

Review of Status of Knowledge of Samoan Avifauna

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for

O Le Siosiomaga Society Incorporated and the Birdlife Pacific
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1. INTRODUCTION

This report is a review of the status of knowledge of Samoan birds and is based on existing information and research conducted in Samoa over the past 100 years. The review was commissioned by O le Siosiomaga Society Inc (OLSSI) as part of a collaborative project to identify Samoa's Important Bird Areas (IBAs) between OLSSI, the Birdlife Pacific Partnership, Conservation International's Pacific Islands Program (CI-PIP) and the Samoan Ministry of Natural Resources and Environment (MNRE).

The purpose of this report is to review the current status of our knowledge of Samoan avifauna and in particular to identify knowledge gaps in terms of the biology or ecology of particular bird species and the geographical areas that are poorly known ornithologically. A secondary objective is to identify a preliminary set of candidate IBAs that are necessary for the long term conservation of the avifauna of Samoa.

In identifying knowledge gaps, the review also identifies a number of priorities for further research on Samoan birds, in terms of both geographical and taxonomic knowledge gaps. Further work is needed to fill these knowledge gaps, to assess national institutional frameworks for bird conservation in Samoa (eg legislation), to conduct community and national stakeholder consultations and to formally identify the Important Bird Areas for Samoa and actions needed to conserve them. It is expected that the IBAs will be finalized by September 2009 and a book on Samoa's IBAs and Key Biodiversity Areas (KBAs) will then be published. The work of implementing actions at both the national and site level will then commence.

The review has three main sections: i) review of current knowledge of bird species of conservation concern, including the endemic and threatened bird species of Samoa and the restricted range species; ii) identification of knowledge gaps in terms of particular species and sites and iii) preliminary identification of candidate important bird areas for the conservation of the land bird species of conservation concern.

Figure 1 shows place names that are mentioned in this report.

2. REVIEW OF EXISTING KNOWLEDGE OF SAMOA'S BIRDS

2.1 KNOWLEDGE BASE

Samoa's land bird fauna is well studied. The first written records of bird observations in Samoa date from 1838 when the first bird species list for Samoa was prepared by the United States Exploring Expedition (Wilkes 1845). Since then numerous amateur and professional ornithologists have recorded their observations of the birds of Samoa and a number of manuals, field guides and reports on the birds of Samoa or of the South West Pacific have been written (eg Armstrong 1932, Mayr 1945, Dhondt 1976, Muse and Muse 1982, Watling 2001). In addition numerous national and local biological surveys and assessments have included bird survey elements. The most recent set of national bird surveys were conducted in 2006 and culminated in the preparation of species recovery plans for the manumea (MNRE 2006a) and the Ma'oma'o (MNRE 2006b).

Table one below is a summary of a few of the more recent key documents on Samoa's avifauna and biological surveys conducted that included bird surveys. Please note that this list is far from complete.

Table 1: Key Documents on the Birds of Samoa or the SW Pacific region

Author	Title	Year	Survey Area
MNRE	Recovery plan for the Ma'oma'o or Mao (<i>Gymnomyza samoensis</i>) Samoa's Large Forest Honeyeater 2006-2016	2006	National - Samoa
MNRE	Recovery plan for the Manumea or Tooth Billed Pigeon (<i>Didunculus strigirostris</i>) 2006-2016	2006	
Watling, D.	A Guide to the Birds of Fiji and Western Polynesia	2001	Regional
Beichle, U.	Studies on the avifauna: Report on a proposed Conservation Area at Sataoa-Sa'anapu Mangrove Wetland, Upolu, Samoa	1997	Sataoa-Sa'anapu
Schuster, C., Whistler, A. & Tuilemafau, T.S.	The conservation of biological diversity in upland ecosystems of Samoa	1997	Uplands of Savaii and Upolu
Lovegrove, T., Bell, B. & Hay, R	The indigenous wildlife of Western Samoa: impacts of cyclone Val and a recovery and management strategy	1992	National - Samoa
Park, G., Hay, R., Whistler, A. & Lovegrove, T.	The National Ecological Survey of Western Samoa: The conservation of Biological Diversity in the Coastal Lowlands of Western Samoa	1992	Coastal Lowlands of Upolu and Savaii
Bellingham, M & Davis, A	Forest Bird Communities in Western Samoa	1988	National - Samoa
Merlin. M.D. & Juvik, J.O	Bird Protection in Western Samoa	1985	National - Samoa
Muse, C. & Muse, S.	The Birds and Birdlore of Samoa / O manu ma tala'aga o manu o Samoa	1982	National - Samoa
Mayr, E	Birds of the Southwest Pacific: a field guide to the birds of the area between Samoa, New Caledonia & Micronesia	1978	Regional

Despite the significant body of knowledge on Samoan land birds there is still limited knowledge of Samoan bird ecology and behaviour. Another knowledge gap is the status of the seabird fauna of Samoa (Government of Samoa 2001). See section 3 for a more detailed description of these knowledge gaps.

Eighty one bird species have been recorded from Samoa (Watling 2001), including 31 breeding native land birds, one possibly extinct native land bird (the Samoan Moorhen), four breeding introduced birds, approximately ten breeding seabirds and thirty five migrants or vagrants (Watling pers.comm 2008). Nine of the landbirds are endemic to Samoa (including the Ma'oma'o which is now extinct on American Samoa) and another seven are regional endemics or near endemics (Watling 2001).

An unknown number of bird species have been extirpated since human arrival in Samoa, but fossil evidence from other islands in the region indicates that it may be very significant (eg see Steadman 1995).

Figures 2 and 3 show documented locations where some of the land bird and sea/shore bird species of conservation concern have been observed. Please note that these are not species distribution maps but simply show where particular species have been observed. Note that care must be taken when interpreting the maps as species locations may not always have been recorded accurately.

Figure 2. Map of historical land bird survey data

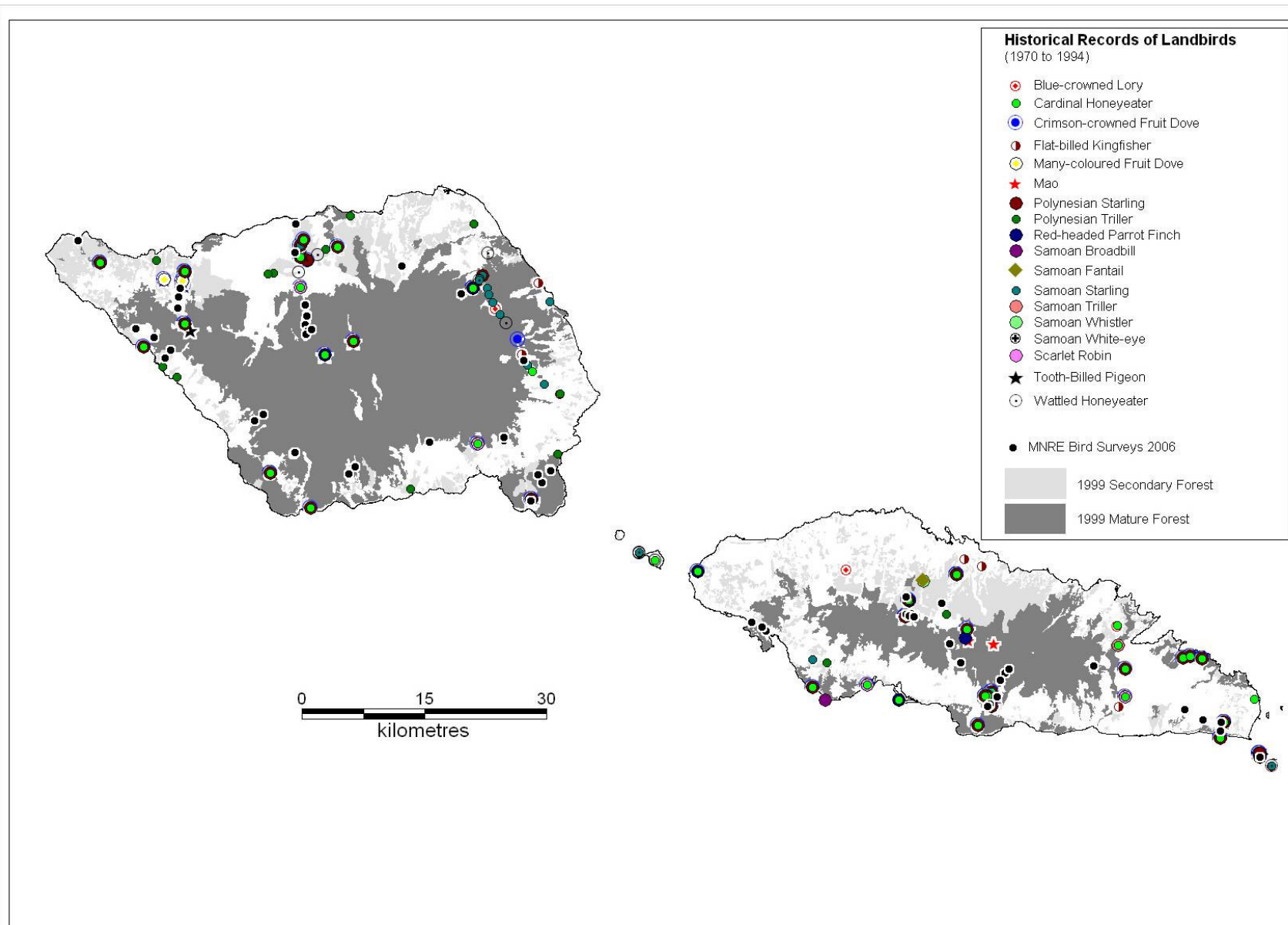
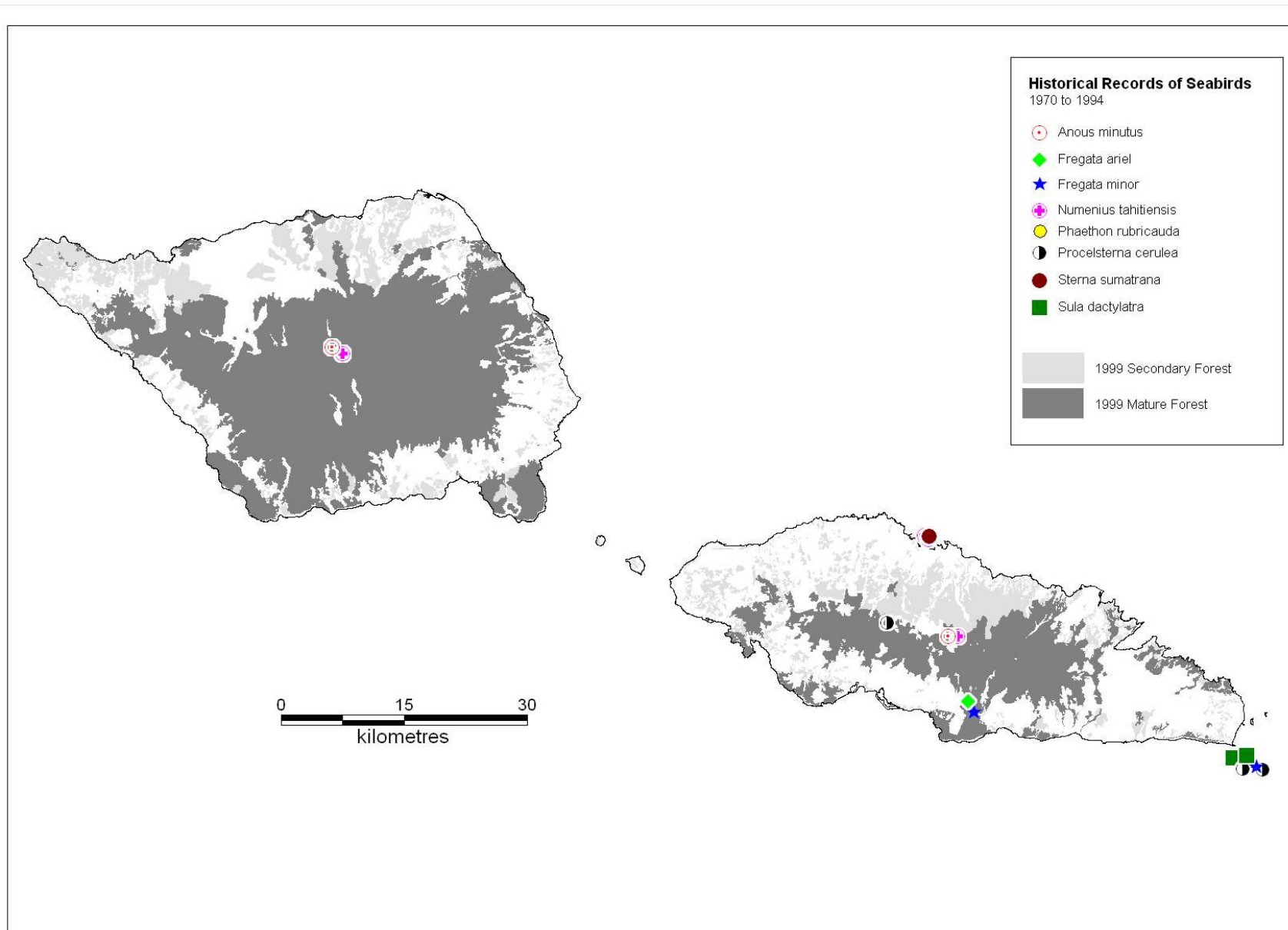


Figure 3. Map of historical sea/shore bird survey data



2.2 SPECIES OF CONSERVATION CONCERN

Annex one is a draft list of trigger species for Samoa, while annex two shows the thresholds for colonial waterbird populations.

2.2.1 Land birds

Samoa has seven land bird species of global conservation concern and classified as threatened (IUCN 2008), all of which are endemic, at least to the sub-species level:

1. Samoan Moorhen (*Gallinula pacifica*)
2. Tooth-billed Pigeon (*Didunculus strigirostris*)
3. Mao (*Gymnomyza samoensis*)
4. Shy Ground-dove (*Gallicolumba stairi*)
5. Samoan Broadbill (*Myiagra albiventris*)
6. Samoan White-eye (*Zosterops samoensis*)
7. Samoan Triller (*Lalage sharpei*)

In addition to these there are another six species that are of national conservation concern and in need of special attention in Samoa. Table 2 below shows the status of these thirteen Samoan land bird species of global or national conservation concern, along with an indication of which are IBA trigger species.

Table 2: Status of Samoa's Land Birds of Conservation Concern

NO	SPECIES			STATUS	IBA Trigger species (Yes/No)
	Common Name	Scientific Name	Samoan Name		
1	Samoan Moorhen	<i>Gallinula pacifica</i>	Puna'e	CR	Yes
2	Shy Ground-dove	<i>Gallicolumba stairi</i>	Tuaimao	VU	Yes
3	Many-coloured Fruit-dove	<i>Ptilinopus perousii</i>	Manuma	cc	Yes
4	Tooth-billed Pigeon	<i>Didunculus strigirostris</i>	Manumea	EN	Yes
5	Blue-crowned Lory	<i>Vini australis</i>	Segavao	cc	No
6	Samoan Triller	<i>Lalage sharpei</i>	Mitivao	VU	Yes
7	Samoan Broadbill	<i>Myiagra albiventris</i>	Tolaifatu	VU	Yes
8	Samoan White-eye	<i>Zosterops samoensis</i>	Matapapa'e	VU	Yes
9	Ma'o	<i>Gymnomyza samoensis</i>	Ma'oma'o	EN	Yes
10	Red-headed Parrotfinch	<i>Erythrura cyaneovirens</i>	Sega'ula	cc	Yes
11	Polynesian Starling	<i>Aplonis tabuensis</i>	Fuiavao	cc	Yes
12	Island Thrush	<i>Turdus poliocephalus samoensis</i>	Tutumalili	cc	No
13	Scarlet Robin	<i>Petroica multicolor pusilla</i>	Tolaiula	cc	No
Legend:++					
CR	Critically endangered	'...it is facing an extremely high risk of extinction in the wild in the immediate future, judged to be a probability of 50% in 10 years.'			
EN	Endangered	'...it is not Critical but is facing a very high risk of extinction in the wild in the near future, judged to be a probability of 20% in 20 years.'			
VU	Vulnerable	'...it is not Critical or Endangered but is facing a high risk of extinction in the wild in the medium-term future, judged to be a probability of 10% in 100 years.'			
cc	Conservation concern	'... a national category for native species that are of local conservation concern even though they may not be considered to be globally threatened. This category includes native birds that may be regionally common but are locally rare and believed threatened in Samoa.'			

2.2.2 Sea/shore birds

In the case of seabirds the status of “national conservation concern” includes seabirds that breed in Samoa and that are rare, not species that are common outside Samoa, but are rare visitors or migrants to Samoa and do not breed here. However, our knowledge of the population and breeding status of seabirds in Samoa is poor, and this makes it difficult to identify the list of seabird species of conservation concern (see section 3). Approximately 12 seabird and shorebird species are of global or national conservation concern in Samoa (see table 3).

The globally threatened bristle-thighed curlew *Numenius tahitiensis* is a regular northern winter migrant in small numbers. Several seabird species of global concern are either passage migrants, visitors or status unknown in Samoa. These include the Phoenix Petrel *Pterodroma alba*; Tahiti Petrel *Pseudobulweria rostrata*; Collared Petrel *Pterodroma brevipes* and Polynesian Storm Petrel *Nesofregetta fuliginosa*. Recent surveys in American Samoa have recorded the Tahitian petrel, Audubon’s shearwater *Puffinus iherminieri* and possibly the Wedge-tailed shearwater *Puffinus pacificus* and Phoenix petrel on Lata Mountain on Ta’u (O’Connor and Rauzon 2004), but the status of these and other petrel and shearwater species in Independent Samoa is not known.

Vaiusu Bay appears to be a key site for migrant birds partly because of its good habitat, but also because numerous observations have been made there (refer to Figure 3).

Table 3: Status of Samoa’s Sea/shore Birds of Conservation Concern

NO	SPECIES			STATUS
	Common Name	Scientific Name	Samoaan Name	
1	Bristle-Thighed Curlew	<i>Numenius tahitiensis</i>	Tuli'olovalu	VU
2	Red-Tailed Tropic Bird	<i>Phaethon rubricauda</i>	Tava'eula	cc
3	Masked Booby	<i>Sula dactylatra</i>	Fua'o	cc
4	Polynesian Storm Petrel	<i>Nesofregetta fuliginosa</i>	Ta'i'o	VU
5	Great Frigatebird	<i>Fregata minor</i>	Ta'i'o	cc
6	Lesser Frigatebird	<i>Fregata ariel</i>	Ta'i'o	cc
7	Crested Tern	<i>Sterna bergii</i>	Gogo	cc
8	Sooty Tern	<i>Sterna fuscata</i>	Gogo	cc
9	Black- Naped Tern	<i>Sterna sumatrana</i>	Gogo	cc
10	Bridled Tern	<i>Sterna anaethetus</i>	Gogo Uli	cc
11	Blue Noddy	<i>Procelsterna cerulea</i>	Laia	cc
12	Black Noddy	<i>Anous minutus</i>	Gogo	cc
Legend:++				
VU	Vulnerable	'...it is not Critical or Endangered but is facing a high risk of extinction in the wild in the medium-term future, judged to be a probability of 10% in 100 years.'		
cc	Conservation concern	'... a national category for species that are of local conservation concern even though they may not be considered to be globally threatened. This category includes seabirds that breed in Samoa that may be regionally common but are locally rare and threatened in Samoa.'		

2.3 SPECIES DESCRIPTIONS

The following 14 species descriptions focus on the land bird species of conservation concern, but with one sea bird included. Further research on the conservation status of sea birds is needed.

Each description begins with the common name, scientific name and then local name followed by an indication in brackets of the conservation status of the bird (2008 IUCN Redlist category: CR = critically endangered; EN = endangered; VU = vulnerable; or cc = national conservation concern).

1. Samoan Woodhen/Moorhen (*Gallinula pacifica*) Puna'e (CR)

The Samoan Moorhen is a flightless olive-black rail that is endemic to Savaii and known only from one mountain, near Aopo village in the cloud forests of north central Savaii (Elmqvist *et al*, 1998; Taule'alo 1993:70).

The Puna'e is listed as 'critically endangered' on the 2008 IUCN Red List although recent surveys failed to find it indicating that it may be extinct (Mittermeier 2006). It has an estimated population of less than 50 individuals and its population trend is unknown (Birdlife International 2000). The main threats to its survival are hunting and predation by invasive mammal pests such as rats, cats, pigs and dogs (Watling 2001, Mittermeier 2006). The Samoan Woodhen has not been formally observed since 1908, but limited ornithological work has been conducted in the area so it may still survive (Taulealo 1993:22).

2. Shy Ground Dove (*Gallicolumba stairii*) Tuameo (VU)

The shy ground dove is a medium sized brown ground dove. It is a poor flyer and usually escapes by running. In Samoa it is very rare being restricted to the offshore Aleipata islands, the Tafua rainforest on Savaii and at low densities in the upland forests of both main islands. Being a ground dweller, the Tuameo has been badly impacted by invasive mammals, and its preferred habitat, the dry open forests of coastal areas, is under severe threat from development (Watling 2001).

3. Many Coloured Fruit Dove (*Ptilinopus perousii*) Manuma (cc)

The many coloured fruit dove or manuma is a small, compact, but beautiful dove. The manuma is a forest dweller and is often seen on its favourite food tree – the fig. At first glance the male bird appears pale cream, but close up it can be seen to be truly multi-coloured. The female is grey-green with pale yellow undertail coverts and is often confused with the crimson crowned fruit dove. Both male and female have a crimson cap. The manuma is threatened by hunting and habitat change.

4. Tooth-billed Pigeon (*Didunculus strigirostris*) Manumea (EN)

The Manumea is endemic to Samoa at the generic level. Its taxonomic position has been much debated and it is of ancient origin with no clear lineage to existing pigeons anywhere in the world (Park *et al* 1992:36). This pigeon only lives within and on the edges of mature native forest in both Upolu and Savaii. Its numbers have declined dramatically, mostly through loss of habitat and hunting and it is now considered to be in significant danger of extinction (MNRE 2006a).

The Tooth-billed Pigeon is listed as 'endangered' on the 2008 IUCN Red List. It qualifies for this status because it has a very small and fragmented range and population, and its range and population are declining due to forest destruction.

The Manumea is of cultural significance to Samoans, used in the past as a food of high status and is now known as the national bird and was the mascot for the South Pacific

Games in 2007 (MNRE 2006a). A comprehensive 10 year recovery plan has been prepared for the conservation of the Manumea (MNRE 2006a) and significant progress is now underway to implement this plan.

5. Blue-crowned Lory (*Vini australis*) Sega vao (cc)

The sega vao is a bright emerald green lory with a conspicuous red throat, ear coverts and abdominal pouch and with purple-blue thighs, crown and lower abdomen (Watling 2001). The only parrot like bird in Samoa, the Sega vao feeds on flowering trees and nests in cavities or in dead standing coconut trees (Elmqvist *et al* 1998:67). This bird is not as common in Samoa as it was formerly and is thought to be impacted by invasive mammals, in particular ship rats.

6. Samoan Triller (*Lalage sharpie*) Miti Vao (NT)

The Samoan Triller is endemic to Samoa, with separate sub-species/races recognized on Savaii and Upolu (Taule'alo 1993:71). The Miti Vao is a little known, quiet and shy species that is mostly recorded singly rather than in pairs or flocks. It is a dull bird, grayish brown in color, with white iris, orange bill and barred flanks (Elmqvist *et al* 1998:79) and is most frequently seen at forest edges and forest clearings in upland areas (Watling 2001).

7. Samoan Broadbill/Flycatcher (*Myiagra albiventris*) Tolai fatu (VU)

The Samoan Broadbill is an uncommon Samoan endemic that usually moves singly rather than in pairs or flocks and prefers forest edges to dense forest. The bird looks like a European flycatcher, but is in fact unrelated (Elmqvist *et al* 1998:70). The male is glossy blue-black with a white chest and rust-coloured throat while the female is and more dull. The breeding habits of the Samoan Broadbill are not known (Elmqvist *et al* 1998:70). The Tolai fatu is classified as 'vulnerable' and has suffered a rapid decline in population numbers following the cyclones of the early 1990s and does not appear to have recovered. It is now assumed to have a small and declining population (Birdlife International 2000:54).

8. Samoan White-eye (*Zosterops samoensis*) Mata-papae (VU)

The Samoan white-eye, a tiny light green bird with a white-eye ring, is endemic to Savaii and may have a range of less than 150 km². It lives in flocks and inhabits montane forest, generally above 1,000m in elevation but occasionally down to 700m (Elmqvist *et al* 1998:97). Recent surveys of upland ecosystems on Savaii indicate that the Samoan White-eye is fairly abundant (Schuster, *et al* 1997:10; Tipama'a & Biechle, 2006) although the 2008 IUCN Redlist shows this bird as vulnerable to extinction because of its small range.

9. Mao (*Gymnomyza samoensis*) Ma'oma'o (EN)

The Ma'oma'o is endemic to the Samoan archipelago; however it has not been sighted in American Samoa since 1977 and is now believed to occur only in Samoa. It is a large, slim honeyeater with a long, down-curved bill and is described as having a remarkable voice. The Ma'oma'o is generally restricted to large areas of mature forest although can be seen in disturbed areas near forest edges. During recent bird surveys (MNRE 2006b) the ma'oma'o was recorded at a wide range of elevations ranging from 284 meters to 803 meters on Upolu and 463m to 1547m in Savaii. The Ma'oma'o is threatened by habitat loss and degradation and also by invasive species such as rats and some hunting (MNRE 2006b).

Since the bird is generally restricted to mature forest and the area of undisturbed mature forest has significantly declined in Samoa, the bird is of significant conservation concern. A comprehensive 10 year recovery plan has been prepared for the conservation of the Ma'oma'o (MNRE 2006b) and significant progress is now underway to implement this plan.

10. Red-headed Parrotfinch (*Erythrura cyaneovirens*) Segaula (cc)

The Segaula is a small green endemic finch with a striking scarlet rump and tail and a crimson head. This is a bird of the forest and is associated with forest clearings. It is primarily a seed eater but also eats insects, nectar and berries. In Samoa this bird is uncommon and was badly affected by the cyclones of the early 1990s. It is threatened by rats, mice and deforestation.

11. Polynesian Starling (*Aplonis tabuensis brevirostris*) Fuia vao (cc)

A subspecies race of Polynesian Starling, endemic to the Samoan Archipelago (Taule'alo 1993:70). This uncommonly occurring forest species has a dark brown head and back, lighter grayish brown chest and belly, dark crown and yellow eye. The Polynesian Starling forages in small flocks, primarily in interior forest areas, for fruits and insects. It nest in tree cavities, sometimes close to ground level (Elmqvist *et al* 1998:71)

12. Island Thrush (*Turdus poliocephalus samoensis*) Tutumalili (cc)

The Tutumalili is restricted to areas of mature upland forest and is quite rare on Upolu. This shy medium sized bird is a ground feeding species that eats snails, worms and insects in loose leaf litter. The Samoan sub-species is entirely black but is slightly lighter on the head and throat with yellowish-red feet (Watling 2001) and appears very similar to the European Black bird (Elmqvist *et al* 1998: 79).

13. Scarlet Robin (*Petroica multicolor pusilla*) Tolaiula (cc)

The Tolaiula is a small robin with a large head and upright poster which is endemic at the sub species level to Samoa. The male has a bright cherry red breast and black upperparts, head and throat. The female is similar but with duller brown upperparts and only a pale pink underparts with a whitish central region (Watling 2001).The bird is most commonly seen at the edge of forests or in forest clearings where it pursues flying insects.

14. Polynesian Storm Petrel (*Nesofregatta fuliginosa*) Ta'i'o (VU)

The Polynesian Storm Petrel has a small population and breeding range. It is thought to have occurred on mixed beach and rocky coastlines in Samoa (Birdlife International 2000:71) although there have not been recent confirmed breeding records or even observations in Samoa (Watling 2001). The bird has sooty black upperparts, sooty brown upper wings with a pale bars across the middle of the inner wing. This bird feeds on small fish, crustaceans and cephalopods and nests throughout the year in loosely-formed colonies.

It is classified as 'vulnerable' because it has a small population and breeding range with many breeding locations disappearing and surviving populations declining due to invasive predators (Birdlife International 2000:71). In Samoa it should be considered data deficient (Watling 2001).

3. IDENTIFICATION OF KNOWLEDGE GAPS

This review of current knowledge on the birds of Samoa has identified a number of taxonomic, ecological and spatial gaps in knowledge. Taxonomic gaps refer to particular species or groups of birds that have not been well studied at all, or not in recent years. Ecological knowledge gaps refer to gaps in our knowledge of the ecology of otherwise well-known species (eg population data, species breeding biology, threats and overall conservation status). Spatial gaps refer to particular areas that are likely to contain significant bird diversity but have not been well surveyed and so should be a priority for further research.

Wherever suitable data allows, an assessment of the immediate survey priority (next five years) has been indicated for taxonomic, thematic and spatial knowledge gaps.

3.1 TAXONOMIC DATA GAPS

The most obvious taxonomic data gaps are for: a) current status of the Puna'e and b) conservation status and population of seabirds in Samoa.

3.1.1 Puna'e (Samoa woodhen)

The current status of the Puna'e is not known but as noted the last confirmed sighting was in 1908. It may be extinct. However large areas of upland survey to the east of Mt Silisili (see figure 4) have not been surveyed and could potentially harbour small populations of the bird.

3.1.2 Seabirds

The current conservation status and population of Samoa's seabirds is not well known and needs survey. In particular the status of the Polynesian storm petrel and Bristle-thighed curlew in Samoa which are both classified by the IUCN as vulnerable is not well known and is in need of further survey. A number of small offshore islands and islets exist in Samoa (eg the Aleipata islands) that might have small breeding populations of petrels or shearwaters for example. Without improved knowledge of populations of seabirds in Samoa it is impossible to define seabird IBAs that meet specific criteria (see annex 1 and 2).

3.2 ECOLOGICAL KNOWLEDGE GAPS

Our understanding of the ecology of the vast majority of bird species in Samoa is very poor (as it is for many other taxonomic groups too). Without a good knowledge of the population, distribution, habitat, threats, breeding and feeding habits of bird species (especially the fauna) it is hard to manage or conserve them adequately.

For all threatened bird species, the following types of information are needed in particular:

- Current distribution and population size (especially of seabirds);
- Habitat requirements (eg forest type, climate, topography etc);
- Feeding habits (eg what they feed on, seasonality of feeding on different foods etc);
- Breeding habits (eg territoriality, frequency of breeding, timing, seasonality of breeding, gestation periods, number of young etc);
- Threats at each life stage (eg threats to eggs, chicks and adults).

The recovery plans recently prepared for Manumea and Ma'oma'o (MNRE 2006a and b) define the specifics of data needed for these two birds at least. Research on the ecology of both birds will commence in 2009 with funds provided by the Critical Ecosystem Partnership Fund (CEPF), through Conservation International, but more research needs to be done on all threatened Samoan birds, not just these two species.

3.3 SPATIAL DATA GAPS

A quick glance at the maps of bird survey work shows that surveys and observations have focused on lowland areas and along or close to the road network. This is perhaps to be expected given that such sites are the most accessible. However, the outcome of this is that there are at least two geographic areas that have not been surveyed for birds (see figure 4).

The following two areas are considered the key areas where further bird survey work is considered to be most needed.

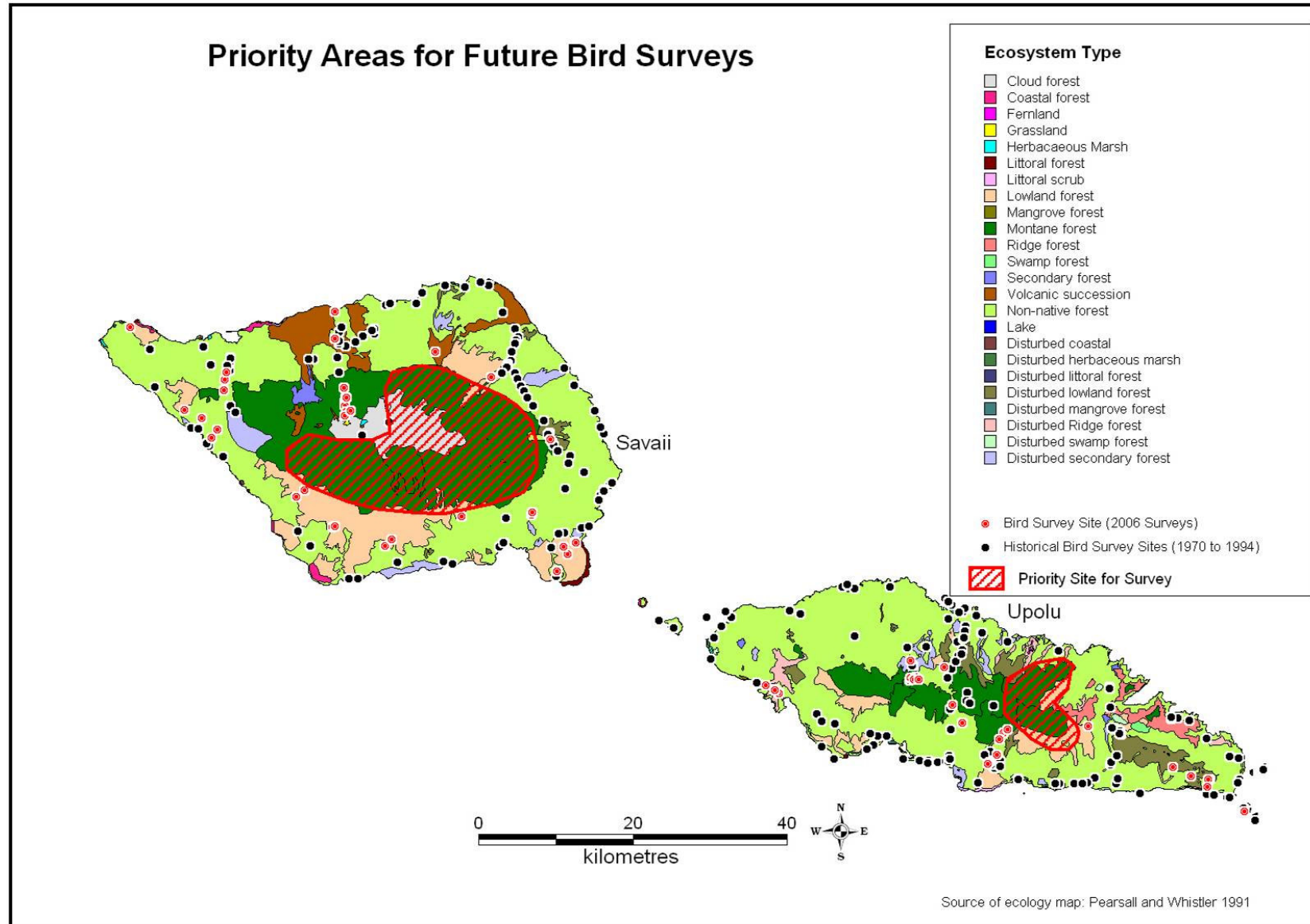
3.3.1 East-central Savaii

The central part of Savaii to the east of Mt Silisili, and the southern slopes of the central mountain plateaux have never been surveyed for birds or other biodiversity. This forest contains the bulk of Samoa's bird fauna including potentially the Samoan woodhen, and should therefore be a priority area for future survey.

3.3.2 East-central Upolu

Similarly the east-central part of Upolu from Mt Fito to the east towards Mauga Sa and north towards Mauga Tele has not been surveyed, except around the fringes. This area of intact forest may contain significant populations of threatened species such as the manumea and maomao and so should be a target for future surveys.

Figure 4. Map of Spatial Data Gaps for Birds



4. DRAFT CANDIDATE IMPORTANT BIRD AREAS

The following criteria were used in selecting the candidate list of Important Bird Areas (IBAs). Note that due to insufficient data on sea/shore birds only land bird IBAs have been identified.

- Sites must include all areas where populations of birds of conservation concern that meet IBA thresholds have been recorded in the past 20 years;
- Sites should include complete forest blocks from the latest Samoa forest cover map (1999);
- Wherever possible sites should follow watershed boundaries to the lower edge of the forest;
- As far as possible the site should include within its boundary existing Conservation Area (CA) or Protected Area boundaries;
- Sites should follow the boundaries of proposed sites for conservation (such as those from the lowland ecological survey, upland ecological survey and Pearsall and Whistler (1991) terrestrial ecosystem mapping project).

Figure 5 is a map of the 11 candidate sites while table 4 below shows the trigger species and IBA qualifying criteria for the proposed sites. Annex 3 provides more details on the candidate sites.

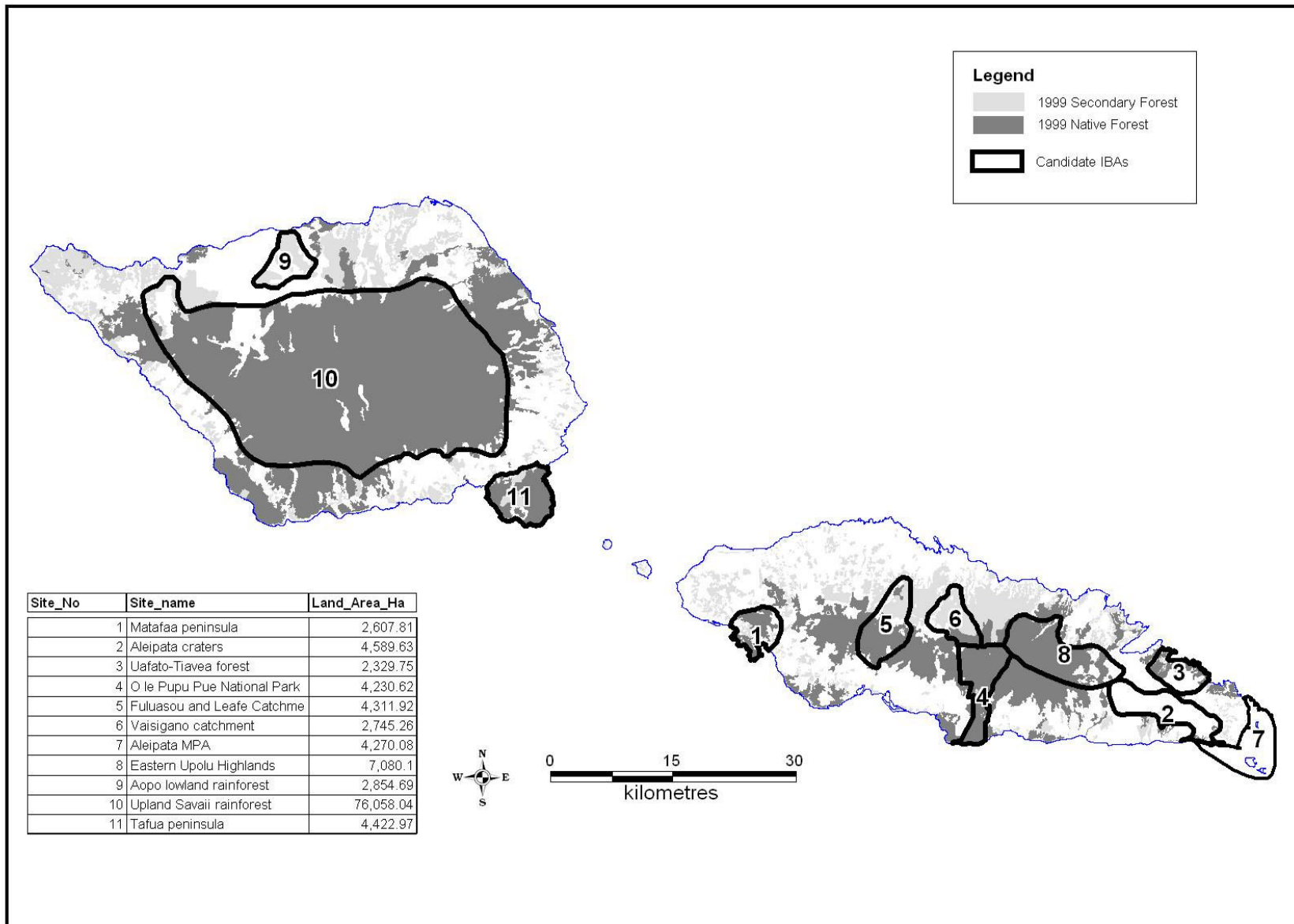
Table 4: Candidate Important Bird Areas in Samoa

Site Number	Site Name	Trigger Species Found in Site	IBA qualifying criteria
Upolu			
1	Matafaa peninsula	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill	A1 and A2
2	Aleipata craters	Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch, Scarlet Robin	A1 and A2
3	Uafato Tiavea forest	Mao, Blue-crowned Lory, Many coloured fruit dove, Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch, Scarlet Robin	A1 and A2
4	O le Pupu-Pue National Park	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Island Thrush	A1 and A2
5	Fuluasou and Leafe Catchments	Mao, Blue-crowned Lory, Many coloured fruit dove, Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch, Scarlet Robin	A1 and A2
6	Vaisigano catchment	Mao, Blue-crowned Lory, Many coloured fruit dove, Samoan Broadbill, Red-headed Parrotfinch, Scarlet Robin, Shy Ground-dove	A1 and A2
7	Aleipata MPA	Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Samoan Broadbill, Tooth-billed pigeon, Shy Ground-dove	A1 and A2, possible A4ii
8	Eastern Upolu Highlands	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Island Thrush	A1 and A2
Savaii			
9	Aopo lowland	Blue-crowned Lory, Many coloured fruit dove,	A1 and A2

Site Number	Site Name	Trigger Species Found in Site	IBA qualifying criteria
	rainforest	Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch	
10	Upland Savaii rainforest	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Island Thrush, Samoan White-eye, Samoan Moorhen (possibly)	A1 and A2; possible A4ii
11	Tafua peninsula	Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Tooth-billed pigeon, Shy Ground-dove	A1 and A2

Further work in 2009 will refine and finalise this list of IBAs, develop boundaries for these IBAs and begin the process of community engagement with relevant communities.

Figure 5. Map of Candidate Important Bird Areas in Samoa



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ANNEX 1. DRAFT LIST OF TRIGGER SPECIES

Category A1

Globally threatened species – CR, EN; regular presence may be sufficient to define an IBA

Samoan Moorhen (*Gallinula pacifica*) CR

Tooth-billed Pigeon (*Didunculus strigirostris*) EN

Mao (*Gymnomyza samoensis*) EN

Globally threatened species – Vu, NT; significant population (>10 pairs or 30 individuals) likely to be sufficient to define an IBA. Popn estimates may be inferred from area of habitat etc.

Bristle-thighed Curlew (*Numenius tahitensis*) VU

Shy Ground-dove (*Gallicolumba stairi*) VU

Samoan Flycatcher (*Myiagra albiventris*) VU

Samoan White-eye (*Zosterops samoensis*) VU

Samoan Triller (*Lalage sharpie*) NT

Category A2

Range restricted species – sites chosen such that they form a network across the country that contain all species that make up the Samoan EBA. Larger IBAs with more species often chosen first. Note overlap with category A1 species.

Samoan Moorhen (*Gallinula pacifica*)

Shy Ground-dove (*Gallicolumba stairi*)

Many-coloured Fruit-dove (*Ptilinopus perousii*)

Tooth-billed Pigeon (*Didunculus strigirostris*)

Purple-capped Fruit-dove (*Ptilinopus porphyraceus*)

Blue-crowned Lorikeet (*Vini australis*)

Flat-billed Kingfisher (*Todiramphus recurvirostris*)

Wattled Honeyeater (*Foulehaio carunculatus*)

Mao (*Gymnomyza samoensis*)

Cardinal Myzomela (*Myzomela cardinalis*)

Polynesian Triller (*Lalage maculosa*)

Samoan Triller (*Lalage sharpie*)

Samoan Flycatcher (*Myiagra albiventris*)

Samoan Whistler (*Pachycephala flavifrons*)

Samoan White-eye (*Zosterops samoensis*)

Samoan Fantail (*Rhipidura nebulosa*)

Fiji Shrikebill (*Clytorhynchus vitiensis*)

Samoan Starling (*Aplonis atrifusca*)

Polynesian Starling (*Aplonis tabuensis*)

Red-headed Parrotfinch (*Erythrura cyaneovirens*)

ANNEX 2. THRESHOLDS FOR COLONIAL WATERBIRD POPULATIONS

Table of 1% thresholds for Pacific waterbirds (Category A4i)

English and Scientific name	Bioregion (distribution of regional population)	1% regional population (individuals)	1% global population (individuals)
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	Pacific (Aus and Melanesia)	10,000	10,000
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	Pacific (Aus, NZ, NG, NC)	10,000	10,000
Great Cormorant <i>P. carbo</i>	Pacific (Aus, NG, NZ, Rennell, NC)	10,000	20,000
Little Pied Cormorant <i>P. melanoleucos</i>	Pacific (Aus, NG, Melanesia, NZ)	10,000	10,000
Great (White) Egret <i>Ardea (Casmerodius) alba</i>	Pacific (Aus, NG, NZ)	1,000	20,000
Yellow Bittern <i>Ixobrychus sinensis</i>	Pacific (Micronesia)	10,000	10,000
Grey Teal <i>Anas gracilis</i>	Global (Aus, NZ and NC)	20,000	20,000
Pacific Black Duck <i>Anas superciliosa</i>	Global (Indonesia, Aus, NG, Pacific Islands, NZ)	11,000	11,000
Hardhead <i>Aythya australis</i>	Global (Aus, Vanuatu, NC)	10,000	10,000
Pacific Golden Plover <i>Pluvialis fulva</i>	East Asian flyway and Alaska migrating to central Pacific	1,400	2,000
Double-banded Plover <i>Charadrius b. bicinctus</i>	NZ migrating north	500	500
Bar-tailed Godwit <i>Limosa lapponica baueri</i>	East Asian flyway and Alaska migrating to central Pacific	3,300	11,000
Whimbrel <i>Numenius phaeopus variegatus</i>	East Asian Flyway	550	20,000
Bristle-thighed Curlew <i>Numenius tahitiensis</i>	Global (Alaska migrating to central Pacific)	100	100
Grey-tailed Tattler <i>Tringa (Heteroscelus) brevipes</i>	Global (East Asian flyway)	400	400
Wandering Tattler <i>T. (H.) incana</i>	Global (Alaska migrating to American W coast and Pacific)	250	250
Tuamotu Sandpiper <i>Prosobonia cancellata</i>	Global (Tuamotu archipelago)	6	6
Ruddy Turnstone <i>Arenaria interpres</i>	East Asian Flyway and Alaska migrating to central Pacific	1,000	7,000
Sanderling <i>Calidris alba</i>	East Asian Flyway	220	7,000
Silver Gull <i>Larus novaehollandiae</i>	Global (Aus, NC)	20,000	20,000
Crested Tern <i>Sterna bergii cristata</i>	Pacific (Aus; small numbers in Pacific Islands)	5,000 pairs	6,000 pairs
Roseate Tern <i>S. dougallii bangsi</i> and <i>S. d. gracilis</i>	Pacific (Aus, Melanesia)	130 pairs	500 pairs
Black-naped Tern <i>S. sumatrana</i>	Pacific (Aus, Pacific Islands)	1000 pairs	1000 pairs
Common Tern <i>S. hirundo longipennis</i>	East Asian Flyway	10,000	20,000

English and Scientific name	Bioregion (distribution of regional population)	1% regional population (individuals)	1% global population (individuals)
Little Tern <i>S. albigrons placens</i> and <i>S. a. sinensis</i>	Pacific (Aus, NG, Solomons)	40 pairs	1000 pairs
Fairy Tern <i>S. nereis</i>	Global (Aus, NC, NZ)	30 pairs	30 pairs
Grey-backed Tern <i>S. lunata</i>	Global (Hawai'i, Micronesia, Tuamotus)	1000 pairs	1000 pairs
Bridled Tern <i>S. a. anaethetus</i> and <i>S. a. novaehollandiae</i>	Pacific	1000 pairs	7000 pairs
Sooty Tern <i>S. fuscata</i>	Pacific	20,000	20,000
Brown (Common) Noddy <i>Anous stolidus pileatus</i>	Pacific	5,000 pairs	12,000 pairs
Black Noddy <i>A. minutus</i>	Pacific	4,000 pairs	6,000 pairs
Blue Noddy <i>Procelsterna cerulea</i>	Global (tropical Pacific)	200 pairs	200 pairs
Grey Noddy <i>Procelsterna albivitta</i>	Global (sub-tropical Pacific)	250 pairs	250 pairs
White Tern <i>Gygis alba</i> (including Little White Tern <i>G. microrhyncha</i>)	Pacific	1000 pairs	10,000 pairs

Table of 1% thresholds for Pacific seabirds (Category A4ii)

In most cases follow Brooke (2004a) as the most authoritative guide, updating previous BirdLife estimates. Where BirdLife (2004b) has estimated numbers for threatened species, these figures are used as they are likely to be more accurate and more precautionary than figures in Brooke (2004a).

English and Scientific name	Global population estimate	1% threshold
Wedge-tailed Shearwater <i>P. pacificus</i>	5,200,000 individuals	10,000 pairs
Christmas Shearwater <i>P. nativitatis</i>	50,000 pairs	500 pairs
Little Shearwater <i>P. assimilis</i>	300,000 pairs	3,000 pairs
Audubon's Shearwater <i>P. lherminieri</i>	150,000 pairs	1,500 pairs
Heinroth's Shearwater <i>P. heinrothi</i>	500 individuals	1 pair
Bulwer's Petrel <i>Bulweria bulwerii</i>	750,000 individuals	1,500 pairs
Tahiti Petrel <i>Pseudobulweria rostrata</i>	10,000 pairs	100 pairs
Beck's Petrel <i>P. becki</i>	25 individuals	1 pair
Fiji Petrel <i>P. macgillivrayi</i>	25 individuals	1 pair
Black-winged Petrel <i>Pterodroma nigripennis</i>	9,000,000 individuals	20,000 pairs
Collared Petrel <i>P. brevipes</i>	5,000 individuals	10 pairs
Gould's Petrel <i>P. leucoptera</i>	5,000 pairs	50 pairs
Phoenix Petrel <i>P. alba</i>	5,000 individuals	10 pairs

English and Scientific name	Global population estimate	1% threshold
Henderson Petrel <i>P. atrata</i>	16,000 pairs	160 pairs
Kermadec Petrel <i>P. neglecta</i>	55,000 pairs	550 pairs
Herald Petrel <i>P. heraldica</i>	50,000 pairs	500 pairs
Murphy's Petrel <i>P. ultima</i>	265,000 pairs	2,650 pairs
White-bellied Storm-petrel <i>Fregatta grallaria</i>	100,000 pairs	1000 pairs
Polynesian Storm-petrel <i>Nesofregatta fuliginosa</i>	1700 pairs	17 pairs
Red-tailed Tropicbird <i>Phaethon rubricauda</i>	32,000 individuals	80 pairs
White-tailed Tropicbird <i>P. lepturus</i>	50,000 individuals	125 pairs
Masked Booby <i>Sula dactylatra</i>	200,000 individuals	500 pairs
Red-footed Booby <i>S. sula</i>	600,000 individuals	1,500 pairs
Brown Booby <i>S. leucogaster</i>	200,000 individuals	500 pairs
Great Frigatebird <i>Fregata minor</i>	340,000 individuals	850 pairs
Lesser Frigatebird <i>F. ariel</i>	200,000 individuals	500 pairs

ANNEX 3. KEY INFORMATION ON CANDIDATE IBAS

Sources: MNRE 2006a and 2006b

Site	Tafua Peninsula	Upland Savaii Rainforest	Aopo Lowland Forest	O Le Pupu Pue National Park	Fuluasou & Leafa Catchments	Uafato-Tiavea Forest	Aleipata Caters	Matafaa - Peninsula	Vaisigano catchment	Aleipata MPA	Eastern Upolu Highlands
Location	South-east Savaii	Central Savaii	North coast Savaii	South coast to central Upolu	Central Upolu	North coast Upolu	Central eastern Upolu	South-west Upolu	North Central Upolu	Eastern Upolu	East- central Upolu
Villages that have land tenure over site	Faala, Tafua, Salelologa	Aopo, Letui, Manase, Patamea, Vaipouli, Puapua, Vaiaata, Vaiola, Maota, Palauli, Sili, Taga, Salailua, Fogasavaii, Fagafau, Vaisala, Asau	Aopo and Letui	Saaga and Saleilua	Lotofaga, Afiamalu, Tapatapao, Tanumapua	Tiavea and Uafato	Tiavea uta, Lotofaga, Vavau, Aufaga, Lepa, Lalomanu	Matafaa, Faleaseela, Falelatai	Magiagi, Vailima, Avele, Letava, Vaoala, Vailima, Tiapapata	Satitua, Malaela, Lotopue, Mutiatiele, Saleaamua, Utufaafala, Samusu, Amaile, Lalomanu, Vailoa, Ulutogia	Manunu, sauniatu, Lufilufi, Saoluafata, Fusi, Salelesi, Eva, Solosolo
Approx village population (2001 census)	Approx 4000? (3300 Salelologa and 700 for Tafua and Faala)	38,000	676	1,089	1509	936	4,643	1,837	5,156	Approx 4,000	Approx 4,000
Area of Site (Ha)	4,406	76,000	2,855	4230	4312	2330	4590	2608	2745	5,084 (total, of which 156 ha is land)	7,080
Forest Area (Ha)	3716ha	69042ha	1624ha	4005ha (to be extended)	3658ha (L.Lanoto'o N.P. 200ha)	1077ha	239ha	1696ha	2357	Approx 150ha	Approx 6,500ha
Land Ownership	Customary	State & Customary	Customary	State & Customary	State & Customary (small area of freehold)	Customary	Customary	Customary	State & Customary	Customary	Customary (small area of freehold)
Altitudinal Range (m)	0-60m	160-1800m	0-220m	0-1158m	160-750	0-740m	0-545m	0-450m	100-1120	0 -210	340-1100
Community Support	Yes – though only some of the villages were followed up	Yes – though only some of the villages were followed up	To be determined	Largely not applicable	To be determined	Yes – Tiavea followed-up	To be determined	Yes – Matafaa followed-up on 28/7/06	To be determined	Yes – site is a well established MPA	To be determined
Forest Condition and Quality	Good quality, dominated by Tava	Generally good quality. This is the largest contiguous patch of forest in	Medium quality, many secondary species present	Low quality, severely damaged by cyclone winds	Medium (low in exposed places, high in sheltered valleys and	Generally good quality	Generally low quality, severely damaged by cyclones	Medium quality, damaged by cyclone winds	Low quality, much secondary forest	Generally good quality on the offshore islands-	Medium (low in exposed places, high in sheltered valleys and

Site	Tafua Peninsula	Upland Savaii Rainforest	Aopo Lowland Forest	O Le Pupu Pue National Park	Fuluasou & Leafe Catchments	Uafato-Tiavea Forest	Aleipata Caters	Matafaa - Peninsula	Vaisigano catchment	Aleipata MPA	Eastern Upolu Highlands
		Samoa			gullies)		except inside volcanic craters			especially Nuutele (the largest island)	gullies)
Native Ecosystems Present	Lowland Rainforest	Lowland, montane and cloud forest	Secondary forest and volcanic scrub	Littoral scrub, lowland and montane rainforest	Secondary forest and montane rainforest	Ridge rainforest	Disturbed lowland forest and scrub	Disturbed ridge rainforest and secondary forest	Disturbed montane and lowland rainforest, secondary forest	Coastal Rainforest	Montane rainforest, Lowland rainforest and upland swamp forest
Other Conservation Efforts	History of conservation as Rainforest Preserve (SNF & OLSS) – 1990. Some recent discussion on a National Park – not happening.	Part protected as Aopo Cloud Forest Preserve. 1-year conservation project (USAID for Aopo, Letui & Sasina. GEF Medium-sized grant project close to finalisation	1-year conservation project (USAID for Aopo, Letui & Sasina.	National Park since 1978. Various facility development projects.	L. Lanotoo National Park formed in 2003 & RAMSAR site	SPBCP Conservation Area project at Uafato since 1993 (OLSSI) but has since lapsed.	None?	Mangrove conservation project – GEF Small Grant.	Focus of the FAO supported Vaisigano Watershed Management Project (early 1990s)	Site was established as an MPA in 1999	None?
Density of Invasive Species present	Low	Low	High	High (espec <i>Merremia</i> in south)	High (espec tamaligi spp- <i>Albizzia</i>)	Low	High	High	High (espec <i>tamaligi</i> spp- <i>Albizzia</i>)	Low	Medium
Other Threats	Township development	Logging	Logging?	Cattle incursion	Agriculture	Logging of ifilele trees (<i>Intsia bijuga</i>)	Agriculture	Agriculture	Agriculture	Tourism and infrastructure development (wharf)	Agriculture
Trigger Bird species found in site	Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Tooth-billed pigeon, Shy Ground-dove	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Island Thrush, Samoan White-eye, Samoan Moorhen	Blue-crowned Lory, Many coloured fruit dove, Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Island Thrush	Mao, Blue-crowned Lory, Many coloured fruit dove, Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch, Scarlet Robin	Mao, Blue-crowned Lory, Many coloured fruit dove, Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch, Scarlet Robin	Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Red-headed Parrotfinch, Scarlet Robin	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill	Mao, Blue-crowned Lory, Many coloured fruit dove, Samoan Broadbill, Red-headed Parrotfinch, Shy Ground-dove	Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Samoan Broadbill, Tooth-billed pigeon, Shy Ground-dove	Mao, Blue-crowned Lory, Many coloured fruit dove, Polynesian Starling, Tooth-billed pigeon, Samoan Broadbill, Samoan Triller, Red-headed Parrotfinch, Scarlet Robin, Island Thrush

Site	Tafua Peninsula	Upland Savaii Rainforest	Aopo Lowland Forest	O Le Pupu Pue National Park	Fuluasou & Leafe Catchments	Uafato-Tiavea Forest	Aleipata Caters	Matafaa - Peninsula	Vaisigano catchment	Aleipata MPA	Eastern Upolu Highlands
		(possibly)									
Other Redlisted Threatened Species	Niu vao, pea vao,	Niu vao, pea vao, <i>Drymophloeus samoensis</i>	To be determined	Niu vao, pea vao, sisi	Niu vao, pea vao,	Niu vao, pea vao,	Niu vao, pea vao,	Niu vao, pea vao,	Niu vao, pea vao	Niu vao, pea vao	Niu vao, pea vao
Accessibility	High. Accessible to roads, the Salelologa wharf and to the Maota airport	Low. Accessible by road from Aopo and by walking track from most villages	Low. Accessible by walking track from Aopo and Letui	Medium. Not accessible except by walking track	Medium. Accessible by road from Afiamalu and Lotofaga and walking track from Tapatapao	Low. Not accessible except by walking track from both villages	Low. Accessible by walking track	Medium. Accessible by road from Avele and Magiagi	Medium. - Accessible by road from Avele and Magiagi	Low. Not accessible except by boat	Mostly low. Not accessible except by walking track from coastal villages and le mafa pass
Other Comments	Area next to the existing town of Salelologa is being developed	Subject of a GEF funded FAO/MNRE project to conserve the upland forests		Subject to a JICA funded national park management project with MNRE		The conservation of this site has lapsed	This area is contiguous with the Eastern Upolu Highlands site		This area is contiguous with the O Le Pupu Pue National Park	Rats will be eradication from Nuutele in 2009 as part of a CEPF funded project	This area is contiguous with the O Le Pupu Pue National Park and Aleipata craters IBA and could be merged with these sites