, is the only other species with which it could have been confused. The bird we saw, however, appeared to have a more slender neck and was paler gray than the Reef Herons commonly seen in Samoa. It also had the white patch at the base of the bill and whitish underwing linings, features not possessed by the Reef Heron. Later on this same day we found what was presumably the same individual in the taro swamp behind Olosega Village on Olosega. Here the bird was feeding by sticking out a foot, stirring up the muck, and stabbing at prey items.

This is the first record of the White-faced Heron from Samoa. The species is resident in Australia and New Zealand, and has been recorded as a vagrant in the Fiji region (Watling 1982) and on Niue (Pratt et al. 1987). The individual we observed was no doubt a stray.



Figure 7. White-faced Heron observed along the runway at Ofu on 14 July 1986.

REEF HERON: Egretta sacra

Samoa name: Matu'u

Other common names: Pacific Reef Heron (or Egret), Eastern Reef Heron (or Egret)

Distribution: The Reef Heron has been reported from all islands of American Samoa (Amerson et al. 1982). Outside Samoa the species is widespread, from the eastern Indian Ocean through Southeast Asia, north to Japan and south to southern Australia and New Zealand, and throughout most of Oceania (Watling 1982).

Habits: The Reef Heron is found mostly along reefs and coastlines where it forages for fish, crustacea, and other prey items. It is generally found singly or in pairs and roosts and nests in trees, on rocky offshore islets, and on rock ledges along cliffs.

Survey Results and Status: This species is considered to be uncommon in American Samoa (Watling 1982, Amerson et al. 1982). We likewise found it to be uncommon, and recorded only occasional birds along the coasts of Tutuila, Aunu'u, Ofu, and Olosega. Most birds we recorded were along the coasts; on Tutuila a Reef Heron was observed walking on the runway on 26 June 1985. All the individuals we observed were dark phase birds, as has been reported by others (Amerson et al. 1982). However, a white morph bird has been reported from Rose Atoll (W. Knowles, pers. comm.).

SNOWY EGRET: Egretta thula (Hypothetical record)

Based on two reports of small white egrets from Rose Atoll (Scott et al. 1983) we have listed the Snowy Egret as a hypothetical species in American Samoa. R. Coleman sighted a small, all-white egret on Rose on 29 March 1978. This bird had a black bill, yellow lores, black legs with no yellow stripe up the back, and yellow feet. On Rose Atoll in November 1980, R. Shallenberger observed a small white heron or egret with two Reef Herons.

These two records could be either the Snowy Egret, which is North American in origin, or the Little Egret (E. garzetta), which is from the Old World. They were probably Snowy Egrets, since most migrants and stragglers to Samoa would be expected to be from North America. Also, the race of the Little Egret that would most likely reach American Samoa from the Old World is E. garzetta nigripes, which has blackish feet with greenish yellow soles, rather than pure yellow feet as was reported for the 1978 sighting on Rose. Pratt et al. (1987) do not consider the Snowy Egret record in Samoa to be hypothetical, because the only race of Little Egret that has yellow lores and yellow feet is a sedentary Indian Ocean race.

CATTLE EGRET: Bulbulcus ibis (Hypothetical record)

Amerson et al. (1982) gave a second-hand account of a Cattle Egret that was sighted on the Lava Lava Golf Course in Tafuna, Tutuila, in early 1975. No details of the sighting were presented. The Cattle Egret has been expanding its range throughout the Central Pacific and in all probability vagrants have reached American Samoa. However, because there are several other all-white egrets which could reach American Samoa, we consider this record hypothetical.

GRAY DUCK: Anas superciliosa

Samoan name: Toloa

Other common names: Australian Gray Duck, Pacific Black Duck.

Distribution: In American Samoa specimens have been taken from Tutuila and Aunu'u (Banks 1984). There are also reports of ducks from Ofu, Olosega, Ta'u, and Swains (Amerson et al. 1982). Without further detail these reports should probably be regarded as hypothetical, since migratory waterfowl that could be mistaken for the Gray Duck may occasionally reach Samoa. Outside American Samoa the Gray Duck is widespread in the South Pacific, from Micronesia, Australia, and New Zealand east to French Polynesia.

Habits: This dabbling duck is generally found in freshwater wetlands, but occasionally in brackish water or saltwater. Flight is fast and powerful. The call is similar to that of a Mallard (Anas platyrhynchos).

Survey Results and Status: The Gray Duck is very rare in American Samoa and may be near extinction. Amerson et al. (1982) sighted an individual at Faimulivai Marsh, Aunu'u; single individuals on three different occasions at Pala Lake, Aunu'u; and a pair on Pala Lagoon, Tutuila. No young birds were found, and it is not known if the species still nests in American Samoa. Possibly the sightings by Amerson et al. (1982) represent strays from Western Samoa.

We did not find the Gray Duck during the 1986 survey. There appeared to be very little potential habitat for the duck on Ofu, Olosega, and Ta'u. On Tutuila there were several marshes that we did not visit which could support ducks. There were reports of ducks in one of these marshes near Leone Village (K. So'oto, pers. comm.). Ducks may occasionally reach American Samoa from Western Samoa. Faimulivai Marsh on Aunu'u and the large taro swamp on this island are believed to be the best remaining habitat for the duck. Though we searched this area on 9-10 July 1986, we did not hear or see ducks. Nor have ducks been seen on Aunu'u since about 1980 (T. Sagale, pers. comm.).

Recommendations: The rarity of the Gray Duck in American Samoa is probably due to the loss of wetland habitat and overhunting. Management of the species would necessarily revolve around protecting and developing wetland habitat along with prohibiting hunting. A translocation program might be feasible to reestablish the Gray Duck in American Samoa. Birds could possibly be brought from Western Samoa, where the species is still found in low numbers.

JUNGLEFOWL: Gallus gallus

Local name: Moa'aivao

Other common names: Feral chicken

Distribution: The Red Junglefowl is found on all the major islands of American Samoa. Most birds, however, may be semi-domestic or feral and it is unknown if there are any fully wild, self-sustaining populations. The population is most likely mixed, with wild fowl being captured and domesticated and other domestic birds escaping and becoming feral. The species is native to Southeast Asia, the Philippines, and parts of Indonesia. It was widely introduced throughout Indonesia and Oceania.

Habits: The junglefowl is found in forest or along forest edges. It forages on the ground and roosts in trees at night. The junglefowl is active and often runs on the ground to escape detection; it will also take to the air when flushed and flies rapidly and powerfully for short distances. This species is most readily detected by the crowing of the male, which carries over long distances. The wild type readily interbreeds with domestic chickens, and as a result the plumage often shows evidence of domestic strains.

Survey Results and Status: Most junglefowl in American Samoa are found around villages and residential areas. However, there are reports of wild birds (K. So'oto, pers. comm.). Several birds that we recorded on Tutuila appeared to be deep in interior forest and were probably wild. Most of the birds that we recorded were domestic birds around villages. We did not record any birds deep in the interior of Ofu, Olosega, or Ta'u. Amerson et al. (1982) do not mention the Red Junglefowl in their report.

BANDED RAIL: Rallus philippensis

Local name: Ve'a

Other common names: Buff-banded Rail; Land Rail, Banded Land Rail.

Distribution: The Banded Rail is resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'u (Amerson et al. 1982). Outside of American Samoa it is widespread, and various races are found in Eastern Indonesia, Southeast Asia, Australia, New Guinea, and in many islands of the south-central Pacific. American Samoa represents the easternmost extent of its range.

Habits: The Banded Rail is an edge species and is found in a variety of habitats. It favors wet areas but is not restricted to wetlands. Favorite habitats include semi-open gardens, wetlands, roadsides, and fields. In some

areas it is found in forest, but the rail is generally not found in the interior of extensive tracts of mature forest. The species forages on a variety of animal and plant material. Like most rails it is secretive and generally seen as it scoots across a road or an opening, or as it forages in the open along the edge of cover. Commonly voiced calls consist of clear, high, slightly nasal whistles. The nest is a flimsy structure built in the vegetation. Four to six eggs are laid (Watling 1982).

The nesting season in American Samoa is reported to be twice a year (Amerson et al. 1982), but Banks (1984), in examining specimens, suggests that the rail breeds year-round. We noticed several young birds in July, a month for which Amerson et al. (1982) do not have nesting records. On Ofu, we found three just-hatched chicks on 17 July 1986. On Ta'u, we saw several chicks of various ages on 21 July 1986.

Survey Results and Status: (Appendix Table 2) The Banded Rail is a common resident throughout American Samoa (Amerson et al. 1982). We found rails on all islands from which they have been previously reported, and even found a few birds on Nu'utele Islet, Ofu. Our observations of rails along roadsides suggest that the species is more common on Ofu, Olosega, and Ta'u than on Tutuila. The rail is secretive and is not easily surveyed, but we nonetheless include results from 8-minute counts. On Tutuila the rail is widespread and can sometimes be found deep in interior forest. On Ta'u, rails were restricted to lowland areas, and we did not record any deep in the interior forests. Likewise, most rails on Ofu and Olosega were restricted to lowlands areas. On Ta'u, Ofu, and Olosega, rails were especially conspicuous along roads; they would often call in response to the passing of a vehicle. Birds were also conspicuous in the mowed grass along runways.

SPOTLESS CRAKE: Porzana tabuensis

Samoan name: None known.

Other common names: Sooty Rail, Sooty Crake

Distribution: In American Samoa this species is found only on Ta'u. It is widespread outside of American Samoa and is found from Southeast Asia to Australia and east to French Polynesia.

Habits: This small, secretive rail is "liable to turn up in almost any habitat so long as the vegetation is rank, usually near water, though" (Watling 1982). The bird is described as vocal, with a variety of calls ranging from a mechanical clicking to a low crooning, including chirping whistles.

Survey Results and Status: In America Samoa this species is known only from a series of ten specimens taken on Ta'ū by the Whitney South Seas Expedition in 1923 (Murphy 1924, Banks 1984). Amerson et al. (1982) did not identify this rail, and based on these results the crane was reported as *Porzana* on Ta'ū (Muse and Muse 1982).

We found a fresh, road-killed Spotless Crane on 27 June 1985 on a dirt road approximately 1 km east of Ta'ū Village on the northwest side of the island. The specimen was deposited at the Bishop Museum (specimen number BPBM 1985) (Engbring and Engilis 1988). The short chord measurement indicated the specimen belongs to the short-winged population, *P. t. tabuensis*, found in Tonga, Fiji, Niue, and Samoa. Banks (1984) considers this population distinct from two longer-winged forms from the South Pacific: *P. tabuensis niuensis* found in French Polynesia, and *P. tabuensis plumbea* found in Australasia.

In July 1986, we heard or saw at least three more individuals on Ta'ū, near the main road within 2 km of where the 1985 specimen was collected. The birds were located by their soft but rather distinctive chattering calls. We heard two birds on 21 July 1986; the two birds were in dense grass, vine, and weedy vegetation along a dryland taro garden at tr. 1, st. 4. The call was a soft clicking sound: "tch-tch; tch; tch-tch-tch-tch," voiced rapidly, sometimes very rapid into a chatter. One bird called approximately every minute as we searched for it in dense, knee-high cover. Despite our persistent attempts to flush the bird it was able to elude us by remaining within a patch of vegetation 30 x 30 m in size. On 23 July 1986 we returned to this same site to again try to flush a bird. A bird was heard in the same area, and after considerable effort we were finally able to briefly sight the individual as it scooted across a small path. It never did take to the air. The other bird was heard along the road near the west end of tr. 3 on 21 July 1986.

On 2 August 1987 we found one Spotless Crane on Ta'ū within 100 m of where the specimen was collected in 1985. The population had evidently survived the devastating effects of Hurricane Tusi, a strong hurricane that hit the Manua Islands in January 1987.

Field notes from the Whitney South Sea Expedition indicate that the Spotless Crane population on Ta'ū occupied marshy habitat on the northwest side of the island (Banks 1984). The cranes that we found were also in the northwest portion of the island, but were not associated with wetland habitat. Rather, they occupied rank grass and weed patches in semi-open agricultural forest. No marsh or reeds were noted in these areas, though there were muddy puddles in the heavily overgrown road where the 1985 specimen was collected, and several moist swales with dense vegetation.

The Spotless Crake population on Ta'ū has evidently never been large and may be confined to the northwest portion of the island. Residents of Ta'ū do not recognize the bird that we salvaged and thought that it was a young of Purple Swamphen, a well-known bird on Ta'ū. The crakes that we found were associated with habitat created by subsistence agriculture, an activity that has diminished over the last several decades. It is possible that the decrease in habitat associated with subsistence agriculture, along with a possible loss of wetland habitat, has led to a decrease in Spotless Crake numbers on Ta'ū.

PURPLE SWAMPHEN: Porphyrio porphyrio

Samoan name: Manuali'i

Other common names: Swamphen

Distribution: The Purple Swamphen is found on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū (Amerson et al. 1982, Banks 1984). Outside of American Samoa it is found from Eurasia to Australia, New Zealand, and various islands of the Pacific.

Habits: The swamphen is usually found around marshes, taro patches, and agricultural forests. It is not normally found deep in the interior of native forest. The Purple Swamphen is fond of cultivated food crops such as taro and bananas, and is sometimes considered to be a pest around gardens. Feeding birds constantly flick their tails as they walk along. Calls consist of a variety of rail-like squawks and whistles. The bird is most often seen on the ground or sometimes perched in low trees. Though inconspicuous, birds can be seen along roads or the edges of open fields, where they remain close to cover. In flight, birds appear very dark from above, sometimes appearing nearly black, and the yellowish legs trail awkwardly behind.

The nest is built in thick vegetation, usually on the ground but sometimes in low bushes. Three to four eggs are laid (Watling 1982). Based on specimens collected by the Whitney South Seas Expedition, nesting was confirmed at least from November through January (in Banks 1984). The swamphen probably breeds at other times of the year as well. We recorded several swamphen chicks crossing the road on Ta'ū on 23 July 1986. These were all blackish, nearly-grown individuals. They were very gangly and awkward-looking, with long legs and neck and a curious upright stance.

Survey Results and Status: (Appendix Table 3) Field notes of the Whitney South Seas Expedition report this to be a relatively common and widespread bird (in Banks 1984). Amerson et al. (1982) regard this as an uncommon resident.

We found the species to be uncommon but relatively widespread throughout of the islands. On 24 June 1985 we examined a bird that had been taken by a hunter near Afono, Tutuila, in agricultural forest. It had been in a tree, evidently feeding on fruit. Good places to find this species are the open grass fields around the runway on Tutuila and Ta'ū, the golf course on Tutuila, Faimulivai Marsh on Aunu'u (where we saw seven at one time), Vaoto Marsh on Ofu, and along the road between Ta'ū Village and Fitiuta on Ta'ū. Outside of these areas we recorded birds at scattered locations throughout most of the islands. Birds were not found in the interior forest on Ta'ū.

Vaoto Marsh on Ofu is a small wetland, but it is favorite habitat for the swamphen. We heard a number of swamphens calling from the marsh on 14 July and spotted several perching in banana trees or flying along the edges of the swamp.

We recorded 29 swamphens during counts, calculated an average density of 0.29/sq. km, and estimated the population at 313. This is believed to be an underestimate of the islands' total population because most of the transects were in interior forest where we would expect few swamphens. Amerson et al. (1982) estimated the population at 700, but based on linear surveys believed the population to be somewhat higher.

LESSER GOLDEN-PLOVER: Pluvialis dominica

Local name: Tuli

Other common names: Golden Plover; Pacific Golden-Plover.

The Lesser Golden-Plover is a common migrant that is found on all islands in American Samoa (Amerson et al. 1982). The species nests in the Arctic of northern Asia and Alaska and migrates to the Central and South Pacific. It is found year-round in Samoa, with greater numbers present during the boreal winter.

We found one or two birds in various open areas on several of the islands, but most were seen on Tutuila around the golf course, the airport, and Pala Lagoon. Birds foraged on the mowed grass of the golf course, along the runway, and on lawns in residential areas. In the evening, birds flew out to roost on exposed flats in Pala Lagoon. At dusk on 29 June 1986 we observed flocks of 2, 4, 9, 11, 11, and 12 birds flying out to roost in Pala Lagoon. During the day on 3 July 1986 we saw a total of about 25 birds feeding on the golf course lawn. We found birds in various open areas on several other islands, including two at the Ofu runway and two at the Ta'ū runway. More birds would be present during the months of September through April.

Amerson et al. (1982) list the species as Pluvialis dominica fulva. Banks (1984) refers to the species as Pluvialis fulva; he follows Connors (1983), who believes that dominica and fulva differ at the species level.

BRISTLE-THIGHED CURLEW: Numenius tahitiensis

Samoan name: Tuli'olovalu. Amerson et al. (1982) list the generic name Tuli for the Bristle-thighed Curlew and state that Tuli'olovalu, a name given by Muse and Muse (1982), is not correct. The Bristle-thighed Curlew is a very distinctive shorebird and it is reasonable to assume that the species was known by a unique Samoan name, possibly not familiar to many Samoans today. The name Tuli'olovalu clearly refers to some type of shorebird, and we know no species other than the Bristle-thighed Curlew to which it applies. We have opted to follow Muse and Muse (1982).

Amerson et al. (1982) regard this curlew as an uncommon migrant and list records from Tutuila, Ta'u, Swains, and Rose. The species is also reported from Olosega (Beck in Banks 1984). We did not find any Bristle-thighed Curlews during the survey, but did see several on Upolu, Western Samoa, on August 1986.

The Whimbrel (Numenius phaeopus) is a migrant that evidently reaches American Samoa occasionally, but for which adequate documentation is lacking. It is similar in size and appearance to the Bristle-thighed Curlew, and could be confused with it. We saw two Whimbrels on Upolu, Western Samoa, on 2 August 1986. One Whimbrel was reported on Tutuila in December 1987 (W. Knowles, pers. comm.).

BAR-TAILED GODWIT: Limosa lapponica

Samoan name: Tuli

The Bar-tailed Godwit is a rare migrant reported from Tutuila and Rose (Amerson et al. 1982, Banks 1984). This species is a common visitant to islands west of Samoa, and large flocks have been reported from Fiji (Watli 1982). We did not find this species during the survey.

WANDERING TATTLER: Heteroscelus incanus

Samoan name: Tuli

This common migrant is reported from all the islands of American Samoa (Amerson et al. 1982). We observed single birds, mostly along the coast, on Tutuila, Aunu'u, Olosega, Nu'utele Islet off Ofu, and Ta'u. The highest number of birds we saw was five single birds over Pala Lagoon, Tutuila, on June 1986. One of these five was very pale and could have been a Gray-tail (Siberian) Tattler (Heteroscelus brevipes), which has not been recorded from American Samoa. W. Knowles (pers. comm.) believes that a small portion of tattlers reaching American Samoa are Gray-Tailed Tattlers (H. brevipes).

TURNSTONE: Arenaria interpres

Local name: Tuli'alomalala. Amerson et al. (1982) give the generic name for this species and state that Tuli'alomalala, the name given by Muse (1982), is not correct. Based on the same reasoning we give for the name of the Bristle-thighed Curlew (see above), we have chosen to use Muse and Muse (1982).

The Ruddy Turnstone is an uncommon migrant found on all islands on exposed reef flats, rocky islets, and open grassy areas (Amerson et al. 1982). We saw a single flock of 22 birds on the short grass of the golf course, Tutuila, on 3 July 1986, and a group of three birds on Ofu on 14 July 1986.

SANDERLING: Calidris alba

Local name: Tuli

This uncommon migrant has been reported from Tutuila, Rose, and Swains (Amerson et al. 1982). We did not find Sanderlings during the survey.

BLACK-NAPED TERN: Sterna sumatrana

Local name: Gogosina. This very pale tern often appears all white from a distance and the Samoan name Gogosina is apt. Of the two names listed by Watling (1982), Fua'o refers to boobies and Gogo'uli means "black tern." Neither is appropriate.

The Black-naped Tern is evidently a rare visitor to American Samoa. Only two records exist, an individual sighted on Swains (Clapp 1968) and a specimen taken at Rose on 12 December 1923 (Banks 1984). In Western Samoa the species is occasionally recorded from the lagoon around Apia, and breeding is suspected (Muse and Muse 1982). We saw an individual there on 3 August 1986. The species ranges from the tropical Indian Ocean throughout much of the Western Pacific. Fiji and Tonga are the island groups closest to Samoa from which breeding has been documented (Watling 1982).

GRAY-BACKED TERN ~~1982~~

Samoa name

Gray-backed Tern

Other common name

The Gray-backed Tern is an uncommon resident which nests on Tutuila, Aunu'u, and Rose (Amerson et al. 1982). On Tutuila in 1976, up to about 100 birds were seen nesting in the bays (Amerson et al. 1982). On Aunu'u during the same period, Amerson et al. (1982) saw 30 adults and 2 immatures on the cliffs. On Rose, they saw four adults and two fledglings. The species occasionally feeds within Pago Pago Harbor in the afternoon when young mackerel are schooling (W. Knowles pers. comm.).

Gray-backed Terns in American Samoa may be transitory as we did not see any species in 1986. Nesting should be further documented.

BRIDLED TERN

Samoa name

Bridled Tern

Other common name

The Bridled Tern is usually a rare visitor to American Samoa. King (1967) lists one collected by R. Crossin off of Tutuila in 1951. Other sightings have been reported (Amerson et al. 1982). In Western Samoa the species is uncommon and was observed 6-8 birds on the south coast of Upolu on 4 August 1986. (Muse pers. comm. July 1986).

SOOTY TERN

Samoa name

Sooty Tern

Other common name

The Sooty Tern is a resident nests in large numbers on Rose. The species was first seen in October 1975 (Amerson et al. 1982). The species probably be seen near any of the islands in the western part of Samoa for Tutuila (Amerson et al. 1982) and Swains Island during a pelagic trip off the southeast coast of Upolu.

CRESTED TERN: Sterna bergii

Local name: Gogo. We are not familiar with Tala or Tola, the names assigned to this species by Watling (1982).

Other common names: Great-crested Tern

The Crested Tern is a rare visitor to American Samoa, where there are a few sight records from the coastal waters around Tutuila (Amerson et al. 1982). King (1967) lists the species as a vagrant. Muse and Muse (1982) consider it to be an irregular visitor to Samoa. We saw no Crested Terns in American Samoa, but saw four birds in Western Samoa around the lagoon at Apia, on 1-3 August 1986, and a single bird perched on a piling in the lagoon at the west tip of Upolu on 1 August 1986.

BLUE-GRAY NODDY: Procelsterna cerulea

Local name: Laia

Other common names: Gray Noddy

The Blue-Gray Noddy is an uncommon resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'u. Amerson et al. (1982) reported small colonies from coastal cliffs and rocks on all islands of occurrence, and reported a few birds inland on a sheer rock cliff on the southeast face of Tau Mountain, Tutuila.

We observed pairs or small groups of Blue-gray Noddies at various locations on Tutuila, Aunu'u, Nu'utele Islet off Ofu, and on Olosega. Most of the places that we saw birds were previously listed by Clapp and Sibley (1966) and Amerson et al. (1982). On Tutuila we saw three birds at Fagatele Bay on 24 June 1985; several groups of two or three birds along the cliffs of Pioa Mountain on 20 and 28 June 1986; about 10 birds low along the coastal cliffs of Pola Islet on 21 June 1986; a pair flying around Futi Rock on 28 June 1986; four landing on the cliff face of Tau Mountain at dusk on 8 July 1986; and two pairs on cliffs on the southeast side of Tutuila along the road near Fagaitua Bay on 8 July 1986. Offshore the south coast of Tutuila we saw about a dozen birds on 25 June 1986 and another dozen on 11 July 1986. On Aunu'u, two Blue-Gray Noddies were on the rock cliffs on the east side of the island on 9 July 1986. On Olosega, two birds landed on the cliffs near Maga Point on 15 July 1986. On Nu'utele Islet, Ofu, two were seen on the western cliffs.

We did not see eggs but believe that nesting occurred on the rock ledges at a number of the sites where we saw birds.

BROWN NODDY: Anous stolidus

Samoa name: Gogo. The name Fua'ō listed by Watling (1982) for this species refers to boobies.

Other common names: Common Noddy

Distribution: This very common resident is found on all the islands of American Samoa. Outside of American Samoa the species is found throughout the tropical and subtropical Pacific.

Habits: The Brown Noddy frequents inland forests as well as coastal sites and forms loose nesting colonies in these areas. Depending on the nests are placed on the ground or in trees. Nesting is believed to occur throughout the year (Amerson et al. 1982), though molt appears to be restricted to the winter months, from October to March (Banks 1984). The species is believed to be primarily sedentary on the main islands with fluctuation in colony size. On Rose and Swains, however, colony sizes fluctuate from several thousand to nearly none (Amerson et al. 1982).

Survey Results and Status: (Appendix Table 4) Amerson et al. (1982) describe a number of nesting sites on Tutuila, Aunu'u, Ofu, Olosega, and Nu'uutele. We commonly observed Brown Noddies along the coast and over inland forest on all the islands. Birds were most evident toward dusk as they returned from the ocean. On Tutuila, we found colonies around Amalau Bay, Pola Islet, Fagatele Bay. On Nu'uutele Islet, Ofu, several birds were seen landing on rocky western cliffs, where they probably nested. Two birds were also seen on the cliffs of Maga Point, Olosega. On Ta'u, Brown Noddies were common on Liu Bench. We heard many adults and young calling from this area at 1800-2000 hours on 19 July 1986. Other colonies were located in well-developed forest at elevations at scattered sites around the island. On Ta'u, Brown Noddies usually nested and roosted at higher elevations than Black Noddies, but were seldom found in high cloud forest. Offshore Tutuila we found Brown Noddies to be one of the most common seabirds.

Densities ranged from 0/sq. km on Olosega to 167/sq. km on Ta'u. We calculated an average density of 30/sq. km and a total population of 4026 on Ta'u, highest densities (238/sq. km) were found on Liu Bench. Our population estimate was about one fourth of that estimated by Amerson et al. (1982).

The variable circular plot is not well suited as a survey method for Brown Noddy. Many birds are likely at sea when counts are conducted and thus missed. For example, we did not record any Brown Noddies on Olosega during counts, even though we regularly saw them on the island. Also, the Brown Noddy is a highly mobile species and does not meet certain survey assumptions. Brown Noddies are perhaps best counted near colonies at dusk when they return from the ocean.

NODDY: Anous minutus

Common name: Gogo. Our impression is that no distinction is made between the Black and Brown Noddy, and both are known simply as Gogo. Muse and Muse (1982) list Gogo'uli as the Samoan name for the Black Noddy.

Local names: White-capped Noddy

Distribution: In American Samoa the Black Noddy nests on Tutuila, Ta'ū, and Swains, and is known as a visitor to the other islands (Amerson et al. 1982). Outside of American Samoa the species is widespread throughout the tropical Pacific and Atlantic Oceans (Harrison 1983).

Habits: The Black Noddy is generally restricted to colonies along isolated coastal areas rather than interior forests. It forages up to about 100 km offshore of breeding and roosting islands (King 1967), usually remaining closer to shore than the Brown Noddy. The Black Noddy nests in trees or shrubs; in American Samoa the species is believed to nest year round (Banks et al. 1982). The size of the resident population is thought to fluctuate (Amerson et al. 1982), presumably due to undescribed patterns of movement.

Survey Results and Status: (Appendix Table 5) Outside of the relatively small colonies on Swains and Rose, nesting Black Noddies have only been recorded around Pola Islet and Pola'uta Ridge on the north shore of Tutuila, along the isolated south shore of Ta'ū (Amerson et al. 1982). [Fry (1966) reports eight nesting birds, seen mostly in pairs, along the steep cliffs of Litua Bay on the south coast of Tutuila, but we regard this record as spurious. We found nesting pairs of Blue-gray Noddies in this area which could have been mistaken for Black Noddies.]

The population of Black Noddies on Tutuila is not large. Clapp and Fry (1966) recorded only two birds, feeding at sea, in six visits to Tutuila from 1963-1965. Amerson et al. (1982) estimate a total of 200 birds on Tutuila, presumably all from the Pola Islet and adjacent Pola'uta Ridge colony. When off of Pola Islet on 21 June 1986, we recorded five Black Noddies along the coast. On 25 June 1985, we recorded a single bird flying over the island near Pago Pago. Off of Tutuila we recorded a flock of about 10 Black Noddies 10 km south of Larsen Bay on 25 June 1986. They greatly outnumbered the Brown Noddies which were with them. Many of the Black Noddies were sitting on the water. (On another offshore trip on 11 July 1986, not a single Black Noddy was seen, although we saw a number of Brown Noddies).

The population of Black Noddies on Ta'ū is much larger than that on Tutuila. Amerson et al. (1982) estimated a minimum population of 5,000 nesting birds near Lavania Cove, though the population varied and was usually smaller. We found the colony to consist of a number of subcolonies that stretched along the coast from the mouth of Laufuti Stream to Papaotoma Point. Most birds nested in large Barringtonia trees that grew along the coast. Based on incidental observations, we estimated that several thousand birds were present on 19-20 July 1986.

We commonly observed small groups of Black Noddies, usually fewer than a dozen birds, moving along the coast of Ofu and Olosega. We did not locate nesting sites on these two islands and the birds were possibly from the large colony on Ta'ū. However, colonies might be present in remote coastal areas of Ofu or Olosega.

During 8-minute counts we recorded no Black Noddies on Tutuila, 11 on Ofu, none on Olosega, and 5 on Ta'ū. Sample size was too small to calculate meaningful densities, and survey technique was not suited for this species (see Brown Noddy species account).

WHITE TERN: *Gygis alba*

Samoan name: Manusina; Gogosina

Other common names: Fairy Tern, Common Fairy Tern

Distribution: This common resident nests on all the islands of American Samoa (Amerson et al. 1982). The species is pantropical and is a well-known and common seabird in the Pacific.

Habits: The White Tern nests and roosts in all types of forests on high and low islands, often in close proximity to humans. It forages over the open ocean, usually within 80 km of breeding or roosting islands (King 1967). It is usually found in pairs or small groups of no more than a dozen birds. It is often noisy over land, voicing harsh laughing calls. The White Tern is strongly gregarious and is widely dispersed in loose colonies over forested portions of the islands. Though the species most commonly nests in trees, Amerson et al. (1982) report nest sites on coastal cliffs on Aunu'u, Nu'utele Islet near Ofu, and Maga point on Olosega.

Survey Results and Status: (Appendix Table 6) Amerson et al. (1982) found and reported small colonies from all the major islands of American Samoa. One of the largest colonies they located, 2,000 birds, was along the coastal forest of Ta'ū from Lavania Cove to Ulufala Point. We found White Terns to be relatively common on all the islands that we visited. Usually pairs or small groups were seen flying over forest or along the coast. We found birds over bays and farther offshore as well. On 23 June 1985 small groups of White Terns were seen flying along the northeast tip of Tutuila around Cape Matatula. At Fagatele Bay 4-8 birds were seen on 24 June 1985. On 11 July 1986 we watched a flock of 30-50 White Terns feeding near Taema Bank south of Tutuila.

Amerson et al. (1982) estimate the total population at about 4,200 on the major islands. Our estimate was 11,269 for these same islands. We found highest average density on Tutuila (85/sq. km). Density was similar throughout the island, with very little difference in the western, central, and eastern parts of the island. On Ofu and Olosega densities were high but

elevation, but were much lower above 300 m elevation. On Ta'ū, highest densities were found on Liu Bench. We only recorded one bird above 300 m.

The survey technique used is not well suited for the White Tern, primarily because of the tern's highly mobile nature. Also, during the day a large percentage of the population may be foraging over the ocean and thus missed during counts.

ROCK DOVE: Columba Livia

Samoa name: Lupe Pālagi

Other common names: Feral Pigeon

Amerson et al. (1982) report observations of single birds in Nu'uuli and Pago Pago, Tutuila, in 1976. Rock Doves have been kept as pets at various places in American Samoa, but feral populations have evidently never become established. We did not observe Rock Doves during the 1986 survey, but would expect that with greater urbanization the species may eventually become established.

MANY-COLORED FRUIT-DOVE: Ptilinopus perousii

Samoa name: Manulua or Manumā (in American Samoa). There is confusion regarding the Samoan name (Table 4). Amerson et al. (1982) list Manumā as the name presently in use and Manulua as an old name; Muse and Muse (1982) list Manumā as the adult and Manulua as young; Watling (1982) lists Manumā as the female and Manulua as the male. In Western Samoa, Manumā is the name for the Sooty-billed Pigeon (Didunculus strigirostris), while the Many-colored Fruit-dove is known as Manutagi, Manutagi Pa'epa'e ("white Manutagi"), or sometimes Manulua (D. Blockstein, pers. comm.).

Other common names: Nutmeg, Rainbow, or Painted Dove.

Distribution: In American Samoa the species is found on Tutuila, Ofu, Olosega, and Ta'ū. Amerson et al. (1982) list it as a former resident on Anunu'u, though we are not aware of records to confirm this. Outside of American Samoa it occurs in Western Samoa, Tonga, and Fiji.

Habits: This secretive dove is seldom seen and even less often heard in American Samoa. It congregates in favorite fruiting trees, generally Ficus. The nest is said to be a small platform of twigs, placed in trees often high off the ground. One or two white eggs are laid (Watling 1982). On the basis of two specimens, Amerson et al. (1982) suggest that breeding takes place in the southern winter. Based on examination of a larger series of specimens, however, the species probably breeds throughout the year (Banks 1984). On a number of occasions we observed a single female being followed by 1-3 males, presumably a type of courtship activity.

During the survey we only heard Many-colored Fruit-Doves calling in contrast to the Purple-capped Fruit-Dove, which is a very vocal species. Both species have hooting or cooing calls, but the call of the Many-colored Fruit-Dove has a raspy or wheezy quality, a different pattern, and does not seem to carry as far as the call of the Purple-capped Fruit-Dove. The call of the Many-colored Fruit-Dove is a four-note series repeated about seven times. The call of the Purple-capped Fruit-Dove is usually a two-note series repeated 10-20 times, often beginning with a drawn-out introductory note and speeding up toward the end of the call. (Although hoots of the Purple-capped Fruit-Dove are generally given in a two-note pattern, one, three, or even four-note patterns are sometimes voiced.)

Watling (1982) reports that the Many-colored Fruit-Dove is primarily a forest bird, rarely encountered away from large tracts of mature forest, but that it is also found in isolated stands of favored fruiting trees, in parks and gardens, and in scrub forest on small islands.

We found the Many-colored Fruit-Dove to have a patchy distribution even though habitat appears to be suitable throughout many forested portions of American Samoa; the species was relatively conspicuous in a few areas, but was otherwise rarely found. Distribution may be related to the availability of certain fruits. The small feeding groups that we found were all in *Ficus* trees, which are believed to be the "key" to this species' distribution (D. Blockstein, pers. comm.). Notes from previous collectors also suggest that the species congregates in certain areas. Amerson et al. (1982) found birds only in a small area on Tutuila. Banks (1984), in examining field notes from the Whitney South Sea Expedition, wrote that "the species apparently occurs in large isolated flocks rather than being evenly distributed." Beck's notes from Ta'u report that a hunter with *Correia* "struck a tree with the yellow-backed doves feeding in it and got ten... the first we have seen on this island."

The Many-colored Fruit-Dove is most often recorded as it flies rapidly above the forest canopy. Flight is swift and direct, much like the flight of the Purple-capped Fruit-Dove. The two species are best separated by color. Male Many-colored Fruit-Doves appear very pale, almost whitish, and if seen from above the reddish bar across the shoulders is distinct. Females are overall dark green, lacking the pale gray foreparts and the yellow tail band and yellow undertail coverts of the Purple-capped Fruit-Dove.

Survey Results and Status: (Appendix Table 7) Amerson et al. (1982) found only a small population restricted to forest on the north shore of Tutuila from Afono to Vatia Villages. We found the Many-colored Fruit-Dove on Tutuila, Ofu, Olosega, and Ta'u. On Tutuila we found the species to be more widely distributed than the single population reported by Amerson et al. (1982). We recorded birds from the eastern, central, and western portions of the island. Most birds were observed flying over native forest, but on 3 Jul 1986 we recorded a pair on the Tafuna Plain at the northeast end of the golf course. This is a residential area, although there are a few large trees, remnants of the native forest that once grew here. The Many-colored Fruit-

Population on Tutuila appears to be centered in forests from Afono to Villages. We could regularly see a few birds flying below us as we passed from the pass between Aua and Afono Villages.

On Ofu and Olosega we observed several birds in forest along the road from Sili Village to the Runway on Ofu. Most were single birds flying above forest canopy, but at least four birds were observed foraging in a Ficus tree on Ofu on 17 July 1986.

On Ta'ū we recorded several birds along the road between Ta'ū and Fitiuta. Most observations were of single birds flying above the forest canopy, however, at least five birds were feeding in a large Ficus tree near the high school on 23 July 1986.

Because of its secretive nature and rarity, the Many-colored Fruit-Dove is not easily surveyed. We recorded a total of 12 birds during counts, 10 on Tutuila and 2 on Ta'ū. Our total population estimate for all islands is only 12. We recorded 3-4 times as many birds incidental to 8-minute counts. The Many-colored Fruit-Dove is rare throughout American Samoa, although the population is probably larger than one would expect. The dove is inconspicuous and has a patchy distribution, both traits that would lead one to believe that it is less common than it actually is. Banks (1984) wrote "flocking behavior might make the species seem less abundant than it actually is...."

The Many-colored Fruit-Dove appears to be found primarily in native forest, and loss of this habitat would probably cause a reduction in numbers. Destruction of Ficus trees, which are often girdled and burned in agricultural areas, could account for much of the apparent decline of the Many-colored Fruit-Dove (D. Blockstein, pers. comm.). The fact that over 50 specimens were taken by the Whitney South Sea Expedition in 1923-24 would suggest that the species was relatively common at that time, and that it has possibly declined. Although the species is apparently not sought as a game bird (most hunters seek the larger Pacific Pigeon), the fact that the Many-colored Fruit-Dove concentrates in certain trees could make it vulnerable to hunters. Banks (1984) also believed that the bird's flocking behavior could make it more vulnerable to hunting pressure.

Recommendations: Populations of this species are probably best protected by maintaining native forest habitat, especially by preserving Ficus trees. Because of its rarity, the species should not be hunted. In the field, many hunters probably cannot distinguish between the relatively abundant Purple-capped Fruit-Dove and the Many-colored Fruit-Dove. The status of the Many-colored Fruit-Dove should be monitored in the future.

PURPLE-CAPPED FRUIT-DOVE: Ptilinopus porphyraceus

Samoa name: Manutagi (the name means "calling bird" and is apt).

Other common names: Crimson-crowned Fruit-Dove

Distribution: Found on Tutuila, Aunu'u, Ofu, Olosega, and Ta'u. Outside of American Samoa the species is found in Western Samoa, Tonga, Fiji, Kosrae, Pohnpei, and Truk.

Habits: This species is found in all types of forest, from mature natural forest to scrubby second growth and agricultural forest. It appears to be rather evenly distributed throughout suitable habitat, unlike the Many-colored Fruit-Dove which is concentrated in certain areas. Watling (1982) writes "although there is overlap, the Crimson-crowned Fruit-dove is not a gregarious canopy feeder like the Many-colored Fruit-dove; rather it tends to feed solitarily or in pairs and usually beneath the canopy in small trees, shrubs or on vines."

The Purple-capped Fruit-Dove is quite vocal, and its calls are one of the dominant forest sounds in American Samoa (see the description of calls under the Many-colored Fruit-Dove species account). There is considerable individual variation in calls, some being rapid and some slow.

In examining a series of specimens, Banks (1984) found adult birds to be in breeding condition from June through February, and believed that breeding was concentrated during the last half of the year. The nest is a small platform of twigs placed low in bushes or trees (Watling 1982). A single white egg is laid.

Like many other fruit-doves, the Purple-capped Fruit-Dove is difficult to observe when it is in the forest canopy and can be inconspicuous. Birds are readily seen, however, as they fly above the forest canopy. In the field the Purple-capped Fruit-Dove looks much like the female Many-colored Fruit-Dove, but it can be separated by its yellow or yellow-orange undertail coverts, a yellow subterminal tail band, lighter gray foreparts, and slightly larger size.

The Purple-capped Fruit-Dove feeds on various fruits, especially Ficus. Ashmole (1963) reported that there was seasonal wandering in search of ripe fruit, perhaps involving inter-island flight.

Survey Results and Status: (Appendix Table 8) Amerson et al. (1982) considered the Purple-capped Fruit-Dove to be a common resident and estimated a total population of about 326,000 in American Samoa. We found the species to be common to abundant, and calculated a total population of 11,691.

Densities were highest on Tutuila (80/sq. km), very low on Ofu (12/sq. km) and Olosega (9/sq. km), and intermediate on Ta'ū (47/sq. km). The explained low densities on Ofu and Olosega have also been noted in the past. Beck of the Whitney South Sea Expedition reported that pigeons and doves are rare on Olosega Island, although they were frequently seen on the other islands (in Banks 1984). On Ta'ū, densities were lowest at elevations above 300 m (3/sq. km). One of the highest average densities calculated, 106/sq. km, was below 300 m elevation on Liu Bench, Ta'ū. On all islands highest densities were in rain forest and secondary forest.

On Tutuila, densities were slightly higher in the west (90/sq. km), lower in the east (65/sq. km) and intermediate in the central portion of the island (75/sq. km). The scrubby nature of the eastern forests possibly accounts for this difference.

Recommendations: At the present, the Purple-capped Fruit-Dove requires special management practices. The species does well in secondary and agricultural forests, and the population is believed to be relatively stable. Although not sought as a game bird, the Purple-capped Fruit-Dove is probably taken occasionally by hunters. Because of its similarity to the rare Many-colored Fruit-Dove, we do not encourage hunting the Purple-capped Fruit-Dove.

PACIFIC PIGEON: *Ducula pacifica*

Local name: Lupe

Distribution: In American Samoa the Pacific Pigeon is found on Tutuila, Ofu, Olosega, and Ta'ū. It is listed as a former resident on Aunu'u (Amerson et al. 1982). Outside of American Samoa the species occurs in Western Samoa, Tonga, and Fiji.

Habits: This large frugivorous pigeon usually remains in the upper canopy and is seen most often as it flies high above the forest. In flight at a distance it appears all dark, has distinctive wingbeats, and has a relatively long tail. It occupies a variety of forest habitat, from mature native forest to scrubby second growth. In American Samoa it is found most commonly in the interior forests of the large islands. Outside of Samoa, however, it is said to be a bird of dry beach forest and scrub, and in many areas is found only on the smaller islands and islets (Watling 1982). The fact that it is less common in agricultural forests and more common in interior forests may have as much to do with the varying amounts of hunting pressure as the quality of the habitat. It is said to move between islands in search of fruiting trees (Watling 1982). There is meager evidence that suggests breeding takes place in mid-year (Banks 1984). Watling (1982) reports that nests are placed high in large trees.

The call of the Pacific Pigeon consists of harsh growling notes and various hoots and coos. There is considerable variation in the pattern and number of notes voiced. The pigeon is moderately vocal.

Survey Results and Status: (Appendix Table 9) Amerson et al. (1982) report the Pacific Pigeon to be an uncommon bird and estimate the population at 58,000. They found the species on all the main islands as well as on Aunu'u.

We found the distribution of the Pacific Pigeon to be similar to that described by Amerson et al. (1982), although we did not record the species on Aunu'u. We found one bird on Nu'utele Islet, Ofu. We estimated the total population at 3,900. The highest density was on Ta'u (40/sq. km), with lesser densities on Tutuila (18/sq. km), Olosega (8/sq. km), and Ofu (5/sq. km). The low density on Olosega (and probably Ofu) is evidently not a recent development; in 1923-24 R. Beck reported that pigeons and doves were rare on Olosega, though they were frequently seen on the other islands (in Banks 1984).

One of the highest densities (155/sq. km) that we found was on Liu Bench, Ta'u. We believe that densities were high here because of the well-developed native forest growing in the area and because the area is relatively inaccessible to hunters. On Tutuila, much lower densities were found in the eastern third of the island (4/sq. km) than in the central (30/sq. km) or western (16/sq. km) portions. We believe this is a result of the scrubby nature of the forests on the eastern side of the island. On the various islands we found the pigeon in rain forest, secondary forest, mixed forest, plantation land, and cloud forest.

If not actively calling or moving about the pigeon is inconspicuous, which can be a problem during a survey. On Ofu and Olosega we commonly observed Pacific Pigeons as they flew high along forested cliffs. However, birds did not appear to be actively calling and few were recorded during counts, which were conducted mostly from beneath the forest canopy. Pigeons may call more actively in areas such as Liu Bench where they are seldom hunted or disturbed.

Recommendations: The Pacific Pigeon is the most actively sought game bird in American Samoa and is probably the most important bird in Samoan culture. Traditionally, pigeon hunting is allowed only during certain months of the year. This law is poorly enforced, and it is widely known that pigeons are taken throughout the year. There are no daily or seasonal limits.

Although the species is not abundant, numbers are believed to be large enough to allow a hunting program. Regulations should be drafted that would establish a hunting season along with daily and seasonal bag limits. At the present, little is known about the biology, the breeding cycle, annual production, food preferences, and other life history factors. Studies should be initiated to investigate these factors and develop a sound management program.

FRIENDLY GROUND-DOVE: Gallicolumba stairi

Local name: Tu'aimeo. Tu'aimeo is given as the name for the female and Tu'antifa or Tu'autifa as the name for the male (Muse and Muse 1982, Watling 1982). The name assigned to the female appears to be the name used for the species as a whole, at least in American Samoa.

Other common names: Friendly Quail-Dove; Shy Ground-Dove

Distribution: Found on Ofu and possibly Olosega in American Samoa. Outside of American Samoa the species occurs in Western Samoa, Tonga, Fiji, and the Gilbert Islands.

Habits: This is a quiet and secretive bird of the forest understory. The bird voices a resonant, mournful coo, monotonously repeated (Watling 1982). We heard it call briefly on Ofu. The ground-dove forages on the ground or in the understory on seeds, fruit, buds, and young leaves and shoots (Watling 1982). It occupies any forest type (Watling 1982), but in American Samoa it has only been found in forest along the south side of Ofu. The breeding season is not known in American Samoa; the nest is an insubstantial structure of twigs, vine stems, and rootlets placed 1-3 m above the ground (Watling 1982).

Survey Results and Status: This species was first reported from Ofu in 1976, when Amerson et al. (1982) collected two individuals and observed another bird that was not taken. The birds were on the ground eating fallen fruits of Macaranga harveyana in coastal forest or plantation land at less than 60 m elevation near the airport. Based on these three observations Amerson et al. (1982) estimated the total population on Ofu at about 100 birds. Although Amerson et al. (1982) did not find the bird on Olosega, they received reports from residents that the species was present on that island.

We flushed 2-3 solitary Friendly Ground-Doves from the ground on Ofu on 17 July 1986. The birds were in forest along a rocky talus slope at 25-75 m elevation about 200 m inland of the south coast and 2 km east of the Ofu airport. The birds were evidently feeding on the ground and were very secretive. None were seen before they quietly flushed. All three birds appeared to be dark-phase individuals and were possibly young. We flushed one bird three times; each time it would fly about 30 m before landing in the understory. The bird was skittish and flew before we could approach closely.

The steep talus area where the birds were found supports a well-developed native forest with a complete canopy and a relatively open understory. The substrate consists of a jumble of many large, often loose rocks, interspersed with bare patches of loose soil. The steepness and constant sliding of the soil prevents ground cover from becoming established, and these open patches of soil provide foraging substrate for the ground-dove. Such areas are rare in American Samoa, and possibly the lack of such sites limits the distribution and abundance of the ground-dove. We searched similar areas on Olosega and although we did not find the ground-dove we expect that it is present.

We did not record the Friendly Ground-Dove during 8-minute counts and not make a population estimate. The population on Ofu is very small, however.

Recommendations: The very limited population of this species in American Samoa may be due to the limited habitat available. This habitat and the species should be protected. More life history information is needed to develop specific management practices, and surveys designed specifically for the ground-dove should be conducted.

BLUE-CROWNED LORY: *Vini australis*

Samoan name: Segavao. Various names have been listed for this species, including Sega; Sega'ula, Segavao, and Sega Samoa (Table 4). Segavao, meaning bird of the forest, is the commonly used name. It is similar to the name of the Fiji Shrikebill, Sega'olevao.

Other common names: Blue-crowned Lorikeet

Distribution: Historically, the Blue-crowned Lory was found on Ofu, Olosega, and Ta'u in American Samoa. Recently there have been sightings in Tutuila, where a population may become established. Outside of American Samoa, the species is found in Western Samoa, Tonga, and Fiji.

Habits: The Blue-crowned Lory is a conspicuous, social bird found in pairs or small groups. It feeds on nectar, pollen, and fruit (Watling 1982). Erythrina and coconut flowers are favorite sources of nectar. The species is vocal but not loud; the call is a high-pitched, clear whistle or screech, often voiced in flight or while actively feeding. The lory occupies a variety of forested habitats, but is perhaps most fond of mixed coconut forest in the lowlands. Amerson et al. (1982) found the lory to be most common around village and plantation lands. The lory is a mobile bird and commonly flies long distances above the forest canopy as it moves about. Based on our observations, there may be daily movements from roosting sites in the interior forests to foraging areas along the coast. This appears to be the case on Savai'i in Western Samoa as well (D. Blockstein, pers. comm.). Watling (1982) wrote that the species moved between islands, and R. Beck (in Banks 1984) wrote that lorries moved between Olosega and Ta'u. Flight is rapid and direct with fast steady wingbeats.

Survey Results and Status: (Appendix Table 10) This is a common resident in American Samoa that appears to have a well-established population. R. Beck (in Banks 1984) wrote that the lory was scarce on Olosega, but was more common on Ofu. Amerson et al. (1982) estimated a total population of 47,000. We recorded a total of 677 and estimated a population of 8,506. Highest densities were on Olosega (190/sq. km), followed by Ta'u (150/sq. km) and Ofu (94/sq. km).

In the 1980's there have been several reports of Blue-crowned Lorries from Tutuila (J. Enright and W. Knowles, pers. comm.). These could be stray birds from Western Samoa, the Manua Islands, or possibly escaped pets. Considering the fact that lorries are resident in Western Samoa and in the Manua Group, it is likely that they are not resident on Tutuila. According to Watling (1982) interruptions in its range may not be permanent, for the Blue-crowned Lorry is well known as an inter-island nomad.

Because of its highly mobile nature, the Blue-crowned Lorry is a difficult species to survey. Many of the birds that we recorded at upper elevations were flying over the survey area rather than actually foraging in or otherwise using the area.

Recommendations: It is not known what management practices would best benefit the lorry. The planting of certain food trees, such as *Erythrina*, would probably increase the nectar supply. More information about the life history is needed if management measures are to be implemented, but at this time no special management does not appear necessary.

LONG-TAILED CUCKOO: *Eudynamys taitensis*

Local name: 'Āleva

Other common names: Long-tailed New Zealand Cuckoo; Long-tailed Koel.

Distribution: This species has been reported from all islands in American Samoa. Outside American Samoa it breeds in New Zealand and winters throughout much of Polynesia, Micronesia, and parts of Melanesia.

Habits: This is a secretive and solitary species that moves quietly through the forest, flying short distances as it moves from perch to perch. It can be found in a variety of forest types and at all canopy levels, as well as on the ground. Amerson et al. (1982) wrote that it frequented deep forest as well as shrub areas, preferring cover to extensive open areas. The Long-tailed Cuckoo feeds on a variety of insects and other animal matter. It is not known to call when away from its breeding area in New Zealand, and is inconspicuous as it perches quietly within the vegetation. It is usually noticed in flight, often as it is mobbed by other birds. This is the only migrant that regularly reaches American Samoa from the southern hemisphere. Although it is more common in the Southern winter, birds are present year-round (Clapp and Sibley 1966, Amerson et al. 1982).

Survey Results and Status: The Long-tailed Cuckoo is an uncommon migrant in American Samoa (Amerson et al. 1982). We recorded several birds incidental to 8-minute counts. On 28 June 1986, we watched a Long-tailed Cuckoo in a forested portion of central Tutuila being mobbed by Samoan Starlings. On 10 July 1986, we observed a single Long-tailed Cuckoo flying over Pala Lake, Aunu'u. At Maga Point, Olosega, on 15 July 1986, a Long-tailed Cuckoo flew

past us four times over a period of several hours. We believe that only one bird was present. On Ta'ū on 25 July 1986, we flushed a Long-tailed Cuckoo from the ground along the ridge between Lata Mountain and Olotania Crater at an elevation of nearly 1,000 m. Too few birds were recorded to make a meaningful population estimate.

COMMON BARN OWL: Tyto Alba

Samoan name: Lulu

Other common names: Barn Owl

Distribution: In American Samoa the Barn Owl is found on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū. This is a widespread species outside of American Samoa and is found on many Pacific islands as well as most continental areas.

Habits: The Common Barn Owl is a nocturnal predator, although individuals can occasionally be seen flying during the day. It is an inconspicuous species and generally remains quietly hidden throughout the day. In flight, the bird appears very pale. R. Beck noted that the species seemed less nocturnal than the barn owl of California (in Banks 1984). The owl is reported to take rats, small birds, young chickens, lizards, insects, and possibly fruit bats (Watling 1982, Amerson et al. 1982). The nest is placed in the cavity of a tree or in a cave (Watling 1982). The call is a harsh, hissing screech. The owl occupies a variety of habitats, showing a preference for village and plantation lands.

Survey Results and Status: The Common Barn Owl is uncommon but is widely distributed throughout the islands of American Samoa (Amerson et al. 1982). Areas where owls were seen by Amerson et al. (1982) include the Tafuna Plain, Tutuila, and the airports and coastal roads on Ofu and Ta'ū.

We observed owls at several different locations on most of the islands visited. On Tutuila at dusk on 22 June 1985, an owl flew across the road on the mountain pass between Aua and Afono Villages. Owls were heard on several occasions at night near Mapusaga Village, Tutuila. It is believed that the birds called while in flight. On 6 July 1986 on Tutuila, we flushed an owl from a large Ficus tree in well-developed forest at tr. 10, st. 7. On 8 July 1986 we heard loud flapping from a tree at tr. 12, st. 2, Tutuila as a Samoan fruit bat (Pteropus samoensis) and an owl flew out. We received reports of owls on Aunu'u, but did not see any while on the island. Owls that are reported from Aunu'u could be visitors from Tutuila. We saw two owls on Olosega, one near Maga Point and the other along the coastal road near Sili. On Ta'ū, we observed an individual near Fitiuta Village at daybreak on 24 July 1986.

We did not make a population estimate. Comparing our observations to those of Amerson et al. (1982), the owl population appears to be stable.

Recommendations: Some Samoans shoot the owl because they fear it or because it kills chickens (D. Blockstein, pers. comm.). Because it preys upon chickens, the owl should be fully protected. Education of Samoans is needed to prevent shooting of the owl. Populations of this species may depend mostly on an abundant prey base, but little is known about the ecology or biology. Research on the diet and habits would provide valuable information about the

WHITE-RUMPED SWIFTLET: Collocalia spodiopygia

Local name: Pe'ape'a

Other common names: Gray Swiftlet; Gray-rumped Swiftlet

Distribution: This swiftlet is resident on Tutuila, Ofu, Olosega, and Ta'u. It is reported as a visitor to Aunu'u, but is not known to nest or roost there. Outside of American Samoa it is found throughout most of the islands of the South Pacific from American Samoa to north Australia.

Habits: The White-rumped Swiftlet roosts and nests in caves and forages on insects above a variety of habitat types. Amerson et al. (1982) found that its preferred habitat was secondary forest and plantation land, though the species was common above high windswept ridges as well. The species is gregarious and commonly forages in pairs or in small flocks of up to 100 birds. Caves are sometimes shared with the sheath-tailed bat (Emballonura macaodata). The call is a dry twittering, though away from nesting caves the species is not highly vocal. When in a cave, swiftlets continually voice an audible clicking used for echo-location. The species is very mobile and inconspicuous. No migratory pattern is known, though birds are thought to occasionally move between islands or from one cave to another. Nests are placed on the walls or ceilings of caves, and nesting is believed to continue throughout the year.

Survey Results and Status: (Appendix Table 11) This is a common resident on Tutuila, Ofu, Olosega, and Ta'u. Amerson et al. (1982) estimated a population of 350,000 birds. On 29 September 1976, Amerson et al. (1982) visited two caves that they describe at Anape'ape'a Cove, Afono Village, Tutuila. They found fewer than ten swiftlets and five fresh nests. We revisited the same site on 28 June 1985 and found about 50 birds, 7 of which were on nests. Amerson et al. (1982) estimated that 11,000 birds used these caves, though it is uncertain how this estimate was derived.

We recorded swiftlets over most areas on all islands. Although we did not find the swiftlet on Aunu'u, birds were reported to visit the island occasionally. We recorded several birds on Nu'utele Islet, Ofu, where there may be a small nesting cave (Amerson et al. 1982). We found the species was especially common along ridges, along roads, and in forest openings. We recorded a total of 1,086 during 8-minute counts and estimate the population

at 35,320. We calculated densities on Ofu (594/sq. km), Tutuila (208/sq. km), Olosega (169/sq. km), and Ta'ū (149/sq. km).

On Tutuila, densities were higher in the central third (389/sq. km) than in the western (126/sq. km) or the eastern third of the island (52/sq. km). Possibly most of the nesting caves are located in this part of the island. Swiftlets are thus concentrated in this area.

Recommendations: Management for the White-rumped Swiftlet should be based on the protection of nesting caves. An inventory of caves is needed, followed by a management plan that will secure or otherwise protect these sites. The method of protection will vary; some caves are inaccessible and should require no special management. Others are more vulnerable to human intrusion or development and must have management plans drafted. The maintenance of an adequate insect prey base will also be important for the swiftlet. Pest control and other factors that might decimate the prey base should be examined. The swiftlet forages above a variety of habitat types, and changing land use may have only a minor effect on the population.

COLLARED KINGFISHER: Halcyon chloris

Samoan name: Ti'otala

Other common names: White-collared Kingfisher, Mangrove Kingfisher.

Distribution: In American Samoa the Collared Kingfisher is found on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū. This species is widespread throughout American Samoa, and a number of races are found from American Samoa to Australia, Indonesia, Southern Asia, and Africa. The population in American Samoa represents the easternmost extent of the species' range. A similar species, the Flat-billed Kingfisher (H. recurvirostris), is found in West Samoa.

Habits: The Collared Kingfisher is a conspicuous territorial bird that is usually found alone or in pairs. It occupies a broad range of habitat from urban and coastal areas to deep interior forest. The kingfisher hunts predominantly insect prey by sitting quietly on an exposed perch, then flying down and pouncing on food items. Lizards, small rodents, and occasionally young birds are taken. One bird that we observed on 17 July 1986 on Ofu ate a large black skink. The call is loud and distinct, consisting generally of a number of clear, high notes followed by several very harsh churrs. The nest is placed in a cavity burrowed into rotten trees, earth banks, termite nests, or the base of tree ferns (Watling 1982, Amerson et al. 1982). Nests have been found in February and March, and the nesting season is evidently during the southern summer (Banks 1984, Amerson et al. 1982).

Based on differences in crown color, two subspecies are known from American Samoa, H. chloris pealei on Tutuila and Aunu'u, and H. chloris manuae on Ofu, Olosega, and Ta'u. Banks (1984) notes that there is considerable variation in the crown color of H. chloris pealei and suggests that there may be some exchange between the populations.

Survey Results and Status: (Appendix Table 12) Amerson et al. (1982) found the kingfisher uncommon on all islands and estimated the population at 7,000.

We recorded 288 birds during 8-minute counts and estimated a total population of 982. Average densities were similar among the islands and ranged from 6/sq. km on Tutuila and Ta'u to 9/sq. km on Ofu. On all islands densities were higher at lower elevations than at upper elevations. We recorded birds in all habitat types except montane and cloud forest. We found at least two birds on Nu'utele Islet, Ofu.

The Collared Kingfisher does well in mixed forest and plantation lands. Although densities are not high, the population is believed to be stable.

Recommendations: The kingfisher should fare well without special management, though it should be protected along with other songbirds. The kingfisher is said to occasionally take small chicks, and thus is not favored by some residents (Watling 1982). Such losses, however, are not known to be serious.

RED-VENTED BULBUL: Pycnonotus cafer

Samoa name: Manu Pālagi

Distribution: The Red-vented Bulbul is native to India and Southeast Asia, but has been introduced to several areas in the Pacific including Fiji, Tonga, Hawaii, American Samoa (Tutuila), Western Samoa, and parts of Australia. It is believed to have been introduced to American Samoa in the late 1950's (Amerson et al. 1982).

Habits: The bulbul is found around villages and in other disturbed habitats throughout Tutuila and is rarely seen in extensive tracts of undisturbed forest. It is a conspicuous species that calls frequently, remains in open habitats, and often congregates in small groups. The nesting season in Samoa is believed to be from October through February, during which time more than one clutch may be produced (Watling 1982, Amerson et al. 1982).

We found the bulbul common around residential and urban areas, where it foraged on grass in mowed lawns, on fruit, on food scraps, and other items. It would give way to the Common Myna when this larger species approached. Perhaps the largest center of concentration is on the Tafuna Plain, where the bulbul is common around residential areas and around the airport.

Survey Results and Status: (Appendix Table 13) Amerson et al. (1982) found this species to be common and estimated the population at 119,000. They calculated an average density of 12.54 on Tutuila and estimated the population at 1,655 (excluding the Tafuna Plain). Density was highest in the western third of Tutuila (25/sq. km) and was lower in the central (4/sq. km) and eastern (7/sq. km) thirds.

One of the largest centers of concentration for the Red-vented Bulbul on the Tafuna Plain, an area of 23 sq. km that was not included in the area surveyed. Densities here are undoubtedly higher than in the areas we surveyed, and several thousand birds could reasonably be added to our total population estimate.

It appears that this species has spread throughout the available habitat on Tutuila, and its numbers may now have stabilized since its introduction. With additional urbanization and clearing of forests, however, we expect its numbers may grow in the future.

Recommendations: The Red-vented Bulbul poses a threat to native birds through direct competition or as a reservoir of avian diseases. The bulbul could also be a threat to other native biota on the island, and is known to be an agricultural pest. For these reasons, we recommend that this species be protected, and actions should be taken to prevent its spread to Ofu, Olosega, and Ta'u. Eradication of the species on Tutuila is probably not feasible.

FIJI SHRIKEBILL: Clytorhynchus vitiensis

Samoan name: Sega'olevao

Because little has been written about the race in American Samoa, we provide a detailed account for this species.

Distribution: This endemic subspecies (C. v. powelli) occurs on Ofu, Olosega, and Ta'u in American Samoa. A number of other subspecies are found in Fiji and Tonga (Watling 1982).

Habits: Little is known about this uncommon and inconspicuous bird in American Samoa. Amerson et al. (1982) only recorded it from Ta'u, where they found the species in secondary and montane rain forests at about 250-600 m elevation. We recorded birds on Ofu, Olosega, and Ta'u at various elevations. The shrikebill is secretive and generally remains in dark, shady understory. Birds that we found were most often in small family groups of 2-4 individuals.

Habitat: On Ofu on 15 July 1986 we recorded a single bird near the top of Tumu at 440 m. The vegetation here consisted of native forest with a relatively low canopy and a dense understory. On 16 July 1986 we recorded a small group of shrikebills along the south coast of Ofu about 2 km east of the airport. The birds were found at an elevation of about 15 m and occupied the understory of well-developed native forest along the base of a talus slope.

On Olosega we recorded ten birds in four different groups on 16 July. All birds were in cloud forest near the top of Piumafua Mountain at an elevation of 400-600 m. The forest here is mossy, moist, and relatively cool. The trees are large and have a well-developed upper canopy. The understory is relatively open, partially a function of extensive pig damage. All birds were found in the understory, generally within 2 m of the ground in the thicker patches of understory vegetation. Several of the birds flew over the steep slope to the west, indicating that the verdant but somewhat scrubby vegetation along the cliff was also used as habitat.

On Ta'u we found birds at a number of locations around most of the island, from about 75-600 m. Although R. Beck (in Banks 1984) reported the shrikebill only from the north side of the island, we found birds around the entire island. The best habitat appeared to be moist, well-developed native forest at the middle elevations.

Based on our observations, prime habitat for the shrikebill consists of areas that have large trees with a complete canopy and a moderately dense understory. This correlates well with R. Beck's comment (in Banks 1984): "They keep fairly near the ground in the bushy sections under the high trees in the old parts of the forest." Shrikebills appear to avoid a dense understory where there is a partially open upper forest canopy.

Voice and Field Identification: The Samoan race of the Fiji Shrikebill is an all-dark, slaty gray bird [similar to the illustration in Muse and Muse (1982), and unlike the illustrations in Pratt et al. (1987) and Watling (1982), which are of a different race]. The white edges on the outer edge of the tail can be seen in the field and serve as a field trait. The shrikebill is not highly vocal. Calls and songs that we heard were given primarily in response to the presence of observers, in response to other shrikebills calling, and at dawn. Calls we heard include: sharp, harsh scold notes given in response to an observer; a clear, rapid, four-note whistle, each note being even and of the same volume and quality; and a single, clear whistle, soft but piercing, with a rising then lowering inflection. The four-note and single-note whistle calls were once heard at dawn and may constitute the dawn song. One bird that scolded us voiced the rapid four-note whistle, each whistle with a harsh scold note at the beginning. Sometimes shrikebills can be located by the snapping of their bill as they forage for insects.

Nesting: Nests have been found in January and July. Four nests were collected by R. Beck from 4-10 January 1924 on Ta'ū and Ofu (in Banks 1984). Two of these nests were from Ta'ū; they were located in the branch or fork of a small understory tree or bush. One was 1.5 m and the other 4.5 m above the ground. One nest measured 6 inches long and wide and 1-1/2 inches deep. The nests were made of shredded bark with a little green moss and were lined with blackish rootlets. One of the nests had two young in it, the other had a single fresh egg which was being incubated by the male.

We found a nest on 19 July 1986 on the south side of Ta'ū at 135 m elevation (tr. 7, st. 15) (Figures 8 and 9). The surrounding forest was well-developed with a complete canopy and a moderately developed understory. The nest was placed 1 m up in the fork of a 1.5 m-high understory shrub. The shrub had a single stem about 1 cm in diameter. The nest was made of coarse strands of bark, dried vegetable fibers, a few mosses, and had an inner cup lined with fine rootlets. The measurements were: outer diameter - 13.5 cm; inner cup diameter - 7.3 cm; cup depth - 4.4 cm; top to bottom - 13.6 cm; vegetation trailing from the bottom of the nest - 14 cm. The two eggs were white, finely speckled with rusty brown, and measured 25 x 18 mm and 26 x 17 mm.

No adult was on the nest when we first approached, but as we watched from 10 m away an adult flew in and began incubating. Two other shrikebills could be heard in the distance. The adult sat very tight and allowed us to approach within 2 m before flushing.

Aside from the fact that nests have been found in January and July, little is known about seasonality of breeding in American Samoa.

Foods and Foraging Behavior: The shrikebill forages on insects and "probably a little fruit" (Watling 1982). Birds we observed were gleaning and flycatching in the forest understory. An individual we saw in the vicinity of the nest took two, 2-cm long, white hairy caterpillars of unknown species.

Survey Results and Status: (Appendix Table 14) Amerson et al. (1982) regard the Fiji Shrikebill as uncommon. We found it to be uncommon to rare. During 8-minute counts we recorded 103 birds and estimated the population at 4,695. Densities were 9/sq. km on Ofu, 73/sq. km on Olosega, and 107/sq. km on Ta'ū. Greatest densities were found on Liu Bench on Ta'ū (368/sq. km). We did not record any birds above 600 m on Ta'ū. Based upon a comparison of our results to those of Amerson et al. (1982), the population appears to be stable.

Most of the birds that we recorded were very close to the observer, and the effective detection area is relatively small. Our sample size was small and more intensive surveys would result in better estimates.

Recommendations: This rare and unique endemic should be fully protected by local regulations. Aside from the protection of habitat, few management actions can be taken without first studying life history.

Figure 8. Nest
of Fiji Shrike-
bill found on
19 July
1986.

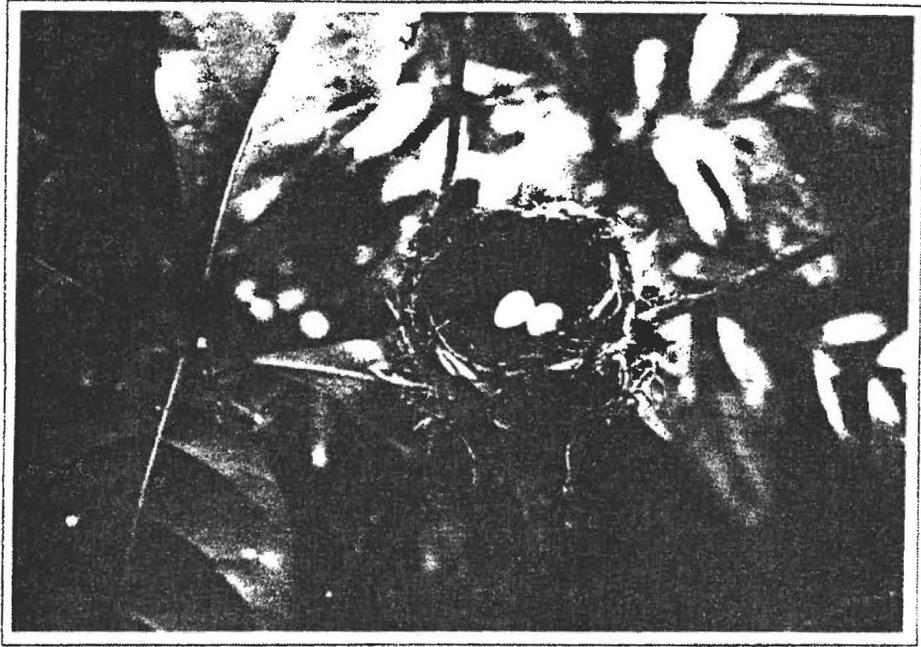


Figure 9. Side view of Fiji
Shrikebill nest pictured in
Figure 8.

MAO: Gymnomyza samoensis

Samoan name: Ma'oma'o

Other common names: Mao Honeyeater; Black-breasted Honeyeater.

Distribution: Endemic to Western Samoa, where it is found on the islands of Upolu and Savai'i. Specimens were previously collected from Tutuila, but the Tutuila population may now be extinct.

Habits: In Western Samoa this large honeyeater is found primarily in well-developed, moist, mossy forests at upper elevations; it is occasionally found in moist forests at lower elevations. Watling (1982) reports that it has been recorded visiting coconut trees near the coast, though this would probably be unusual. The bird uses the mid to upper canopy levels of the forest and will forage along forest edges and even in brushy forest openings. A pair that we observed in montane forest on Upolu was feeding on nectar in a brushy garden patch. Based on our limited observations, birds are generally found individually or in pairs. They are most often noticed by their loud, penetrating, eerie calls. The nest and nesting season have not been described.

Survey Results and Status: We did not record the Mao on American Samoa nor did Amerson et al. (1982). Banks (1984) gives details of three specimens originally reported by Mayr (1932) that were taken on Tutuila by the White South Seas Expedition in February 1924. Since then, we are only aware of one other record from Tutuila, the sighting of a bird in 1977 (Pratt et al. 1977).

The Mao, with its loud call, is a relatively conspicuous species. It is unlikely that a breeding population on Tutuila was missed during both this survey and the Amerson et al. (1982) survey. The fact that the two males collected in 1924 had enlarged testes (Banks 1984) indicated that at one time a population was breeding and presumably established on Tutuila. However, the birds recorded from Tutuila could possibly represent vagrants from Western Samoa. The status of the Mao on Tutuila remains questionable.

WATTLED HONEYEATER: Foulehaio carunculata

Local name: Lao

Other common names: Carunculated Honeyeater

Distribution: The Wattled Honeyeater is found on all the main islands of American Samoa as well as most small offshore islets. Outside of American Samoa it occurs in Western Samoa, Tonga, and Fiji. The population found in the Manua Islands may be slightly smaller and darker than the population on Tutuila (Banks 1984).

Habits: This loud and boisterous honeyeater is found in virtually all vegetation types, from mangrove to upper elevation cloud forest. It commonly inhabits scrubby strand vegetation and village gardens. In forest it generally remains in the upper canopy. Wattled Honeyeaters are aggressive and often chase and scold one another or other bird species. The honeyeater sings and calls often; at dawn and dusk it is especially vocal. The call is a loud, jumbled series of notes. When alarmed or scolding, such as when an owl flies over, the Wattled Honeyeater voices a steady yipping, a call similar to that given by begging young. Pairs often give a loud and rapid duet, timed perfectly and sounding like a single bird. Pairs are well distributed throughout various habitat types and appear to maintain and defend a territory. In some instances the species evidently forages in agroforest or mangroves during the day and moves into inland, native forest to roost. On at least one occasion at dusk we noted numbers of birds moving up a valley toward native forest. The Wattled Honeyeater feeds primarily on nectar, but also takes fruit, spiders, and insects (Watling 1982). The nest is reported to be a fragile cup of fine grass stalks or other fine strands of vegetation, commonly draped with spider's webs, and hung between the forked stem of a bush or tree (Watling 1982). The nesting season is not well defined, but based on specimen records and field reports it appears that some breeding occurs throughout the year, perhaps with peaks in mid-summer and mid-winter (Amerson et al. 1982, Banks 1984). We observed a begging young just out of the nest on 14 July 1986.

Survey Results and Status: (Appendix Table 15) Past researchers have found this to be the most abundant and conspicuous land bird in American Samoa (Clapp and Sibley 1966, Amerson et al. 1982, Beck in Banks 1984). Our findings confirm these earlier reports. We found the Wattled Honeyeater to be so conspicuous and abundant that it was sometimes difficult to isolate and determine the total number of birds actually calling during each count. We recorded 7,859 birds, calculated an average density of 982/sq. km, and estimated a total population of 163,387. Densities were high on all islands, but were greater on Ofu (1,203/sq. km) and Olosega (1,461/sq. km) than on Ta'u (1,034/sq. km) and Tutuila (868/sq. km). All areas and habitats had high densities, though densities were lower at upper elevations than at lower elevations, especially in cloud forest on Ta'u. We noted especially high densities in bushy stands of beach sunflower (Wedelia biflora) along the coast

of Olosega. Amerson et al. (1982) found highest densities in mangrove forest and lowest in montane scrub.

Recommendations: This abundant species should be protected as a songbird, but requires no special management at this time.

CARDINAL HONEYEATER: Myzomela cardinalis

Samoan name: Segasegamau'u

Distribution: The Cardinal Honeyeater is widespread in the Western Pacific but in American Samoa is found only on Tutuila. Outside of American Samoa it occurs in Western Samoa, Rotuma Island in Fiji, New Caledonia, Vanuatu, the Solomons, and in much of Micronesia. The population in Micronesia is regarded as a separate species by Pratt et al. (1987).

Habits: This bright and conspicuous honeyeater frequents a variety of habitats, from suburban gardens to mature rain forest. It is common in mangrove stands and coconut plantations, where flowers provide an abundant source of nectar. The Cardinal Honeyeater is nectarivorous, but it sometimes takes insects as well. The calls consist of thin, high, wheezy whistles. Its dawn song is complex, and consists of a variety of wheezy whistles and chirp. Though normally well distributed throughout various habitat types, birds will sometimes gather around a good food source. At dusk we have seen groups of birds flying above the forest canopy as they moved from agroforest or mangroves toward native forest. These birds were evidently feeding in mangroves during the day and roosting elsewhere at night. The nest is a loosely-woven cup hung between a small fork in a bush or tree. The nesting season is not certainly known, but based on specimen records (Banks 1984), it appears that some nesting occurs throughout the year. We heard a begging young calling on 22 June 1985, and another on 28 June 1986.

Survey Results and Status: (Appendix Table 16) The species is common and abundant on Tutuila. Amerson et al. (1984) found it in all habitats except Kula fernland and estimated the population at 118,000. We likewise found it in all habitats. Densities were higher in plantation land and mixed vegetation than in rain forest. We calculated an average density of 91/sq. km and estimated the total population at 9,940. The Cardinal Honeyeater was one of the only species that had higher densities on the eastern third of Tutuila (116/sq. km) than on the western third of the island (69/sq. km).

Recommendations: The Cardinal Honeyeater is an adaptable species that could not require special management practices. The species should be protected as a songbird.

POLYNESIAN STARLING: Aplonis tabuensis

Local name: Miti Vao

Other common names: Striped Starling

Distribution: The Polynesian Starling occurs on all the main islands of American Samoa. Outside of American Samoa it is found in Western Samoa, Tonga, Fiji, and the eastern Solomon Islands.

Two different subspecies are found in American Samoa, A. t. tutuila on Tutuila and A. t. manuae in the Manua Islands. The race found in the Manuas is distinctly darker than that found on Tutuila.

Habits: The Polynesian Starling is less conspicuous than the Samoan Starling and generally prefers to remain within the cover of the canopy. (Outside of Samoa, however, Pratt et al. (1987) report it to be bold and conspicuous.) The Polynesian Starling is found in most forest types, though it seldom uses the upper cloud forest of Ta'ū and Olosega. While Amerson et al. (1982) rarely saw birds below 120 m, we recorded the species regularly at this elevational range in suitable habitat. The Polynesian Starling is usually found individually or in pairs, but will sometimes gather in small groups. It forages on fruits, berries, and insects (Watling 1982). Amerson et al. (1982) frequently found it eating small caterpillars. The Polynesian Starling is capable of a variety of whistles, but has a characteristic short, rising trill. The nest is placed in a hole in a tree or rotten stump at any height above the ground (Watling 1984). Nesting season is not definitely known, but based on specimen records it may peak during the boreal spring and summer months (Banks 1984).

Survey Results and Status: (Appendix Table 17) Amerson et al. (1982) found the Polynesian Starling to be common on all the main islands and Aunu'u. We found birds to be relatively common on all the main islands but did not record the species from Aunu'u. We had a total of 486 records and estimated a total population of 13,016. Densities on the various islands ranged from 16/sq. km on Olosega to 79/sq. km on Tutuila. We estimated relatively high densities in all habitat types at all elevations with the exception of cloud forest on Ta'ū. On Tutuila, birds were less abundant in the eastern third of the island (42/sq. km) than in the central (98/sq. km) or western thirds (85/sq. km). We believe that this indicates a preference for the well-developed forests on the western two thirds of the island.

Recommendations: Little is known about the life history of this species. We recommend that the Polynesian Starling be protected along with other birds, but specific management actions do not appear necessary.

SAMOAN STARLING: Aplonis atrifusca

Samoan name: Fuia

Distribution: This species is endemic to Western and American Samoa. American Samoa it resides on all the main islands and even small offshore islets such as Nu'utele off Ofu.

Habits: The Samoan Starling is conspicuous and noisy. It often moves about in small groups as it forages for fruit, usually in the upper canopy. Amerson et al. (1982) found that papaya and banana were favorite foods. Insects are taken as well (Watling 1982). The starling is found in all forest types, but prefers mixed agroforest areas. Calls consist of a variety of mostly clear whistles. A song is sometimes given that consists of a string of hollow-sounding whistled notes. The nest is placed in a cavity in large trees. We observed adults carrying food into a coconut tree on 27 June 1984. A summary of past data suggests an extended breeding season from about June to December (Banks 1984).

Survey Results and Status: (Appendix Table 18) The Samoan Starling is common throughout American Samoa. We calculated an average density of 361/sq. km. Densities were similar among the different islands. Highest densities were on Ofu (381/sq. km) and lowest densities were on Olosega (269/sq. km). Birds were common in all habitat types and at all elevations. On Tutuila birds were common on both eastern and western parts of the island.

Recommendations: This species should be protected, but because of its potential as an agricultural pest there could be conditions for control if problems arise.

COMMON MYNA: Acridotheres tristis

Samoan name: None known.

Other common names: Indian Myna; House Myna.

Distribution: Introduced to Tutuila in American Samoa. Native to India but introduced throughout much of the Pacific including Western Samoa, Fiji, the Solomons, and Hawaii.

Habits: The Common Myna is found in a variety of habitats altered by humans, especially urban and residential habitats, where it forages on lawns, parking lots, and along streets. It feeds on insects, fruit, grains, and garbage (Watling 1982). Birds are often found in pairs. Although feeding territories are defended, birds often congregate in communal roosting trees at night. The Common Myna is conspicuous and noisy. Calls are loud, raucous, and unmusical. It is an aggressive species that will harass and scold other birds. The nest is placed in a cavity in a building or tree, but the nesting season in American Samoa is not known.

Survey Results and Status: The population of Common Mynas on Tutuila is poorly established and still small. Birds evidently arrived on Tutuila sometime between 1976, when Amerson et al. (1982) completed their survey, and October 1980, when Potter (1981) observed a single bird on the grounds of the Rainmaker Hotel. He saw the bird on two consecutive days and believed that it was the same individual. Though Potter (1981) remained on Tutuila for about 2 weeks, this was the only individual he observed. The population must have been very small at that time and just been introduced. The Tutuila population possibly originated from Western Samoa or Fiji rather than from Hawaii as suggested by Potter (1981).

We did not record the Common Myna during 8-minute counts, but saw them regularly in urban areas around Pago Pago Harbor, the airport, and the Tafuna main. The farthest west that we recorded the myna was in Leone, where we observed a pair foraging on a lawn. Numbers were low and we did not locate any large roost sites. A flock of seven birds near the Rainmaker Hotel was the largest we saw.

Clearly, the population has increased since 1980 when only one bird was reported. It is unlikely that the population has reached a peak and we expect that it will grow in future years.

Recommendations: As an introduced species the Common Myna poses a potential problem to the native fauna. The Common Myna could compete directly with native species, could prey upon native fauna, or could act as a host for various diseases. The population on Tutuila could also spread to the Manua Islands. We recommend that the population be eradicated. Whether or not this is possible or feasible depends on the amount of effort devoted to the program. At present, the Common Myna is restricted to a relatively small area on Tutuila, and it should be possible to remove this small population.

JUNGLE MYNA: Acridotheres fuscus

Samoa name: None known.

Distribution: A few birds have been observed on Tutuila and a population may soon become established on this island. The species is native to India and Southeast Asia, and has been introduced to Fiji and Western Samoa.

Habits: Like the Common Myna, the Jungle Myna associates with human-altered habitats. The Jungle Myna, however, is better adapted to forest edges and fields away from urban centers. On Upolu, Western Samoa, birds roost in large flocks in downtown Apia and disperse to forage during the day. The Jungle Myna is primarily insectivorous and feeds mainly on the ground. Fruit and nectar are also taken (Watling 1982). Nests are placed in cavities in trees or buildings (Watling 1982).

Survey Results and Status: The Jungle Myna has not previously been reported from American Samoa. We observed a group of four birds in mid-morning at the airport on Tutuila on 3 July 1986. The birds were first seen on the lawn near one of the outbuildings, but immediately flushed and perched on a telephone wire. We observed the birds for several minutes at a distance of 15 m and clearly noted the field marks that separate this species from the Common Myna. The birds were somewhat smaller than a Common Myna, had a distinct nasal tuft, and had no bare yellow patch of skin below and behind the eye. [Although the photograph of the myna in Muse and Muse (1982) is that of a Jungle Myna, the description given is that of a Common Myna.] We visited the airport on several other occasions but did not see the birds again in 1986. In 1987, we observed a pair of Jungle Mynas in the same area at the airport at 0730 hrs on 29 July. The pair foraged on the lawn for several minutes, occasionally flying up into low plumeria (Plumeria sp.) trees and atop fences. One bird captured a gecko around the base of a plumeria tree.

These are the first reports of the Jungle Myna on Tutuila, and it is not known where the birds originated. The birds probably came from Upolu, but whether they reached Tutuila via a boat or whether the birds simply flew from Upolu to Tutuila is not known. The fact that birds have been on the island for at least a year, and that pairs appear to be present, would indicate that a population may soon become established.

Recommendations: This species, perhaps more so than the Common Myna, has potential for disrupting native ecosystems because it is able to move into an use habitats that have many native components. We strongly recommend that an eradication program be initiated. If done before the population becomes established the program would require minimal time and energy.

COMMENTS ON METHOD

SURVEY METHOD

The variable circular plot methodology can be relied upon to remove from counts of species those detectability effects which are attributable to differences in observers' abilities and differences in density of vegetation surrounding the stations. Whether the method produces accurate measures of population density, however, depends upon how closely a species' behavior adheres to the method's assumptions. Behavioral patterns which do not meet the assumptions required for obtaining true estimates of density include the following. A highly mobile species (White-rumped Swiftlet, Blue-crowned Lory, Ocean Starling) have their population densities overestimated by the variable circular plot method (Scott and Ramsey 1981). The method may also be susceptible to error introduced by species which emit low frequency calls, making estimation of distance difficult (Scott et al. 1981). The Purple-rumped Fruit-Dove is a case in point. The method overestimates the density of species which are curious and attracted to the observer (possibly the Wattled Honeyeater and Fiji Shrikebill), but underestimates the density of those that avoid the observer by moving off or ceasing vocalization (Purple Swamphen). The tendency of many species to occur in small flocks or groups will not bias estimates of density, but it does render the estimates more variable (Pollock 1981). We emphasize, however, that the method does provide indices free from observer and habitat effects even in those cases where the assumptions are obviously violated.

COMPARISON TO AMERSON SURVEY

We compared our forest bird population estimates to those obtained by Amerson et al. (1982) and found that their estimates were generally much higher than those calculated on this survey, sometimes as much as 150 times higher (Table 7). Of the 10 forest birds for which we compared populations, our estimates were lower for 9 species; we had a higher population estimate for only 1 bird, the Fiji Shrikebill (Table 7). Based on our experience on other Pacific islands, bird populations appeared "healthy" during our survey in Samoa and we do not believe that the lower values obtained on this survey reflect a true decline in forest bird numbers. Rather, the difference is probably a result of different methods of calculating densities. Because Amerson et al. (1982) do not fully describe their methods (neither the amount of area surveyed nor the number of birds recorded at each plot are given), we do not know the reason for the significant differences in population estimates between the two surveys. This survey, done with the variable circular plot method, is repeatable, whereas that conducted by Amerson et al. is probably

not. Also, the number of sites (points or plots) surveyed, the amount of area surveyed, and the sample size was considerably larger on this survey than on the Amerson et al. survey. Amerson et al. surveyed birds at 34 different plots on the main islands (Amerson et al. 1982, Vol. I, Table 1, p. 78), while we surveyed 441 stations. It is not known how much area was surveyed at each of these sites by Amerson et al., but it probably ranged from about 0.04-1.00 ha (Amerson et al. 1982, Vol. II, pp. 7-17 and Table 55, p. 130). With the variable circular plot method that we used, the area surveyed at each station varied with the species, the observer, and other factors, but ranged from about 0.2 ha for species such as the Fiji Shrikebill to over 5 ha for species such as the Purple-capped Fruit-Dove.

We have not made a comparison of non-forest bird population estimates between the two surveys, largely because we do not consider the variable circular plot to be the best method to survey these species. Amerson et al. (1982) based their estimates for seabirds on counts of colonies, which we consider to be a more accurate method of determining population sizes for a group of birds than the variable circular plot.

Table 7. Comparison of population estimates for 18 species of birds based on results from Amerson et al. (1982) and this survey. Estimates are for populations on Tutuila, Aunu'u, Ofu, Olosega, and Ta'u. The magnitude of difference and percent difference are measures of the difference in population estimates from Amerson's survey to this survey.

Species	Population estimate, Amerson et al.	Population estimate, this survey	Magnitude of difference	Percent difference
<u>Five forest birds</u>				
Many-colored Fruit-Dove	no estimate	85	--	--
Purple-capped Fruit-Dove	326,550	11,691	-27.9	-96%
Pacific Pigeon	58,100	3,910	-14.9	-93%
Blue-crowned Lōry	47,350	8,506	-5.6	-82%
White-rumped Swiftlet	349,530	35,320	-9.9	-90%
Collared Kingfisher	146,955	982	-149.6	-99%
Fiji Shrikebill	4,400	4,965	+1.1	+13%
Wattled Honeyeater	545,520	163,387	-3.3	-70%
Cardinal Honeyeater	118,100	9,940	-11.9	-92%
Polynesian Starling	106,450	13,016	-8.2	-88%
Samoan Starling	334,405	62,296	-5.4	-81%
<u>Non-forest birds</u>				
White-tailed Tropicbird	3,700	2,312	--	--
Banded Rail	2,030	2,332	--	--
Purple Swamphen	720	313	--	--
Brown Noddy	15,850	4,026	--	--
Black Noddy	5,200	39	--	--
White Tern	4,250	11,269	--	--
Red-vented Bulbul	18,900	1,655	--	--

RECOMMENDATIONS

A section on recommendations regarding resource management is included in Amerson et al. (1982, Vol. I, pp 62-74), and we refer the reader to that report. The recommendations are sound and still applicable today. We highlight here some of those recommendations and include several others pertaining to avifaunal resources. A major step in the conservation of natural resources in American Samoa was made in 1986, when a wildlife program was initiated by the American Samoa Office of Marine and Wildlife Resources. The program is supported by Federal Pittman-Robertson funds.

ESTABLISHMENT OF ECOLOGICAL RESERVES

Preservation of habitat is a primary goal in assuring the continued existence of native birds in American Samoa. Loss of habitat, due primarily to an increased human population and continued development, is a problem facing several avian species. Wise land use planning, combined with securing and protecting the most important ecological areas, is needed. Specific areas and representative samples of habitat zones identified in this report should be protected through legislation and other means. Areas of special concern which are under the greatest threat of being lost include the following:

Native Broadleaf Forest

This forest includes lowland rain forest and montane rain forest discussed by Amerson et al. (1982). Much of the richest and best-developed native forest has been cut or otherwise modified for agriculture or other development, especially on Tutuila. The previously extensive lowland forest on Tafuna Plain, Tutuila, is now nearly gone; a few large Ficus remain as reminders of this once well-developed forest. Loss of native forest will continue, and representative portions of this forest type should be set aside. On Tutuila, good stands of native forest are located on the north slope of the island between Afono and Fagasa, and on the north and central portions of the island from Fagasa to Fagamalo. On Ta'u, most of the Liu Bench area consists of undisturbed and inaccessible native forest.

Coastal Marshes and Freshwater Wetlands

Wetlands are scarce throughout American Samoa. One species that is dependent on wetlands, the Gray Duck, may now be extinct partly because of the loss of these areas. All remaining wetlands in American Samoa should be preserved or otherwise protected and additional wetlands should be developed. Most wetlands, with the exception of Faimulivai Marsh on Aunu'u (Figure 10), have been modified by humans in some way, and a number are used for the cultivation of taro. The production of wetland taro is generally compatible with the management of wetland areas, and should be encouraged except perhaps in Faimulivai Marsh. This marsh should be set aside as a preserve.

Mangrove Forest

Mangroves are very limited in American Samoa and this unique community should be protected from filling and cutting. Only three good examples of mangrove forest remain in American Samoa: around Pala Lagoon, Tutuila; at Asefau, Tutuila; and around Pala Lake, Aunu'u (Amerson et al. 1982). Although there are no birds that are completely dependent upon mangroves for survival, several species use this habitat. The tidal flats around mangroves provide feeding sites for migratory shorebirds as well.

Cloud Forest and Montane Scrub

These habitat types, found at inaccessible upper elevations (Figure 11), are not immediately threatened by development. However, feral pigs are seriously damaging certain areas on Olosega and Ta'u. The harvest and control of pigs in these areas should be encouraged. Cloud forest and montane scrub are of special importance because they are used by several ground-nesting seabirds, including the Audubon's Shearwater, at least two petrels, and possibly several other seabirds. Any future planning should take into consideration these unique areas necessary for the survival of these seabirds.

Pola Islet and Pola'uta Ridge, Tutuila

This rugged islet and ridge on the north side of Tutuila near Vatia provide important nesting and roosting habitat for several species of seabirds, including Red-footed and Brown boobies, Great and Lesser Frigatebirds, Brown, Black, and Blue-gray noddies, the Gray-backed Tern, and possibly others (Figure 12). This is the most important nesting area for seabirds on Tutuila, and should be designated a seabird sanctuary.

Fagatele Bay, Tutuila

The waters of Fagatele Bay have been designated as a marine preserve. The coastal forests and steep cliffs surrounding the Bay should also be protected. The slopes surrounding the Bay provide nesting and roosting habitat for several seabirds, including the Brown Booby, Blue-gray Noddy, Brown Noddy, Gray-backed Tern, and White Tern. The forest around the Bay provides roosting habitat for a colony of Tongan fruit bats (Pteropus tonganus). This is one of the largest colonies in American Samoa.

Caves

Caves provide nesting and roosting habitat for the White-rumped Swiftlet as well as the sheath-tailed bat. These sites should be preserved and protected from excessive human disturbance. Caves presently occupied by swiftlets include two caves along the shoreline of Anape'ape'a Cove, Tutuila. Several other potential cave sites are described by Amerson et al. (1982). There are undoubtedly a number of caves that have not been found or described. A search should be made to inventory caves, and management actions should be taken to protect caves that are threatened.



Figure 10. Faimulivai Marsh, Aunu'u. The marsh is located in a dormant volcanic crater.

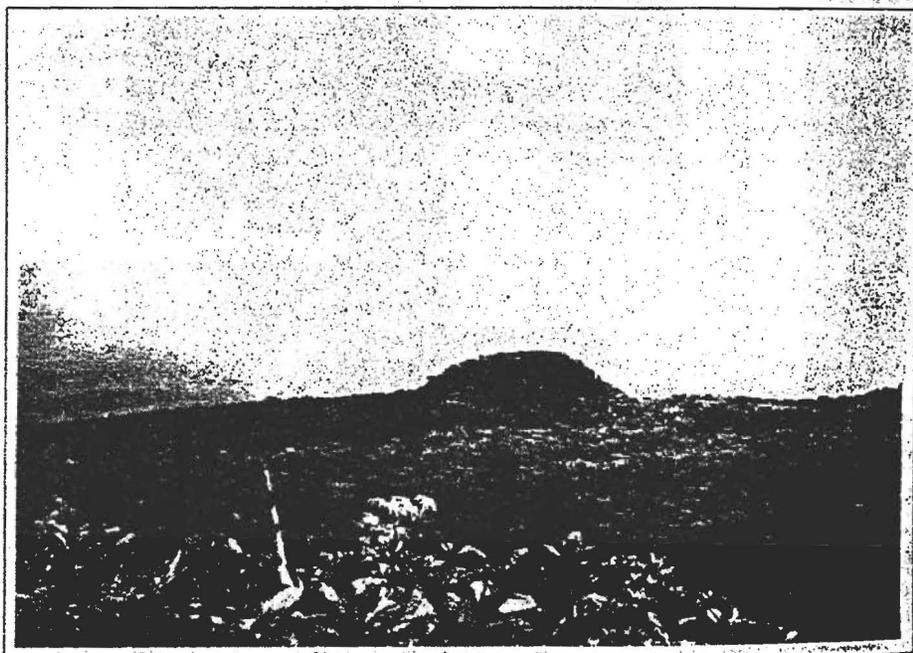


Figure 11. Cloud forest at the upper elevations of Ta'u. The photograph was taken from Olotania Crater looking down onto Olomatimu Crater.

Southern Ta'ū

The southern coast of Ta'ū, from Lavania Cove to Ulufala Point, and the beach below and south of Lata Mountain, is an isolated and unique area. The forests here are undisturbed and represent some of the best forest habitat in all of American Samoa. Highest densities for several forest birds, including the Fiji Shrikebill, were found in this area. The largest colony of Black Noddies on the main islands nests along this coast. White Terns, Brown Noddies, and White-tailed Tropicbirds also use the area for nesting and roosting. Tahiti Petrels and Audubon's Shearwaters use the upper cliff ridge around Lata Mountain. This unique area, although under no immediate threat, should be protected and set aside as a reserve.

Nu'utele Islet, Ofu

This islet off the west coast of Ofu is described by Amerson et al. (1982). In the past the native forest has been converted mostly into a coconut plantation. The forest has been further modified by pigs and cattle. As such, the vegetation is not unique. However, the steep coastal cliffs along the west coast of the Islet are important for seabirds that roost and nest here. These include the Brown Booby, the Blue-gray Noddy, and the Brown Noddy. A colony of Red-footed Boobies was once reported to nest on the islet, but is no longer extant. If protected, Nu'utele Islet might become a more important seabird sanctuary.

Maga Point, Olosega

This rocky peninsula and the adjacent coastal cliffs on the south coast of Olosega are used by nesting and roosting seabirds, including the Brown Booby, the Brown Noddy, and the Blue-Gray Noddy (Figure 13). We have also observed Red-footed Boobies and a single Masked Booby resting here. Maga Point is steep and inaccessible, and seabirds have found a refuge here because of its isolation. The area should be designated as a seabird sanctuary. In 1987, a road was built on the mainland that skirted the base of Maga Point. Disturbance caused by the building of this road has possibly caused some seabirds to leave the area.

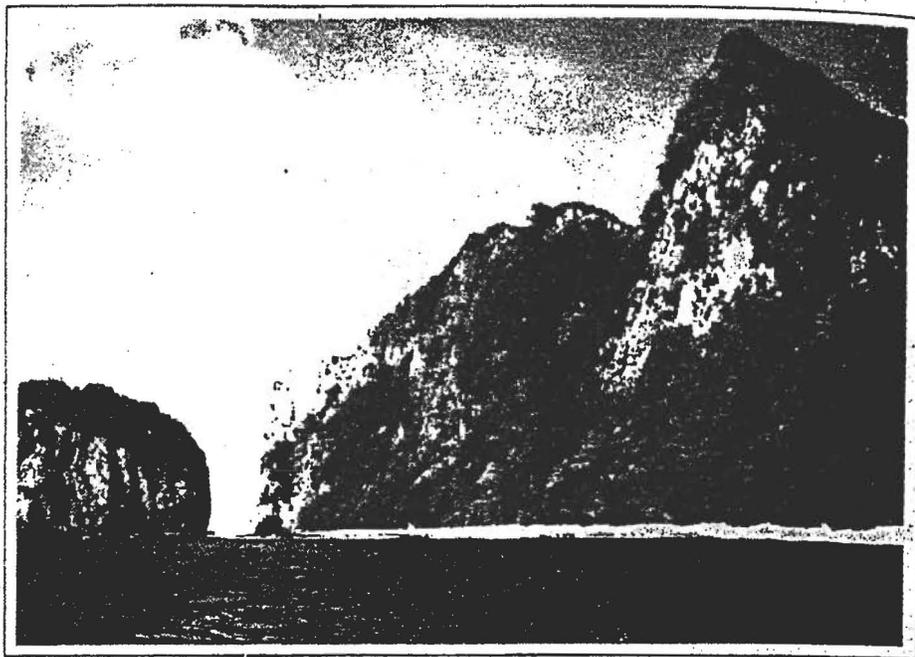


Figure 12. Pola Islet (left) and Pola'uta Ridge, Tutuila. Many seabirds nest on the cliffs in this area.

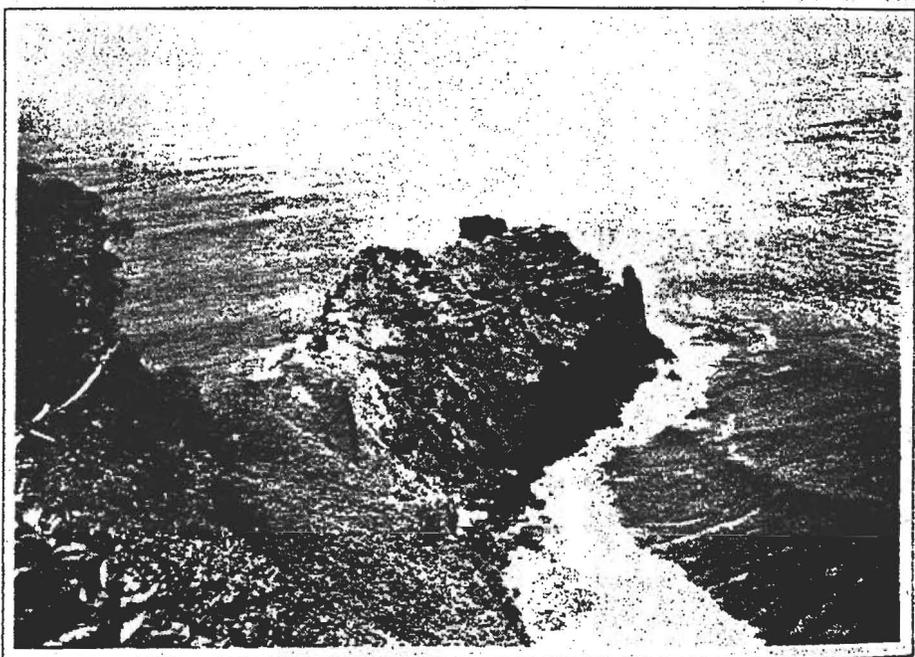


Figure 13. Maga Point, Olosega. This is a favorite roosting and nesting site for several species of seabirds.

INTRODUCED SPECIES

One of the serious threats facing the flora and fauna of America Samoa is the introduction of alien species. Introduced species may compete with or prey upon the native flora and fauna, may bring in diseases harmful to native species, or may otherwise upset ecological balances. There are already several introduced species of animals in America Samoa, including the marine toad (Bufo marinus), the Red-vented Bulbul, the Common Myna, the pig (Sus scrofa), a mouse (Mus musculus), and several species of rats (Rattus spp.).

Introductions should be discouraged and controlled. With the exception of a few species of agricultural importance, birds from outside America Samoa should not be allowed entry, nor should they be kept as pets and transported between islands within America Samoa. Many birds that have become established on islands throughout the world are a result of the pet trade.

Two recent introductions to America Samoa, the Common Myna and the Jungle Myna, are found only on Tutuila in very limited numbers. Because the numbers are very low and the distribution is limited, we believe that an eradication program would be feasible and desirable. It would probably not be feasible to attempt control or eradication of the Red-vented Bulbul, which has a relatively large population and distribution.

Species of commercial value such as the Red Junglefowl should be thoroughly tested by a veterinarian for diseases before being brought to the island and should be quarantined upon arrival. Many of the regulatory mechanisms for agricultural inspection and animal quarantine are already established, but further legislation is needed to ban the introduction of non-native birds and other non-native species.

CONSERVATION LEGISLATION AND ENFORCEMENT

Few of the conservation recommendations presented in this report can be executed without appropriate legislation. A concerted effort should be made to draft and promulgate such legislation. This should encompass a variety of subjects, including the establishment of refuges, hunting regulations, and local endangered species regulations. At present there are no bird hunting regulations in American Samoa. Amerson et al. (1982) wrote that "Hunting, especially for Pacific Pigeons, traditionally takes place only during September and October, but this unwritten custom is not enforced. Until recently, the only regulatory agents for the territory were the police, who do not attempt to control hunting except to issue firearm permits....Legislation for better hunting regulations and enforcement is a necessary part of a program for preservation of many of the bird species in American Samoa. Such regulation should completely protect some species and should set season and bag limits on others. Regulations should permit the taking of specimens for scientific purposes under proper controls."

CONSERVATION EDUCATION

An integral part of a sound conservation program includes education of the public. Regardless of the enactment of a number of environmental regulations, enforcement of such laws will be difficult and only partially successful without a public education program. Such programs should start with young students in the classroom. Amerson et al. (1982) wrote that "An appreciation and understanding of Samoan plants and animals should be encouraged. Biology classes should stress the importance of the forest and the insular ecosystem of American Samoa. Too often, examples are taken from mainland textbooks that have no relevance to the student's island environment."

ENDANGERED AND RARE SPECIES

No resident forest bird from American Samoa is included on the U.S. endangered species list. Results of the forest bird survey have shown that most forest birds of American Samoa are able to thrive in a variety of forest types and are relatively common. This adaptability accounts for the general abundance of most species. We are aware of only one forest bird once found in American Samoa that is evidently now gone, the Mao. In contrast, two-thirds of the avifauna of Hawaii has become extinct since the arrival of humans.

Some species in American Samoa are restricted in their habitat requirements or are limited by other factors. These are mostly indigenous, rather than endemic species. Most have extensive ranges in the tropical Pacific and are not endangered at the species level. Populations of certain species in American Samoa are restricted, however, and merit local protection. These include the following species:

Gray Duck

This bird may now be extinct in American Samoa, where it was probably never common. The very limited amount of wetland habitat, along with hunting, are believed to be the main reasons for the decline.

Friendly Ground-Dove

The Friendly Ground-Dove is a rare bird in American Samoa. Although Amerson et al. (1982) speculate that it may be a recent arrival, we believe that it has probably been long-established. Little is known about the ground-dove or the reasons for its rarity in American Samoa. Amerson et al. (1982) believe that hunting pressure, rat predation, or disturbance of lowland rain forest could all be limiting factors. The absence of suitable habitat could also be a potential limiting factor.

Many-colored Fruit-Dove

The Many-colored Fruit-Dove is uncommon to rare in American Samoa. However, it is also inconspicuous, has a patchy distribution, and is probably more common than it seems. The species appears to be affiliated with suitable food trees such as Ficus. The loss of mature native forest, along with the loss of food trees, probably limit this species.

Fiji Shrikebill

Although not faced with any imminent threat, the Fiji Shrikebill is an uncommon species found only on Ofu, Olosega, and Ta'ū. This unique bird is an endemic subspecies, and populations should be monitored in future years.

Spotless Crane

Little is known about the habitat requirements of this rare bird. We found it in moist weedy areas on Ta'ū, and efforts should be made to maintain these areas. Research on habitat requirements and life history would probably be needed before specific management actions could be taken.

SEABIRD COLONIES

Though occasionally used for food by Samoans, seabirds serve a more valuable function as an aid in locating schools of fish for fishermen. On commercial grounds alone, the conservation of seabirds is high priority for a wildlife program. Seabirds are important ecological components of the marine and terrestrial environments.

Many seabirds are colonial in their nesting behavior and are restricted in their choice of nesting sites. It is important to identify and secure these colonies. Some species such as the White Tern, White-tailed Tropicbird, and Brown Noddy nest at scattered locations throughout forested areas. For these species the general preservation of forests is important.

Most seabirds found in American Samoa have extensive ranges in the Pacific. Although not endangered at the species level, many occur in small numbers and in restricted habitats in American Samoa.

MIGRATORY SHOREBIRDS

Several species of migratory shorebirds winter or pass through American Samoa during the non-breeding season. Most are found along the shore, where they feed and roost. Others forage in open grassy fields. Feeding and roosting habitat for these species appears to be under no immediate threat, with perhaps the exception of certain tidal flats which may eventually be filled for commercial or residential development. Pala Lagoon is an example. Tidal flats throughout American Samoa should be protected.

FURTHER STUDIES

Our knowledge of the ecology of avifaunal resources in American Samoa is very limited. Distribution and abundance is now described, but little is known about life histories of forest birds. Further studies would aid in the management and conservation of the avifauna. Life history studies that explore activity patterns, habitat use, food habits, dispersal, and nesting habits are needed. These studies should focus on 1) Rare species such as the Gray Duck; 2) Game species such as the Pacific Pigeon; 3) Seabirds and seabird colonies, which are important to commercial fishermen; and 4) Introduced species such as the Common Myna and Red-vented Bulbul. In addition to life history studies, periodic surveys should be conducted to monitor population levels of all types of birds.

LITERATURE CITED

- American Ornithologists Union. 1983. Check-list of North American birds. Sixth ed. Allen Press, Lawrence, Kansas.
- Amerson, A. B., Jr., W. A. Whistler, and T. D. Schwaner. 1982. Wildlife and Wildlife habitat of American Samoa: Vol. I, Environment and ecology (119 pp.) and Vol. II, Accounts of flora and fauna (151 pp.). U.S. Fish and Wildlife Service, Washington, D.C.
- Ashmole, M. J. 1963. Guide to the birds of Samoa. Pac. Sci. Inf. Center, B. P. Bishop Museum, Honolulu, HI. 21 pp. (Mimeo)
- Banks, R. C. 1984. Bird specimens from American Samoa. Pacific Science 38(2):150-169.
- Clapp, R. B. 1968. The birds of Swain's Island South-central Pacific. Notornis 15:198-206.
- Clapp, R. B., and F. C. Sibley. 1966. Notes on the birds of Tutuila, American Samoa. Notornis 13:157-164.
- Connors, P. G. 1983. Taxonomy, distribution, and evolution of golden plovers (Pluvialis dominica and Pluvialis fulva). Auk 100:607-620.
- Engbring, J., and A. Engilis, Jr. 1988. Rediscovery of the Sooty Rail (Porzana tabuensis) in American Samoa. Auk 105:391.
- Engbring, J., and F. L. Ramsey. 1984. Distribution and abundance of the forest birds of Guam; results of a 1981 survey. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. 54 pp.
- Engbring, J., F. L. Ramsey, and V. J. Wildman. 1986. Micronesian Forest Bird Survey, 1982: Saipan, Tinian, Agiguan, and Rota. 143 pp. Unpublished, U.S. Fish and Wildlife Service, Honolulu.
- Fry, F. X. 1966. Birds observed on various Polynesian islands aboard the research ship Te Vega. 'Elepaio 27:3-5, 16-19.
- Harrison, P. 1983. Seabirds, an identification guide. Croom Helm Ltd. Kent. 448 pp.
- Kepler, C. B., and J. M. Scott. 1981. Reducing bird count variability by training observers. 366-371 in C. J. Ralph and J. M. Scott (eds.). Estimating numbers of terrestrial birds. Cooper Ornithological Society, Studies in Avian Biology No. 6. 630 pp.

- King, W. B. 1967. Seabirds of the tropical Pacific Ocean. Smithsonian Inst., Washington, D.C. 126 pp.
- Mayr, E. 1932. Birds collected during the Whitney South Sea Expedition. XVIII. Notes on Meliphagidae from Polynesia and the Solomon Islands. Am. Mus. Novit. 516:1-30.
- Milner, G. B. 1978. Samoan dictionary. Samoan Free Press, Manila. 465 pp.
- Murphy, R. C. 1924. Birds collected during the Whitney South Sea Expedition. II. Am. Mus. Novit. 124:1-13.
- Muse, C., and S. Muse. 1982. The birds and birdlore of Samoa. Pioneer Press, Walla Walla. 156 pp.
- Pollock, K. H. 1981. A general line-transect model with sighting probabilities related to object size. Technical Report, Department of Applied Statistics, University of Reading. Reading, Berkshire, England.
- Potter, R. E. 1981. Common Myna and other species in American Samoa. 'Elepaio 42(1):137-138.
- Pratt, H. D., P. L. Bruner, and D. Berrett. 1987. A field guide to the birds of Hawaii and the tropical Pacific. Princeton University Press, Princeton. 409 pp.
- Pyle, P., J. Engbring, and L. Spear. In prep. On the discovery of a population of Herald Petrel (*Pterodroma arminjoniana*) on Ta'ū Island, American Samoa. Pt. Reyes Bird Observatory Publication.
- Ramsey, F. L. and J. M. Scott. 1979. Estimating population densities from variable circular plot surveys. Pp. 155-181 in R. M. Cormack, G. P. Patil, and D. S. Robson (eds.). Sampling biological populations. Stat. Ecol. Ser., vol 5. In. co-op. Publ. House, Fairland, MD.
- Ramsey, F. L., V. Wildman, and J. Engbring. 1987. Covariate adjustments to effective area in variable-area wildlife surveys. Biometrics 43: 1-11.
- Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82:309-313.
- Scott, J. M., and F. L. Ramsey. 1981. Length of count period as a possible source of bias in estimating bird densities. Pp. 409-413 in C. J. Ralph and J. M. Scott (eds). Estimating numbers of terrestrial birds. Cooper Ornithological Society, Studies in Avian Biology No. 6. 630 pp.
- Scott, J. M., F. L. Ramsey, and C. B. Kepler. 1981. Distance estimation as a variable in estimating bird numbers. Pp. 334-340 in C. J. Ralph and J. M. Scott (eds). Estimating numbers of terrestrial birds. Cooper Ornithological Society, Studies in Avian Biology No. 6. 630 pp.

Scott, J. M., R. Pyle, and R. Coleman. 1983. Records of small white egrets in Hawaii and Samoa with notes on identification. 'Elepaio 43(10):79-82.

Scott, J. M., S. Mountainspring, F. L. Ramsey, and C. B. Kepler. 1986. Forest bird communities of the Hawaiian Islands: their dynamics, ecology, and conservation. Stud. Avian Biol. 9. 431 pp.

Watling, D. 1982. Birds of Fiji, Tonga, and Samoa. Millwood Press, Ltd. Wellington. 176 pp.

Wildman, V., and F. L. Ramsey. 1985. Estimating effective area surveyed with the cumulative distribution function. Tech. Report 106. Oregon State Univ. Dept. of Statistics. 39 pp.

Wingert, E. A. (Project Director). 1981. A coastal zone management atlas of American Samoa. Heath Printers, Seattle. Unpaged.

APPENDIX

This appendix contains computer print-outs of bird densities and population estimates as calculated by the variable circular plot method. Densities are calculated for various areas and habitat types and are presented in seven different sub-tables for each species (labelled A-G). These seven sub-tables give densities for the following categories:

Sub-table	Density calculated for these categories
A	Elevational zones and major habitat types
B	Elevational zones
C	Major habitat types
D	Island
E	Total (all islands and all counts including transect 3 on Ofu)
F	Transect
G	Stratum, island, and total of all islands and all counts except transect 3 on Ofu

Abbreviations and headings used in the Appendix tables include:

ISLAND: Tutuila, Ofu, Olosega, and Ta'ū. Liu Bench on Ta'ū is a unique area and densities were calculated separately for this area in some instances.

ELEVATION: Elevational zone in 100 m increments.

HABITAT: Habitat types, including rain forest, secondary vegetation, mixed vegetation, plantation land, littoral forest, cloud forest, montane forest, and village land. (Habitat types are defined by Amerson et al. 1982.)

STRATUM: Various strata within the islands surveyed, including East, Central, and West Tutuila (see Figure 2); Ofu above and below 300 m; Olosega above and below 300 m; and Ta'ū below 300 m, between 300 and 600 m, above 600 m, and Liu Bench above and below 300 m.

TRANSECT: Transect number.

AVERAGE: Average density in birds per square km.

ST_DEV: Standard deviation of the density estimate.

STNS: Number of stations surveyed.

COUNT: Number of birds recorded during 8-minute counts.

AREA: Area actually surveyed (in hectares).

%COV: Percent of study area actually surveyed.

EST-N: Estimated number of birds in population (population estimate).

ST-ERR: Standard error of population estimate.

Appendix Table 1. White-tailed Tropicbird.

A		SPECIES = WTTR		SUMMARY OF DENSITIES (B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	.00	.00	2	0	6.86	
Tutuila	0-100 m	Secondary	9.31	22.71	11	4	41.62	
Tutuila	0-100 m	Mixed	8.40	14.55	3	3	16.01	
Tutuila	0-100 m	Plantation	6.62	11.47	6	10	145.85	
Tutuila	0-100 m	Littoral	6.08	14.90	6	1	13.82	
Tutuila	1-200 m	Rain Forest	10.23	17.33	11	7	34.91	
Tutuila	1-200 m	Secondary	1.78	5.83	17	2	63.06	
Tutuila	1-200 m	Mixed	6.04	12.67	8	4	51.71	
Tutuila	1-200 m	Plantation	4.70	6.65	2	2	14.64	
Tutuila	1-200 m	Littoral	.00	.00	2	0	18.19	
Tutuila	2-300 m	Rain Forest	10.25	20.57	42	28	151.90	
Tutuila	2-300 m	Secondary	10.28	19.68	47	47	362.45	
Tutuila	2-300 m	Mixed	.00	.00	2	0	13.09	
Tutuila	3-400 m	Rain Forest	16.21	47.31	32	20	88.48	
Tutuila	3-400 m	Secondary	13.20	44.30	24	10	130.53	
Tutuila	3-400 m	Mixed	.00	.00	2	0	17.97	
Tutuila	3-400 m	Plantation	1.02	2.28	5	1	51.36	
Tutuila	4-500 m	Secondary	.00	.00	2	0	2.48	
Tutuila	4-500 m	Montane	18.30	16.69	2	5	22.20	
Tutuila	5-600 m	Montane	17.00	.00	1	10	45.08	
Ofu	0-100 m	Secondary	.00	.00	4	0	33.22	
Ofu	0-100 m	Mixed	10.72	20.25	10	8	54.14	
Ofu	0-100 m	Plantation	12.71	13.93	12	13	80.41	
Ofu	0-100 m	Village	.00	.00	1	0	9.53	
Ofu	1-200 m	Secondary	.00	.00	6	0	26.71	
Ofu	1-200 m	Mixed	73.35	103.73	2	4	8.78	
Ofu	2-300 m	Secondary	.00	.00	5	0	37.89	
Ofu	2-300 m	Mixed	12.90	22.34	3	1	20.28	
Ofu	3-400 m	Rain Forest	.00	.00	3	0	22.82	
Ofu	3-400 m	Secondary	.00	.00	1	0	2.19	
Ofu	3-400 m	Mixed	.00	.00	3	0	23.23	
Ofu	4-500 m	Rain Forest	.00	.00	2	0	13.66	
Ofu	4-500 m	Secondary	.00	.00	4	0	6.94	
Olosega	1-200 m	Mixed	7.97	17.93	10	4	30.45	
Olosega	2-300 m	Rain Forest	.00	.00	1	0	3.70	
Olosega	2-300 m	Mixed	.00	.00	1	0	3.44	
Olosega	3-400 m	Rain Forest	48.60	.00	1	3	4.01	
Olosega	3-400 m	Secondary	.00	.00	1	0	4.34	
Olosega	4-500 m	Secondary	47.70	.00	1	2	2.57	
Olosega	4-500 m	Cloud	116.20	.00	1	7	3.78	
Olosega	5-600 m	Cloud	50.30	16.04	3	11	12.21	
Ta'u	0-100 m	Rain Forest	.00	.00	1	0	1.47	
Ta'u	0-100 m	Secondary	47.46	84.17	5	6	13.19	
Ta'u	0-100 m	Mixed	28.20	25.67	22	77	153.15	
Ta'u	0-100 m	Littoral	.00	.00	1	0	.78	
Ta'u	1-200 m	Rain Forest	.00	.00	2	0	3.27	
Ta'u	1-200 m	Secondary	24.07	41.68	3	2	12.57	
Ta'u	1-200 m	Mixed	11.83	10.65	11	37	142.64	
Ta'u	1-200 m	Plantation	.00	.00	1	0	7.01	
Ta'u	2-300 m	Rain Forest	18.29	54.87	9	4	25.62	
Ta'u	2-300 m	Secondary	14.82	33.14	5	4	18.31	
Ta'u	2-300 m	Mixed	.00	.00	1	0	7.62	
Ta'u	3-400 m	Rain Forest	28.69	66.82	7	5	23.12	
Ta'u	3-400 m	Secondary	17.45	24.68	2	1	3.87	
Ta'u	4-500 m	Rain Forest	2.26	6.40	8	1	22.23	
Ta'u	4-500 m	Secondary	16.12	36.05	5	1	9.69	
Ta'u	5-600 m	Rain Forest	12.85	25.70	4	3	9.32	
Ta'u	5-600 m	Secondary	.00	.00	3	0	13.56	
Ta'u	5-600 m	Cloud	56.10	.00	1	1	2.09	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	1.20	
Ta'u	6-700 m	Secondary	22.84	31.72	5	8	36.82	
Ta'u	6-700 m	Cloud	8.95	12.66	2	1	15.18	
Ta'u	7-800 m	Cloud	9.26	24.49	7	2	54.29	
Ta'u	8-900 m	Cloud	11.01	22.70	21	7	87.20	
Liu Bench	1-200 m	Rain Forest	62.25	35.12	4	15	19.82	
Liu Bench	1-200 m	Secondary	51.00	.00	1	7	7.33	
Liu Bench	2-300 m	Rain Forest	52.78	30.55	9	23	34.83	
Liu Bench	2-300 m	Secondary	45.90	.00	1	5	5.85	
Liu Bench	3-400 m	Rain Forest	47.70	54.68	12	24	31.78	
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	3.05	

Appendix Table 1, continued. White-tailed Tropicbird.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		7.28	16.68	28	18	224.17
Tutuila	1-200 m		5.02	11.60	40	15	182.51
Tutuila	2-300 m		10.04	19.82	91	75	527.43
Tutuila	3-400 m		13.35	43.24	83	31	288.35
Tutuila	4-500 m		8.15	13.47	4	5	24.66
Tutuila	5-600 m		17.00	.00	1	10	45.28
Ofu	0-100 m		9.62	15.71	27	21	177.31
Ofu	1-200 m		18.34	51.87	8	4	35.47
Ofu	2-300 m		4.84	13.68	8	1	58.16
Ofu	3-400 m		.00	.00	7	0	48.25
Ofu	4-500 m		.00	.00	6	0	20.60
Olosega	1-200 m		7.97	17.93	10	4	30.45
Olosega	2-300 m		.00	.00	2	0	7.14
Olosega	3-400 m		24.30	34.37	2	3	8.35
Olosega	4-500 m		81.95	48.44	2	9	6.35
Olosega	5-600 m		50.30	16.04	3	11	12.31
Ta'u	0-100 m		29.58	40.34	29	83	167.57
Ta'u	1-200 m		11.90	18.50	17	39	166.79
Ta'u	2-300 m		15.91	45.34	15	8	51.56
Ta'u	3-400 m		26.19	58.73	9	6	26.99
Ta'u	4-500 m		7.59	22.50	13	2	31.92
Ta'u	5-600 m		13.44	24.91	8	4	25.17
Ta'u	6-700 m		16.51	26.11	8	9	53.25
Ta'u	7-800 m		9.26	24.49	7	2	54.29
Ta'u	8-900 m		11.01	22.70	21	7	87.20
Liu Bench	1-200 m		60.00	30.83	5	22	27.15
Liu Bench	2-300 m		52.09	28.88	10	28	40.68
Liu Bench	3-400 m		47.70	54.68	12	24	31.78
Liu Bench	4-500 m		.00	.00	3	0	3.05

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	12.20	32.48	87	55	282.15
Tutuila		Secondary	9.24	26.49	101	63	600.13
Tutuila		Mixed	4.90	10.99	15	7	98.78
Tutuila		Plantation	4.17	8.21	13	13	211.85
Tutuila		Montane	16.53	11.81	3	15	67.48
Tutuila		Littoral	4.56	12.90	8	1	32.01
Ofu		Rain Forest	.00	.00	5	0	36.48
Ofu		Secondary	.00	.00	20	0	106.96
Ofu		Mixed	16.26	36.86	18	13	106.40
Ofu		Plantation	12.71	13.93	12	13	80.41
Ofu		Village	.00	.00	1	0	9.53
Olosega		Rain Forest	24.30	34.37	2	3	7.71
Olosega		Secondary	23.85	33.73	2	2	6.91
Olosega		Mixed	7.25	17.17	11	4	33.89
Olosega		Cloud	66.78	35.46	4	18	16.09
Ta'u		Rain Forest	13.59	42.77	32	13	86.34
Ta'u		Secondary	21.90	43.55	28	22	107.07
Ta'u		Mixed	22.08	22.99	34	114	304.61
Ta'u		Plantation	.00	.00	1	0	7.01
Ta'u		Cloud	11.94	23.16	31	11	158.96
Ta'u		Littoral	.00	.00	1	0	.78
Liu Bench		Rain Forest	46.30	43.84	28	62	89.47
Liu Bench		Secondary	48.45	3.61	2	12	13.18

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			9.73	27.15	227	154	1292.40
Ofu			7.95	22.72	56	26	339.78
Olosega			23.32	32.86	19	27	64.60
Ta'u			17.08	33.89	127	160	664.75
Liu Bench			46.44	42.31	30	74	102.65

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			14.51	31.40	459	441	2464.19

Appendix Table 1, concluded. White-tailed Tropicbird.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	32.63	59.79	19	27	81.32
Tutuila	2	1.55	6.58	18	1	40.42
Tutuila	3	.38	1.25	20	2	165.79
Tutuila	4	14.72	15.93	18	16	71.35
Tutuila	5	4.56	12.80	8	1	32.01
Tutuila	6	4.69	9.02	18	20	143.93
Tutuila	7	12.52	24.36	24	37	295.23
Tutuila	8	21.13	52.30	18	13	49.63
Tutuila	9	4.51	9.48	15	14	193.41
Tutuila	10	11.24	18.56	18	14	50.84
Tutuila	11	.00	.00	18	0	74.72
Tutuila	12	4.52	10.78	18	4	53.80
Tutuila	13	8.99	20.93	15	5	39.94
Ofu	1	.00	.00	21	0	149.38
Ofu	2	16.32	38.09	17	11	89.66
Ofu	3	9.32	12.44	18	15	90.75
Olosega	1	23.32	32.86	19	27	64.60
Ta'u	1	23.97	52.35	16	12	84.67
Ta'u	2	7.50	17.55	18	5	50.74
Ta'u	3	35.00	19.14	20	113	232.55
Ta'u	4	9.77	21.46	32	16	147.57
Ta'u	5	3.85	14.65	30	2	126.36
Ta'u	6	41.31	63.46	13	12	22.80
Ta'u	7	60.03	45.34	15	50	63.18
Ta'u	8	32.86	35.47	15	24	39.47

TOTAL ESTIMATES FOR WTR

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	47	53.49	7.3	11.53	31.92	616	167
Tutuila Central	87	87	40.59	14.2	11.41	28.76	463	125
Tutuila East	57	20	19.97	16.3	4.54	12.99	90	34
Tutuila	227	154	114.05	11.3	9.73	27.15	1169	227
Ofu [<300m]	25	11	5.71	31.6	11.10	32.05	63	36
Ofu [>300m]	13	0	1.54	44.7	.00	.00	0	0
Ofu	38	11	7.25	34.3	7.30	26.35	63	36
Olosega [<300m]	12	4	4.26	8.8	6.64	16.51	28	20
Olosega [>300m]	7	23	1.18	22.9	51.91	35.07	61	15
Olosega	19	27	5.44	11.9	23.32	32.86	89	25
Ta'u [<300m]	61	130	18.98	20.3	21.29	37.36	404	90
Ta'u [3-600m]	30	12	10.70	7.9	14.73	37.08	157	72
Ta'u [>600m]	36	18	8.93	21.8	11.89	23.24	106	34
Liu Bnch [<300m]	15	50	3.03	22.4	54.73	28.68	165	22
Liu Bnch [>300m]	15	24	4.19	8.3	38.16	52.34	159	56
Ta'u	157	234	45.83	16.7	22.69	37.35	991	133
ALL ISLANDS	441	426	172.57	13.8	14.72	31.92	2312	266

Appendix Table 2. Banded Rail.

A

SPECIES = BARA SUMMARY OF DENSITIES (B/SQ-KM)

ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA (HA)
Tutuila	0-100 m	Rain Forest	22.05	31.18	2	2	5.68
Tutuila	0-100 m	Secondary	13.35	23.86	11	6	31.27
Tutuila	0-100 m	Mixed	32.67	37.69	3	6	10.61
Tutuila	0-100 m	Plantation	48.32	89.95	6	10	15.65
Tutuila	0-100 m	Littoral	29.12	27.32	6	8	22.33
Tutuila	1-200 m	Rain Forest	8.88	15.33	11	6	53.79
Tutuila	1-200 m	Secondary	21.13	20.35	17	16	56.62
Tutuila	1-200 m	Mixed	22.76	27.04	8	11	26.05
Tutuila	1-200 m	Plantation	61.40	48.65	2	6	6.51
Tutuila	1-200 m	Littoral	6.75	9.55	2	1	7.41
Tutuila	2-300 m	Rain Forest	4.95	10.17	42	14	160.80
Tutuila	2-300 m	Secondary	21.17	33.47	47	45	149.97
Tutuila	2-300 m	Mixed	63.40	89.66	2	6	7.65
Tutuila	3-400 m	Rain Forest	8.57	18.05	32	11	98.86
Tutuila	3-400 m	Secondary	13.39	26.96	24	12	78.70
Tutuila	3-400 m	Mixed	8.45	11.95	2	1	6.85
Tutuila	3-400 m	Plantation	5.98	8.19	5	2	15.85
Tutuila	4-500 m	Secondary	.00	.00	2	0	6.62
Tutuila	4-500 m	Montane	.00	.00	2	0	10.61
Tutuila	5-600 m	Montane	.00	.00	1	0	5.63
Ofu	0-100 m	Secondary	4.00	8.00	4	1	14.09
Ofu	0-100 m	Mixed	11.31	23.92	10	5	27.73
Ofu	0-100 m	Plantation	78.19	80.59	12	32	29.28
Ofu	0-100 m	Village	.00	.00	1	0	3.32
Ofu	1-200 m	Secondary	.00	.00	6	0	18.84
Ofu	1-200 m	Mixed	.00	.00	2	0	9.01
Ofu	2-300 m	Secondary	.00	.00	5	0	16.99
Ofu	2-300 m	Mixed	11.73	20.32	3	2	11.14
Ofu	3-400 m	Rain Forest	22.77	20.07	3	4	11.02
Ofu	3-400 m	Secondary	.00	.00	1	0	3.01
Ofu	3-400 m	Mixed	48.83	27.46	3	10	12.31
Ofu	4-500 m	Rain Forest	9.25	13.08	2	1	4.89
Ofu	4-500 m	Secondary	.00	.00	4	0	10.87
Olosega	1-200 m	Mixed	23.67	29.56	10	15	32.40
Olosega	2-300 m	Rain Forest	.00	.00	1	0	3.03
Olosega	2-300 m	Mixed	.00	.00	1	0	3.33
Olosega	3-400 m	Rain Forest	.00	.00	1	0	3.55
Olosega	3-400 m	Secondary	.00	.00	1	0	3.75
Olosega	4-500 m	Secondary	.00	.00	1	0	4.13
Olosega	4-500 m	Cloud	7.60	.00	1	1	7.85
Olosega	5-600 m	Cloud	.00	.00	3	0	17.75
Ta'u	0-100 m	Rain Forest	.00	.00	1	0	4.02
Ta'u	0-100 m	Secondary	37.32	46.01	5	6	10.07
Ta'u	0-100 m	Mixed	47.12	62.92	22	49	74.91
Ta'u	0-100 m	Littoral	.00	.00	1	0	5.82
Ta'u	1-200 m	Rain Forest	.00	.00	2	0	5.81
Ta'u	1-200 m	Secondary	13.77	23.84	3	3	9.91
Ta'u	1-200 m	Mixed	22.40	28.74	11	13	39.85
Ta'u	1-200 m	Plantation	.00	.00	1	0	3.24
Ta'u	2-300 m	Rain Forest	1.63	4.90	9	1	26.09
Ta'u	2-300 m	Secondary	.00	.00	5	0	16.69
Ta'u	2-300 m	Mixed	24.80	.00	1	1	2.91
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	17.24
Ta'u	3-400 m	Secondary	23.15	32.74	2	2	5.80
Ta'u	4-500 m	Rain Forest	.00	.00	8	0	21.61
Ta'u	4-500 m	Secondary	.00	.00	5	0	15.43
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	12.99
Ta'u	5-600 m	Secondary	.00	.00	3	0	12.24
Ta'u	5-600 m	Cloud	.00	.00	1	0	4.35
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	3.27
Ta'u	6-700 m	Secondary	.00	.00	5	0	57.57
Ta'u	6-700 m	Cloud	.00	.00	2	0	26.42
Ta'u	7-800 m	Cloud	.00	.00	7	0	45.79
Ta'u	8-900 m	Cloud	.00	.00	21	0	98.60
Liu Bench	1-200 m	Rain Forest	.00	.00	4	0	25.31
Liu Bench	1-200 m	Secondary	.00	.00	1	0	4.54
Liu Bench	2-300 m	Rain Forest	.00	.00	9	0	28.97
Liu Bench	2-300 m	Secondary	.00	.00	1	0	3.29
Liu Bench	3-400 m	Rain Forest	.00	.00	12	0	32.62
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	5.66

Appendix Table 2, continued. Banded Rail.

B	ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	0-100 m		26.81	46.62	28	32	85.54
	Tutuila	1-200 m		19.38	23.62	40	40	150.38
	Tutuila	2-300 m		14.61	28.77	91	65	318.43
	Tutuila	3-400 m		10.20	21.12	63	26	200.26
	Tutuila	4-500 m		.00	.00	4	0	17.23
	Tutuila	5-600 m		.00	.00	1	0	5.63
	Ofu	0-100 m		39.53	64.84	27	38	74.41
	Ofu	1-200 m		.00	.00	8	0	27.85
	Ofu	2-300 m		4.40	12.45	8	2	28.14
	Ofu	3-400 m		30.69	27.18	7	14	26.34
	Ofu	4-500 m		3.08	7.55	6	1	15.56
	Olosega	1-200 m		23.67	29.56	10	15	32.40
	Olosega	2-300 m		.00	.00	2	0	6.37
	Olosega	3-400 m		.00	.00	2	0	7.30
	Olosega	4-500 m		3.80	5.37	2	1	11.98
	Olosega	5-600 m		.00	.00	3	0	17.75
	Ta'u	0-100 m		42.18	58.50	29	55	94.82
	Ta'u	1-200 m		16.92	25.76	17	16	58.82
	Ta'u	2-300 m		2.63	7.21	15	2	45.69
	Ta'u	3-400 m		5.14	15.43	9	2	23.04
	Ta'u	4-500 m		.00	.00	13	0	37.04
	Ta'u	5-600 m		.00	.00	8	0	29.58
	Ta'u	6-700 m		.00	.00	8	0	87.26
	Ta'u	7-800 m		.00	.00	7	0	45.79
	Ta'u	8-900 m		.00	.00	21	0	98.60
	Liu Bench	1-200 m		.00	.00	5	0	29.85
	Liu Bench	2-300 m		.00	.00	10	0	32.26
	Liu Bench	3-400 m		.00	.00	12	0	32.62
	Liu Bench	4-500 m		.00	.00	3	0	5.66
C	ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila		Rain Forest	7.17	14.63	87	33	319.14
	Tutuila		Secondary	18.05	28.75	101	79	323.19
	Tutuila		Mixed	28.25	37.51	15	24	51.16
	Tutuila		Plantation	34.05	64.38	13	18	38.01
	Tutuila		Montane	.00	.00	3	0	16.24
	Tutuila		Littoral	23.52	25.56	8	9	29.74
	Ofu		Rain Forest	17.36	17.29	5	5	15.71
	Ofu		Secondary	.80	3.58	20	1	63.80
	Ofu		Mixed	16.38	26.01	18	17	60.20
	Ofu		Plantation	78.19	80.59	12	32	29.28
	Ofu		Village	.00	.00	1	0	3.32
	Olosega		Rain Forest	.00	.00	2	0	6.56
	Olosega		Secondary	.00	.00	2	0	7.88
	Olosega		Mixed	21.52	28.94	11	15	35.74
	Olosega		Cloud	1.90	3.80	4	1	25.60
	Ta'u		Rain Forest	.46	2.60	32	1	91.04
	Ta'u		Secondary	9.79	24.79	28	11	127.71
	Ta'u		Mixed	38.46	53.98	34	63	117.67
	Ta'u		Plantation	.00	.00	1	0	3.24
	Ta'u		Cloud	.00	.00	31	0	175.15
	Ta'u		Littoral	.00	.00	1	0	5.82
	Liu Bench		Rain Forest	.00	.00	28	0	92.56
	Liu Bench		Secondary	.00	.00	2	0	7.83
D	ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila			15.42	28.99	227	163	777.47
	Ofu			23.86	49.03	56	55	172.30
	Olosega			12.86	24.02	19	16	75.80
	Ta'u			12.57	34.02	127	75	520.63
	Liu Bench			.00	.00	30	0	100.40
E	**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
				14.55	32.72	459	309	1646.59

Appendix Table 2, concluded. Banded Rail.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	4.87	10.58	19	8	73.00
Tutuila	2	19.88	29.44	18	13	40.98
Tutuila	3	13.90	20.41	20	17	74.56
Tutuila	4	14.42	23.11	18	13	66.50
Tutuila	5	23.52	25.56	8	9	29.74
Tutuila	6	6.32	13.58	18	6	66.48
Tutuila	7	24.51	37.69	24	24	67.17
Tutuila	8	2.68	7.49	18	4	87.53
Tutuila	9	33.73	58.90	15	19	41.97
Tutuila	10	6.64	17.92	18	6	72.54
Tutuila	11	28.20	40.39	18	25	53.59
Tutuila	12	4.87	13.05	18	6	70.88
Tutuila	13	23.85	24.39	15	13	32.54
Ofu	1	9.52	21.47	21	14	76.25
Ofu	2	8.68	14.39	17	8	59.59
Ofu	3	54.81	74.40	18	33	36.45
Olosega	1	12.86	24.02	19	16	75.80
Ta'u	1	64.87	69.60	16	43	45.52
Ta'u	2	1.18	4.72	16	1	48.13
Ta'u	3	23.44	24.89	20	28	79.38
Ta'u	4	1.45	8.18	32	2	179.72
Ta'u	5	.83	4.53	30	1	124.14
Ta'u	6	.00	.00	13	0	43.73
Ta'u	7	.00	.00	15	0	63.87
Ta'u	8	.00	.00	15	0	36.52

TOTAL ESTIMATES FOR BARA

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	60	53.49	5.3	14.13	22.42	755	131
Tutuila Central	87	49	40.59	7.9	12.48	25.49	506	110
Tutuila East	57	54	19.97	8.7	21.80	40.00	435	105
Tutuila	227	163	114.05	6.8	15.42	28.99	1696	200
Ofu [<300m]	25	7	5.71	16.5	4.57	12.64	26	14
Ofu [>300m]	13	15	1.54	27.2	17.95	24.46	27	10
Ofu	38	22	7.25	18.7	9.14	18.41	53	17
Olosega [<300m]	12	15	4.26	9.1	19.73	28.28	84	34
Olosega [>300m]	7	1	1.18	31.4	1.09	2.87	1	1
Olosega	19	16	5.44	13.9	12.86	24.02	85	34
Ta'u [<300m]	61	73	18.98	10.5	25.42	45.52	482	110
Ta'u [3-600m]	30	2	10.70	8.4	1.54	8.45	16	16
Ta'u [>600m]	36	0	8.93	25.9	.00	.00	0	0
Liu Bnch [<300m]	15	0	3.03	20.5	.00	.00	0	0
Liu Bnch [>300m]	15	0	4.19	9.1	.00	.00	0	0
Ta'u	157	75	45.83	13.6	10.17	30.97	498	111
ALL ISLANDS	441	276	172.57	9.3	12.90	28.83	2332	231

Appendix Table 3. Purple Swamphen.

SPECIES = PUSW		SUMMARY OF DENSITIES (B/SQ-KM)						
A	ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA (HA)
	Tutuila	0-100 m	Rain Forest	.00	.00	2	0	4.85
	Tutuila	0-100 m	Secondary	.00	.00	11	0	19.42
	Tutuila	0-100 m	Mixed	.00	.00	3	0	5.02
	Tutuila	0-100 m	Plantation	.00	.00	6	0	8.37
	Tutuila	0-100 m	Littoral	.00	.00	6	0	11.36
	Tutuila	1-200 m	Rain Forest	.00	.00	11	0	18.53
	Tutuila	1-200 m	Secondary	3.56	10.05	17	2	31.11
	Tutuila	1-200 m	Mixed	2.91	8.24	6	1	11.77
	Tutuila	1-200 m	Plantation	.00	.00	2	0	3.59
	Tutuila	1-200 m	Littoral	18.95	26.80	2	2	5.74
	Tutuila	2-300 m	Rain Forest	2.28	10.70	42	2	78.89
	Tutuila	2-300 m	Secondary	1.47	7.31	47	3	105.26
	Tutuila	2-300 m	Mixed	.00	.00	2	0	2.49
	Tutuila	3-400 m	Rain Forest	.00	.00	32	0	56.60
	Tutuila	3-400 m	Secondary	.00	.00	24	0	59.34
	Tutuila	3-400 m	Mixed	.00	.00	2	0	4.30
	Tutuila	3-400 m	Plantation	.00	.00	5	0	6.25
	Tutuila	4-500 m	Secondary	.00	.00	2	0	5.07
	Tutuila	4-500 m	Montane	.00	.00	2	0	2.59
	Tutuila	5-600 m	Montane	.00	.00	1	0	.71
	Ofu	0-100 m	Secondary	.00	.00	4	0	8.50
	Ofu	0-100 m	Mixed	4.04	12.78	10	1	12.99
	Ofu	0-100 m	Plantation	2.70	9.35	12	1	18.76
	Ofu	0-100 m	Village	.00	.00	1	0	1.05
	Ofu	1-200 m	Secondary	.00	.00	6	0	13.99
	Ofu	1-200 m	Mixed	.00	.00	2	0	2.78
	Ofu	2-300 m	Secondary	.00	.00	5	0	9.90
	Ofu	2-300 m	Mixed	10.27	17.78	3	1	5.37
	Ofu	3-400 m	Rain Forest	.00	.00	3	0	4.69
	Ofu	3-400 m	Secondary	.00	.00	1	0	2.40
	Ofu	3-400 m	Mixed	41.67	72.17	3	3	4.29
	Ofu	4-500 m	Rain Forest	.00	.00	2	0	2.88
	Ofu	4-500 m	Secondary	.00	.00	4	0	9.44
	Olosega	1-200 m	Mixed	.00	.00	10	0	15.31
	Olosega	2-300 m	Rain Forest	.00	.00	1	0	2.18
	Olosega	2-300 m	Mixed	.00	.00	1	0	2.54
	Olosega	3-400 m	Rain Forest	.00	.00	1	0	2.44
	Olosega	3-400 m	Secondary	.00	.00	1	0	2.28
	Olosega	4-500 m	Secondary	.00	.00	1	0	2.01
	Olosega	4-500 m	Cloud	.00	.00	1	0	.77
	Olosega	5-600 m	Cloud	.00	.00	3	0	4.61
	Ta'u	0-100 m	Rain Forest	.00	.00	1	0	1.37
	Ta'u	0-100 m	Secondary	.00	.00	5	0	7.86
	Ta'u	0-100 m	Mixed	14.74	35.88	22	10	44.29
	Ta'u	0-100 m	Littoral	.00	.00	1	0	1.43
	Ta'u	1-200 m	Rain Forest	.00	.00	2	0	3.89
	Ta'u	1-200 m	Secondary	12.03	20.84	3	1	5.27
	Ta'u	1-200 m	Mixed	11.02	27.35	11	4	18.85
	Ta'u	1-200 m	Plantation	.00	.00	1	0	1.01
	Ta'u	2-300 m	Rain Forest	.00	.00	9	0	17.29
	Ta'u	2-300 m	Secondary	.00	.00	5	0	7.95
	Ta'u	2-300 m	Mixed	.00	.00	1	0	1.26
	Ta'u	3-400 m	Rain Forest	.00	.00	7	0	15.93
	Ta'u	3-400 m	Secondary	.00	.00	2	0	4.13
	Ta'u	4-500 m	Rain Forest	.00	.00	8	0	16.68
	Ta'u	4-500 m	Secondary	.00	.00	5	0	9.17
	Ta'u	5-600 m	Rain Forest	.00	.00	4	0	5.38
	Ta'u	5-600 m	Secondary	.00	.00	3	0	5.05
	Ta'u	5-600 m	Cloud	.00	.00	1	0	1.24
	Ta'u	6-700 m	Rain Forest	.00	.00	1	0	1.52
	Ta'u	6-700 m	Secondary	.00	.00	5	0	4.09
	Ta'u	6-700 m	Cloud	.00	.00	2	0	.30
	Ta'u	7-800 m	Cloud	.00	.00	7	0	3.90
	Ta'u	8-900 m	Cloud	.00	.00	21	0	25.74
	Liu Bench	1-200 m	Rain Forest	.00	.00	4	0	4.30
	Liu Bench	1-200 m	Secondary	.00	.00	1	0	.60
	Liu Bench	2-300 m	Rain Forest	.00	.00	9	0	14.34
	Liu Bench	2-300 m	Secondary	.00	.00	1	0	1.38
	Liu Bench	3-400 m	Rain Forest	.00	.00	12	0	19.76
	Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	3.23

Appendix Table 3, continued. Purple Swamphen.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		.00	.00	28	0	49.03
Tutuila	1-200 m		3.04	8.39	40	5	70.73
Tutuila	2-300 m		1.81	8.93	91	5	186.64
Tutuila	3-400 m		.00	.00	63	0	126.49
Tutuila	4-500 m		.00	.00	4	0	7.66
Tutuila	5-600 m		.00	.00	1	0	.71
Ofu	0-100 m		2.70	9.78	27	2	41.29
Ofu	1-200 m		.00	.00	8	0	16.77
Ofu	2-300 m		3.85	10.89	8	1	15.27
Ofu	3-400 m		17.86	47.25	7	3	11.92
Ofu	4-500 m		.00	.00	6	0	12.32
Olosega	1-200 m		.00	.00	10	0	15.31
Olosega	2-300 m		.00	.00	2	0	4.71
Olosega	3-400 m		.00	.00	2	0	4.72
Olosega	4-500 m		.00	.00	2	0	2.78
Olosega	5-600 m		.00	.00	3	0	4.61
Ta'u	0-100 m		11.18	31.81	29	10	54.95
Ta'u	1-200 m		8.25	23.27	17	5	29.02
Ta'u	2-300 m		.00	.00	15	0	26.49
Ta'u	3-400 m		.00	.00	9	0	20.07
Ta'u	4-500 m		.00	.00	13	0	25.85
Ta'u	5-600 m		.00	.00	8	0	11.67
Ta'u	6-700 m		.00	.00	8	0	5.91
Ta'u	7-800 m		.00	.00	7	0	3.90
Ta'u	8-900 m		.00	.00	21	0	26.74
Liu Bench	1-200 m		.00	.00	5	0	4.90
Liu Bench	2-300 m		.00	.00	10	0	15.72
Liu Bench	3-400 m		.00	.00	12	0	19.76
Liu Bench	4-500 m		.00	.00	3	0	3.23

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	1.10	7.48	87	2	158.87
Tutuila		Secondary	1.28	6.50	101	5	220.20
Tutuila		Mixed	1.55	6.02	15	1	23.60
Tutuila		Plantation	.00	.00	13	0	18.20
Tutuila		Montane	.00	.00	3	0	3.30
Tutuila		Littoral	4.74	13.40	8	2	17.10
Ofu		Rain Forest	.00	.00	5	0	7.58
Ofu		Secondary	.00	.00	20	0	44.23
Ofu		Mixed	10.90	30.74	18	5	26.03
Ofu		Plantation	2.70	9.35	12	1	18.76
Ofu		Village	.00	.00	1	0	1.05
Olosega		Rain Forest	.00	.00	2	0	4.62
Olosega		Secondary	.00	.00	2	0	4.29
Olosega		Mixed	.00	.00	11	0	17.85
Olosega		Cloud	.00	.00	4	0	5.38
Ta'u		Rain Forest	.00	.00	32	0	62.06
Ta'u		Secondary	1.29	6.82	28	1	43.53
Ta'u		Mixed	13.10	32.54	34	14	64.41
Ta'u		Plantation	.00	.00	1	0	1.01
Ta'u		Cloud	.00	.00	31	0	32.17
Ta'u		Littoral	.00	.00	1	0	1.43
Liu Bench		Rain Forest	.00	.00	28	0	41.63
Liu Bench		Secondary	.00	.00	2	0	1.98

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			1.26	6.95	227	10	441.26
Ofu			4.08	18.25	56	6	97.64
Olosega			.00	.00	19	0	32.13
Ta'u			3.79	17.87	127	15	204.60
Liu Bench			.00	.00	30	0	43.61

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			2.17	12.40	459	31	819.24

Appendix Table 3, concluded. Purple Swamphen.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	.00	.00	19	0	29.12
Tutuila	2	.00	.00	18	0	27.44
Tutuila	3	1.46	6.51	20	1	40.26
Tutuila	4	1.39	5.92	18	1	37.46
Tutuila	5	4.74	13.40	8	2	17.10
Tutuila	6	.00	.00	18	0	36.40
Tutuila	7	.00	.00	24	0	60.03
Tutuila	8	1.93	8.18	18	1	35.67
Tutuila	9	.00	.00	15	0	27.45
Tutuila	10	5.82	17.19	18	3	33.11
Tutuila	11	.00	.00	18	0	35.21
Tutuila	12	.00	.00	18	0	35.63
Tutuila	13	3.65	9.74	15	2	26.36
Ofu	1	7.42	27.76	21	4	42.30
Ofu	2	.00	.00	17	0	29.35
Ofu	3	4.04	11.85	18	2	25.99
Olosega	1	.00	.00	19	0	32.13
Ta'u	1	12.15	40.00	16	3	22.19
Ta'u	2	.00	.00	16	0	26.65
Ta'u	3	14.36	24.71	20	12	42.30
Ta'u	4	.00	.00	32	0	42.90
Ta'u	5	.00	.00	30	0	44.36
Ta'u	6	.00	.00	13	0	26.21
Ta'u	7	.00	.00	15	0	21.70
Ta'u	8	.00	.00	15	0	21.90

TOTAL ESTIMATES FOR PUSW

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	4	53.49	2.8	1.11	5.85	59	34
Tutuila Central	87	4	40.59	4.5	1.60	8.77	65	38
Tutuila East	57	2	19.97	5.3	.96	5.13	19	13
Tutuila	227	10	114.05	3.9	1.26	6.95	143	52
Ofu [<300m]	25	1	5.71	8.3	1.23	6.16	7	7
Ofu [>300m]	13	3	1.54	15.8	9.62	34.67	14	14
Ofu	38	4	7.25	9.9	4.10	20.75	21	15
Olosega [<300m]	12	0	4.26	4.7	.00	.00	0	0
Olosega [>300m]	7	0	1.18	10.3	.00	.00	0	0
Olosega	19	0	5.44	5.9	.00	.00	0	0
Ta'u [<300m]	61	15	18.98	5.8	7.90	25.26	149	61
Ta'u [3-600m]	30	0	10.70	5.4	.00	.00	0	0
Ta'u [>600m]	36	0	8.93	4.1	.00	.00	0	0
Liu Bnch [<300m]	15	0	3.03	6.8	.00	.00	0	0
Liu Bnch [>300m]	15	0	4.19	5.5	.00	.00	0	0
Ta'u	157	15	45.83	5.4	3.07	16.13	149	61
ALL ISLANDS	441	29	172.57	4.6	2.09	12.43	313	81

Appendix Table 4. Brown Noddy.

SPECIES = BRNO

SUMMARY OF DENSITIES(B/SQ-KM)

A

ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m	Rain Forest	.00	.00	2	0	2.10
Tutuila	0-100 m	Secondary	3.38	11.22	11	1	17.19
Tutuila	0-100 m	Mixed	.00	.00	3	0	6.10
Tutuila	0-100 m	Plantation	.00	.00	6	0	22.81
Tutuila	0-100 m	Littoral	.00	.00	6	0	14.60
Tutuila	1-200 m	Rain Forest	7.03	16.54	11	2	15.46
Tutuila	1-200 m	Secondary	.00	.00	17	0	46.85
Tutuila	1-200 m	Mixed	27.85	65.06	8	20	27.32
Tutuila	1-200 m	Plantation	8.90	12.59	2	3	10.82
Tutuila	1-200 m	Littoral	.00	.00	2	0	8.15
Tutuila	2-300 m	Rain Forest	7.10	18.86	42	10	82.22
Tutuila	2-300 m	Secondary	.99	4.12	47	4	211.10
Tutuila	2-300 m	Mixed	9.45	13.36	2	1	4.08
Tutuila	3-400 m	Rain Forest	13.93	73.97	32	7	63.41
Tutuila	3-400 m	Secondary	16.61	44.42	24	11	72.18
Tutuila	3-400 m	Mixed	.00	.00	2	0	11.02
Tutuila	3-400 m	Plantation	.00	.00	5	0	29.53
Tutuila	4-500 m	Secondary	.00	.00	2	0	1.91
Tutuila	4-500 m	Montane	57.65	81.53	2	5	8.15
Tutuila	5-600 m	Montane	9.10	.00	1	1	5.91
Ofu	0-100 m	Secondary	.00	.00	4	0	10.67
Ofu	0-100 m	Mixed	4.42	9.32	10	2	24.93
Ofu	0-100 m	Plantation	4.46	11.09	12	3	35.02
Ofu	0-100 m	Village	.00	.00	1	0	3.27
Ofu	1-200 m	Secondary	.00	.00	6	0	11.43
Ofu	1-200 m	Mixed	.00	.00	2	0	2.31
Ofu	2-300 m	Secondary	.00	.00	5	0	18.30
Ofu	2-300 m	Mixed	.00	.00	3	0	6.71
Ofu	3-400 m	Rain Forest	.00	.00	3	0	6.20
Ofu	3-400 m	Secondary	.00	.00	1	0	.95
Ofu	3-400 m	Mixed	.00	.00	3	0	9.43
Ofu	4-500 m	Rain Forest	.00	.00	2	0	6.71
Ofu	4-500 m	Secondary	.00	.00	4	0	4.40
Olosega	1-200 m	Mixed	.00	.00	10	0	15.29
Olosega	2-300 m	Rain Forest	.00	.00	1	0	1.44
Olosega	2-300 m	Mixed	.00	.00	1	0	1.44
Olosega	3-400 m	Rain Forest	.00	.00	1	0	1.33
Olosega	3-400 m	Secondary	.00	.00	1	0	1.34
Olosega	4-500 m	Secondary	.00	.00	1	0	1.09
Olosega	4-500 m	Cloud	.00	.00	1	0	.95
Olosega	5-600 m	Cloud	.00	.00	3	0	3.23
Ta'u	0-100 m	Rain Forest	61.70	.00	1	2	1.23
Ta'u	0-100 m	Secondary	.00	.00	5	0	5.94
Ta'u	0-100 m	Mixed	176.10	150.09	22	183	52.66
Ta'u	0-100 m	Littoral	170.20	.00	1	4	1.57
Ta'u	1-200 m	Rain Forest	85.50	44.83	2	4	2.68
Ta'u	1-200 m	Secondary	.00	.00	3	0	3.65
Ta'u	1-200 m	Mixed	36.34	51.06	11	22	28.68
Ta'u	1-200 m	Plantation	.00	.00	1	0	3.51
Ta'u	2-300 m	Rain Forest	.00	.00	9	0	13.93
Ta'u	2-300 m	Secondary	.00	.00	5	0	6.96
Ta'u	2-300 m	Mixed	.00	.00	1	0	3.21
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	11.59
Ta'u	3-400 m	Secondary	.00	.00	2	0	3.41
Ta'u	4-500 m	Rain Forest	.00	.00	8	0	10.66
Ta'u	4-500 m	Secondary	.00	.00	5	0	6.89
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	4.80
Ta'u	5-600 m	Secondary	.00	.00	3	0	5.05
Ta'u	5-600 m	Cloud	.00	.00	1	0	1.64
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	1.21
Ta'u	6-700 m	Secondary	.00	.00	5	0	9.16
Ta'u	6-700 m	Cloud	.00	.00	2	0	2.49
Ta'u	7-800 m	Cloud	.00	.00	7	0	12.15
Ta'u	8-900 m	Cloud	.00	.00	21	0	31.19
Liu Bench	1-200 m	Rain Forest	286.50	279.34	4	27	5.65
Liu Bench	1-200 m	Secondary	.00	.00	1	0	2.40
Liu Bench	2-300 m	Rain Forest	255.82	361.81	9	51	12.24
Liu Bench	2-300 m	Secondary	94.50	.00	1	3	2.06
Liu Bench	3-400 m	Rain Forest	299.22	259.66	12	63	13.03
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	3.82

Appendix Table 4, continued. Brown Noddy.

B	ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	0-100 m		1.33	7.03	28	1	62.80
	Tutuila	1-200 m		7.95	30.76	40	25	108.59
	Tutuila	2-300 m		4.00	13.58	91	15	297.39
	Tutuila	3-400 m		14.17	59.14	63	18	176.14
	Tutuila	4-500 m		28.83	57.65	4	5	10.05
	Tutuila	5-600 m		9.10	.00	1	1	5.91
	Ofu	0-100 m		3.62	9.23	27	5	73.88
	Ofu	1-200 m		.00	.00	8	0	13.74
	Ofu	2-300 m		.00	.00	8	0	23.01
	Ofu	3-400 m		.00	.00	7	0	18.56
	Ofu	4-500 m		.00	.00	6	0	11.11
	Olosega	1-200 m		.00	.00	10	0	15.29
	Olosega	2-300 m		.00	.00	2	0	2.87
	Olosega	3-400 m		.00	.00	2	0	2.68
	Olosega	4-500 m		.00	.00	2	0	2.04
	Olosega	5-600 m		.00	.00	3	0	3.22
	Ta'u	0-100 m		141.59	147.20	29	189	62.00
	Ta'u	1-200 m		33.57	48.78	17	26	38.52
	Ta'u	2-300 m		.00	.00	15	0	24.10
	Ta'u	3-400 m		.00	.00	9	0	15.00
	Ta'u	4-500 m		.00	.00	13	0	17.55
	Ta'u	5-600 m		.00	.00	8	0	11.29
	Ta'u	6-700 m		.00	.00	8	0	12.86
	Ta'u	7-800 m		.00	.00	7	0	12.15
	Ta'u	8-900 m		.00	.00	21	0	31.19
	Liu Bench	1-200 m		229.20	273.75	5	27	8.05
	Liu Bench	2-300 m		239.69	344.91	10	54	14.30
	Liu Bench	3-400 m		299.22	259.66	12	63	13.03
	Liu Bench	4-500 m		.00	.00	3	0	3.82
C	ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila		Rain Forest	9.44	46.78	87	19	163.19
	Tutuila		Secondary	5.25	23.05	101	16	349.23
	Tutuila		Mixed	16.11	48.03	15	21	48.51
	Tutuila		Plantation	1.37	4.94	13	3	63.16
	Tutuila		Montane	41.47	64.10	3	6	14.02
	Tutuila		Littoral	.00	.00	8	0	22.75
	Ofu		Rain Forest	.00	.00	5	0	14.91
	Ofu		Secondary	.00	.00	20	0	43.75
	Ofu		Mixed	2.46	7.15	18	2	43.37
	Ofu		Plantation	4.46	11.09	12	3	35.02
	Ofu		Village	.00	.00	1	0	3.27
	Olosega		Rain Forest	.00	.00	2	0	2.77
	Olosega		Secondary	.00	.00	2	0	2.44
	Olosega		Mixed	.00	.00	11	0	16.73
	Olosega		Cloud	.00	.00	4	0	4.18
	Ta'u		Rain Forest	7.27	24.59	32	6	46.51
	Ta'u		Secondary	.00	.00	28	0	41.04
	Ta'u		Mixed	125.70	141.28	34	205	84.55
	Ta'u		Plantation	.00	.00	1	0	3.51
	Ta'u		Cloud	.00	.00	31	0	47.48
	Ta'u		Littoral	170.20	.00	1	4	1.57
	Liu Bench		Rain Forest	251.39	288.36	28	141	34.73
	Liu Bench		Secondary	47.25	66.82	2	3	4.46
D	ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila			7.65	35.73	227	65	660.89
	Ofu			1.74	6.60	56	5	140.32
	Olosega			.00	.00	19	0	28.11
	Ta'u			36.82	92.28	127	215	224.66
	Liu Bench			237.78	283.29	30	144	39.19
E	**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
				29.72	106.22	459	429	1091.17

Appendix Table 4, concluded. Brown Noddy.

F	ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	1	15.19	45.89	19	22	40.91
	Tutuila	2	1.52	6.46	18	1	39.17
	Tutuila	3	.00	.00	20	0	85.33
	Tutuila	4	4.70	9.41	18	6	58.57
	Tutuila	5	.00	.00	8	0	22.75
	Tutuila	6	12.81	31.10	18	11	58.29
	Tutuila	7	.87	2.49	24	3	189.91
	Tutuila	8	43.37	100.36	18	13	22.91
	Tutuila	9	.00	.00	15	0	35.36
	Tutuila	10	2.07	8.77	18	1	23.57
	Tutuila	11	10.74	39.61	18	5	30.08
	Tutuila	12	.00	.00	18	0	23.85
	Tutuila	13	4.83	10.94	15	3	30.18
	Ofu	1	1.05	4.82	21	1	58.33
	Ofu	2	.00	.00	17	0	31.00
	Ofu	3	4.20	10.18	18	4	50.99
	Olosega	1	.00	.00	19	0	26.11
	Ta'u	1	.00	.00	16	0	25.14
	Ta'u	2	31.73	78.06	16	14	21.12
	Ta'u	3	188.83	140.73	20	191	58.70
	Ta'u	4	1.36	7.87	32	1	41.94
	Ta'u	5	.00	.00	30	0	58.90
	Ta'u	6	26.95	55.63	13	9	20.87
	Ta'u	7	442.73	271.80	15	132	17.62
	Ta'u	8	32.94	48.59	15	12	21.58

TOTAL ESTIMATES FOR BRNO

G	STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
	Tutuila West	83	29	53.49	4.6	4.83	22.90	258	134
	Tutuila Central	87	28	40.59	7.6	12.29	49.75	498	216
	Tutuila East	57	8	19.97	5.4	4.66	22.97	93	60
	Tutuila	227	65	114.05	5.8	7.65	35.73	849	261
	Ofu [<300m]	25	1	5.71	10.4	.88	4.42	5	5
	Ofu [>300m]	13	0	1.54	19.3	.00	.00	0	0
	Ofu	38	1	7.25	12.3	.58	3.59	5	5
	Olosega [<300m]	12	0	4.26	4.3	.00	.00	0	0
	Olosega [>300m]	7	0	1.18	6.7	.00	.00	0	0
	Olosega	19	0	5.44	4.8	.00	.00	0	0
	Ta'u [<300m]	61	215	18.98	6.6	76.67	121.57	1455	295
	Ta'u [3-600m]	30	0	10.70	4.1	.00	.00	0	0
	Ta'u [>600m]	36	0	8.93	6.3	.00	.00	0	0
	Liu Bnch[<300m]	15	81	3.03	7.4	236.19	312.91	715	244
	Liu Bnch[>300m]	15	63	4.19	4.0	239.37	261.39	1002	282
	Ta'u	157	359	45.82	5.8	75.22	167.57	3172	474
	ALL ISLANDS	441	425	172.57	6.0	30.77	108.23	4026	541

Appendix Table 5. Black Noddy.

A		SPECIES = BLNO		SUMMARY OF DENSITIES (B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA (HA)	
Tutuila	0-100 m	Rain Forest	.00	.00	2	0	9.96	
Tutuila	0-100 m	Secondary	.00	.00	11	0	54.80	
Tutuila	0-100 m	Mixed	.00	.00	3	0	14.95	
Tutuila	0-100 m	Plantation	.00	.00	6	0	29.89	
Tutuila	0-100 m	Littoral	.00	.00	6	0	29.89	
Tutuila	1-200 m	Rain Forest	.00	.00	11	0	54.80	
Tutuila	1-200 m	Secondary	.00	.00	17	0	84.69	
Tutuila	1-200 m	Mixed	.00	.00	6	0	39.88	
Tutuila	1-200 m	Plantation	.00	.00	2	0	9.96	
Tutuila	1-200 m	Littoral	.00	.00	2	0	9.96	
Tutuila	2-300 m	Rain Forest	.00	.00	42	0	209.24	
Tutuila	2-300 m	Secondary	.00	.00	47	0	234.15	
Tutuila	2-300 m	Mixed	.00	.00	2	0	9.96	
Tutuila	3-400 m	Rain Forest	.00	.00	32	0	159.42	
Tutuila	3-400 m	Secondary	.00	.00	24	0	119.57	
Tutuila	3-400 m	Mixed	.00	.00	2	0	9.96	
Tutuila	3-400 m	Plantation	.00	.00	5	0	24.91	
Tutuila	4-500 m	Secondary	.00	.00	2	0	9.96	
Tutuila	4-500 m	Montane	.00	.00	2	0	9.96	
Tutuila	5-600 m	Montane	.00	.00	1	0	4.98	
Ofu	0-100 m	Secondary	.00	.00	4	0	19.93	
Ofu	0-100 m	Mixed	1.08	3.42	10	1	49.82	
Ofu	0-100 m	Plantation	18.93	34.58	12	21	59.78	
Ofu	0-100 m	Village	.00	.00	1	0	4.98	
Ofu	1-200 m	Secondary	3.62	8.86	6	2	29.89	
Ofu	1-200 m	Mixed	.00	.00	2	0	9.96	
Ofu	2-300 m	Secondary	.00	.00	5	0	24.91	
Ofu	2-300 m	Mixed	.00	.00	3	0	14.95	
Ofu	3-400 m	Rain Forest	.00	.00	3	0	14.95	
Ofu	3-400 m	Secondary	.00	.00	1	0	4.98	
Ofu	3-400 m	Mixed	.00	.00	3	0	14.95	
Ofu	4-500 m	Rain Forest	.00	.00	2	0	9.96	
Ofu	4-500 m	Secondary	.00	.00	4	0	19.93	
Olosega	1-200 m	Mixed	.00	.00	10	0	49.82	
Olosega	2-300 m	Rain Forest	.00	.00	1	0	4.98	
Olosega	2-300 m	Mixed	.00	.00	1	0	4.98	
Olosega	3-400 m	Rain Forest	.00	.00	1	0	4.98	
Olosega	3-400 m	Secondary	.00	.00	1	0	4.98	
Olosega	4-500 m	Secondary	.00	.00	1	0	4.98	
Olosega	4-500 m	Cloud	.00	.00	1	0	4.98	
Olosega	5-600 m	Cloud	.00	.00	3	0	14.95	
Ta'u	0-100 m	Rain Forest	10.80	.00	1	1	4.98	
Ta'u	0-100 m	Secondary	.00	.00	5	0	24.91	
Ta'u	0-100 m	Mixed	.00	.00	22	0	109.60	
Ta'u	0-100 m	Littoral	.00	.00	1	0	4.98	
Ta'u	1-200 m	Rain Forest	.00	.00	2	0	9.96	
Ta'u	1-200 m	Secondary	.00	.00	3	0	14.95	
Ta'u	1-200 m	Mixed	.98	3.26	11	1	54.80	
Ta'u	1-200 m	Plantation	.00	.00	1	0	4.98	
Ta'u	2-300 m	Rain Forest	.00	.00	9	0	44.84	
Ta'u	2-300 m	Secondary	.00	.00	5	0	24.91	
Ta'u	2-300 m	Mixed	.00	.00	1	0	4.98	
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	34.87	
Ta'u	3-400 m	Secondary	.00	.00	2	0	9.96	
Ta'u	4-500 m	Rain Forest	.00	.00	8	0	39.86	
Ta'u	4-500 m	Secondary	.00	.00	5	0	24.91	
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	19.92	
Ta'u	5-600 m	Secondary	.00	.00	3	0	14.95	
Ta'u	5-600 m	Cloud	.00	.00	1	0	4.98	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	4.98	
Ta'u	6-700 m	Secondary	.00	.00	5	0	24.91	
Ta'u	6-700 m	Cloud	.00	.00	2	0	9.96	
Ta'u	7-800 m	Cloud	.00	.00	7	0	34.87	
Ta'u	8-900 m	Cloud	.00	.00	21	0	104.62	
Liu Bench	1-200 m	Rain Forest	.00	.00	4	0	19.93	
Liu Bench	1-200 m	Secondary	32.50	.00	1	3	4.98	
Liu Bench	2-300 m	Rain Forest	.00	.00	9	0	44.84	
Liu Bench	2-300 m	Secondary	.00	.00	1	0	4.98	
Liu Bench	3-400 m	Rain Forest	.00	.00	12	0	59.78	
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	14.95	

Appendix Table 5, continued. Black Noddy.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		.00	.00	28	0	139.49
Tutuila	1-200 m		.00	.00	40	0	199.28
Tutuila	2-300 m		.00	.00	91	0	453.35
Tutuila	3-400 m		.00	.00	63	0	313.86
Tutuila	4-500 m		.00	.00	4	0	19.93
Tutuila	5-600 m		.00	.00	1	0	4.98
Ofu	0-100 m		8.31	24.39	27	22	134.51
Ofu	1-200 m		2.71	7.67	8	2	39.86
Ofu	2-300 m		.00	.00	8	0	39.86
Ofu	3-400 m		.00	.00	7	0	34.87
Ofu	4-500 m		.00	.00	6	0	29.89
Olosega	1-200 m		.00	.00	10	0	49.82
Olosega	2-300 m		.00	.00	2	0	9.96
Olosega	3-400 m		.00	.00	2	0	9.96
Olosega	4-500 m		.00	.00	2	0	9.96
Olosega	5-600 m		.00	.00	3	0	14.95
Ta'u	0-100 m		.37	2.01	29	1	144.48
Ta'u	1-200 m		.64	2.62	17	1	84.69
Ta'u	2-300 m		.00	.00	15	0	74.73
Ta'u	3-400 m		.00	.00	9	0	44.84
Ta'u	4-500 m		.00	.00	13	0	64.76
Ta'u	5-600 m		.00	.00	8	0	39.86
Ta'u	6-700 m		.00	.00	8	0	39.86
Ta'u	7-800 m		.00	.00	7	0	34.87
Ta'u	8-900 m		.00	.00	21	0	104.62
Liu Bench	1-200 m		6.50	14.53	5	3	24.91
Liu Bench	2-300 m		.00	.00	10	0	49.82
Liu Bench	3-400 m		.00	.00	12	0	59.78
Liu Bench	4-500 m		.00	.00	3	0	14.95

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	.00	.00	87	0	433.43
Tutuila		Secondary	.00	.00	101	0	503.17
Tutuila		Mixed	.00	.00	15	0	74.73
Tutuila		Plantation	.00	.00	13	0	64.76
Tutuila		Montane	.00	.00	3	0	14.95
Tutuila		Littoral	.00	.00	8	0	39.86
Ofu		Rain Forest	.00	.00	5	0	24.91
Ofu		Secondary	1.08	4.85	20	2	99.64
Ofu		Mixed	.60	2.55	18	1	89.67
Ofu		Plantation	18.93	34.58	12	21	59.78
Ofu		Village	.00	.00	1	0	4.98
Olosega		Rain Forest	.00	.00	2	0	9.96
Olosega		Secondary	.00	.00	2	0	9.96
Olosega		Mixed	.00	.00	11	0	54.80
Olosega		Cloud	.00	.00	4	0	19.93
Ta'u		Rain Forest	.34	1.91	32	1	159.42
Ta'u		Secondary	.00	.00	28	0	139.49
Ta'u		Mixed	.32	1.85	34	1	169.38
Ta'u		Plantation	.00	.00	1	0	4.96
Ta'u		Cloud	.00	.00	31	0	154.44
Ta'u		Littoral	.00	.00	1	0	4.98
Liu Bench		Rain Forest	.00	.00	28	0	139.49
Liu Bench		Secondary	16.25	22.98	2	3	9.96

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			.00	.00	227	0	1130.89
Ofu			4.64	17.50	56	24	278.99
Olosega			.00	.00	19	0	94.66
Ta'u			.17	1.35	127	2	632.70
Liu Bench			1.08	5.93	30	3	149.46

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			.68	6.46	459	29	2286.69

Appendix Table 5, concluded. Black Noddy.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	.00	.00	19	0	94.86
Tutuila	2	.00	.00	18	0	89.67
Tutuila	3	.00	.00	20	0	99.64
Tutuila	4	.00	.00	18	0	89.67
Tutuila	5	.00	.00	8	0	39.86
Tutuila	6	.00	.00	18	0	89.67
Tutuila	7	.00	.00	24	0	119.57
Tutuila	8	.00	.00	18	0	89.67
Tutuila	9	.00	.00	15	0	74.73
Tutuila	10	.00	.00	18	0	89.67
Tutuila	11	.00	.00	18	0	89.67
Tutuila	12	.00	.00	18	0	89.67
Tutuila	13	.00	.00	15	0	74.73
Ofu	1	1.03	4.74	21	2	104.62
Ofu	2	5.73	23.62	17	9	84.69
Ofu	3	7.81	20.27	18	13	89.67
Olosega	1	.00	.00	19	0	94.86
Ta'u	1	.00	.00	16	0	79.71
Ta'u	2	.00	.00	16	0	79.71
Ta'u	3	.54	2.41	20	1	99.64
Ta'u	4	.00	.00	32	0	159.42
Ta'u	5	.00	.00	30	0	149.46
Ta'u	6	.83	3.00	13	1	64.76
Ta'u	7	.00	.00	15	0	74.73
Ta'u	8	2.17	8.39	15	3	74.73

TOTAL ESTIMATES FOR BLNC

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	63	0	53.49	7.7	.00	.00	0	0
Tutuila Central	87	0	40.59	10.7	.00	.00	0	0
Tutuila East	57	0	19.97	14.2	.00	.00	0	0
Tutuila	227	0	114.05	9.9	.00	.00	0	0
Ofu [<300m]	25	11	5.71	21.8	4.76	19.78	27	22
Ofu [>300m]	13	0	1.54	42.1	.00	.00	0	0
Ofu	38	11	7.25	26.1	3.13	16.09	27	22
Olosega [<300m]	12	0	4.26	14.0	.00	.00	0	0
Olosega [>300m]	7	0	1.18	29.6	.00	.00	0	0
Olosega	19	0	5.44	17.4	.00	.00	0	0
Ta'u [<300m]	61	2	18.98	16.0	.35	1.94	6	4
Ta'u [3-600m]	30	0	10.70	14.0	.00	.00	0	0
Ta'u [>600m]	36	0	8.93	20.1	.00	.00	0	0
Liu Bnch[<300m]	15	3	3.03	24.7	2.17	8.39	6	6
Liu Bnch[>300m]	15	0	4.19	17.8	.00	.00	0	0
Ta'u	157	5	45.83	17.1	.34	2.85	12	7
ALL ISLANDS	441	16	172.57	12.7	.39	5.04	39	23

Appendix Table 6, continued. White Tern.

B	ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	0-100 m		49.56	112.83	28	44	85.56
	Tutuila	1-200 m		73.66	175.50	40	47	120.48
	Tutuila	2-300 m		101.21	285.77	81	154	305.62
	Tutuila	3-400 m		85.99	274.49	63	61	210.37
	Tutuila	4-500 m		88.10	148.21	4	12	11.48
	Tutuila	5-600 m		63.10	.00	1	13	13.23
	Ofu	0-100 m		85.71	107.01	27	130	101.02
	Ofu	1-200 m		150.55	185.66	8	26	10.41
	Ofu	2-300 m		50.44	53.14	8	27	32.91
	Ofu	3-400 m		8.91	8.90	7	5	24.55
	Ofu	4-500 m		3.58	8.78	6	3	11.72
	Olosega	1-200 m		91.19	268.48	10	9	9.17
	Olosega	2-300 m		453.75	641.70	2	7	1.23
	Olosega	3-400 m		46.30	85.48	2	1	1.16
	Olosega	4-500 m		.00	.00	2	0	.51
	Olosega	5-600 m		.00	.00	3	0	1.03
	Ta'u	0-100 m		18.52	34.56	29	36	83.48
	Ta'u	1-200 m		13.56	31.36	17	19	75.72
	Ta'u	2-300 m		.00	.00	15	0	14.54
	Ta'u	3-400 m		.00	.00	9	0	7.90
	Ta'u	4-500 m		.00	.00	13	0	7.03
	Ta'u	5-600 m		.00	.00	8	0	3.98
	Ta'u	6-700 m		.00	.00	8	0	4.81
	Ta'u	7-800 m		.00	.00	7	0	5.33
	Ta'u	8-900 m		.00	.00	21	0	19.24
	Liu Bench	1-200 m		6.26	14.00	5	1	4.91
	Liu Bench	2-300 m		27.77	87.82	10	3	8.51
	Liu Bench	3-400 m		28.79	99.74	12	1	6.45
	Liu Bench	4-500 m		.00	.00	3	0	1.65
C	ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila		Rain Forest	151.79	361.27	87	117	85.31
	Tutuila		Secondary	39.97	119.16	101	106	381.30
	Tutuila		Mixed	12.57	24.34	15	18	86.71
	Tutuila		Plantation	20.15	18.71	13	33	144.57
	Tutuila		Montane	138.50	147.27	3	25	24.31
	Tutuila		Littoral	158.55	176.70	8	30	21.55
	Ofu		Rain Forest	6.80	9.84	5	4	21.54
	Ofu		Secondary	99.75	127.90	20	67	53.92
	Ofu		Mixed	11.85	23.92	18	18	50.50
	Ofu		Plantation	145.82	128.70	12	102	49.37
	Ofu		Village	.00	.00	1	0	5.28
	Olosega		Rain Forest	500.05	576.22	2	8	1.16
	Olosega		Secondary	.00	.00	2	0	.88
	Olosega		Mixed	82.90	256.18	11	9	9.78
	Olosega		Cloud	.00	.00	4	0	1.27
	Ta'u		Rain Forest	.00	.00	32	0	20.56
	Ta'u		Secondary	.00	.00	28	0	17.75
	Ta'u		Mixed	22.58	36.90	34	55	151.20
	Ta'u		Plantation	.00	.00	1	0	6.18
	Ta'u		Cloud	.00	.00	31	0	25.85
	Ta'u		Littoral	.00	.00	1	0	.48
	Liu Bench		Rain Forest	22.26	82.24	28	4	17.00
	Liu Bench		Secondary	15.85	22.13	2	1	4.52
D	ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila			85.36	246.18	227	331	746.74
	Ofu			71.29	110.82	56	191	180.61
	Olosega			100.63	276.04	19	17	13.10
	Ta'u			6.04	21.39	127	55	222.02
	Liu Bench			21.82	79.48	30	5	21.52
E	**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
				58.16	190.27	459	599	1183.99

Appendix Table 6, concluded. White Tern.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	201.43	482.39	19	34	22.48
Tutuila	2	23.33	70.80	18	6	19.70
Tutuila	3	17.99	31.12	20	26	160.93
Tutuila	4	46.86	65.20	18	21	43.76
Tutuila	5	158.55	176.70	8	30	21.55
Tutuila	6	77.81	112.06	18	66	71.50
Tutuila	7	15.33	24.88	24	39	255.35
Tutuila	8	237.48	430.33	18	37	11.78
Tutuila	9	48.89	134.55	15	18	65.93
Tutuila	10	76.50	152.08	18	10	11.18
Tutuila	11	18.83	55.00	18	7	22.45
Tutuila	12	204.61	480.26	18	22	8.81
Tutuila	13	32.26	52.76	15	15	31.32
Ofu	1	97.08	125.02	21	72	80.41
Ofu	2	13.20	46.04	17	16	30.15
Ofu	3	96.06	120.44	18	103	70.04
Olosega	1	100.63	276.04	19	17	13.10
Ta'u	1	.00	.00	16	0	25.85
Ta'u	2	.00	.00	16	0	11.10
Ta'u	3	38.38	41.55	20	55	121.01
Ta'u	4	.00	.00	32	0	26.77
Ta'u	5	.00	.00	30	0	31.18
Ta'u	6	.00	.00	13	0	6.12
Ta'u	7	18.51	71.70	15	3	8.29
Ta'u	8	25.12	89.00	15	2	13.23

TOTAL ESTIMATES FOR WHITE

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	117	53.46	5.0	80.95	240.09	4329	1409
Tutuila Central	87	160	40.59	8.9	93.11	229.72	3779	999
Tutuila East	57	54	19.97	5.9	79.97	281.05	1597	743
Tutuila	227	331	114.05	6.5	85.36	246.18	9705	1880
Ofu [<300m]	25	80	5.71	13.0	87.73	121.40	500	138
Ofu [>300m]	13	8	1.54	23.6	5.38	8.64	8	3
Ofu	38	88	7.25	15.3	59.56	105.60	508	138
Olosega [<300m]	12	16	4.26	2.4	151.62	341.06	645	419
Olosega [>300m]	7	1	1.18	2.3	13.23	35.00	15	15
Olosega	19	17	5.44	2.4	100.63	276.04	660	419
Ta'u [<300m]	61	55	18.98	9.2	12.58	29.61	238	71
Ta'u [3-600m]	30	0	10.70	1.8	.00	.00	0	0
Ta'u [>600m]	36	0	8.93	3.3	.00	.00	0	0
Liu Bnch<300m]	15	4	3.03	4.4	20.60	71.58	62	56
Liu Bnch>300m]	15	1	4.19	1.9	23.03	89.21	96	96
Ta'u	157	60	45.83	5.3	9.06	39.78	396	131
ALL ISLANDS	441	496	172.57	6.5	56.63	192.52	11269	1935

Appendix Table 7. Many-colored Fruit-Dove.

A		SPECIES = MCFD		SUMMARY OF DENSITIES(B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	.00	.00	2	0	2.78	
Tutuila	0-100 m	Secondary	.00	.00	11	0	30.94	
Tutuila	0-100 m	Mixed	.00	.00	3	0	10.62	
Tutuila	0-100 m	Plantation	.00	.00	6	0	19.33	
Tutuila	0-100 m	Littoral	.00	.00	6	0	47.42	
Tutuila	1-200 m	Rain Forest	9.86	32.71	11	2	46.77	
Tutuila	1-200 m	Secondary	.00	.00	17	0	87.23	
Tutuila	1-200 m	Mixed	.74	2.09	8	2	47.71	
Tutuila	1-200 m	Plantation	.00	.00	2	0	18.25	
Tutuila	1-200 m	Littoral	.00	.00	2	0	25.74	
Tutuila	2-300 m	Rain Forest	.47	2.20	42	2	201.39	
Tutuila	2-300 m	Secondary	.80	2.51	47	4	268.89	
Tutuila	2-300 m	Mixed	.00	.00	2	0	9.37	
Tutuila	3-400 m	Rain Forest	.00	.00	32	0	157.03	
Tutuila	3-400 m	Secondary	.00	.00	24	0	137.34	
Tutuila	3-400 m	Mixed	.00	.00	2	0	22.95	
Tutuila	3-400 m	Plantation	.00	.00	5	0	59.49	
Tutuila	4-500 m	Secondary	.00	.00	2	0	5.44	
Tutuila	4-500 m	Montane	.00	.00	2	0	12.82	
Tutuila	5-800 m	Montane	.00	.00	1	0	7.35	
Ofu	0-100 m	Secondary	.00	.00	4	0	18.84	
Ofu	0-100 m	Mixed	.00	.00	10	0	37.79	
Ofu	0-100 m	Plantation	.00	.00	12	0	43.61	
Ofu	0-100 m	Village	.00	.00	1	0	5.39	
Ofu	1-200 m	Secondary	.00	.00	6	0	26.53	
Ofu	1-200 m	Mixed	.00	.00	2	0	4.43	
Ofu	2-300 m	Secondary	.00	.00	5	0	33.73	
Ofu	2-300 m	Mixed	.00	.00	3	0	13.36	
Ofu	3-400 m	Rain Forest	.00	.00	3	0	10.37	
Ofu	3-400 m	Secondary	.00	.00	1	0	1.74	
Ofu	3-400 m	Mixed	.00	.00	3	0	20.60	
Ofu	4-500 m	Rain Forest	.00	.00	2	0	6.49	
Ofu	4-500 m	Secondary	.00	.00	4	0	8.52	
Olosega	1-200 m	Mixed	.00	.00	10	0	35.87	
Olosega	2-300 m	Rain Forest	.00	.00	1	0	3.27	
Olosega	2-300 m	Mixed	.00	.00	1	0	3.62	
Olosega	3-400 m	Rain Forest	.00	.00	1	0	3.62	
Olosega	3-400 m	Secondary	.00	.00	1	0	3.80	
Olosega	4-500 m	Secondary	.00	.00	1	0	3.80	
Olosega	4-500 m	Cloud	.00	.00	1	0	2.96	
Olosega	5-800 m	Cloud	.00	.00	3	0	10.16	
Ta'u	0-100 m	Rain Forest	.00	.00	1	0	5.96	
Ta'u	0-100 m	Secondary	.00	.00	5	0	7.82	
Ta'u	0-100 m	Mixed	1.05	4.92	22	2	98.30	
Ta'u	0-100 m	Littoral	.00	.00	1	0	5.96	
Ta'u	1-200 m	Rain Forest	.00	.00	2	0	5.22	
Ta'u	1-200 m	Secondary	.00	.00	3	0	6.34	
Ta'u	1-200 m	Mixed	.00	.00	11	0	47.98	
Ta'u	1-200 m	Plantation	.00	.00	1	0	3.47	
Ta'u	2-300 m	Rain Forest	.00	.00	9	0	23.49	
Ta'u	2-300 m	Secondary	.00	.00	5	0	12.64	
Ta'u	2-300 m	Mixed	.00	.00	1	0	3.65	
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	18.94	
Ta'u	3-400 m	Secondary	.00	.00	2	0	6.12	
Ta'u	4-500 m	Rain Forest	.00	.00	8	0	16.09	
Ta'u	4-500 m	Secondary	.00	.00	5	0	15.00	
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	6.85	
Ta'u	5-600 m	Secondary	.00	.00	3	0	8.50	
Ta'u	5-600 m	Cloud	.00	.00	1	0	3.44	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	2.14	
Ta'u	6-700 m	Secondary	.00	.00	5	0	10.92	
Ta'u	6-700 m	Cloud	.00	.00	2	0	3.50	
Ta'u	7-800 m	Cloud	.00	.00	7	0	13.31	
Ta'u	8-900 m	Cloud	.00	.00	21	0	61.31	
Liu Bench	1-200 m	Rain Forest	.00	.00	4	0	14.18	
Liu Bench	1-200 m	Secondary	.00	.00	1	0	2.84	
Liu Bench	2-300 m	Rain Forest	.00	.00	9	0	23.97	
Liu Bench	2-300 m	Secondary	.00	.00	1	0	2.45	
Liu Bench	3-400 m	Rain Forest	.00	.00	12	0	24.50	
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	5.14	

Appendix Table 7, continued. Many-colored Fruit-Dove.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		.00	.00	28	0	111.16
Tutuila	1-200 m		2.86	17.16	40	4	225.70
Tutuila	2-300 m		.53	2.33	91	6	479.65
Tutuila	3-400 m		.00	.00	63	0	376.80
Tutuila	4-500 m		.00	.00	4	0	18.26
Tutuila	5-600 m		.00	.00	1	0	7.35
Ofu	0-100 m		.00	.00	27	0	105.64
Ofu	1-200 m		.00	.00	8	0	30.95
Ofu	2-300 m		.00	.00	8	0	47.09
Ofu	3-400 m		.00	.00	7	0	32.71
Ofu	4-500 m		.00	.00	6	0	15.01
Olosega	1-200 m		.00	.00	10	0	35.87
Olosega	2-300 m		.00	.00	2	0	8.89
Olosega	3-400 m		.00	.00	2	0	7.42
Olosega	4-500 m		.00	.00	2	0	6.76
Olosega	5-600 m		.00	.00	3	0	10.18
Ta'u	0-100 m		.80	4.29	29	2	118.05
Ta'u	1-200 m		.00	.00	17	0	63.01
Ta'u	2-300 m		.00	.00	15	0	39.78
Ta'u	3-400 m		.00	.00	9	0	23.06
Ta'u	4-500 m		.00	.00	13	0	31.09
Ta'u	5-600 m		.00	.00	8	0	18.79
Ta'u	6-700 m		.00	.00	8	0	16.56
Ta'u	7-800 m		.00	.00	7	0	13.31
Ta'u	8-900 m		.00	.00	21	0	61.31
Liu Bench	1-200 m		.00	.00	5	0	17.03
Liu Bench	2-300 m		.00	.00	10	0	26.42
Liu Bench	3-400 m		.00	.00	12	0	24.50
Liu Bench	4-500 m		.00	.00	3	0	5.14

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	1.47	11.71	87	4	407.97
Tutuila		Secondary	.28	1.73	101	4	529.84
Tutuila		Mixed	.39	1.52	15	2	90.65
Tutuila		Plantation	.00	.00	13	0	97.07
Tutuila		Montane	.00	.00	3	0	20.17
Tutuila		Littoral	.00	.00	8	0	73.22
Ofu		Rain Forest	.00	.00	5	0	16.87
Ofu		Secondary	.00	.00	20	0	89.35
Ofu		Mixed	.00	.00	18	0	76.19
Ofu		Plantation	.00	.00	12	0	43.61
Ofu		Village	.00	.00	1	0	5.39
Olosega		Rain Forest	.00	.00	2	0	6.89
Olosega		Secondary	.00	.00	2	0	7.60
Olosega		Mixed	.00	.00	11	0	39.48
Olosega		Cloud	.00	.00	4	0	13.12
Ta'u		Rain Forest	.00	.00	32	0	76.69
Ta'u		Secondary	.00	.00	28	0	67.34
Ta'u		Mixed	.68	3.96	34	2	149.93
Ta'u		Plantation	.00	.00	1	0	3.47
Ta'u		Cloud	.00	.00	31	0	81.55
Ta'u		Littoral	.00	.00	1	0	5.96
Liu Bench		Rain Forest	.00	.00	28	0	67.78
Liu Bench		Secondary	.00	.00	2	0	5.29

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			.71	7.35	227	10	1218.92
Ofu			.00	.00	56	0	231.41
Olosega			.00	.00	19	0	67.08
Ta'u			.18	2.05	127	2	384.94
Liu Bench			.00	.00	30	0	73.08

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			.40	5.28	459	12	1975.43

Appendix Table 7, concluded. Many-colored Fruit-Dove.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	.31	1.35	19	2	131.85
Tutuila	2	.00	.00	18	0	72.46
Tutuila	3	.70	3.13	20	2	209.53
Tutuila	4	.00	.00	18	0	140.06
Tutuila	5	.00	.00	8	0	73.22
Tutuila	6	.40	1.70	18	1	106.12
Tutuila	7	.59	2.10	24	2	168.17
Tutuila	8	.89	2.95	18	1	57.11
Tutuila	9	7.23	28.01	15	2	34.13
Tutuila	10	.00	.00	18	0	60.24
Tutuila	11	.00	.00	18	0	45.59
Tutuila	12	.00	.00	18	0	78.75
Tutuila	13	.00	.00	15	0	41.63
Ofu	1	.00	.00	21	0	126.07
Ofu	2	.00	.00	17	0	43.69
Ofu	3	.00	.00	18	0	61.64
Olosega	1	.00	.00	19	0	67.08
Ta'u	1	.00	.00	16	0	30.17
Ta'u	2	.00	.00	16	0	28.85
Ta'u	3	1.15	5.17	20	2	116.84
Ta'u	4	.00	.00	32	0	75.69
Ta'u	5	.00	.00	30	0	84.54
Ta'u	6	.00	.00	13	0	48.85
Ta'u	7	.00	.00	15	0	42.44
Ta'u	8	.00	.00	15	0	30.63

TOTAL ESTIMATES FOR MCFD

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	4	52.49	11.7	.24	1.66	12	9
Tutuila Central	87	6	40.59	10.0	1.64	11.74	66	51
Tutuila East	57	0	19.97	9.3	.00	.00	0	0
Tutuila	227	10	114.05	10.7	.71	7.35	78	51
Ofu [<300m]	25	0	5.71	21.4	.00	.00	0	0
Ofu [>300m]	13	0	1.54	31.0	.00	.00	0	0
Ofu	38	0	7.25	23.4	.00	.00	0	0
Olosega [<300m]	12	0	4.26	10.0	.00	.00	0	0
Olosega [>300m]	7	0	1.18	20.6	.00	.00	0	0
Olosega	19	0	5.44	12.3	.00	.00	0	0
Ta'u [<300m]	61	2	18.98	11.6	.38	2.96	7	7
Ta'u [3-600m]	30	0	10.70	6.8	.00	.00	0	0
Ta'u [>600m]	36	0	6.93	10.2	.00	.00	0	0
Liu Bnch [<300m]	15	0	3.03	14.3	.00	.00	0	0
Liu Bnch [>300m]	15	0	4.19	7.1	.00	.00	0	0
Ta'u	157	2	45.83	10.0	.15	1.84	7	7
ALL ISLANDS	441	12	172.57	11.1	.42	5.39	85	51

Appendix Table 8. Purple-capped Fruit-Dove.

SPECIES = PCFD		SUMMARY OF DENSITIES (B/SQ-KM)						
A	ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA (HA)
	Tutuila	0-100 m	Rain Forest	134.20	69.72	2	42	17.74
	Tutuila	0-100 m	Secondary	60.89	38.14	11	105	104.87
	Tutuila	0-100 m	Mixed	86.63	61.91	3	48	33.33
	Tutuila	0-100 m	Plantation	37.53	12.53	6	44	66.03
	Tutuila	0-100 m	Littoral	42.52	14.28	8	47	68.02
	Tutuila	1-200 m	Rain Forest	79.01	37.76	11	157	140.19
	Tutuila	1-200 m	Secondary	74.11	40.20	17	213	181.91
	Tutuila	1-200 m	Mixed	61.11	17.30	8	96	101.03
	Tutuila	1-200 m	Plantation	56.95	37.41	2	22	30.21
	Tutuila	1-200 m	Littoral	33.00	3.11	2	15	37.75
	Tutuila	2-300 m	Rain Forest	110.10	47.24	42	779	482.57
	Tutuila	2-300 m	Secondary	69.54	29.38	47	595	533.31
	Tutuila	2-300 m	Mixed	137.05	4.17	2	42	18.82
	Tutuila	3-400 m	Rain Forest	109.28	47.12	32	519	315.04
	Tutuila	3-400 m	Secondary	69.82	43.03	24	299	283.99
	Tutuila	3-400 m	Mixed	19.00	.42	2	11	32.64
	Tutuila	3-400 m	Plantation	24.68	3.97	5	31	80.24
	Tutuila	4-500 m	Secondary	44.80	27.01	2	15	23.40
	Tutuila	4-500 m	Montane	74.95	.07	2	25	23.54
	Tutuila	5-600 m	Montane	16.90	.00	1	4	13.34
	Ofu	0-100 m	Secondary	10.82	6.69	4	13	68.90
	Ofu	0-100 m	Mixed	2.44	3.32	10	4	98.05
	Ofu	0-100 m	Plantation	2.03	4.28	12	4	129.06
	Ofu	0-100 m	Village	.00	.00	1	0	12.66
	Ofu	1-200 m	Secondary	5.57	6.40	6	8	93.61
	Ofu	1-200 m	Mixed	.00	.00	2	0	15.80
	Ofu	2-300 m	Secondary	23.88	10.54	5	34	90.94
	Ofu	2-300 m	Mixed	2.80	4.85	3	3	39.61
	Ofu	3-400 m	Rain Forest	32.00	8.80	3	20	33.65
	Ofu	3-400 m	Secondary	46.80	.00	1	6	7.15
	Ofu	3-400 m	Mixed	14.07	7.48	3	10	51.84
	Ofu	4-500 m	Rain Forest	9.60	6.36	2	3	19.37
	Ofu	4-500 m	Secondary	12.85	11.13	4	6	27.09
	Olosega	1-200 m	Mixed	4.74	9.17	10	8	112.90
	Olosega	2-300 m	Rain Forest	12.00	.00	1	2	12.73
	Olosega	2-300 m	Mixed	7.50	.00	1	1	13.74
	Olosega	3-400 m	Rain Forest	10.40	.00	1	2	14.27
	Olosega	3-400 m	Secondary	22.70	.00	1	4	11.61
	Olosega	4-500 m	Secondary	20.70	.00	1	3	11.90
	Olosega	4-500 m	Cloud	29.00	.00	1	6	13.70
	Olosega	5-600 m	Cloud	10.00	2.75	3	7	44.37
	Ta'u	0-100 m	Rain Forest	.00	.00	1	0	11.16
	Ta'u	0-100 m	Secondary	242.22	17.61	5	129	31.65
	Ta'u	0-100 m	Mixed	34.54	31.70	22	159	327.37
	Ta'u	0-100 m	Littoral	.00	.00	1	0	11.02
	Ta'u	1-200 m	Rain Forest	36.90	13.58	2	11	20.04
	Ta'u	1-200 m	Secondary	120.50	76.08	3	57	28.22
	Ta'u	1-200 m	Mixed	27.50	9.23	11	95	187.63
	Ta'u	1-200 m	Plantation	6.50	.00	1	1	11.24
	Ta'u	2-300 m	Rain Forest	53.62	13.24	9	74	81.38
	Ta'u	2-300 m	Secondary	51.94	30.30	5	43	47.70
	Ta'u	2-300 m	Mixed	11.90	.00	1	2	9.16
	Ta'u	3-400 m	Rain Forest	61.00	19.34	7	64	61.57
	Ta'u	3-400 m	Secondary	51.85	35.57	2	18	20.19
	Ta'u	4-500 m	Rain Forest	38.54	26.30	8	40	61.80
	Ta'u	4-500 m	Secondary	39.98	24.90	5	30	46.48
	Ta'u	5-600 m	Rain Forest	9.40	11.03	4	5	31.48
	Ta'u	5-600 m	Secondary	17.03	3.07	3	9	28.69
	Ta'u	5-600 m	Cloud	27.50	.00	1	5	11.53
	Ta'u	6-700 m	Rain Forest	.00	.00	1	0	7.38
	Ta'u	6-700 m	Secondary	16.62	17.54	5	12	41.99
	Ta'u	6-700 m	Cloud	.00	.00	2	0	16.60
	Ta'u	7-800 m	Cloud	2.87	5.38	7	3	59.99
	Ta'u	8-900 m	Cloud	.19	.87	21	1	208.44
	Liu Bench	1-200 m	Rain Forest	44.38	34.86	4	34	51.84
	Liu Bench	1-200 m	Secondary	61.20	.00	1	15	12.91
	Liu Bench	2-300 m	Rain Forest	77.07	33.14	9	116	96.13
	Liu Bench	2-300 m	Secondary	75.60	.00	1	20	14.01
	Liu Bench	3-400 m	Rain Forest	120.28	30.94	12	215	117.06
	Liu Bench	4-500 m	Rain Forest	50.13	6.32	3	18	19.32

Appendix Table 8, continued. Purple-capped Fruit-Dove.

B							
ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		59.94	41.67	28	284	289.99
Tutuila	1-200 m		89.94	35.27	40	503	481.09
Tutuila	2-300 m		88.74	43.75	91	1416	1034.80
Tutuila	3-400 m		84.67	51.24	63	860	711.91
Tutuila	4-500 m		59.88	23.37	4	40	46.95
Tutuila	5-600 m		16.90	.00	1	4	13.34
Ofu	0-100 m		3.41	5.19	27	21	308.66
Ofu	1-200 m		4.17	5.99	8	8	109.22
Ofu	2-300 m		15.98	13.76	8	37	130.56
Ofu	3-400 m		26.43	14.34	7	36	92.64
Ofu	4-500 m		11.77	9.23	8	9	46.46
Olosega	1-200 m		4.74	9.17	10	8	112.90
Olosega	2-300 m		9.75	3.18	2	3	26.47
Olosega	3-400 m		16.55	8.70	2	6	25.88
Olosega	4-500 m		24.85	5.87	2	9	25.60
Olosega	5-600 m		10.00	2.75	3	7	44.37
Ta'u	0-100 m		67.96	86.19	29	288	381.20
Ta'u	1-200 m		43.78	46.55	17	164	257.14
Ta'u	2-300 m		50.28	21.82	15	119	138.24
Ta'u	3-400 m		58.92	21.35	9	82	81.76
Ta'u	4-500 m		39.09	24.71	13	70	108.28
Ta'u	5-600 m		14.52	9.83	8	19	71.70
Ta'u	6-700 m		10.39	15.80	8	12	65.97
Ta'u	7-800 m		2.87	5.38	7	3	59.99
Ta'u	8-900 m		.19	.87	21	1	202.44
Liu Bench	1-200 m		47.74	31.11	5	49	64.75
Liu Bench	2-300 m		76.92	31.25	10	136	110.14
Liu Bench	3-400 m		120.28	30.94	12	215	117.06
Liu Bench	4-500 m		50.13	6.32	3	18	19.32
C							
ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	106.42	47.01	87	1497	955.54
Tutuila		Secondary	68.94	35.47	101	1227	1127.48
Tutuila		Mixed	70.73	42.61	15	195	185.92
Tutuila		Plantation	35.58	17.74	13	97	176.48
Tutuila		Montane	55.60	33.52	3	29	36.89
Tutuila		Littoral	40.14	12.80	8	62	105.77
Ofu		Rain Forest	23.04	14.12	5	23	53.02
Ofu		Secondary	14.71	12.94	20	67	287.70
Ofu		Mixed	4.17	6.05	18	17	205.11
Ofu		Plantation	2.03	4.28	12	4	129.06
Ofu		Village	.00	.00	1	0	12.66
Olosega		Rain Forest	11.20	1.13	2	4	27.00
Olosega		Secondary	21.70	1.41	2	7	23.52
Olosega		Mixed	4.99	8.74	11	9	126.64
Olosega		Cloud	14.75	9.76	4	13	58.07
Ta'u		Rain Forest	41.54	25.84	32	194	274.83
Ta'u		Secondary	81.06	86.81	28	298	244.90
Ta'u		Mixed	31.59	26.23	34	256	534.16
Ta'u		Plantation	6.50	.00	1	1	11.24
Ta'u		Cloud	1.66	5.53	31	9	296.56
Ta'u		Littoral	.00	.00	1	0	11.02
Liu Bench		Rain Forest	88.03	42.40	28	383	284.35
Liu Bench		Secondary	58.40	10.18	2	35	26.92
D							
ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			80.32	45.26	227	3107	2588.08
Ofu			9.09	11.70	56	111	687.54
Olosega			9.46	9.69	19	33	235.20
Ta'u			37.25	52.31	127	758	1372.71
Liu Bench			86.72	41.25	30	418	311.27
E							
**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			57.20	51.98	459	4427	5194.83

Appendix Table 8, concluded. Purple-capped Fruit-Dove.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	141.82	44.28	19	389	210.10
Tutuila	2	133.63	42.97	18	316	132.77
Tutuila	3	42.45	24.52	20	222	315.88
Tutuila	4	67.30	23.93	18	250	227.01
Tutuila	5	40.14	12.90	8	62	105.77
Tutuila	6	108.59	43.27	18	293	169.37
Tutuila	7	72.39	27.38	24	326	262.72
Tutuila	8	62.12	24.49	18	250	267.72
Tutuila	9	84.18	54.41	15	209	149.21
Tutuila	10	66.97	18.72	18	271	248.71
Tutuila	11	93.53	37.31	18	241	144.71
Tutuila	12	56.48	31.54	18	150	212.78
Tutuila	13	51.79	24.84	15	128	141.33
Ofu	1	10.74	10.48	21	65	367.91
Ofu	2	14.22	15.28	17	39	148.88
Ofu	3	2.31	3.93	18	7	170.76
Olosega	1	9.46	9.69	19	33	235.22
Ta'u	1	130.45	90.72	16	257	122.29
Ta'u	2	34.91	25.38	16	78	129.28
Ta'u	3	25.68	8.82	20	177	417.53
Ta'u	4	15.88	19.82	32	84	295.24
Ta'u	5	17.86	27.13	30	67	258.87
Ta'u	6	40.62	27.24	13	95	149.50
Ta'u	7	95.83	50.19	15	229	180.10
Ta'u	8	77.61	28.78	15	189	131.17

TOTAL ESTIMATES FOR PCFD

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	1239	53.49	18.5	90.09	55.02	4819	323
Tutuila Central	87	1306	40.59	25.4	81.27	37.21	3298	161
Tutuila East	57	562	19.97	28.4	64.65	36.27	1290	95
Tutuila	227	3107	114.05	22.7	80.32	45.26	9407	373
Ofu [<300m]	25	59	5.71	66.1	8.47	10.45	48	11
Ofu [>300m]	13	45	1.54	90.3	19.66	14.01	30	5
Ofu	38	104	7.25	71.3	12.30	12.78	78	12
Olosega [<300m]	12	11	4.26	32.7	5.58	8.57	23	10
Olosega [>300m]	7	22	1.18	81.2	16.11	8.07	19	3
Olosega	19	33	5.44	43.2	9.46	9.69	42	10
Ta'u [<300m]	61	571	18.98	40.9	56.88	65.38	1079	158
Ta'u [3-600m]	30	171	10.70	24.5	38.49	26.27	411	51
Ta'u [>600m]	36	16	8.93	37.4	2.98	8.52	26	12
Liu Bnch(<300m)	15	185	3.03	57.7	67.19	33.27	203	26
Liu Bnch(>300m)	16	233	4.19	32.5	106.25	40.02	445	43
Ta'u	157	1176	45.83	36.7	46.71	53.92	2164	173
ALL ISLANDS	441	4420	172.57	29.1	59.44	51.80	11691	411

Appendix Table 9. Pacific Pigeon.

A		SPECIES = PAPI		SUMMARY OF DENSITIES(B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	120.40	92.63	2	8	3.98	
Tutuila	0-100 m	Secondary	27.84	48.63	11	11	32.90	
Tutuila	0-100 m	Mixed	60.20	88.57	3	7	9.49	
Tutuila	0-100 m	Plantation	27.22	30.91	6	7	16.43	
Tutuila	0-100 m	Littoral	.00	.00	6	0	30.35	
Tutuila	1-200 m	Rain Forest	47.90	53.44	11	27	47.17	
Tutuila	1-200 m	Secondary	1.89	4.23	17	3	67.74	
Tutuila	1-200 m	Mixed	6.26	12.18	8	4	43.21	
Tutuila	1-200 m	Plantation	.00	.00	2	0	14.30	
Tutuila	1-200 m	Littoral	.00	.00	2	0	17.25	
Tutuila	2-300 m	Rain Forest	29.69	32.99	42	67	172.43	
Tutuila	2-300 m	Secondary	3.57	9.21	47	13	206.88	
Tutuila	2-300 m	Mixed	11.75	16.62	2	1	6.81	
Tutuila	3-400 m	Rain Forest	22.18	29.35	32	35	111.27	
Tutuila	3-400 m	Secondary	18.98	35.71	24	23	107.67	
Tutuila	3-400 m	Mixed	.00	.00	2	0	15.12	
Tutuila	3-400 m	Plantation	.00	.00	5	0	38.89	
Tutuila	4-500 m	Secondary	5.70	8.06	2	1	7.87	
Tutuila	4-500 m	Montane	.00	.00	2	0	8.21	
Tutuila	5-600 m	Montane	.00	.00	1	0	4.76	
Ofu	0-100 m	Secondary	19.13	23.92	4	5	24.15	
Ofu	0-100 m	Mixed	3.53	11.16	10	3	25.91	
Ofu	0-100 m	Plantation	9.07	10.59	12	6	42.40	
Ofu	0-100 m	Village	.00	.00	1	0	4.28	
Ofu	1-200 m	Secondary	4.32	4.74	6	3	34.34	
Ofu	1-200 m	Mixed	.00	.00	2	0	4.56	
Ofu	2-300 m	Secondary	6.58	7.65	5	3	38.45	
Ofu	2-300 m	Mixed	11.13	19.28	3	2	15.73	
Ofu	3-400 m	Rain Forest	.00	.00	3	0	13.93	
Ofu	3-400 m	Secondary	.00	.00	1	0	2.24	
Ofu	3-400 m	Mixed	5.57	9.64	3	1	23.42	
Ofu	4-500 m	Rain Forest	.00	.00	2	0	7.61	
Ofu	4-500 m	Secondary	.00	.00	4	0	9.21	
Ofu	4-500 m	Mixed	10.62	23.14	10	4	43.16	
Olosega	1-200 m	Rain Forest	11.50	.00	1	1	4.33	
Olosega	2-300 m	Mixed	.00	.00	1	0	4.86	
Olosega	3-400 m	Rain Forest	.00	.00	1	0	4.86	
Olosega	3-400 m	Secondary	.00	.00	1	0	3.91	
Olosega	4-500 m	Secondary	.00	.00	1	0	3.91	
Olosega	4-500 m	Cloud	12.80	.00	1	1	3.91	
Olosega	5-600 m	Cloud	6.87	11.89	3	2	13.62	
Ta'u	0-100 m	Rain Forest	.00	.00	1	0	4.86	
Ta'u	0-100 m	Secondary	24.86	42.83	5	4	9.84	
Ta'u	0-100 m	Mixed	20.47	24.24	22	37	129.48	
Ta'u	0-100 m	Littoral	.00	.00	1	0	4.92	
Ta'u	1-200 m	Rain Forest	16.15	22.84	2	1	6.16	
Ta'u	1-200 m	Secondary	95.37	15.96	3	12	8.66	
Ta'u	1-200 m	Mixed	15.91	23.88	11	13	66.77	
Ta'u	1-200 m	Plantation	.00	.00	1	0	4.76	
Ta'u	2-300 m	Rain Forest	19.29	39.24	9	8	26.71	
Ta'u	2-300 m	Secondary	34.92	50.01	5	8	15.40	
Ta'u	2-300 m	Mixed	.00	.00	1	0	3.83	
Ta'u	3-400 m	Rain Forest	12.50	22.51	7	4	18.38	
Ta'u	3-400 m	Secondary	28.10	36.91	2	2	6.97	
Ta'u	4-500 m	Rain Forest	7.99	16.13	8	3	16.45	
Ta'u	4-500 m	Secondary	.00	.00	5	0	16.01	
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	8.11	
Ta'u	5-600 m	Secondary	.00	.00	3	0	8.40	
Ta'u	5-600 m	Cloud	.00	.00	1	0	3.48	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	2.78	
Ta'u	6-700 m	Secondary	.00	.00	5	0	11.42	
Ta'u	6-700 m	Cloud	.00	.00	2	0	4.08	
Ta'u	7-800 m	Cloud	.00	.00	7	0	15.81	
Ta'u	8-800 m	Cloud	.00	.00	21	0	68.00	
Liu Bench	1-200 m	Rain Forest	42.67	42.42	4	6	15.32	
Liu Bench	1-200 m	Secondary	52.20	.00	1	3	3.83	
Liu Bench	2-300 m	Rain Forest	138.42	60.41	9	49	27.88	
Liu Bench	2-300 m	Secondary	128.00	.00	1	7	4.30	
Liu Bench	3-400 m	Rain Forest	210.57	61.21	12	106	38.33	
Liu Bench	4-500 m	Rain Forest	180.13	54.66	3	18	6.38	

Appendix Table 9, continued. Pacific Pigeon.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		31.82	53.47	28	33	93.15
Tutuila	1-200 m		15.63	34.33	40	34	189.67
Tutuila	2-300 m		15.81	26.66	81	81	386.12
Tutuila	3-400 m		18.50	30.81	63	58	272.95
Tutuila	4-500 m		2.85	5.70	4	1	16.07
Tutuila	5-600 m		.00	.00	1	0	4.76
Ofu	0-100 m		8.17	13.65	27	14	100.74
Ofu	1-200 m		3.24	4.48	8	3	38.90
Ofu	2-300 m		8.29	12.05	8	5	54.18
Ofu	3-400 m		2.39	6.31	7	1	39.59
Ofu	4-500 m		.00	.00	6	0	16.82
Olosega	1-200 m		10.62	23.14	10	4	43.16
Olosega	2-300 m		5.75	8.13	2	1	9.19
Olosega	3-400 m		.00	.00	2	0	8.76
Olosega	4-500 m		6.40	9.05	2	1	7.81
Olosega	5-600 m		6.87	11.89	3	2	13.62
Ta'u	0-100 m		19.81	27.12	29	41	149.10
Ta'u	1-200 m		29.02	37.92	17	26	86.37
Ta'u	2-300 m		23.21	41.13	15	17	45.94
Ta'u	3-400 m		15.52	24.21	9	6	25.34
Ta'u	4-500 m		4.92	12.97	13	3	32.46
Ta'u	5-600 m		.00	.00	8	0	19.99
Ta'u	6-700 m		.00	.00	8	0	18.27
Ta'u	7-800 m		.00	.00	7	0	15.81
Ta'u	8-900 m		.00	.00	21	0	68.00
Liu Bench	1-200 m		44.58	36.98	5	9	19.15
Liu Bench	2-300 m		137.38	57.05	10	56	32.18
Liu Bench	3-400 m		210.57	61.21	12	106	38.33
Liu Bench	4-500 m		180.13	54.66	3	18	6.36

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	31.32	38.90	87	137	334.85
Tutuila		Secondary	9.64	25.64	101	51	423.06
Tutuila		Mixed	18.01	41.28	15	12	74.62
Tutuila		Plantation	12.56	24.44	13	7	69.62
Tutuila		Montane	.00	.00	3	0	12.97
Tutuila		Littoral	.00	.00	8	0	47.60
Ofu		Rain Forest	.00	.00	5	0	21.55
Ofu		Secondary	6.76	12.44	20	11	108.40
Ofu		Mixed	4.74	11.47	18	6	73.62
Ofu		Plantation	9.07	10.59	12	6	42.40
Ofu		Village	.00	.00	1	0	4.22
Olosega		Rain Forest	5.75	8.13	2	1	9.19
Olosega		Secondary	.00	.00	2	0	7.81
Olosega		Mixed	9.65	22.18	11	4	48.02
Olosega		Cloud	8.35	10.15	4	3	17.53
Ta'u		Rain Forest	11.17	24.88	32	17	83.47
Ta'u		Secondary	22.76	39.70	28	26	76.70
Ta'u		Mixed	18.39	23.71	34	50	200.08
Ta'u		Plantation	.00	.00	1	0	4.76
Ta'u		Cloud	.00	.00	31	0	91.37
Ta'u		Littoral	.00	.00	1	0	4.92
Liu Bench		Rain Forest	160.14	80.04	28	179	87.92
Liu Bench		Secondary	90.10	53.60	2	10	8.13

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			18.20	33.48	227	207	962.72
Ofu			5.88	11.10	56	23	250.24
Olosega			7.95	17.43	19	8	82.55
Ta'u			12.75	26.67	127	93	461.30
Liu Bench			155.47	78.87	30	189	96.05

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			23.74	49.13	459	520	1852.85

Appendix Table 9, concluded. Pacific Pigeon.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	18.79	19.59	19	17	82.87
Tutuila	2	21.83	29.50	18	15	44.14
Tutuila	3	1.58	3.87	20	4	138.75
Tutuila	4	31.24	44.02	18	31	89.18
Tutuila	5	.00	.00	8	0	47.60
Tutuila	6	31.27	36.58	18	30	67.82
Tutuila	7	4.09	8.93	24	7	109.18
Tutuila	8	22.83	27.93	18	29	89.38
Tutuila	9	70.49	88.46	15	39	36.01
Tutuila	10	32.11	29.12	18	31	84.73
Tutuila	11	.00	.00	18	0	50.84
Tutuila	12	.00	.00	18	0	77.23
Tutuila	13	8.13	14.29	15	4	46.88
Ofu	1	8.83	13.44	21	14	145.46
Ofu	2	.68	2.81	17	1	51.87
Ofu	3	7.36	11.77	18	8	53.11
Olosega	1	7.95	17.43	19	8	82.55
Ta'u	1	26.99	45.84	16	17	39.14
Ta'u	2	12.58	23.26	16	7	28.07
Ta'u	3	25.32	24.36	20	45	161.34
Ta'u	4	12.53	28.96	32	18	92.17
Ta'u	5	.00	.00	30	0	87.30
Ta'u	6	6.11	9.57	13	6	53.27
Ta'u	7	166.59	97.94	15	112	58.96
Ta'u	8	144.34	57.92	15	77	37.08

TOTAL ESTIMATES FOR PAPI

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	67	53.49	7.5	15.73	28.36	841	166
Tutuila Central	87	131	40.59	9.1	29.95	42.48	1215	184
Tutuila East	57	9	19.97	9.6	3.85	11.88	76	31
Tutuila	227	207	114.05	8.4	18.20	33.48	2132	249
Ofu [<300m]	25	14	5.71	24.6	7.21	12.59	41	14
Ofu [>300m]	13	1	1.54	36.6	1.28	4.83	1	1
Ofu	38	15	7.25	27.2	5.18	10.86	42	14
Olosega [<300m]	12	5	4.26	12.3	9.81	21.16	41	26
Olosega [>300m]	7	3	1.18	25.6	4.77	8.45	5	3
Olosega	19	8	5.44	15.2	7.95	17.43	46	26
Ta'u [<300m]	81	84	18.98	14.8	23.22	33.71	440	81
Ta'u [3-600m]	30	9	10.70	7.3	8.79	16.41	72	32
Ta'u [>600m]	36	0	8.93	11.4	.00	.00	0	0
Liu Bnch [<300m]	15	65	3.03	16.9	106.45	67.33	322	52
Liu Bnch [>300m]	15	124	4.19	10.7	204.49	59.41	856	64
Ta'u	157	282	45.83	12.2	40.02	70.20	1690	119
ALL ISLANDS	441	512	172.57	10.4	24.41	49.96	3910	277

Appendix Table 10. Blue-crowned Lory.

A		SPECIES = BCLO SUMMARY OF DENSITIES(B/SQ-KM)						
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	.00	.00	2	0	2.59	
Tutuila	0-100 m	Secondary	.00	.00	11	0	13.79	
Tutuila	0-100 m	Mixed	.00	.00	3	0	4.70	
Tutuila	0-100 m	Plantation	.00	.00	6	0	10.56	
Tutuila	0-100 m	Littoral	.00	.00	6	0	10.99	
Tutuila	1-200 m	Rain Forest	.00	.00	11	0	17.11	
Tutuila	1-200 m	Secondary	.00	.00	17	0	22.31	
Tutuila	1-200 m	Mixed	.00	.00	6	0	17.52	
Tutuila	1-200 m	Plantation	.00	.00	2	0	4.89	
Tutuila	1-200 m	Littoral	.00	.00	2	0	5.19	
Tutuila	2-300 m	Rain Forest	.00	.00	42	0	70.99	
Tutuila	2-300 m	Secondary	.00	.00	47	0	81.72	
Tutuila	2-300 m	Mixed	.00	.00	2	0	3.84	
Tutuila	3-400 m	Rain Forest	.00	.00	32	0	38.41	
Tutuila	3-400 m	Secondary	.00	.00	24	0	36.84	
Tutuila	3-400 m	Mixed	.00	.00	2	0	3.37	
Tutuila	3-400 m	Plantation	.00	.00	5	0	8.14	
Tutuila	4-500 m	Secondary	.00	.00	2	0	2.81	
Tutuila	4-500 m	Montane	.00	.00	2	0	3.21	
Tutuila	5-600 m	Montane	.00	.00	1	0	1.98	
Ofu	0-100 m	Secondary	44.48	35.00	4	5	6.46	
Ofu	0-100 m	Mixed	46.55	73.38	10	9	11.36	
Ofu	0-100 m	Plantation	121.91	200.82	12	29	15.40	
Ofu	0-100 m	Village	42.50	.00	1	1	1.30	
Ofu	1-200 m	Secondary	46.07	57.32	6	7	6.40	
Ofu	1-200 m	Mixed	105.35	148.99	2	3	1.96	
Ofu	2-300 m	Secondary	109.20	56.91	5	17	8.82	
Ofu	2-300 m	Mixed	208.03	128.81	3	12	4.20	
Ofu	3-400 m	Rain Forest	23.80	41.22	3	2	4.42	
Ofu	3-400 m	Secondary	.00	.00	1	0	.84	
Ofu	3-400 m	Mixed	60.60	104.96	3	3	5.26	
Ofu	4-500 m	Rain Forest	.00	.00	2	0	2.38	
Ofu	4-500 m	Secondary	.00	.00	4	0	3.23	
Olosega	1-200 m	Mixed	198.72	118.12	10	51	14.14	
Olosega	2-300 m	Rain Forest	.00	.00	1	0	1.22	
Olosega	2-300 m	Mixed	.00	.00	1	0	1.36	
Olosega	3-400 m	Rain Forest	89.80	.00	1	2	1.29	
Olosega	3-400 m	Secondary	.00	.00	1	0	1.14	
Olosega	4-500 m	Secondary	.00	.00	1	0	1.00	
Olosega	4-500 m	Cloud	475.60	.00	1	7	.88	
Olosega	5-600 m	Cloud	355.77	154.10	3	19	3.18	
Ta'u	0-100 m	Rain Forest	213.00	.00	1	4	1.16	
Ta'u	0-100 m	Secondary	232.30	134.78	5	19	4.99	
Ta'u	0-100 m	Mixed	243.47	196.79	22	167	44.82	
Ta'u	0-100 m	Littoral	142.20	.00	1	3	1.21	
Ta'u	1-200 m	Rain Forest	.00	.00	2	0	2.09	
Ta'u	1-200 m	Secondary	123.00	59.45	3	8	4.04	
Ta'u	1-200 m	Mixed	193.70	77.79	11	83	24.23	
Ta'u	1-200 m	Plantation	171.40	.00	1	4	1.35	
Ta'u	2-300 m	Rain Forest	25.20	55.79	9	3	9.26	
Ta'u	2-300 m	Secondary	167.72	103.69	5	19	6.49	
Ta'u	2-300 m	Mixed	39.60	.00	1	1	1.26	
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	7.17	
Ta'u	3-400 m	Secondary	59.00	16.55	2	2	2.36	
Ta'u	4-500 m	Rain Forest	62.34	77.89	8	7	9.00	
Ta'u	4-500 m	Secondary	206.80	131.71	5	17	5.19	
Ta'u	5-600 m	Rain Forest	109.35	151.85	4	7	4.72	
Ta'u	5-600 m	Secondary	317.70	128.08	3	15	2.97	
Ta'u	5-600 m	Cloud	544.20	.00	1	8	.83	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	1.52	
Ta'u	6-700 m	Secondary	285.48	250.16	5	22	5.41	
Ta'u	6-700 m	Cloud	90.15	127.49	2	3	2.37	
Ta'u	7-800 m	Cloud	245.46	139.82	7	30	7.87	
Ta'u	8-900 m	Cloud	70.56	60.94	21	27	20.89	
Liu Bench	1-200 m	Rain Forest	30.52	35.83	4	2	5.58	
Liu Bench	1-200 m	Secondary	.00	.00	1	0	1.32	
Liu Bench	2-300 m	Rain Forest	83.88	145.66	9	12	11.48	
Liu Bench	2-300 m	Secondary	200.10	.00	1	5	1.43	
Liu Bench	3-400 m	Rain Forest	151.93	108.08	12	44	20.04	
Liu Bench	4-500 m	Rain Forest	521.97	180.59	3	21	2.57	

Appendix Table 10, continued. Blue-crowned Lory.

B	ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	0-100 m		.00	.00	28	0	42.63
	Tutuila	1-200 m		.00	.00	40	0	67.02
	Tutuila	2-300 m		.00	.00	91	0	156.56
	Tutuila	3-400 m		.00	.00	63	0	86.77
	Tutuila	4-500 m		.00	.00	4	0	6.02
	Tutuila	5-600 m		.00	.00	1	0	1.98
	Ofu	0-100 m		79.58	143.38	27	44	34.53
	Ofu	1-200 m		60.89	79.19	8	10	10.36
	Ofu	2-300 m		146.26	96.64	8	29	13.02
	Ofu	3-400 m		36.17	89.51	7	5	10.52
	Ofu	4-500 m		.00	.00	6	0	5.62
	Olosega	1-200 m		198.72	116.12	10	51	14.14
	Olosega	2-300 m		.00	.00	2	0	2.58
	Olosega	3-400 m		44.90	63.50	2	2	2.44
	Olosega	4-500 m		237.80	336.30	2	7	1.88
	Olosega	5-600 m		355.77	154.10	3	19	3.18
	Ta'u	0-100 m		237.00	178.94	29	193	52.17
	Ta'u	1-200 m		157.12	91.98	17	95	31.72
	Ta'u	2-300 m		73.67	97.99	15	23	17.01
	Ta'u	3-400 m		13.11	26.67	9	2	9.52
	Ta'u	4-500 m		117.90	121.13	13	24	14.19
	Ta'u	5-600 m		241.84	200.31	8	30	8.52
	Ta'u	6-700 m		200.96	229.05	8	25	9.31
	Ta'u	7-800 m		245.46	139.82	7	30	7.87
	Ta'u	8-900 m		70.56	60.94	21	27	20.89
	Liu Bench	1-200 m		24.42	33.90	5	2	6.90
	Liu Bench	2-300 m		95.50	142.16	10	17	12.92
	Liu Bench	3-400 m		151.93	108.08	12	44	20.04
	Liu Bench	4-500 m		521.97	180.59	3	21	2.57

C	ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila		Rain Forest	.00	.00	87	0	129.10
	Tutuila		Secondary	.00	.00	101	0	157.46
	Tutuila		Mixed	.00	.00	15	0	29.44
	Tutuila		Plantation	.00	.00	13	0	23.59
	Tutuila		Montane	.00	.00	3	0	5.19
	Tutuila		Littoral	.00	.00	8	0	16.18
	Ofu		Rain Forest	14.28	31.93	5	2	6.80
	Ofu		Secondary	50.02	58.14	20	29	27.76
	Ofu		Mixed	82.34	105.32	18	27	22.79
	Ofu		Plantation	121.91	200.82	12	29	15.40
	Ofu		Village	42.50	.00	1	1	1.30
	Olosega		Rain Forest	44.90	63.50	2	2	2.52
	Olosega		Secondary	.00	.00	2	0	2.14
	Olosega		Mixed	180.65	125.40	11	51	15.50
	Olosega		Cloud	385.73	139.38	4	26	4.06
	Ta'u		Rain Forest	43.00	81.79	32	21	34.92
	Ta'u		Secondary	210.77	151.36	28	102	31.44
	Ta'u		Mixed	221.37	167.51	34	251	70.31
	Ta'u		Plantation	171.40	.00	1	4	1.35
	Ta'u		Cloud	126.60	135.36	31	68	31.97
	Ta'u		Littoral	142.20	.00	1	3	1.21
	Liu Bench		Rain Forest	152.36	180.40	28	79	39.68
	Liu Bench		Secondary	100.05	141.49	2	5	2.75

D	ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila			.00	.00	227	0	360.97
	Ofu			72.49	117.51	56	88	74.05
	Olosega			190.52	164.66	19	79	24.21
	Ta'u			149.94	153.33	127	449	171.20
	Liu Bench			148.87	176.54	30	84	42.43

E	**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
				67.95	127.95	459	700	672.86

Appendix Table 10, concluded. Blue-crowned Lory.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	.00	.00	19	0	30.40
Tutuila	2	.00	.00	18	0	17.88
Tutuila	3	.00	.00	20	0	28.79
Tutuila	4	.00	.00	18	0	22.04
Tutuila	5	.00	.00	8	0	16.18
Tutuila	6	.00	.00	18	0	33.61
Tutuila	7	.00	.00	24	0	42.80
Tutuila	8	.00	.00	18	0	32.16
Tutuila	9	.00	.00	15	0	23.73
Tutuila	10	.00	.00	18	0	32.99
Tutuila	11	.00	.00	18	0	37.12
Tutuila	12	.00	.00	18	0	25.96
Tutuila	13	.00	.00	15	0	17.31
Ofu	1	78.45	85.90	21	48	34.61
Ofu	2	59.94	108.98	17	17	18.52
Ofu	3	77.37	158.73	18	23	20.91
Olosega	1	190.52	164.66	19	79	24.21
Ta'u	1	286.84	195.08	16	98	21.09
Ta'u	2	58.31	98.92	16	15	16.57
Ta'u	3	177.00	108.48	20	158	50.66
Ta'u	4	119.36	118.26	32	83	41.67
Ta'u	5	136.50	153.39	30	63	28.19
Ta'u	6	158.86	187.04	13	32	13.02
Ta'u	7	75.41	83.35	15	36	27.56
Ta'u	8	222.34	214.59	15	48	14.87

TOTAL ESTIMATES FOR BCLO

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	0	53.49	2.2	.00	.00	0	0
Tutuila Central	87	0	40.59	3.8	.00	.00	0	0
Tutuila East	57	0	19.87	4.5	.00	.00	0	0
Tutuila	227	0	114.05	3.2	.00	.00	0	0
Ofu [<300m]	25	60	5.71	6.5	86.53	101.35	551	115
Ofu [>300m]	13	5	1.54	10.5	18.48	52.61	29	22
Ofu	38	65	7.25	7.3	70.17	94.51	580	117
Olosega [<300m]	12	51	4.28	3.9	165.60	130.44	705	160
Olosega [>300m]	7	28	1.18	6.3	233.24	216.27	275	96
Olosega	19	79	5.44	4.5	190.52	164.66	980	186
Ta'u [<300m]	61	311	18.98	5.3	174.58	154.77	3313	376
Ta'u [3-600m]	30	56	10.70	3.0	119.51	153.61	1278	300
Ta'u [>600m]	36	82	8.93	4.3	133.55	147.95	1192	220
Liu Bnch [<300m]	15	19	3.03	6.5	71.81	120.51	217	94
Liu Bnch [>300m]	15	65	4.19	5.4	225.94	193.16	946	202
Ta'u	157	533	45.83	4.7	149.74	157.42	6946	574
ALL ISLANDS	441	677	172.57	3.8	67.56	126.75	8506	614

Appendix Table 11. White-rumped Swiftlet.

A		SPECIES = WRSW		SUMMARY OF DENSITIES(B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	105.55	149.27	2	2	.88	
Tutuila	0-100 m	Secondary	52.52	85.34	11	7	5.66	
Tutuila	0-100 m	Mixed	133.67	143.20	3	4	2.31	
Tutuila	0-100 m	Plantation	42.00	56.76	6	7	9.46	
Tutuila	0-100 m	Littoral	98.45	111.19	6	13	5.04	
Tutuila	1-200 m	Rain Forest	76.43	215.48	11	5	5.11	
Tutuila	1-200 m	Secondary	69.32	149.50	17	11	9.45	
Tutuila	1-200 m	Mixed	127.69	163.39	8	17	8.54	
Tutuila	1-200 m	Plantation	164.60	109.60	2	6	2.18	
Tutuila	1-200 m	Littoral	207.80	142.55	2	17	3.36	
Tutuila	2-300 m	Rain Forest	59.29	129.09	42	17	23.61	
Tutuila	2-300 m	Secondary	531.47	780.85	47	195	27.80	
Tutuila	2-300 m	Mixed	148.80	210.43	2	3	1.02	
Tutuila	3-400 m	Rain Forest	131.99	212.67	32	24	16.03	
Tutuila	3-400 m	Secondary	284.45	371.84	24	65	14.58	
Tutuila	3-400 m	Mixed	84.10	61.38	2	4	3.26	
Tutuila	3-400 m	Plantation	194.26	55.77	5	35	8.99	
Tutuila	4-500 m	Secondary	617.35	351.50	2	5	.84	
Tutuila	4-500 m	Montane	375.35	307.24	2	4	.89	
Tutuila	5-600 m	Montane	.00	.00	1	0	.80	
Ofu	0-100 m	Secondary	802.10	590.14	4	77	4.89	
Ofu	0-100 m	Mixed	205.43	242.53	10	22	6.88	
Ofu	0-100 m	Plantation	207.63	254.13	12	26	12.54	
Ofu	0-100 m	Village	315.20	.00	1	6	1.22	
Ofu	1-200 m	Secondary	731.90	594.85	6	69	5.64	
Ofu	1-200 m	Mixed	292.05	413.02	2	1	.37	
Ofu	2-300 m	Secondary	753.78	206.74	5	99	7.54	
Ofu	2-300 m	Mixed	597.17	724.26	3	16	2.26	
Ofu	3-400 m	Rain Forest	1185.70	826.93	3	28	1.56	
Ofu	3-400 m	Secondary	486.00	.00	1	1	.18	
Ofu	3-400 m	Mixed	299.37	262.68	3	25	3.53	
Ofu	4-500 m	Rain Forest	535.75	74.46	2	12	1.41	
Ofu	4-500 m	Secondary	133.30	266.60	4	1	.78	
Ofu	5-600 m	Mixed	.00	.00	10	0	6.25	
Olosega	1-200 m	Rain Forest	273.40	.00	1	2	.56	
Olosega	2-300 m	Mixed	.00	.00	1	0	.54	
Olosega	3-400 m	Rain Forest	.00	.00	1	0	.51	
Olosega	3-400 m	Secondary	.00	.00	1	0	.36	
Olosega	4-500 m	Secondary	.00	.00	1	0	.28	
Olosega	4-500 m	Cloud	268.20	.00	1	1	.20	
Olosega	5-600 m	Cloud	889.47	392.04	3	10	.82	
Ta'u	0-100 m	Rain Forest	327.10	.00	1	1	.44	
Ta'u	0-100 m	Secondary	157.88	216.21	5	4	1.67	
Ta'u	0-100 m	Mixed	320.80	295.56	22	164	25.48	
Ta'u	0-100 m	Littoral	.00	.00	1	0	.25	
Ta'u	1-200 m	Rain Forest	621.45	221.54	2	6	.92	
Ta'u	1-200 m	Secondary	217.43	376.61	3	3	1.37	
Ta'u	1-200 m	Mixed	87.15	80.86	11	38	19.63	
Ta'u	1-200 m	Plantation	187.20	.00	1	2	.66	
Ta'u	2-300 m	Rain Forest	78.14	142.14	9	4	3.36	
Ta'u	2-300 m	Secondary	.00	.00	5	0	2.75	
Ta'u	2-300 m	Mixed	553.20	.00	1	5	.56	
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	2.86	
Ta'u	3-400 m	Secondary	153.75	217.44	2	1	1.18	
Ta'u	4-500 m	Rain Forest	124.24	200.17	8	5	2.92	
Ta'u	4-500 m	Secondary	74.86	167.39	5	3	1.81	
Ta'u	5-600 m	Rain Forest	111.88	223.75	4	2	1.41	
Ta'u	5-600 m	Secondary	.00	.00	3	0	.71	
Ta'u	5-600 m	Cloud	.00	.00	1	0	.20	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	.27	
Ta'u	6-700 m	Secondary	425.86	952.25	5	3	.78	
Ta'u	6-700 m	Cloud	.00	.00	2	0	.30	
Ta'u	7-800 m	Cloud	28.43	75.21	7	1	1.30	
Ta'u	8-900 m	Cloud	50.32	126.06	21	7	9.43	
Liu Bench	1-200 m	Rain Forest	419.10	479.51	4	8	1.44	
Liu Bench	1-200 m	Secondary	568.70	.00	1	4	.52	
Liu Bench	2-300 m	Rain Forest	66.44	110.91	9	4	4.67	
Liu Bench	2-300 m	Secondary	348.40	.00	1	3	.61	
Liu Bench	3-400 m	Rain Forest	77.34	121.61	12	10	7.44	
Liu Bench	4-500 m	Rain Forest	406.17	529.93	3	6	1.28	

Appendix Table 11, continued. White-rumped Swiftlet.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		72.59	94.57	28	33	23.33
Tutuila	1-200 m		84.64	167.93	40	56	28.65
Tutuila	2-300 m		305.13	612.56	81	215	52.42
Tutuila	3-400 m		185.87	279.99	63	128	43.86
Tutuila	4-500 m		496.35	303.60	4	8	1.73
Tutuila	5-600 m		.00	.00	1	0	.80
Ofu	0-100 m		313.69	388.37	27	131	25.53
Ofu	1-200 m		621.94	564.43	8	70	6.01
Ofu	2-300 m		695.05	425.28	8	115	9.80
Ofu	3-400 m		705.89	676.64	7	54	5.28
Ofu	4-500 m		267.45	294.86	6	13	2.19
Olosega	1-200 m		.00	.00	10	0	6.25
Olosega	2-300 m		136.70	193.32	2	2	1.10
Olosega	3-400 m		.00	.00	2	0	.86
Olosega	4-500 m		134.10	189.65	2	1	.48
Olosega	5-600 m		889.47	392.04	3	10	.82
Ta'u	0-100 m		281.87	281.14	29	169	27.84
Ta'u	1-200 m		178.88	235.47	17	49	22.58
Ta'u	2-300 m		83.77	172.66	15	9	6.62
Ta'u	3-400 m		34.17	102.50	9	1	4.03
Ta'u	4-500 m		105.25	182.59	13	8	4.73
Ta'u	5-600 m		55.94	158.22	8	2	2.32
Ta'u	6-700 m		266.16	752.82	8	3	1.36
Ta'u	7-800 m		28.43	75.21	7	1	1.30
Ta'u	8-900 m		50.32	126.08	21	7	9.43
Liu Bench	1-200 m		449.02	420.62	5	12	1.96
Liu Bench	2-300 m		94.64	137.42	10	7	5.28
Liu Bench	3-400 m		77.34	121.61	12	10	7.44
Liu Bench	4-500 m		406.17	529.93	3	6	1.28

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	89.26	176.21	87	48	45.61
Tutuila		Secondary	339.77	599.59	101	283	58.34
Tutuila		Mixed	125.89	141.59	15	28	15.14
Tutuila		Plantation	119.42	95.14	13	48	21.63
Tutuila		Montane	250.23	306.86	3	4	1.69
Tutuila		Littoral	125.79	119.57	8	30	8.41
Ofu		Rain Forest	925.72	686.79	5	40	2.97
Ofu		Secondary	639.40	494.13	20	247	19.04
Ofu		Mixed	296.00	363.10	18	84	13.04
Ofu		Plantation	207.63	254.13	12	26	12.54
Ofu		Village	315.20	.00	1	6	1.22
Olosega		Rain Forest	136.70	193.32	2	2	1.07
Olosega		Secondary	.00	.00	2	0	.84
Olosega		Mixed	.00	.00	11	0	6.79
Olosega		Cloud	734.15	446.05	4	11	1.02
Ta'u		Rain Forest	116.08	206.20	32	18	12.19
Ta'u		Secondary	151.89	424.25	28	14	10.27
Ta'u		Mixed	252.04	269.33	34	207	45.67
Ta'u		Plantation	187.20	.00	1	2	.66
Ta'u		Cloud	40.51	109.50	31	8	11.24
Ta'u		Littoral	.00	.00	1	0	.25
Liu Bench		Rain Forest	157.89	280.44	28	28	14.84
Liu Bench		Secondary	458.55	155.78	2	7	1.13

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			208.28	433.86	227	441	150.80
Ofu			456.27	476.24	56	383	48.81
Olosega			188.95	356.31	19	13	9.52
Ta'u			141.57	277.59	127	249	80.28
Liu Bench			177.94	282.63	30	35	15.97

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			216.47	400.22	459	1121	305.38

Appendix Table 11, concluded. White-rumped Swiftlet.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	65.49	105.71	19	15	12.05
Tutuila	2	207.27	265.91	18	22	8.55
Tutuila	3	149.47	147.19	20	71	25.80
Tutuila	4	82.69	116.96	18	16	11.10
Tutuila	5	125.79	119.57	8	30	8.41
Tutuila	6	160.62	208.26	18	21	8.98
Tutuila	7	1106.75	813.90	24	203	12.52
Tutuila	8	149.99	248.73	18	19	9.73
Tutuila	9	129.55	190.35	15	22	14.71
Tutuila	10	18.74	39.50	18	3	13.04
Tutuila	11	76.89	129.37	18	8	8.65
Tutuila	12	17.31	52.49	18	3	7.96
Tutuila	13	48.51	96.20	15	8	9.30
Ofu	1	657.20	445.82	21	293	25.89
Ofu	2	515.34	575.97	17	55	5.81
Ofu	3	166.08	212.61	18	35	17.12
Olosega	1	168.95	356.31	19	13	9.52
Ta'u	1	182.39	225.51	16	21	7.47
Ta'u	2	70.97	141.19	16	7	6.96
Ta'u	3	313.16	300.39	20	184	37.25
Ta'u	4	186.18	393.59	32	21	13.92
Ta'u	5	24.68	105.50	30	7	9.94
Ta'u	6	148.08	241.88	13	9	4.73
Ta'u	7	166.69	289.79	15	18	8.72
Ta'u	8	189.19	284.98	15	17	7.24

TOTAL ESTIMATES FOR WRSW

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	154	53.49	1.2	126.02	170.39	6740	1000
Tutuila Central	87	257	40.59	1.2	389.42	636.04	15806	2767
Tutuila East	57	30	19.97	1.8	51.59	99.43	1030	262
Tutuila	227	441	114.05	1.3	208.28	433.86	23576	2953
Ofu [<300m]	25	281	5.71	4.2	640.64	479.08	3658	547
Ofu [>300m]	13	67	1.54	4.9	503.53	562.94	775	240
Ofu	38	348	7.25	4.4	593.73	505.96	4433	597
Olosega [<300m]	12	2	4.26	1.7	22.78	78.92	97	97
Olosega [>300m]	7	11	1.18	1.8	419.51	503.46	495	224
Olosega	19	13	5.44	1.8	168.95	356.31	592	244
Ta'u [<300m]	61	227	18.98	3.0	204.45	255.64	3880	621
Ta'u [3-600m]	30	11	10.70	1.0	70.77	154.09	757	301
Ta'u [>600m]	36	11	8.93	1.4	94.03	363.56	839	541
Liu Bnch [<300m]	15	19	3.03	2.4	212.77	304.29	644	236
Liu Bnch [>300m]	15	16	4.19	2.1	143.11	265.09	599	286
Ta'u	157	284	45.83	2.1	148.52	278.01	6719	951
ALL ISLANDS	441	1066	172.57	1.7	218.53	406.05	35320	3168

Appendix Table 12. Collared Kingfisher.

A SPECIES = COKI		SUMMARY OF DENSITIES(B/SQ-KM)					
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m	Rain Forest	.00	.00	2	0	12.37
Tutuila	0-100 m	Secondary	12.10	13.31	11	16	72.01
Tutuila	0-100 m	Mixed	13.70	14.98	3	4	18.71
Tutuila	0-100 m	Plantation	2.52	8.18	6	2	42.78
Tutuila	0-100 m	Littoral	9.33	15.10	6	5	29.96
Tutuila	1-200 m	Rain Forest	4.73	7.13	11	6	78.54
Tutuila	1-200 m	Secondary	6.16	11.19	17	10	104.35
Tutuila	1-200 m	Mixed	9.80	11.26	8	7	37.36
Tutuila	1-200 m	Plantation	.00	.00	2	0	9.43
Tutuila	1-200 m	Littoral	.00	.00	2	0	11.83
Tutuila	2-300 m	Rain Forest	10.20	14.97	42	43	286.73
Tutuila	2-300 m	Secondary	3.05	7.70	47	20	318.59
Tutuila	2-300 m	Mixed	22.95	32.46	2	4	13.42
Tutuila	3-400 m	Rain Forest	2.48	8.80	32	9	224.98
Tutuila	3-400 m	Secondary	2.48	5.42	24	7	159.07
Tutuila	3-400 m	Mixed	.00	.00	2	0	10.67
Tutuila	3-400 m	Plantation	6.66	10.07	5	3	23.85
Tutuila	4-500 m	Secondary	.00	.00	2	0	12.17
Tutuila	4-500 m	Montane	.00	.00	2	0	18.04
Tutuila	5-600 m	Montane	.00	.00	1	0	9.78
Ofu	0-100 m	Secondary	15.07	10.78	4	8	28.79
Ofu	0-100 m	Mixed	2.40	5.09	10	3	73.03
Ofu	0-100 m	Plantation	18.79	28.98	12	23	74.84
Ofu	0-100 m	Village	6.40	.00	1	1	8.29
Ofu	1-200 m	Secondary	7.33	11.98	6	5	37.29
Ofu	1-200 m	Mixed	.00	.00	2	0	17.35
Ofu	2-300 m	Secondary	12.38	8.67	5	6	28.17
Ofu	2-300 m	Mixed	3.77	6.52	3	1	20.54
Ofu	3-400 m	Rain Forest	7.80	13.51	3	2	13.89
Ofu	3-400 m	Secondary	15.40	.00	1	2	6.95
Ofu	3-400 m	Mixed	20.93	26.70	3	8	18.32
Ofu	4-500 m	Rain Forest	.00	.00	2	0	10.23
Ofu	4-500 m	Secondary	4.73	5.46	4	2	25.89
Ofu	4-500 m	Mixed	8.03	13.46	10	8	50.89
Closega	1-200 m	Mixed	.00	.00	1	4	6.51
Closega	2-300 m	Rain Forest	32.83	.00	1	2	6.01
Closega	2-300 m	Mixed	17.20	.00	1	0	6.81
Closega	3-400 m	Rain Forest	.00	.00	1	0	7.21
Closega	3-400 m	Secondary	.00	.00	1	0	7.69
Closega	4-500 m	Cloud	.00	.00	1	0	9.88
Closega	5-600 m	Cloud	.00	.00	3	0	28.15
Ta'u	0-100 m	Rain Forest	47.40	.00	1	4	4.58
Ta'u	0-100 m	Secondary	3.20	7.16	5	2	30.09
Ta'u	0-100 m	Mixed	22.43	28.29	22	46	118.52
Ta'u	0-100 m	Littoral	75.40	.00	1	6	4.32
Ta'u	1-200 m	Rain Forest	10.45	14.78	2	2	10.43
Ta'u	1-200 m	Secondary	4.73	8.20	3	2	22.25
Ta'u	1-200 m	Mixed	7.33	11.44	11	11	81.47
Ta'u	1-200 m	Plantation	.00	.00	1	0	4.40
Ta'u	2-300 m	Rain Forest	.60	1.80	9	1	53.45
Ta'u	2-300 m	Secondary	1.74	3.89	5	1	35.52
Ta'u	2-300 m	Mixed	.00	.00	1	0	4.64
Ta'u	3-400 m	Rain Forest	3.63	6.63	7	3	42.91
Ta'u	3-400 m	Secondary	.00	.00	2	0	11.85
Ta'u	4-500 m	Rain Forest	3.46	7.20	8	3	53.77
Ta'u	4-500 m	Secondary	4.84	10.82	5	2	31.08
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	27.51
Ta'u	5-600 m	Secondary	.00	.00	3	0	25.62
Ta'u	5-600 m	Cloud	.00	.00	1	0	9.07
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	4.71
Ta'u	6-700 m	Secondary	.00	.00	5	0	54.73
Ta'u	6-700 m	Cloud	.00	.00	2	0	24.77
Ta'u	7-800 m	Cloud	.00	.00	7	0	73.15
Ta'u	8-900 m	Cloud	.00	.00	21	0	156.71
Liu Bench	1-200 m	Rain Forest	9.35	12.49	4	7	37.84
Liu Bench	1-200 m	Secondary	.00	.00	1	0	10.10
Liu Bench	2-300 m	Rain Forest	2.78	5.52	9	4	70.13
Liu Bench	2-300 m	Secondary	6.10	.00	1	1	8.68
Liu Bench	3-400 m	Rain Forest	.00	.00	12	0	65.09
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	14.09

Appendix Table 12, continued. Collared Kingfisher.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		8.76	12.38	28	27	175.84
Tutuila	1-200 m		5.88	9.71	40	23	239.54
Tutuila	2-300 m		8.79	12.75	91	67	618.74
Tutuila	3-400 m		2.74	7.80	53	19	412.54
Tutuila	4-500 m		.00	.00	4	0	30.21
Tutuila	5-600 m		.00	.00	1	0	9.78
Ofu	0-100 m		11.71	19.74	27	35	184.95
Ofu	1-200 m		5.50	10.68	8	5	54.64
Ofu	2-300 m		9.14	8.65	8	7	46.72
Ofu	3-400 m		14.51	18.49	7	12	37.16
Ofu	4-500 m		3.15	4.82	6	2	34.12
Olosega	1-200 m		8.03	13.46	10	8	50.89
Olosega	2-300 m		25.00	11.03	2	6	12.72
Olosega	3-400 m		.00	.00	2	0	14.07
Olosega	4-500 m		.00	.00	2	0	17.57
Olosega	5-600 m		.00	.00	3	0	26.15
Ta'u	0-100 m		21.80	26.72	29	58	160.49
Ta'u	1-200 m		6.81	10.46	17	15	118.50
Ta'u	2-300 m		.94	2.56	15	2	93.81
Ta'u	3-400 m		2.82	5.96	9	3	54.76
Ta'u	4-500 m		3.99	8.38	13	5	84.86
Ta'u	5-600 m		.00	.00	8	0	62.20
Ta'u	6-700 m		.00	.00	8	0	84.21
Ta'u	7-800 m		.00	.00	7	0	73.15
Ta'u	8-900 m		.00	.00	21	0	156.71
Liu Bench	1-200 m		7.48	11.60	5	7	47.94
Liu Bench	2-300 m		3.11	5.31	10	5	78.82
Liu Bench	3-400 m		.00	.00	12	0	65.09
Liu Bench	4-500 m		.00	.00	3	0	14.09

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	6.44	12.44	87	58	600.61
Tutuila		Secondary	4.36	9.00	101	53	864.20
Tutuila		Mixed	11.03	14.52	15	15	80.19
Tutuila		Plantation	3.72	7.50	13	5	78.04
Tutuila		Montane	.00	.00	3	0	27.81
Tutuila		Littoral	7.00	13.48	8	5	41.79
Ofu		Rain Forest	4.68	10.46	5	2	24.12
Ofu		Secondary	10.02	9.65	20	23	133.09
Ofu		Mixed	5.45	12.42	18	12	127.24
Ofu		Plantation	18.79	26.98	12	23	74.84
Ofu		Village	6.40	.00	1	1	8.29
Olosega		Rain Forest	16.40	23.19	2	4	13.37
Olosega		Secondary	.00	.00	2	0	14.91
Olosega		Mixed	8.86	13.06	11	10	57.10
Olosega		Cloud	.00	.00	4	0	36.03
Ta'u		Rain Forest	3.96	9.88	32	13	197.35
Ta'u		Secondary	2.25	6.01	28	7	214.16
Ta'u		Mixed	16.89	23.22	34	57	204.63
Ta'u		Plantation	.00	.00	1	0	4.40
Ta'u		Cloud	.00	.00	31	0	263.70
Ta'u		Littoral	75.40	.00	1	6	4.32
Liu Bench		Rain Forest	2.23	6.06	28	11	187.15
Liu Bench		Secondary	3.05	4.31	2	1	18.78

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			5.60	10.95	227	136	1490.64
Ofu			9.89	16.12	56	61	357.59
Olosega			6.86	12.37	19	14	121.40
Ta'u			6.61	16.00	127	83	888.54
Liu Bench			2.28	5.91	30	12	205.93

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			6.24	13.11	459	306	3064.11

Appendix Table 12, concluded. Collared Kingfisher.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	7.07	14.48	19	13	129.11
Tutuila	2	.00	.00	18	0	124.19
Tutuila	3	2.07	5.65	20	4	126.35
Tutuila	4	1.57	3.63	18	3	126.25
Tutuila	5	7.00	13.48	8	5	41.79
Tutuila	6	4.05	8.18	18	7	117.24
Tutuila	7	3.03	8.55	24	11	161.15
Tutuila	8	7.39	12.50	18	15	127.69
Tutuila	9	6.41	10.92	15	10	95.99
Tutuila	10	14.39	15.70	18	27	123.20
Tutuila	11	4.05	12.22	18	8	110.29
Tutuila	12	5.41	8.82	18	10	116.05
Tutuila	13	13.74	12.46	15	23	91.34
Ofu	1	10.60	9.15	21	26	130.14
Ofu	2	7.66	13.76	17	17	114.53
Ofu	3	11.17	23.80	18	18	112.92
Olosega	1	6.86	12.37	19	14	121.40
Ta'u	1	8.58	12.55	16	14	107.11
Ta'u	2	1.69	3.67	16	3	106.47
Ta'u	3	23.08	26.81	20	47	128.25
Ta'u	4	1.65	5.60	32	5	251.71
Ta'u	5	.00	.00	30	0	212.65
Ta'u	6	12.35	23.58	13	14	82.36
Ta'u	7	4.16	7.89	15	11	100.89
Ta'u	8	.41	1.56	15	1	105.24

TOTAL ESTIMATES FOR COKI

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	25	53.49	10.2	3.13	8.93	167	52
Tutuila Central	87	68	40.59	14.3	7.11	12.08	288	52
Tutuila East	57	43	19.97	18.2	6.87	11.36	137	30
Tutuila	227	136	114.05	13.1	5.60	10.95	592	79
Ofu [<300m]	25	29	5.71	30.4	9.29	9.57	53	10
Ofu [>300m]	13	14	1.54	46.3	9.27	14.68	14	6
Ofu	38	43	7.25	33.7	9.28	11.37	67	11
Olosega [<300m]	12	14	4.26	14.9	10.86	14.24	46	17
Olosega [>300m]	7	0	1.18	49.0	.00	.00	0	0
Olosega	19	14	5.44	22.3	6.86	12.37	46	17
Ta'u [<300m]	61	75	18.98	19.6	12.49	21.17	237	51
Ta'u [3-600m]	30	8	10.70	18.9	2.58	6.44	27	12
Ta'u [>600m]	36	0	8.93	35.2	.00	.00	0	0
Liu Bnch [<300m]	15	12	3.03	41.8	4.57	7.82	13	6
Liu Bnch [>300m]	15	0	4.19	18.9	.00	.00	0	0
Ta'u	157	95	45.89	23.9	5.78	14.71	277	52
ALL ISLANDS	441	288	172.57	17.1	6.03	12.51	982	96

Appendix Table 13. Red-vented Bulbul.

A		SPECIES = RVBU		SUMMARY OF DENSITIES (B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	.00	.00	2	0	13.43	
Tutuila	0-100 m	Secondary	7.05	23.37	11	1	35.24	
Tutuila	0-100 m	Mixed	5.87	10.18	3	2	14.38	
Tutuila	0-100 m	Plantation	99.02	135.90	6	10	10.25	
Tutuila	0-100 m	Littoral	.00	.00	6	0	44.07	
Tutuila	1-200 m	Rain Forest	.00	.00	11	0	32.16	
Tutuila	1-200 m	Secondary	.00	.00	17	0	55.68	
Tutuila	1-200 m	Mixed	6.38	18.03	8	1	30.71	
Tutuila	1-200 m	Plantation	5.05	7.14	2	3	16.15	
Tutuila	1-200 m	Littoral	2.45	3.46	2	1	19.92	
Tutuila	2-300 m	Rain Forest	.00	.00	42	0	123.06	
Tutuila	2-300 m	Secondary	.34	1.78	47	4	177.66	
Tutuila	2-300 m	Mixed	.00	.00	2	0	1.81	
Tutuila	3-400 m	Rain Forest	.00	.00	32	0	89.24	
Tutuila	3-400 m	Secondary	.00	.00	24	0	91.82	
Tutuila	3-400 m	Mixed	7.05	9.97	2	1	16.23	
Tutuila	3-400 m	Plantation	412.42	189.84	5	72	18.82	
Tutuila	4-500 m	Secondary	.00	.00	2	0	5.54	
Tutuila	4-500 m	Montane	.00	.00	2	0	.44	
Tutuila	5-600 m	Montane	.00	.00	1	0	.06	
Ofu	0-100 m	Secondary	.00	.00	4	0	12.69	
Ofu	0-100 m	Mixed	.00	.00	10	0	17.07	
Ofu	0-100 m	Plantation	.00	.00	12	0	40.84	
Ofu	0-100 m	Village	.00	.00	1	0	.51	
Ofu	1-200 m	Secondary	.00	.00	6	0	38.05	
Ofu	1-200 m	Mixed	.00	.00	2	0	.57	
Ofu	2-300 m	Secondary	.00	.00	5	0	36.39	
Ofu	2-300 m	Mixed	.00	.00	3	0	8.75	
Ofu	3-400 m	Rain Forest	.00	.00	3	0	6.42	
Ofu	3-400 m	Secondary	.00	.00	1	0	1.57	
Ofu	3-400 m	Mixed	.00	.00	3	0	12.16	
Ofu	4-500 m	Rain Forest	.00	.00	2	0	3.27	
Ofu	4-500 m	Secondary	.00	.00	4	0	10.45	
Ofu	4-500 m	Mixed	.00	.00	10	0	19.37	
Olosega	1-200 m	Rain Forest	.00	.00	1	0	1.91	
Olosega	2-300 m	Mixed	.00	.00	1	0	2.81	
Olosega	3-400 m	Rain Forest	.00	.00	1	0	1.91	
Olosega	3-400 m	Secondary	.00	.00	1	0	1.43	
Olosega	4-500 m	Secondary	.00	.00	1	0	.91	
Olosega	4-500 m	Cloud	.00	.00	1	0	.08	
Olosega	5-600 m	Cloud	.00	.00	3	0	1.20	
Ta'u	0-100 m	Rain Forest	.00	.00	1	0	1.78	
Ta'u	0-100 m	Secondary	.00	.00	5	0	4.98	
Ta'u	0-100 m	Mixed	.00	.00	22	0	134.83	
Ta'u	0-100 m	Littoral	.00	.00	1	0	1.96	
Ta'u	1-200 m	Rain Forest	.00	.00	2	0	10.27	
Ta'u	1-200 m	Secondary	.00	.00	3	0	5.13	
Ta'u	1-200 m	Mixed	.00	.00	11	0	26.16	
Ta'u	1-200 m	Plantation	.00	.00	1	0	1.11	
Ta'u	2-300 m	Rain Forest	.00	.00	9	0	31.10	
Ta'u	2-300 m	Secondary	.00	.00	5	0	18.65	
Ta'u	2-300 m	Mixed	.00	.00	1	0	1.54	
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	27.02	
Ta'u	3-400 m	Secondary	.00	.00	2	0	7.98	
Ta'u	4-500 m	Rain Forest	.00	.00	8	0	19.82	
Ta'u	4-500 m	Secondary	.00	.00	5	0	12.36	
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	4.81	
Ta'u	5-600 m	Secondary	.00	.00	3	0	1.96	
Ta'u	5-600 m	Cloud	.00	.00	1	0	.24	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	1.99	
Ta'u	6-700 m	Secondary	.00	.00	5	0	.89	
Ta'u	6-700 m	Cloud	.00	.00	2	0	.01	
Ta'u	7-800 m	Cloud	.00	.00	7	0	.34	
Ta'u	8-900 m	Cloud	.00	.00	21	0	44.75	
Liu Bench	1-200 m	Rain Forest	.00	.00	4	0	1.89	
Liu Bench	1-200 m	Secondary	.00	.00	1	0	.07	
Liu Bench	2-300 m	Rain Forest	.00	.00	9	0	12.37	
Liu Bench	2-300 m	Secondary	.00	.00	1	0	.63	
Liu Bench	3-400 m	Rain Forest	.00	.00	12	0	34.61	
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	9.44	

Appendix Table 13, continued. Red-vented Bulbul.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		24.61	72.14	28	13	117.38
Tutuila	1-200 m		1.65	8.19	40	5	154.62
Tutuila	2-300 m		.18	1.28	91	4	302.52
Tutuila	3-400 m		32.96	122.24	63	73	217.10
Tutuila	4-500 m		.00	.00	4	0	5.98
Tutuila	5-600 m		.00	.00	1	0	.06
Ofu	0-100 m		.00	.00	27	0	71.10
Ofu	1-200 m		.00	.00	8	0	38.62
Ofu	2-300 m		.00	.00	8	0	45.14
Ofu	3-400 m		.00	.00	7	0	20.15
Ofu	4-500 m		.00	.00	6	0	13.72
Olosega	1-200 m		.00	.00	10	0	19.37
Olosega	2-300 m		.00	.00	2	0	4.71
Olosega	3-400 m		.00	.00	2	0	3.34
Olosega	4-500 m		.00	.00	2	0	.99
Olosega	5-600 m		.00	.00	3	0	1.20
Ta'u	0-100 m		.00	.00	29	0	143.54
Ta'u	1-200 m		.00	.00	17	0	42.67
Ta'u	2-300 m		.00	.00	15	0	51.29
Ta'u	3-400 m		.00	.00	8	0	35.00
Ta'u	4-500 m		.00	.00	13	0	32.19
Ta'u	5-600 m		.00	.00	8	0	7.01
Ta'u	6-700 m		.00	.00	8	0	2.89
Ta'u	7-800 m		.00	.00	7	0	.34
Ta'u	8-900 m		.00	.00	21	0	44.76
Liu Bench	1-200 m		.00	.00	5	0	1.96
Liu Bench	2-300 m		.00	.00	10	0	13.00
Liu Bench	3-400 m		.00	.00	12	0	34.61
Liu Bench	4-500 m		.00	.00	3	0	9.44

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	.00	.00	87	0	257.88
Tutuila		Secondary	.93	7.79	101	5	365.93
Tutuila		Mixed	5.51	13.77	15	4	63.14
Tutuila		Plantation	205.10	223.43	13	85	46.21
Tutuila		Montane	.00	.00	3	0	.50
Tutuila		Littoral	.61	1.73	8	1	64.00
Ofu		Rain Forest	.00	.00	5	0	9.68
Ofu		Secondary	.00	.00	20	0	99.15
Ofu		Mixed	.00	.00	18	0	38.55
Ofu		Plantation	.00	.00	12	0	40.84
Ofu		Village	.00	.00	1	0	.51
Olosega		Rain Forest	.00	.00	2	0	3.82
Olosega		Secondary	.00	.00	2	0	2.34
Olosega		Mixed	.00	.00	11	0	22.18
Olosega		Cloud	.00	.00	4	0	1.22
Ta'u		Rain Forest	.00	.00	32	0	96.79
Ta'u		Secondary	.00	.00	28	0	51.86
Ta'u		Mixed	.00	.00	34	0	162.53
Ta'u		Plantation	.00	.00	1	0	1.11
Ta'u		Cloud	.00	.00	31	0	45.35
Ta'u		Littoral	.00	.00	1	0	1.96
Liu Bench		Rain Forest	.00	.00	28	0	58.31
Liu Bench		Secondary	.00	.00	2	0	.71

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			12.54	70.38	227	95	797.67
Ofu			.00	.00	56	0	188.73
Olosega			.00	.00	19	0	29.61
Ta'u			.00	.00	127	0	359.69
Liu Bench			.00	.00	30	0	59.02

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			6.20	49.84	459	95	1434.72

Appendix Table 13, concluded. Red-vented Bulbul.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	.00	.00	19	0	26.26
Tutuila	2	.00	.00	18	0	53.45
Tutuila	3	103.81	202.52	20	73	95.77
Tutuila	4	1.46	3.55	18	7	105.27
Tutuila	5	.61	1.73	8	1	54.00
Tutuila	6	.00	.00	18	0	35.05
Tutuila	7	.00	.00	24	0	108.63
Tutuila	8	.00	.00	18	0	30.84
Tutuila	9	45.95	94.80	15	13	68.97
Tutuila	10	.00	.00	18	0	82.72
Tutuila	11	2.83	12.02	18	1	32.06
Tutuila	12	.00	.00	18	0	33.42
Tutuila	13	.00	.00	15	0	61.23
Ofu	1	.00	.00	21	0	110.33
Ofu	2	.00	.00	17	0	24.62
Ofu	3	.00	.00	18	0	53.78
Olosega	1	.00	.00	19	0	29.61
Ta'u	1	.00	.00	16	0	16.40
Ta'u	2	.00	.00	16	0	61.67
Ta'u	3	.00	.00	20	0	125.72
Ta'u	4	.00	.00	32	0	63.84
Ta'u	5	.00	.00	30	0	65.90
Ta'u	6	.00	.00	13	0	26.18
Ta'u	7	.00	.00	15	0	18.18
Ta'u	8	.00	.00	15	0	40.84

TOTAL ESTIMATES FOR RVBU

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	81	53.49	6.4	25.39	107.16	1356	629
Tutuila Central	87	9	40.59	7.8	3.81	33.71	154	148
Tutuila East	57	5	19.97	6.8	7.17	32.24	143	25
Tutuila	227	95	114.05	7.0	12.54	70.38	1655	651
Ofu [<300m]	25	0	5.71	17.7	.00	.00	0	0
Ofu [>300m]	13	0	1.54	22.0	.00	.00	0	0
Ofu	38	0	7.25	18.6	.00	.00	0	0
Olosega [<300m]	12	0	4.26	5.7	.00	.00	0	0
Olosega [>300m]	7	0	1.18	4.7	.00	.00	0	0
Olosega	19	0	5.44	5.4	.00	.00	0	0
Ta'u [<300m]	61	0	18.98	12.5	.00	.00	0	0
Ta'u [3-600m]	30	0	10.70	6.9	.00	.00	0	0
Ta'u [>600m]	36	0	8.93	5.4	.00	.00	0	0
Liu Ench(<300m)	15	0	3.03	4.9	.00	.00	0	0
Liu Ench(>300m)	15	0	4.19	10.5	.00	.00	0	0
Ta'u	157	0	45.83	9.1	.00	.00	0	0
ALL ISLANDS	441	95	172.57	8.0	6.46	50.83	1655	651

Appendix Table 14. Fiji Shrikebill.

A		SUMMARY OF DENSITIES (B/SQ-KM)							
SPECIES = FISH		ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA (HA)
		Tutuila	0-100 m	Rain Forest	.00	.00	2	0	.52
		Tutuila	0-100 m	Secondary	.00	.00	11	0	3.92
		Tutuila	0-100 m	Mixed	.00	.00	3	0	.87
		Tutuila	0-100 m	Plantation	.00	.00	6	0	1.73
		Tutuila	0-100 m	Littoral	.00	.00	6	0	2.39
		Tutuila	1-200 m	Rain Forest	.00	.00	11	0	6.21
		Tutuila	1-200 m	Secondary	.00	.00	17	0	6.10
		Tutuila	1-200 m	Mixed	.00	.00	8	0	2.05
		Tutuila	1-200 m	Plantation	.00	.00	2	0	.63
		Tutuila	1-200 m	Littoral	.00	.00	2	0	.94
		Tutuila	2-300 m	Rain Forest	.00	.00	42	0	23.81
		Tutuila	2-300 m	Secondary	.00	.00	47	0	19.82
		Tutuila	2-300 m	Mixed	.00	.00	2	0	1.28
		Tutuila	3-400 m	Rain Forest	.00	.00	32	0	15.31
		Tutuila	3-400 m	Secondary	.00	.00	24	0	10.89
		Tutuila	3-400 m	Mixed	.00	.00	2	0	.48
		Tutuila	3-400 m	Plantation	.00	.00	5	0	1.05
		Tutuila	4-500 m	Secondary	.00	.00	2	0	1.24
		Tutuila	4-500 m	Montane	.00	.00	2	0	.93
		Tutuila	5-600 m	Montane	.00	.00	1	0	.49
		Ofu	0-100 m	Secondary	.00	.00	4	0	1.67
		Ofu	0-100 m	Mixed	.00	.00	10	0	3.66
		Ofu	0-100 m	Plantation	.00	.00	12	0	3.56
		Ofu	0-100 m	Village	.00	.00	1	0	.52
		Ofu	1-200 m	Secondary	.00	.00	6	0	2.05
		Ofu	1-200 m	Mixed	.00	.00	2	0	.79
		Ofu	2-300 m	Secondary	.00	.00	5	0	1.36
		Ofu	2-300 m	Mixed	.00	.00	3	0	.93
		Ofu	3-400 m	Rain Forest	.00	.00	3	0	.48
		Ofu	3-400 m	Secondary	.00	.00	1	0	.29
		Ofu	3-400 m	Mixed	.00	.00	3	0	.76
		Ofu	4-500 m	Rain Forest	163.80	231.65	2	1	.37
		Ofu	4-500 m	Secondary	.00	.00	4	0	.92
		Ofu	4-500 m	Mixed	.00	.00	10	0	3.30
		Olosega	1-200 m	Rain Forest	.00	.00	1	0	.39
		Olosega	2-300 m	Mixed	.00	.00	1	0	.32
		Olosega	3-400 m	Rain Forest	.00	.00	1	0	.40
		Olosega	3-400 m	Secondary	.00	.00	1	0	.41
		Olosega	4-500 m	Secondary	.00	.00	1	0	.43
		Olosega	4-500 m	Cloud	98.40	.00	1	1	.51
		Olosega	5-600 m	Cloud	427.87	647.10	3	8	1.41
		Ta'u	0-100 m	Rain Forest	.00	.00	1	0	.28
		Ta'u	0-100 m	Secondary	.00	.00	5	0	1.95
		Ta'u	0-100 m	Mixed	.00	.00	22	0	7.58
		Ta'u	0-100 m	Littoral	.00	.00	1	0	.27
		Ta'u	1-200 m	Rain Forest	447.50	632.86	2	4	.49
		Ta'u	1-200 m	Secondary	180.70	226.65	3	4	1.45
		Ta'u	1-200 m	Mixed	.00	.00	11	0	6.85
		Ta'u	1-200 m	Plantation	.00	.00	1	0	.15
		Ta'u	2-300 m	Rain Forest	210.46	372.90	9	11	2.58
		Ta'u	2-300 m	Secondary	.00	.00	5	0	2.44
		Ta'u	2-300 m	Mixed	.00	.00	1	0	.16
		Ta'u	3-400 m	Rain Forest	52.39	138.60	7	1	1.82
		Ta'u	3-400 m	Secondary	.00	.00	2	0	.76
		Ta'u	4-500 m	Rain Forest	224.05	372.96	8	7	2.35
		Ta'u	4-500 m	Secondary	32.36	72.36	5	1	1.76
		Ta'u	5-600 m	Rain Forest	.00	.00	4	0	1.39
		Ta'u	5-600 m	Secondary	39.10	67.72	3	1	1.15
		Ta'u	5-600 m	Cloud	.00	.00	1	0	.51
		Ta'u	6-700 m	Rain Forest	.00	.00	1	0	.33
		Ta'u	6-700 m	Secondary	.00	.00	5	0	3.28
		Ta'u	6-700 m	Cloud	.00	.00	2	0	1.90
		Ta'u	6-700 m	Cloud	.00	.00	7	0	4.01
		Ta'u	8-900 m	Cloud	.00	.00	21	0	8.52
		Liu Bench	1-200 m	Rain Forest	60.05	70.37	4	2	2.78
		Liu Bench	1-200 m	Secondary	.00	.00	1	0	.55
		Liu Bench	2-300 m	Rain Forest	374.39	328.17	9	26	5.15
		Liu Bench	2-300 m	Secondary	121.30	.00	1	1	.46
		Liu Bench	3-400 m	Rain Forest	303.43	503.44	12	23	6.32
		Liu Bench	4-500 m	Rain Forest	1218.10	796.21	3	12	.67

Appendix Table 14, continued. Fiji Shrikebill.

B	ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	0-100 m		.00	.00	28	0	9.44
	Tutuila	1-200 m		.00	.00	40	0	15.93
	Tutuila	2-300 m		.00	.00	91	0	44.90
	Tutuila	3-400 m		.00	.00	63	0	27.73
	Tutuila	4-500 m		.00	.00	4	0	2.17
	Tutuila	5-600 m		.00	.00	1	0	.49
	Ofu	0-100 m		.00	.00	27	0	9.40
	Ofu	1-200 m		.00	.00	8	0	2.84
	Ofu	2-300 m		.00	.00	8	0	2.29
	Ofu	3-400 m		.00	.00	7	0	1.52
	Ofu	4-500 m		54.80	133.74	6	1	1.29
	Olosega	1-200 m		.00	.00	10	0	3.30
	Olosega	2-300 m		.00	.00	2	0	.76
	Olosega	3-400 m		.00	.00	2	0	.82
	Olosega	4-500 m		49.20	69.58	2	1	.84
	Olosega	5-600 m		427.87	647.10	3	8	1.41
	Ta'u	0-100 m		.00	.00	29	0	10.08
	Ta'u	1-200 m		84.54	234.55	17	8	8.94
	Ta'u	2-300 m		126.27	301.41	15	11	5.17
	Ta'u	3-400 m		40.74	122.23	9	1	2.58
	Ta'u	4-500 m		150.32	303.82	13	8	4.11
	Ta'u	5-600 m		14.86	41.47	8	1	3.05
	Ta'u	6-700 m		.00	.00	8	0	5.51
	Ta'u	7-800 m		.00	.00	7	0	4.01
	Ta'u	8-900 m		.00	.00	21	0	8.52
	Liu Bench	1-200 m		48.04	66.60	5	2	3.33
	Liu Bench	2-300 m		349.08	319.59	10	27	5.61
	Liu Bench	3-400 m		303.43	503.44	12	23	8.32
	Liu Bench	4-500 m		1218.10	796.21	3	12	.67
C	ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila		Rain Forest	.00	.00	87	0	45.85
	Tutuila		Secondary	.00	.00	101	0	41.97
	Tutuila		Mixed	.00	.00	15	0	4.68
	Tutuila		Plantation	.00	.00	13	0	3.41
	Tutuila		Montane	.00	.00	3	0	1.43
	Tutuila		Littoral	.00	.00	8	0	3.33
	Ofu		Rain Forest	65.52	146.51	5	1	.85
	Ofu		Secondary	.00	.00	20	0	6.29
	Ofu		Mixed	.00	.00	18	0	6.14
	Ofu		Plantation	.00	.00	12	0	3.56
	Ofu		Village	.00	.00	1	0	.52
	Olosega		Rain Forest	.00	.00	2	0	.79
	Olosega		Secondary	.00	.00	2	0	.85
	Olosega		Mixed	.00	.00	11	0	3.68
	Olosega		Cloud	345.50	553.44	4	9	1.91
	Ta'u		Rain Forest	154.63	314.01	32	23	9.24
	Ta'u		Secondary	29.33	89.56	28	6	12.79
	Ta'u		Mixed	.00	.00	34	0	14.59
	Ta'u		Plantation	.00	.00	1	0	.15
	Ta'u		Cloud	.00	.00	31	0	14.95
	Ta'u		Littoral	.00	.00	1	0	.27
	Liu Bench		Rain Forest	389.47	527.65	28	63	14.93
	Liu Bench		Secondary	60.65	85.77	2	1	1.01
D	ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila			.00	.00	227	0	100.67
	Ofu			5.85	43.78	56	1	17.35
	Olosega			72.74	268.31	19	9	7.23
	Ta'u			45.43	173.67	127	29	51.98
	Liu Bench			387.55	516.16	30	64	15.94
E	**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
				40.32	190.37	459	103	193.16

Appendix Table 14, concluded. Fiji Shrikebill.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	.00	.00	19	0	11.48
Tutuila	2	.00	.00	18	0	6.79
Tutuila	3	.00	.00	20	0	5.83
Tutuila	4	.00	.00	18	0	6.47
Tutuila	5	.00	.00	8	0	3.33
Tutuila	6	.00	.00	18	0	6.89
Tutuila	7	.00	.00	24	0	6.21
Tutuila	8	.00	.00	18	0	13.98
Tutuila	9	.00	.00	15	0	4.01
Tutuila	10	.00	.00	18	0	12.04
Tutuila	11	.00	.00	18	0	9.29
Tutuila	12	.00	.00	18	0	9.59
Tutuila	13	.00	.00	15	0	4.77
Ofu	1	.00	.00	21	0	7.24
Ofu	2	19.27	79.45	17	1	4.78
Ofu	3	.00	.00	18	0	5.33
Olosega	1	72.74	268.31	19	9	7.23
Ta'u	1	81.73	237.20	16	11	6.45
Ta'u	2	120.21	285.54	16	7	3.97
Ta'u	3	.00	.00	20	0	10.32
Ta'u	4	8.40	33.79	32	2	17.62
Ta'u	5	36.13	159.29	30	3	8.81
Ta'u	6	91.19	247.77	13	6	4.81
Ta'u	7	256.37	333.57	15	33	10.53
Ta'u	8	478.73	643.52	15	31	5.40

TOTAL ESTIMATES FOR FISH

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	0	53.49	.6	.00	.00	0	0
Tutuila Central	87	0	40.59	1.0	.00	.00	0	0
Tutuila East	57	0	19.97	1.3	.00	.00	0	0
Tutuila	227	0	114.05	.9	.00	.00	0	0
Ofu [<300m]	25	0	5.71	1.6	.00	.00	0	0
Ofu [>300m]	13	1	1.54	1.8	25.20	90.86	38	38
Ofu	38	1	7.25	1.7	8.62	53.14	38	38
Olosega [<300m]	12	0	4.26	1.0	.00	.00	0	0
Olosega [>300m]	7	9	1.18	2.7	197.43	432.73	232	192
Olosega	19	9	5.44	1.3	72.74	268.31	232	192
Ta'u [<300m]	61	19	18.98	1.3	54.61	197.10	1036	478
Ta'u [3-600m]	30	10	10.70	.9	81.27	215.88	869	421
Ta'u [>600m]	36	0	8.93	2.0	.00	.00	0	0
Liu Bnch[<300m]	15	29	3.03	3.0	248.73	297.49	753	232
Liu Bnch[>300m]	15	35	4.19	1.7	486.37	658.12	2037	711
Ta'u	157	93	45.83	1.5	106.98	300.05	4695	981
ALL ISLANDS	441	103	172.57	1.1	41.96	194.05	4965	1000

Appendix Table 15. Wattled Honeyeater.

A		SPECIES = WAHO		SUMMARY OF DENSITIES(B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	842.95	285.03	2	33	2.47	
Tutuila	0-100 m	Secondary	844.01	189.12	11	167	13.64	
Tutuila	0-100 m	Mixed	860.90	47.16	3	59	4.55	
Tutuila	0-100 m	Plantation	539.32	232.74	6	76	9.36	
Tutuila	0-100 m	Littoral	585.82	75.83	8	91	10.17	
Tutuila	1-200 m	Rain Forest	868.75	259.55	11	186	13.32	
Tutuila	1-200 m	Secondary	900.75	260.56	17	271	19.88	
Tutuila	1-200 m	Mixed	732.95	142.76	8	136	12.53	
Tutuila	1-200 m	Plantation	836.25	113.77	2	45	3.67	
Tutuila	1-200 m	Littoral	497.05	200.04	2	29	3.44	
Tutuila	2-300 m	Rain Forest	935.51	239.98	42	766	52.14	
Tutuila	2-300 m	Secondary	905.04	227.22	47	767	52.73	
Tutuila	2-300 m	Mixed	865.55	151.67	2	34	2.30	
Tutuila	3-400 m	Rain Forest	948.48	195.17	32	511	35.80	
Tutuila	3-400 m	Secondary	785.94	242.91	24	339	27.15	
Tutuila	3-400 m	Mixed	716.55	94.54	2	38	3.57	
Tutuila	3-400 m	Plantation	887.38	94.63	5	122	8.29	
Tutuila	4-500 m	Secondary	766.70	132.51	2	26	2.01	
Tutuila	4-500 m	Montane	1127.25	16.76	2	32	1.88	
Tutuila	5-600 m	Montane	1018.70	.00	1	20	1.14	
Ofu	0-100 m	Secondary	1603.75	253.38	4	146	6.36	
Ofu	0-100 m	Mixed	746.35	380.65	10	115	12.23	
Ofu	0-100 m	Plantation	915.23	322.88	12	205	16.71	
Ofu	0-100 m	Village	587.70	.00	1	12	1.37	
Ofu	1-200 m	Secondary	1433.52	372.43	6	189	8.29	
Ofu	1-200 m	Mixed	1283.50	127.28	2	29	1.41	
Ofu	2-300 m	Secondary	892.06	154.29	5	121	8.54	
Ofu	2-300 m	Mixed	1005.47	293.95	3	52	3.38	
Ofu	3-400 m	Rain Forest	1280.60	160.13	3	68	3.16	
Ofu	3-400 m	Secondary	1463.30	.00	1	16	.68	
Ofu	3-400 m	Mixed	1182.80	480.93	3	79	4.47	
Ofu	4-500 m	Rain Forest	1045.40	10.74	2	32	1.64	
Ofu	4-500 m	Secondary	1255.68	168.86	4	55	2.71	
Olosega	1-200 m	Mixed	1606.42	242.51	10	289	10.53	
Olosega	2-300 m	Rain Forest	1186.20	.00	1	19	.94	
Olosega	2-300 m	Mixed	1335.30	.00	1	23	1.01	
Olosega	3-400 m	Rain Forest	1217.40	.00	1	20	.97	
Olosega	3-400 m	Secondary	678.80	.00	1	10	.88	
Olosega	4-500 m	Secondary	746.80	.00	1	10	.80	
Olosega	4-500 m	Cloud	1692.90	.00	1	20	.72	
Olosega	5-600 m	Cloud	1810.00	189.76	3	66	2.47	
Ta'u	0-100 m	Rain Forest	1128.20	.00	1	18	.96	
Ta'u	0-100 m	Secondary	1739.74	247.10	5	108	3.77	
Ta'u	0-100 m	Mixed	871.55	445.17	22	441	35.33	
Ta'u	0-100 m	Littoral	720.50	.00	1	12	1.00	
Ta'u	1-200 m	Rain Forest	1222.25	301.58	2	37	2.11	
Ta'u	1-200 m	Secondary	1535.23	400.19	3	73	3.01	
Ta'u	1-200 m	Mixed	696.27	200.64	11	215	20.63	
Ta'u	1-200 m	Plantation	858.70	.00	1	15	1.03	
Ta'u	2-300 m	Rain Forest	1060.32	300.58	9	132	7.93	
Ta'u	2-300 m	Secondary	986.16	220.25	5	84	6.00	
Ta'u	2-300 m	Mixed	883.80	.00	1	14	.96	
Ta'u	3-400 m	Rain Forest	1000.53	443.77	7	99	6.53	
Ta'u	3-400 m	Secondary	1102.65	427.87	2	38	2.37	
Ta'u	4-500 m	Rain Forest	785.39	169.86	8	90	7.72	
Ta'u	4-500 m	Secondary	945.02	182.80	5	72	4.87	
Ta'u	5-600 m	Rain Forest	1009.68	243.76	4	61	4.07	
Ta'u	5-600 m	Secondary	978.00	359.12	3	38	2.39	
Ta'u	5-600 m	Cloud	888.90	.00	1	9	.66	
Ta'u	6-700 m	Rain Forest	987.30	.00	1	17	1.01	
Ta'u	6-700 m	Secondary	961.66	90.38	5	54	3.49	
Ta'u	6-700 m	Cloud	817.50	118.09	2	20	1.49	
Ta'u	7-800 m	Cloud	822.93	153.52	7	67	5.03	
Ta'u	8-900 m	Cloud	588.25	179.30	21	191	20.31	
Liu Bench	1-200 m	Rain Forest	1310.88	233.53	4	91	4.50	
Liu Bench	1-200 m	Secondary	1142.00	.00	1	24	1.30	
Liu Bench	2-300 m	Rain Forest	1437.29	366.24	9	220	10.12	
Liu Bench	2-300 m	Secondary	1311.20	.00	1	29	1.40	
Liu Bench	3-400 m	Rain Forest	1838.07	240.26	12	430	14.45	
Liu Bench	4-500 m	Rain Forest	1830.40	365.95	3	84	3.31	

Appendix Table 15, continued. Wattled Honeyeater.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		720.84	222.81	28	426	40.18
Tutuila	1-200 m		834.98	245.85	40	667	52.24
Tutuila	2-300 m		818.24	230.59	91	1587	107.17
Tutuila	3-400 m		874.35	219.85	63	1010	74.81
Tutuila	4-500 m		946.97	221.99	4	58	3.89
Tutuila	5-600 m		1018.70	.00	1	20	1.14
Ofu	0-100 m		942.56	428.71	27	480	36.67
Ofu	1-200 m		1398.01	325.90	8	218	8.70
Ofu	2-300 m		934.59	204.29	8	173	11.72
Ofu	3-400 m		1264.79	309.35	7	163	8.31
Ofu	4-500 m		1185.58	170.07	6	87	4.55
Olosega	1-200 m		1808.42	242.51	10	289	10.53
Olosega	2-300 m		1260.75	105.43	2	42	1.94
Olosega	3-400 m		948.10	380.85	2	30	1.84
Olosega	4-500 m		1219.85	668.99	2	30	1.52
Olosega	5-600 m		1610.00	189.76	3	66	2.47
Ta'u	0-100 m		1024.88	520.36	29	579	41.06
Ta'u	1-200 m		915.78	409.73	17	340	26.77
Ta'u	2-300 m		1017.17	282.46	15	230	14.89
Ta'u	3-400 m		1023.22	415.46	9	135	8.80
Ta'u	4-500 m		846.78	185.75	13	162	12.59
Ta'u	5-800 m		982.70	252.97	8	108	7.12
Ta'u	6-700 m		930.07	107.88	8	91	5.99
Ta'u	7-800 m		822.93	153.52	7	67	5.03
Ta'u	8-900 m		588.25	179.30	21	191	20.31
Liu Bench	1-200 m		1277.10	215.89	5	115	5.79
Liu Bench	2-300 m		1424.88	347.59	10	249	11.52
Liu Bench	3-400 m		1838.07	240.26	12	430	14.45
Liu Bench	4-500 m		1830.40	365.95	3	84	3.31

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	929.71	225.31	87	1496	103.72
Tutuila		Secondary	866.83	233.76	101	1570	115.41
Tutuila		Mixed	774.03	130.54	15	287	22.95
Tutuila		Plantation	718.87	238.50	13	243	20.72
Tutuila		Montane	1091.07	63.76	3	52	3.02
Tutuila		Littoral	548.63	104.10	8	120	13.61
Ofu		Rain Forest	1186.52	171.60	5	100	5.01
Ofu		Secondary	1298.12	356.11	20	529	26.37
Ofu		Mixed	921.86	392.36	18	275	21.49
Ofu		Plantation	915.23	322.88	12	205	16.71
Ofu		Village	587.70	.00	1	12	1.37
Olosega		Rain Forest	1201.80	22.07	2	39	1.90
Olosega		Secondary	712.80	48.08	2	20	1.68
Olosega		Mixed	1581.77	244.15	11	312	11.53
Olosega		Cloud	1630.73	180.38	4	86	3.19
Ta'u		Rain Forest	982.45	304.93	32	454	30.34
Ta'u		Secondary	1171.71	393.77	28	463	25.89
Ta'u		Mixed	815.20	381.16	34	670	56.92
Ta'u		Plantation	858.70	.00	1	15	1.03
Ta'u		Cloud	665.73	199.44	31	287	27.49
Ta'u		Littoral	720.50	.00	1	12	1.00
Liu Bench		Rain Forest	1633.11	361.11	28	825	32.36
Liu Bench		Secondary	1226.60	119.64	2	53	2.70

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			867.99	235.89	227	3748	279.43
Ofu			1072.51	388.79	56	1121	70.95
Olosega			1460.61	350.06	19	457	18.31
Ta'u			899.05	370.77	127	1901	142.66
Liu Bench			1806.01	364.06	30	878	35.07

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			974.30	375.35	459	8105	546.42

Appendix Table 15, concluded. Wattled Honeyeater.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	1103.10	214.03	19	380	20.67
Tutuila	2	937.94	229.74	18	261	20.94
Tutuila	3	791.17	186.63	20	370	29.61
Tutuila	4	816.54	160.72	18	275	21.65
Tutuila	5	548.63	104.10	8	120	13.61
Tutuila	6	1046.06	246.26	18	335	19.80
Tutuila	7	900.16	182.20	24	357	23.90
Tutuila	8	954.66	187.01	18	329	20.97
Tutuila	9	719.53	230.42	15	236	21.79
Tutuila	10	722.84	104.11	18	330	28.10
Tutuila	11	833.71	238.52	18	284	20.60
Tutuila	12	878.49	268.03	18	260	18.20
Tutuila	13	802.69	189.45	15	211	19.59
Ofu	1	1171.40	412.16	21	599	32.83
Ofu	2	1242.89	273.13	17	276	13.78
Ofu	3	796.23	311.54	18	246	24.35
Olosega	1	1460.61	350.06	19	457	18.31
Ta'u	1	1508.86	375.75	16	343	14.09
Ta'u	2	774.23	160.88	16	199	18.12
Ta'u	3	581.99	99.94	20	399	41.62
Ta'u	4	873.30	203.69	32	469	33.93
Ta'u	5	725.78	242.17	30	273	24.25
Ta'u	6	1255.65	272.74	13	218	10.66
Ta'u	7	1628.32	436.71	15	488	17.49
Ta'u	8	1583.70	287.67	15	390	17.58

TOTAL ESTIMATES FOR WAHO

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	1406	53.49	2.0	876.53	247.24	46885	1451
Tutuila Central	87	1514	40.59	2.6	898.10	208.95	36453	909
Tutuila East	57	828	19.97	3.4	809.58	250.25	16167	661
Tutuila	227	3748	114.05	2.5	867.99	235.68	99505	1835
Ofu [<300m]	25	625	5.71	5.9	1190.46	402.48	6797	459
Ofu [>300m]	13	250	1.54	8.4	1228.23	248.17	1891	105
Ofu	38	875	7.25	6.4	1203.38	354.09	8688	470
Olosega [<300m]	12	331	4.26	2.9	1548.81	259.29	6597	318
Olosega [>300m]	7	126	1.18	4.9	1309.41	449.59	1545	200
Olosega	19	457	5.44	3.4	1460.61	350.06	8142	375
Ta'u [<300m]	61	1149	18.98	4.4	982.57	435.35	18838	1057
Ta'u [3-600m]	30	403	10.70	2.7	935.96	289.60	10014	565
Ta'u [>600m]	36	349	8.93	3.5	709.84	217.38	6332	323
Liu Bnch [<300m]	15	364	3.03	5.7	1375.49	310.11	4167	242
Liu Bnch [>300m]	15	514	4.19	4.2	1836.53	253.96	7695	274
Ta'u	157	2779	45.83	3.9	1034.14	461.97	47052	1290
ALL ISLANDS	441	7859	172.57	3.0	981.57	376.24	163387	2323

Appendix Table 16. Cardinal Honeyeater.

A		SPECIES - CASO		SUMMARY OF DENSITIES(B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)	
Tutuila	0-100 m	Rain Forest	32.65	17.61	2	2	4.66	
Tutuila	0-100 m	Secondary	117.57	145.49	11	39	24.04	
Tutuila	0-100 m	Mixed	106.23	89.87	3	14	8.27	
Tutuila	0-100 m	Plantation	205.17	191.45	6	40	16.60	
Tutuila	0-100 m	Littoral	149.18	39.75	6	32	15.94	
Tutuila	1-200 m	Rain Forest	44.43	43.64	11	14	20.49	
Tutuila	1-200 m	Secondary	106.44	138.64	17	47	34.99	
Tutuila	1-200 m	Mixed	138.56	110.17	8	37	19.08	
Tutuila	1-200 m	Plantation	281.05	59.89	2	20	4.21	
Tutuila	1-200 m	Littoral	113.65	3.32	2	9	5.02	
Tutuila	2-300 m	Rain Forest	48.15	59.39	42	55	76.19	
Tutuila	2-300 m	Secondary	101.14	134.77	47	121	78.93	
Tutuila	2-300 m	Mixed	24.25	34.29	2	1	2.64	
Tutuila	3-400 m	Rain Forest	22.90	40.77	32	20	61.83	
Tutuila	3-400 m	Secondary	95.56	84.69	24	57	44.65	
Tutuila	3-400 m	Mixed	202.75	40.80	2	18	7.23	
Tutuila	3-400 m	Plantation	313.26	81.66	5	70	16.04	
Tutuila	4-500 m	Secondary	89.80	12.16	2	4	2.60	
Tutuila	4-500 m	Montane	287.75	77.85	2	15	3.26	
Tutuila	5-600 m	Montane	189.30	.00	1	6	1.80	
Ofu	0-100 m	Secondary	.00	.00	4	0	12.28	
Ofu	0-100 m	Mixed	.00	.00	10	0	23.67	
Ofu	0-100 m	Plantation	.00	.00	12	0	31.28	
Ofu	0-100 m	Village	.00	.00	1	0	2.55	
Ofu	1-200 m	Secondary	.00	.00	6	0	16.26	
Ofu	1-200 m	Mixed	.00	.00	2	0	2.49	
Ofu	2-300 m	Secondary	.00	.00	5	0	15.70	
Ofu	2-300 m	Mixed	.00	.00	3	0	6.05	
Ofu	3-400 m	Rain Forest	.00	.00	3	0	5.40	
Ofu	3-400 m	Secondary	.00	.00	1	0	1.21	
Ofu	3-400 m	Mixed	.00	.00	3	0	8.12	
Ofu	4-500 m	Rain Forest	.00	.00	2	0	3.05	
Ofu	4-500 m	Secondary	.00	.00	4	0	4.82	
Olosega	1-200 m	Mixed	.00	.00	10	0	12.93	
Olosega	2-300 m	Rain Forest	.00	.00	1	0	1.30	
Olosega	2-300 m	Mixed	.00	.00	1	0	1.39	
Olosega	3-400 m	Rain Forest	.00	.00	1	0	1.39	
Olosega	3-400 m	Secondary	.00	.00	1	0	1.31	
Olosega	4-500 m	Secondary	.00	.00	1	0	1.24	
Olosega	4-500 m	Cloud	.00	.00	1	0	1.24	
Olosega	5-600 m	Cloud	.00	.00	3	0	4.04	
Ta'u	0-100 m	Rain Forest	.00	.00	1	0	1.45	
Ta'u	0-100 m	Secondary	.00	.00	5	0	5.30	
Ta'u	0-100 m	Mixed	.00	.00	22	0	56.87	
Ta'u	0-100 m	Littoral	.00	.00	1	0	1.58	
Ta'u	1-200 m	Rain Forest	.00	.00	2	0	3.80	
Ta'u	1-200 m	Secondary	.00	.00	3	0	4.69	
Ta'u	1-200 m	Mixed	.00	.00	11	0	33.23	
Ta'u	1-200 m	Plantation	.00	.00	1	0	1.70	
Ta'u	2-300 m	Rain Forest	.00	.00	9	0	13.63	
Ta'u	2-300 m	Secondary	.00	.00	5	0	9.66	
Ta'u	2-300 m	Mixed	.00	.00	1	0	1.59	
Ta'u	3-400 m	Rain Forest	.00	.00	7	0	11.91	
Ta'u	3-400 m	Secondary	.00	.00	2	0	3.81	
Ta'u	4-500 m	Rain Forest	.00	.00	8	0	13.72	
Ta'u	4-500 m	Secondary	.00	.00	5	0	7.95	
Ta'u	5-600 m	Rain Forest	.00	.00	4	0	6.84	
Ta'u	5-600 m	Secondary	.00	.00	3	0	4.45	
Ta'u	5-600 m	Cloud	.00	.00	1	0	1.09	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	1.29	
Ta'u	6-700 m	Secondary	.00	.00	5	0	5.66	
Ta'u	6-700 m	Cloud	.00	.00	2	0	2.24	
Ta'u	7-800 m	Cloud	.00	.00	7	0	7.96	
Ta'u	8-900 m	Cloud	.00	.00	21	0	38.22	
Liu Bench	1-200 m	Rain Forest	.00	.00	4	0	7.59	
Liu Bench	1-200 m	Secondary	.00	.00	1	0	2.61	
Liu Bench	2-300 m	Rain Forest	.00	.00	9	0	16.53	
Liu Bench	2-300 m	Secondary	.00	.00	1	0	2.81	
Liu Bench	3-400 m	Rain Forest	.00	.00	12	0	17.43	
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	6.03	

Appendix Table 16, continued. Cardinal Honeyeater.

B	ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	0-100 m		135.84	132.89	28	127	69.51
	Tutuila	1-200 m		104.90	116.21	40	127	83.78
	Tutuila	2-300 m		74.99	107.95	91	177	157.76
	Tutuila	3-400 m		79.34	102.95	63	165	129.75
	Tutuila	4-500 m		188.78	123.01	4	19	5.87
	Tutuila	5-600 m		189.30	.00	1	6	1.80
	Ofu	0-100 m		.00	.00	27	0	69.78
	Ofu	1-200 m		.00	.00	8	0	18.75
	Ofu	2-300 m		.00	.00	8	0	21.75
	Ofu	3-400 m		.00	.00	7	0	14.72
	Ofu	4-500 m		.00	.00	6	0	7.89
	Olosega	1-200 m		.00	.00	10	0	12.93
	Olosega	2-300 m		.00	.00	2	0	2.69
	Olosega	3-400 m		.00	.00	2	0	2.70
	Olosega	4-500 m		.00	.00	2	0	2.47
	Olosega	5-600 m		.00	.00	3	0	4.04
	Ta'u	0-100 m		.00	.00	29	0	65.20
	Ta'u	1-200 m		.00	.00	17	0	43.43
	Ta'u	2-300 m		.00	.00	15	0	24.88
	Ta'u	3-400 m		.00	.00	9	0	15.72
	Ta'u	4-500 m		.00	.00	13	0	21.68
	Ta'u	5-600 m		.00	.00	8	0	12.38
	Ta'u	6-700 m		.00	.00	8	0	9.19
	Ta'u	7-800 m		.00	.00	7	0	7.96
	Ta'u	8-900 m		.00	.00	21	0	38.22
	Liu Bench	1-200 m		.00	.00	5	0	10.20
	Liu Bench	2-300 m		.00	.00	10	0	19.34
	Liu Bench	3-400 m		.00	.00	12	0	17.43
	Liu Bench	4-500 m		.00	.00	3	0	6.03
C	ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila		Rain Forest	38.04	51.45	87	91	163.17
	Tutuila		Secondary	102.27	123.45	101	268	185.21
	Tutuila		Mixed	125.41	99.60	15	70	37.22
	Tutuila		Plantation	258.42	143.35	13	130	36.85
	Tutuila		Montane	254.93	79.13	3	21	5.06
	Tutuila		Littoral	140.30	37.43	8	41	20.96
	Ofu		Rain Forest	.00	.00	5	0	8.45
	Ofu		Secondary	.00	.00	20	0	50.29
	Ofu		Mixed	.00	.00	18	0	40.33
	Ofu		Plantation	.00	.00	12	0	31.26
	Ofu		Village	.00	.00	1	0	2.55
	Olosega		Rain Forest	.00	.00	2	0	2.69
	Olosega		Secondary	.00	.00	2	0	2.54
	Olosega		Mixed	.00	.00	11	0	14.32
	Olosega		Cloud	.00	.00	4	0	5.27
	Ta'u		Rain Forest	.00	.00	32	0	52.65
	Ta'u		Secondary	.00	.00	28	0	41.53
	Ta'u		Mixed	.00	.00	34	0	91.69
	Ta'u		Plantation	.00	.00	1	0	1.70
	Ta'u		Cloud	.00	.00	31	0	48.50
	Ta'u		Littoral	.00	.00	1	0	1.58
	Liu Bench		Rain Forest	.00	.00	28	0	47.58
	Liu Bench		Secondary	.00	.00	2	0	5.42
D	ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila			91.48	113.25	227	621	448.48
	Ofu			.00	.00	56	0	132.88
	Olosega			.00	.00	19	0	24.82
	Ta'u			.00	.00	127	0	238.65
	Liu Bench			.00	.00	30	0	53.00
E	**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
				45.24	91.79	459	621	897.82

Appendix Table 16, concluded. Cardinal Honeyeater.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	22.25	45.38	19	12	24.50
Tutuila	2	24.89	39.93	18	12	40.10
Tutuila	3	132.62	128.41	20	113	61.74
Tutuila	4	61.25	83.36	18	36	42.51
Tutuila	5	140.30	37.43	8	41	20.96
Tutuila	6	162.47	138.83	18	72	27.94
Tutuila	7	73.82	101.15	24	47	36.35
Tutuila	8	111.46	66.74	18	52	26.80
Tutuila	9	150.73	172.19	15	76	38.99
Tutuila	10	41.94	49.10	18	24	43.57
Tutuila	11	191.76	174.04	18	81	24.45
Tutuila	12	45.86	60.88	18	20	23.23
Tutuila	13	68.21	60.57	15	35	37.33
Ofu	1	.00	.00	21	0	62.90
Ofu	2	.00	.00	17	0	23.79
Ofu	3	.00	.00	16	0	46.19
Olosega	1	.00	.00	19	0	24.82
Ta'u	1	.00	.00	16	0	19.65
Ta'u	2	.00	.00	16	0	38.30
Ta'u	3	.00	.00	20	0	67.70
Ta'u	4	.00	.00	32	0	54.20
Ta'u	5	.00	.00	30	0	44.13
Ta'u	6	.00	.00	13	0	16.66
Ta'u	7	.00	.00	15	0	19.01
Ta'u	8	.00	.00	15	0	33.99

TOTAL ESTIMATES FOR CAHD

G

STRATUM	STNS	COUNT	AREA	XCOV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	214	53.49	3.5	69.26	92.70	3704	544
Tutuila Central	87	229	40.59	3.9	96.55	106.37	3918	462
Tutuila East	57	178	19.97	5.1	116.12	142.86	2318	377
Tutuila	227	621	114.05	3.9	91.48	113.25	9940	807
Ofu [<300m]	25	0	5.71	11.2	.00	.00	0	0
Ofu [>300m]	13	0	1.54	14.7	.00	.00	0	0
Ofu	38	0	7.25	12.0	.00	.00	0	0
Olosega [<300m]	12	0	4.26	3.7	.00	.00	0	0
Olosega [>300m]	7	0	1.18	7.8	.00	.00	0	0
Olosega	19	0	5.44	4.6	.00	.00	0	0
Ta'u [<300m]	61	0	18.98	7.0	.00	.00	0	0
Ta'u [3-600m]	30	0	10.70	4.7	.00	.00	0	0
Ta'u [>600m]	36	0	8.93	6.2	.00	.00	0	0
Liu Bnch [<300m]	15	0	3.03	9.7	.00	.00	0	0
Liu Bnch [>300m]	15	0	4.19	5.6	.00	.00	0	0
Ta'u	157	0	45.83	6.4	.00	.00	0	0
ALL ISLANDS	441	621	172.57	4.9	47.09	93.18	9940	807

Appendix Table 17. Polynesian Starling.

A		SPECIES = POST		SUMMARY OF DENSITIES (B/SQ-KM)				
ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA (HA)	
Tutuila	0-100 m	Rain Forest	204.15	55.93	2	5	1.62	
Tutuila	0-100 m	Secondary	105.82	118.39	11	16	8.99	
Tutuila	0-100 m	Mixed	76.93	26.02	3	4	3.55	
Tutuila	0-100 m	Plantation	15.15	24.00	6	2	7.54	
Tutuila	0-100 m	Littoral	93.93	112.40	6	11	8.55	
Tutuila	1-200 m	Rain Forest	70.47	74.92	11	17	12.12	
Tutuila	1-200 m	Secondary	45.17	86.92	17	12	18.34	
Tutuila	1-200 m	Mixed	35.10	63.17	8	6	12.34	
Tutuila	1-200 m	Plantation	102.25	88.60	2	6	3.34	
Tutuila	1-200 m	Littoral	.00	.00	2	0	4.46	
Tutuila	2-300 m	Rain Forest	69.29	89.67	42	50	46.12	
Tutuila	2-300 m	Secondary	63.93	111.33	47	47	48.15	
Tutuila	2-300 m	Mixed	176.70	75.66	2	5	1.91	
Tutuila	3-400 m	Rain Forest	113.03	116.37	32	49	28.22	
Tutuila	3-400 m	Secondary	113.27	116.07	24	46	24.60	
Tutuila	3-400 m	Mixed	19.45	27.51	2	1	3.48	
Tutuila	3-400 m	Plantation	65.60	51.88	5	10	8.41	
Tutuila	4-500 m	Secondary	211.60	137.89	2	7	1.95	
Tutuila	4-500 m	Montane	.00	.00	2	0	1.92	
Tutuila	5-600 m	Montane	102.40	.00	1	2	1.15	
Ofu	0-100 m	Secondary	8.66	17.35	4	1	5.97	
Ofu	0-100 m	Mixed	4.57	14.45	10	1	9.46	
Ofu	0-100 m	Plantation	3.03	10.48	12	1	13.14	
Ofu	0-100 m	Village	.00	.00	1	0	1.15	
Ofu	1-200 m	Secondary	99.60	89.89	6	13	7.60	
Ofu	1-200 m	Mixed	115.10	162.78	2	2	1.00	
Ofu	2-300 m	Secondary	45.82	21.65	5	7	8.52	
Ofu	2-300 m	Mixed	7.47	12.93	3	1	3.36	
Ofu	3-400 m	Rain Forest	.00	.00	3	0	2.79	
Ofu	3-400 m	Secondary	154.70	.00	1	1	.46	
Ofu	3-400 m	Mixed	82.07	71.93	3	9	4.97	
Ofu	4-500 m	Rain Forest	110.35	156.06	2	3	1.58	
Ofu	4-500 m	Secondary	79.43	158.85	4	2	1.81	
Olosega	1-200 m	Mixed	.00	.00	10	0	9.78	
Olosega	2-300 m	Rain Forest	303.20	.00	1	3	.89	
Olosega	2-300 m	Mixed	.00	.00	1	0	1.00	
Olosega	3-400 m	Rain Forest	.00	.00	1	0	.97	
Olosega	3-400 m	Secondary	.00	.00	1	0	.73	
Olosega	4-500 m	Secondary	.00	.00	1	0	.71	
Olosega	4-500 m	Cloud	.00	.00	1	0	.65	
Olosega	5-600 m	Cloud	.00	.00	3	0	2.40	
Ta'u	0-100 m	Rain Forest	.00	.00	1	0	.97	
Ta'u	0-100 m	Secondary	108.86	108.85	5	5	2.45	
Ta'u	0-100 m	Mixed	75.53	111.46	22	32	34.42	
Ta'u	0-100 m	Littoral	.00	.00	1	0	.94	
Ta'u	1-200 m	Rain Forest	113.00	72.69	2	3	1.67	
Ta'u	1-200 m	Secondary	276.23	222.42	3	9	2.27	
Ta'u	1-200 m	Mixed	98.40	118.97	11	22	20.25	
Ta'u	1-200 m	Plantation	192.70	.00	1	3	.92	
Ta'u	2-300 m	Rain Forest	157.49	120.55	9	15	6.18	
Ta'u	2-300 m	Secondary	119.58	125.90	5	8	4.36	
Ta'u	2-300 m	Mixed	70.60	.00	1	1	.78	
Ta'u	3-400 m	Rain Forest	102.29	175.05	7	8	4.77	
Ta'u	3-400 m	Secondary	.00	.00	2	0	1.81	
Ta'u	4-500 m	Rain Forest	48.47	81.52	8	5	5.19	
Ta'u	4-500 m	Secondary	104.28	119.45	5	7	3.66	
Ta'u	5-600 m	Rain Forest	16.28	32.55	4	1	2.74	
Ta'u	5-600 m	Secondary	.00	.00	3	0	1.82	
Ta'u	5-600 m	Cloud	.00	.00	1	0	.60	
Ta'u	6-700 m	Rain Forest	.00	.00	1	0	.71	
Ta'u	6-700 m	Secondary	46.36	103.66	5	2	2.55	
Ta'u	6-700 m	Cloud	57.35	81.11	2	1	1.08	
Ta'u	7-800 m	Cloud	.00	.00	7	0	3.67	
Ta'u	8-900 m	Cloud	.00	.00	21	0	15.36	
Liu Bench	1-200 m	Rain Forest	37.12	48.76	4	2	3.90	
Liu Bench	1-200 m	Secondary	60.90	.00	1	1	1.08	
Liu Bench	2-300 m	Rain Forest	64.73	93.84	9	8	7.98	
Liu Bench	2-300 m	Secondary	54.90	.00	1	1	1.18	
Liu Bench	3-400 m	Rain Forest	74.64	80.98	12	12	11.54	
Liu Bench	4-500 m	Rain Forest	.00	.00	3	0	1.95	

Appendix Table 17, continued. Polynesian Starling.

B

ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		87.77	101.93	28	38	31.25
Tutuila	1-200 m		50.71	68.09	40	41	48.83
Tutuila	2-300 m		68.57	101.66	91	102	96.17
Tutuila	3-400 m		106.38	111.24	63	106	64.71
Tutuila	4-500 m		105.80	145.82	4	7	3.87
Tutuila	5-600 m		102.40	.00	1	2	1.15
Ofu	0-100 m		4.32	12.57	27	3	29.72
Ofu	1-200 m		103.47	98.02	8	15	8.61
Ofu	2-300 m		31.44	26.64	8	8	11.88
Ofu	3-400 m		57.27	72.49	7	10	8.21
Ofu	4-500 m		89.73	142.36	6	5	3.39
Olosega	1-200 m		.00	.00	10	0	9.78
Olosega	2-300 m		151.60	214.39	2	3	1.88
Olosega	3-400 m		.00	.00	2	0	1.69
Olosega	4-500 m		.00	.00	2	0	1.37
Olosega	5-600 m		.00	.00	3	0	2.40
Ta'u	0-100 m		76.07	107.78	29	37	38.79
Ta'u	1-200 m		137.11	142.45	17	37	25.11
Ta'u	2-300 m		139.06	118.28	15	24	11.32
Ta'u	3-400 m		79.56	158.16	9	8	6.58
Ta'u	4-500 m		69.94	97.12	13	12	8.85
Ta'u	5-600 m		8.14	23.02	8	1	5.16
Ta'u	6-700 m		43.31	86.09	8	3	4.34
Ta'u	7-800 m		.00	.00	7	0	3.67
Ta'u	8-900 m		.00	.00	21	0	15.36
Liu Bench	1-200 m		41.88	43.54	5	3	4.98
Liu Bench	2-300 m		63.75	82.53	10	9	9.16
Liu Bench	3-400 m		74.64	80.98	12	12	11.54
Liu Bench	4-500 m		.00	.00	3	0	1.95

C

ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	88.83	100.80	87	121	88.07
Tutuila		Secondary	79.70	110.14	101	129	101.03
Tutuila		Mixed	60.28	71.77	15	16	21.28
Tutuila		Plantation	47.95	54.32	13	18	19.29
Tutuila		Montane	34.13	59.12	3	2	3.08
Tutuila		Littoral	70.45	109.10	8	11	13.03
Ofu		Rain Forest	44.14	98.70	5	3	4.37
Ofu		Secondary	66.69	88.68	20	24	24.36
Ofu		Mixed	30.25	64.02	18	13	18.79
Ofu		Plantation	3.03	10.48	12	1	13.14
Ofu		Village	.00	.00	1	0	1.15
Olosega		Rain Forest	151.60	214.39	2	3	1.85
Olosega		Secondary	.00	.00	2	0	1.44
Olosega		Mixed	.00	.00	11	0	10.78
Olosega		Cloud	.00	.00	4	0	3.05
Ta'u		Rain Forest	87.88	120.46	32	32	22.23
Ta'u		Secondary	97.29	131.87	28	31	18.93
Ta'u		Mixed	82.78	110.98	34	55	55.46
Ta'u		Plantation	193.70	.00	1	3	.92
Ta'u		Cloud	3.70	20.60	31	1	20.70
Ta'u		Littoral	.00	.00	1	0	.94
Liu Bench		Rain Forest	58.10	78.24	28	22	25.37
Liu Bench		Secondary	57.90	4.24	2	2	2.26

D

ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			79.09	101.28	227	296	245.78
Ofu			38.13	73.00	56	41	61.81
Olosega			15.96	68.56	19	3	17.13
Ta'u			68.18	110.24	127	122	119.18
Liu Bench			58.09	75.50	30	24	27.63

E

**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			67.09	99.41	459	486	471.53

Appendix Table 17, concluded. Polynesian Starling.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	116.34	111.40	19	29	20.43
Tutuila	2	67.38	114.38	18	14	13.89
Tutuila	3	54.10	99.52	20	27	29.02
Tutuila	4	111.65	98.50	18	35	18.72
Tutuila	5	70.45	109.10	8	11	13.03
Tutuila	6	79.19	110.75	18	22	17.42
Tutuila	7	72.94	127.07	24	25	22.32
Tutuila	8	187.44	107.00	18	64	23.19
Tutuila	9	86.27	88.98	15	19	16.18
Tutuila	10	41.43	36.99	18	18	24.16
Tutuila	11	41.65	78.85	18	11	15.87
Tutuila	12	29.04	65.45	18	7	17.31
Tutuila	13	67.53	98.01	15	14	14.24
Ofu	1	57.71	62.45	21	33	32.75
Ofu	2	54.31	105.01	17	8	10.76
Ofu	3	.00	.00	18	0	18.29
Olosega	1	15.96	69.56	19	9	17.13
Ta'u	1	109.06	151.60	16	17	10.20
Ta'u	2	80.64	126.02	16	14	11.68
Ta'u	3	41.15	41.18	20	31	44.32
Ta'u	4	81.83	119.30	32	36	25.01
Ta'u	5	17.94	49.47	30	6	17.86
Ta'u	6	126.50	139.67	13	18	10.09
Ta'u	7	73.73	84.86	15	16	15.79
Ta'u	8	42.45	63.89	15	8	11.83

TOTAL ESTIMATES FOR POST

G

STRATUM	STNS	COUNT	AREA	XCOV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	116	53.49	1.8	85.28	97.63	4561	573
Tutuila Central	87	146	40.59	2.4	97.59	112.60	3961	489
Tutuila East	57	34	19.97	2.7	41.84	77.14	835	204
Tutuila	227	296	114.05	2.2	79.09	101.26	9357	780
Ofu [<300m]	25	26	5.71	5.6	47.84	68.67	273	78
Ofu [>300m]	13	15	1.54	7.5	72.25	106.56	111	45
Ofu	38	41	7.25	6.0	56.19	82.94	384	90
Olosega [<300m]	12	3	4.26	2.7	25.27	87.53	107	107
Olosega [>300m]	7	0	1.18	4.6	.00	.00	0	0
Olosega	19	3	5.44	3.1	15.96	69.56	107	107
Ta'u [<300m]	61	98	18.98	4.0	108.57	122.32	2060	297
Ta'u [3-600m]	30	21	10.70	1.9	56.34	108.73	602	212
Ta'u [>600m]	36	3	8.93	2.6	9.63	42.61	85	63
Liu Bnch [<300m]	15	12	3.03	4.7	56.46	75.46	171	59
Liu Bnch [>300m]	15	12	4.19	3.2	59.71	78.15	250	84
Ta'u	157	146	45.83	3.2	66.25	104.36	3168	382
ALL ISLANDS	441	486	172.57	2.6	69.83	100.47	13016	879

Appendix Table 18. Samoan Starling.

SPECIES = SAST		SUMMARY OF DENSITIES(B/SQ-KM)						
A	ISLAND	ELEVATION	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
	Tutuila	0-100 m	Rain Forest	486.60	132.23	2	17	2.19
	Tutuila	0-100 m	Secondary	408.97	143.95	11	72	13.01
	Tutuila	0-100 m	Mixed	405.43	37.33	3	29	4.48
	Tutuila	0-100 m	Plantation	349.53	231.83	6	53	9.85
	Tutuila	0-100 m	Littoral	335.82	108.91	6	58	10.39
	Tutuila	1-200 m	Rain Forest	329.43	172.96	11	70	15.42
	Tutuila	1-200 m	Secondary	402.72	190.35	17	120	21.47
	Tutuila	1-200 m	Mixed	413.70	231.56	8	76	14.50
	Tutuila	1-200 m	Plantation	267.70	76.08	2	17	3.97
	Tutuila	1-200 m	Littoral	131.75	20.86	2	11	5.08
	Tutuila	2-300 m	Rain Forest	385.87	180.89	42	319	56.74
	Tutuila	2-300 m	Secondary	294.81	169.73	47	293	60.45
	Tutuila	2-300 m	Mixed	501.25	224.37	2	18	2.35
	Tutuila	3-400 m	Rain Forest	400.42	251.52	32	214	37.88
	Tutuila	3-400 m	Secondary	364.47	168.23	24	168	31.13
	Tutuila	3-400 m	Mixed	244.15	108.12	2	19	4.33
	Tutuila	3-400 m	Plantation	288.80	78.86	5	57	10.78
	Tutuila	4-500 m	Secondary	626.60	90.93	2	19	2.52
	Tutuila	4-500 m	Montane	457.35	227.48	2	13	2.05
	Tutuila	5-600 m	Montane	148.50	.00	1	4	1.35
	Ofu	0-100 m	Secondary	283.55	26.33	4	35	7.53
	Ofu	0-100 m	Mixed	451.99	218.43	10	61	12.24
	Ofu	0-100 m	Plantation	516.85	150.04	12	104	16.94
	Ofu	0-100 m	Village	368.30	.00	1	10	1.56
	Ofu	1-200 m	Secondary	184.62	88.65	6	31	9.85
	Ofu	1-200 m	Mixed	853.20	141.70	2	16	1.34
	Ofu	2-300 m	Secondary	130.64	79.21	5	24	10.58
	Ofu	2-300 m	Mixed	462.10	265.72	3	21	4.07
	Ofu	3-400 m	Rain Forest	326.00	79.12	3	18	3.31
	Ofu	3-400 m	Secondary	768.20	.00	1	7	.60
	Ofu	3-400 m	Mixed	322.77	355.88	3	19	5.94
	Ofu	4-500 m	Rain Forest	422.80	2.55	2	13	1.85
	Ofu	4-500 m	Secondary	712.02	241.64	4	26	2.37
	Olosega	1-200 m	Mixed	309.20	73.47	10	57	13.15
	Olosega	2-300 m	Rain Forest	452.70	.00	1	8	1.23
	Olosega	2-300 m	Mixed	416.10	.00	1	8	1.34
	Olosega	3-400 m	Rain Forest	281.30	.00	1	5	1.31
	Olosega	3-400 m	Secondary	165.90	.00	1	3	1.04
	Olosega	4-500 m	Secondary	185.90	.00	1	3	1.02
	Olosega	4-500 m	Cloud	104.40	.00	1	2	.96
	Olosega	5-600 m	Cloud	135.50	53.89	3	5	3.35
	Ta'u	0-100 m	Rain Forest	614.10	.00	1	10	1.32
	Ta'u	0-100 m	Secondary	961.36	194.35	5	48	3.14
	Ta'u	0-100 m	Mixed	380.00	290.16	22	200	40.29
	Ta'u	0-100 m	Littoral	581.20	.00	1	9	1.22
	Ta'u	1-200 m	Rain Forest	492.05	66.11	2	14	2.32
	Ta'u	1-200 m	Secondary	546.50	210.69	3	25	2.96
	Ta'u	1-200 m	Mixed	237.17	76.20	11	96	24.04
	Ta'u	1-200 m	Plantation	781.70	.00	1	14	1.07
	Ta'u	2-300 m	Rain Forest	495.77	226.73	9	53	8.53
	Ta'u	2-300 m	Secondary	540.24	235.19	5	45	5.58
	Ta'u	2-300 m	Mixed	622.50	.00	1	10	.98
	Ta'u	3-400 m	Rain Forest	355.77	219.80	7	35	6.76
	Ta'u	3-400 m	Secondary	326.35	93.97	2	13	2.43
	Ta'u	4-500 m	Rain Forest	425.41	174.51	8	42	6.99
	Ta'u	4-500 m	Secondary	435.50	112.15	5	31	5.22
	Ta'u	5-600 m	Rain Forest	432.00	234.75	4	22	3.54
	Ta'u	5-600 m	Secondary	312.07	119.52	3	11	2.70
	Ta'u	5-600 m	Cloud	364.00	.00	1	4	.97
	Ta'u	6-700 m	Rain Forest	228.60	.00	1	3	.81
	Ta'u	6-700 m	Secondary	421.08	216.84	5	21	3.54
	Ta'u	6-700 m	Cloud	569.60	9.19	2	12	1.40
	Ta'u	7-800 m	Cloud	383.10	141.16	7	28	5.08
	Ta'u	8-900 m	Cloud	126.83	158.94	21	37	21.37
	Liu Bench	1-200 m	Rain Forest	218.85	194.67	4	13	5.06
	Liu Bench	1-200 m	Secondary	142.30	.00	1	3	1.32
	Liu Bench	2-300 m	Rain Forest	316.16	166.54	9	44	10.66
	Liu Bench	2-300 m	Secondary	229.40	.00	1	5	1.42
	Liu Bench	3-400 m	Rain Forest	360.23	190.40	12	76	14.98
	Liu Bench	4-500 m	Rain Forest	171.40	64.67	3	5	2.71

Appendix Table 18, continued. Samoan Starling.

B							
ISLAND	ELEVATION	**	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	0-100 m		385.73	149.79	28	229	39.92
Tutuila	1-200 m		364.46	182.51	40	294	60.44
Tutuila	2-300 m		341.37	181.14	91	630	119.54
Tutuila	3-400 m		372.80	210.34	63	458	84.12
Tutuila	4-500 m		541.98	171.91	4	32	4.57
Tutuila	5-600 m		148.50	.00	1	4	1.35
Ofu	0-100 m		449.80	183.82	27	210	38.27
Ofu	1-200 m		351.76	322.91	8	47	11.19
Ofu	2-300 m		254.94	230.62	8	45	14.65
Ofu	3-400 m		387.79	269.16	7	44	9.85
Ofu	4-500 m		615.62	239.46	6	39	4.22
Olosega	1-200 m		309.20	73.47	10	57	13.15
Olosega	2-300 m		434.40	25.88	2	16	2.57
Olosega	3-400 m		223.60	81.60	2	8	2.34
Olosega	4-500 m		145.15	57.83	2	5	1.97
Olosega	5-600 m		135.50	53.89	3	5	3.35
Ta'u	0-100 m		495.25	344.30	29	267	45.97
Ta'u	1-200 m		353.78	198.99	17	149	30.39
Ta'u	2-300 m		519.04	215.53	15	108	15.09
Ta'u	3-400 m		349.23	193.66	8	48	9.19
Ta'u	4-500 m		429.29	148.26	13	73	12.21
Ta'u	5-600 m		378.52	178.80	8	37	7.21
Ta'u	6-700 m		434.15	195.66	8	36	5.75
Ta'u	7-800 m		383.10	141.16	7	28	5.08
Ta'u	8-900 m		126.83	158.94	21	37	21.37
Liu Bench	1-200 m		203.54	172.03	5	16	6.38
Liu Bench	2-300 m		307.48	159.40	10	49	12.09
Liu Bench	3-400 m		360.23	190.40	12	76	14.98
Liu Bench	4-500 m		171.40	64.67	3	5	2.71
C							
ISLAND	***	HABITAT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila		Rain Forest	386.40	206.90	67	620	112.24
Tutuila		Secondary	348.53	177.70	101	672	122.58
Tutuila		Mixed	401.11	191.02	15	142	25.65
Tutuila		Plantation	313.58	161.87	13	127	24.60
Tutuila		Montane	354.40	240.14	3	17	3.40
Tutuila		Littoral	284.80	132.13	8	69	15.47
Ofu		Rain Forest	364.72	77.09	5	31	5.16
Ofu		Secondary	321.57	267.47	20	123	30.93
Ofu		Mixed	476.72	266.27	18	117	23.60
Ofu		Plantation	516.85	150.04	12	104	16.94
Ofu		Village	368.30	.00	1	10	1.56
Olosega		Rain Forest	367.00	121.20	2	13	2.53
Olosega		Secondary	175.90	14.14	2	6	2.05
Olosega		Mixed	318.92	76.79	11	65	14.49
Olosega		Cloud	127.72	46.86	4	7	4.31
Ta'u		Rain Forest	434.70	200.25	32	179	30.27
Ta'u		Secondary	536.40	271.95	28	194	25.57
Ta'u		Mixed	340.93	249.69	34	306	65.31
Ta'u		Plantation	781.70	.00	1	14	1.07
Ta'u		Cloud	220.91	204.82	31	81	28.82
Ta'u		Littoral	581.20	.00	1	9	1.22
Liu Bench		Rain Forest	305.63	178.85	28	138	33.41
Liu Bench		Secondary	185.85	61.59	2	8	2.75
D							
ISLAND	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila			362.35	189.00	227	1647	309.93
Ofu			417.97	241.88	56	385	78.16
Olosega			268.67	111.60	19	91	23.39
Ta'u			383.72	257.79	127	783	152.26
Liu Bench			297.65	175.60	30	146	36.15
E							
**	***	***	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
			366.94	215.64	459	3052	599.81

Appendix Table 18, concluded. Samoan Starling.

F

ISLAND	TRANSECT	AVERAGE	ST DEV	STNS	COUNT	AREA(HA)
Tutuila	1	411.14	136.18	19	159	26.46
Tutuila	2	320.26	189.57	18	68	18.88
Tutuila	3	256.53	90.12	20	170	37.25
Tutuila	4	310.14	127.09	18	139	26.19
Tutuila	5	284.80	132.13	8	69	15.47
Tutuila	6	479.16	159.19	18	150	19.32
Tutuila	7	356.68	126.27	24	173	28.82
Tutuila	8	598.54	265.11	18	199	28.11
Tutuila	9	409.15	158.08	15	132	21.12
Tutuila	10	225.29	67.22	18	116	29.53
Tutuila	11	320.37	229.23	18	91	18.11
Tutuila	12	257.63	130.24	18	78	22.77
Tutuila	13	475.35	195.75	15	103	18.11
Ofu	1	199.06	93.70	21	137	40.96
Ofu	2	606.45	245.22	17	116	13.43
Ofu	3	495.36	145.95	18	132	23.79
Olosega	1	268.67	111.60	19	91	23.39
Ta'u	1	770.27	281.51	16	147	12.94
Ta'u	2	267.40	105.51	15	67	16.26
Ta'u	3	215.32	66.83	20	196	50.94
Ta'u	4	377.61	168.67	32	185	32.12
Ta'u	5	301.47	271.05	30	100	25.32
Ta'u	6	515.06	162.64	13	88	14.67
Ta'u	7	239.83	125.73	15	75	20.29
Ta'u	8	355.46	202.24	15	71	15.86

TOTAL ESTIMATES FOR SACT

G

STRATUM	STNS	COUNT	AREA	%COV	AVERAGE	ST DEV	EST-N	ST-ERR
Tutuila West	83	605	53.49	2.3	320.09	145.92	17121	856
Tutuila Central	87	710	40.59	2.9	410.28	205.87	16653	895
Tutuila East	57	332	19.87	3.4	350.72	203.84	7003	539
Tutuila	227	1647	114.05	2.7	362.35	189.00	40777	1350
Ofu [<300m]	25	170	5.71	7.1	323.27	255.09	1845	291
Ofu [>300m]	13	83	1.54	9.1	492.94	272.20	759	116
Ofu	38	253	7.25	7.5	381.32	289.98	2604	313
Olosega [<300m]	12	73	4.26	3.7	330.07	82.78	1406	101
Olosega [>300m]	7	18	1.18	6.5	163.43	65.87	192	29
Olosega	19	91	5.44	4.3	268.67	111.60	1598	105
Ta'u [<300m]	61	524	18.98	4.8	461.67	285.28	8762	693
Ta'u [3-600m]	30	158	10.70	2.7	391.74	168.01	4191	328
Ta'u [>600m]	36	101	8.93	3.8	244.95	214.19	2187	316
Liu Bnch [<300m]	15	65	3.03	6.1	272.83	165.41	826	129
Liu Bnch [>300m]	15	81	4.19	4.2	322.46	187.60	1351	202
Ta'u	157	929	45.83	4.1	367.27	246.09	17317	862
ALL ISLANDS	441	2920	172.57	3.3	361.70	216.51	62296	1635