

# CONVENTION ON BIOLOGICAL DIVERSITY



## SAMOA'S 4TH NATIONAL REPORT 2009



## Executive Summary

This fourth (4<sup>th</sup>) national report to the CBD documents the achievements, issues, lessons and future needs for Samoa in biological diversity conservation, consistent with the CBD reporting guidelines and building on previous national reports.

Samoa continues to make solid progress in key areas, in the implementation of its obligations as a party to the Convention on Biological Diversity.

### A. CBD Implementation

#### A.1 Conservation of biological diversity –

##### *Forests ecosystems –*

Samoa's protected area network grew rapidly from 1999 to 2006 but has eased off in the last few years. Protected areas of national parks, reserves and community based conservation areas now protect an estimated 5% of the total land area amounting to 13,751 hectares, but this is still considerably short of the 10-15% target set by the NBSAP.

Latest revised data show Samoa has 60% of its forest cover remaining. There are no remaining primary forests primarily due to the impact of cyclones, and the dominant forest categories are 'medium' and 'open' forests which are defined as having > 65% and >45% forest cover respectively. Future trends point to continuing degradation and fragmentation due to agricultural clearing, settlements and infrastructure development and the possible impact of cyclones. The impact of commercial logging is significantly diminished.

The twelve priority ecological sites identified by the NBSAP are facing increasing pressures in large part due to difficulties owing to their location on customary lands. Three sites have been are under various degrees of conservation management - Uafato-Tiavea Coastal Forest, Aleipata Islands, Saanapu-Sataoa Mangrove Forests , with Aleipata Islands currently undergoing intensive rat eradication. The remaining 9 sites are at various levels of vulnerability with at least three seriously degraded as a result of a combination of clearing for agriculture, logging and settlement.

##### *Marine ecosystems –*

Including Samoa's EEZ which was declared a sanctuary for whales, dolphins, turtles and sharks in 2002, Samoa's marine protected area network now stands at 12,011,437 hectares. This network includes the Palolo Marine reserve, the Aleipata MPA and the Safata MPA. A very significant part of Samoa's marine conservation area network is the network of village based fisheries and marine reserves (no area estimate is available). An estimated 71 functional reserves have been reported. This number is likely to have increased as more reserves are being set up with GEF-SGP funding.

Overall, Samoa's coral reef ecosystems have recovered well since the major setbacks of cyclones in 1990, 1991 and 2004. Most recent assessment (2008) shows live coral coverage of 43%, an improvement over 2004 (10.3%) and 2002 (39%). Overfishing continues to be a threat in many areas as are threats including land based pollution and unsustainable fishing practices. The continuing trend of increasing village based conservation initiatives is an important contributor to the improved status.

### *Freshwater ecosystems*

This area represents a significant information gap that needs to be addressed in the near future. Recent preliminary studies (2009) are making a contribution but there is not enough information for an informed assessment. Several introduced exotic species for aquaculture are also of interest and not enough is known about their level of abundance and distribution.

### *Agrobiodiversity –*

Samoa's agrobiodiversity, particularly for economically important crops and fruit trees, continues to diversify with the addition of new species and varieties. Taro, a staple food and an important export crop, have gone through a comprehensive improvement programme since the impact of the Taro Leaf Blight (TLB) in 1993. Genetic improvement programmes to enhance disease resistance, and improve yield and quality are in progress for a wide number of species.

### *Threatened Species –*

IUCN's redlist of endangered species monitors 15 Samoan endemic and native species. Of the eight land bird species listed, one is critically endangered and possibly extinct (*Gallinula pacifica*). Two others are endangered and the remaining five are vulnerable. Seven other endemic species and sub-species identified by MNRE are not of conservation concern.

One mammal (sheath-tailed bat) is considered critically endangered, with only 5 individuals sighted following an extensive search after recent cyclones. This status needs to be confirmed. The hawksbill turtle is considered vulnerable and recent surveys show low level of nesting activities on Aleipata Islands. Two giant clams species are reported extinct, but there is little known of the status of most marine species. A number of threatened species (clams, trochus, snails) have been replenished with imported stocks distributed to a large number of village based fisheries reserves.

## **A.2 Sustainable Use of Biodiversity**

### *Forests*

Ineffective allocation and management of native forests over the last forty years contributed to the near-depletion of all merchantable forests in the country. The diminishing impact predicted for commercial logging is due to this fact. Some economically and culturally important species such as *Intsia bijuga* are also diminishing with the current replanting activities not likely to be enough to sustain it in the long term.

### *Marine resources*

The replenishment of nearshore fisheries resources is the objective of village based fisheries reserves. Anecdotal evidence suggests increasing stocks and diversity of species in closed areas, and in some cases spilling into open zones. There is a heightened level of appreciation of sustainable resource management that is underpinning and driving to establish more community based resource management initiatives.

Samoa's pelagic species took a dive in numbers with a boom in double-hulled alia longlining in the early to late 1990s. Low levels of catch continues but with more effective control on the number of licensed fishing vessels.

### *Birds*

Flying foxes continue to be hunted but at a lower level with the ban on exports largely effective. Pigeons are hunted seasonally and it remains vulnerable to unsustainable levels of hunting.

### **A.3 Equitable Sharing of benefits Arising from the Use of Genetic Resources**

Samoa has already established the legal and policy framework for regulating bio-prospecting and for ensuring the equitable distribution of benefits arising from the use of genetic resources. An agreement in 2001 between the Government of Samoa and AIDS Research Alliance, a US based company, now provides a useful precedent but there has not been any new developments since.

### **B. Status of NBSAP Implementation**

Based on information available to this report, 73% of NBSAP actions directly addressing the various Articles of the Convention on Biological Diversity have been implemented or are in the process of implementation. The other 27% remains to be implemented. Many of the actions in the 73% are open-ended and therefore continue to be relevant and in need of on-going implementation.

There are 8 theme areas of the NBSAP and good progress have been made in the implementation of 6 theme areas. There is limited progress in the theme area on Access and Benefit Sharing, and in Finances.

The overall effectiveness of the NBSAP can only be assessed qualitatively in the absence of NBSAP monitoring in the past. There is good evidence of effectiveness based on the number of conservation actions implemented since the NBSAP was launched, progress made in protected areas and species conservation, studies and surveys that have been completed, and the high profile now enjoyed by ecological sites and species which hitherto to the NBSAP were not widely known. NBSAP has also been catalytic in progress made in the formulation of several biodiversity related policies.

The NBSAP however is now due for a review and for updating to, take on board new information from completed and soon-to-be completed studies, strengthen indicators and targets for monitoring, to address existing gaps and to incorporate lessons learned.

### **C. Mainstreaming Biodiversity Conservation**

The omission of environmental sustainability from previous national development strategies has been corrected with environmental sustainability included as one of the seven goals of Samoa's Sustainable Development Strategy (SDS) 2008-2012. This is a significant step forward, which eliminated a policy constraint several donors expressed concern over.

At the sector level, mainstreaming of biodiversity considerations is more advanced at the level of legislation and policies in forestry, water resources, fisheries and urban planning. Tourism and education highlights the importance of biodiversity and environmental sustainability in their master plans. For instance the Samoa Tourism Development Plan 2009-2013 recognizes the direct links between protecting biodiversity and tourism, and advocates for the protection of key sites against unsustainable resource use including forest clearing, coastal pollution and waste management. The Ministry of Education promotes sustainable practices in the use of the biophysical environment, and is taking active steps to integrate it into school curriculum.

The agriculture's sector strategy is being formulated but sub-sector strategies in fruits and vegetables and livestock show a strong emphasis on genetic improvement and diversification, and sustainability in land management practices. There are however key CBD related considerations that are not reflected, such as LMOs and alien invasive species.

Cross sectoral integration is well advanced in areas including environmental impact assessments, waste management, land management and climate change adaptation. There are also interagency and multi-stakeholder mechanisms such as the Cabinet Development Committee, and various ad hoc committees on specific projects that promote biodiversity related dialogue, and discuss biodiversity conservation related issues within the broader context of national development.

## **Acronyms**

ADB - Asian Development Bank  
AusAID – Australia Agency for International Development  
CA – Conservation Areas  
CIMS - Coastal Infrastructure Management Strategy  
CIMP - Coastal Infrastructure Management Plan  
DEC - Division of Environment and Conservation, MNRE  
EIA - Environmental Impact Assessment  
EPC - Electric Power Corporation  
EEZ - Exclusive Economic Zone  
FAO - Food and Agriculture Organization of the United Nations  
GDP - Gross Domestic Product  
GoS - Government of Samoa  
GEF – Global Environment Facility  
GEF-SGP – Global Environment Facility – Small Grants Program  
IUCN – World Conservation Union  
MAF - Ministry of Agriculture and Fisheries  
MFAT - Ministry of Foreign Affairs and Trade  
MNRE - Ministry of Natural Resources Environment and Meteorology  
MOF - Ministry of Finance  
MOH - Ministry of Health  
MPA – Marine Protected Areas  
MWTI - Ministry of Works Transport and Infrastructure  
NAPA – National Adaptation Plan of Action  
NEMS - National Environment and Development Management Strategies  
NBSAP – National Biodiversity Strategy and Action Plan  
NDMP - National Disaster Management Plan  
NGO - Non-governmental organisation  
NZAID – New Zealand Agency for International Development  
PUMA - Planning and Urban Management Agency  
SDS - Strategy for the Development of Samoa  
SIDS - Small Island Developing State  
SOE - State of the Environment Report  
SPC - Secretariat for the Pacific Community  
SPREP - South Pacific Regional Environmental Programme, Apia, Western Samoa  
SWA - Samoa Water Authority  
TEC - Target Environmental Component  
TLB – Taro Leaf Blight

UNCED - United Nations Conference on Environment and Development  
UNESCO - United Nations Educational, Scientific, and Cultural Organization  
UNDP - United Nations Development Programme  
USP - University of the South Pacific  
SLC - Samoa Land Corporation  
STEC - Western Samoa Trust Estate Corporation  
WRD – Water Resources Division, MNRE

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# CHAPTER I. OVERVIEW OF BIODIVERSITY STATUS, TRENDS & THREATS

## 1. Background

Samoa ratified the Convention on Biological Diversity (CBD) in February 1994, signaling its commitment to the principle of sustainable development and its profound appreciation of the intricate interconnection and interdependence in the well being of its people and that of its biophysical environment. These sentiments are reflected in its development policies and plans wherein environmental sustainability is an essential part of its vision for future economic prosperity and social well being.

This collaboration on a global level is an important milestone in the conservation of Samoa's biodiversity adding to a series of Pacific firsts, including the first terrestrial nature reserve established in 1958, and the first Pacific Islands national park (O Le Pupu Pue NP) established in 1978.

Samoa's commitment to nature conservation is also a reflection of efforts to rise above the many daunting constraints confronting its socio-economic environment. Its land area of 3,030 km<sup>2</sup> is small, its EEZ the smallest in the region (120,000 km<sup>2</sup>) and its natural resource base limited. Combined with its geographic remoteness from major trading partners, diseconomies of scale is a near insurmountable obstacle to its aspirations for economic development and prospect for prosperity.

Geographic isolation over millions of years of evolution from continental land masses played a significant role in its biodiversity make-up, which is marked by high species diversity and endemism. This biodiversity forms an integral and inseparable part of Samoa's ecological foundation.



## 2. Overview of Samoa's Environment and Challenges

### 2.1 Summary Description of Samoa's Biodiversity

The available information on Samoa's biodiversity is incomplete with significant gaps in several areas. A lot of the information is dated and needs to be updated with new studies and field assessments. Similarly recent surveys have identified new species, at the same time, some critically endangered birds and mammal species are feared extinct.

In such a dynamic state, the available data points to biodiversity characterized by high species diversity and endemism. This is the result of thousands of years in geographical isolation which have allowed the evolution of new species and sub species, often aided by the absence of fierce competitors and predators. Endemism evolved under these conditions are at the same time extremely vulnerable to drastic environmental changes and alien invasive species, so the risk of species loss and extinction is significant. The extent of Samoa's biodiversity is summarized below.

#### 2.1.1 Terrestrial Flora

Samoa's flora comprises of 500 species of native flowering plants and about 220 species of ferns in 96 families and 298 genera, making it one of the most diverse floras in Polynesia (Whistler, 1992). Twenty five (25%) percent of plant species are endemic and 32% are endemic to the Samoan archipelago. There is one endemic genus<sup>1</sup> with two species. Whistler (ibid.) listed 136 of these species as threatened or endangered.

A further 500 or so species of plants have been introduced since the arrival of humans 3,000 years ago, most of which are beneficial but others have since become highly invasive.

#### 2.1.2 Terrestrial Fauna -

Samoa's faunal diversity is summarized in Table 1 below. There are 13 species of terrestrial mammals including 3 natives – two flying foxes (*Pteropus s samoensis* and *P. tonganus*) and a small insectivorous bat, the Sheath-tailed bat *Emballonura semicaudata*). Land birds are represented by 44 species including 8 endemic species (GoS, 2001)<sup>2</sup> and 5 sub-species (MNRE, 2008)<sup>3</sup>.

There are 21 seabirds nine of which breed in Samoa (20 in American Samoa). Several species of wading birds visit Samoa on migration and several new species have visited the islands in recent years. The fifteen reptiles consist of 14 species of lizards and one snake (Pacific Boa *Candoia bibroni*). The lizards are well represented and only one, the Samoan skink (*Emoia samoensis*) is endemic. Insects are represented by 59 species of which 12 are endemic. Another report placed insect species diversity at 79 species<sup>4</sup>. Of land snails, a recent study reported 64 species (Atherton, 2009)<sup>5</sup>. Butterflies are represented by 28 species and there are approximately 170 species of moths (Edwards, 2009)<sup>6</sup>.

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1 *Sarcropygme* (Rubiaceae)

2 Government of Samoa. 2001. *National Biodiversity Strategy and Action Plan*. MNRE.

3 MNRE (2008). "Beautiful Birds of Samoa". (Poster).

4 Kami & Miller, 1998; cited by Government of Samoa (NBSAP) 2001.

5 Atherton, 2009. "KBA Gap Analysis in Samoa. Summary of Progress." MNRE.

6 Edwards, Eric. 2009. *Butterfly Investigations of the O le Pupu Pue National Park and Mt Vaea Protected Area: Building Samoa's management capacity, creating public awareness and conservation opportunity*. Department of Conservation. 2008. 40 pp.

### 2.1.3 Freshwater biodiversity

Until Jenkins et al<sup>7</sup> (2008), Samoa's freshwater diversity has never before been systematically studied. Of freshwater fauna, Jenkins et al (ibid) reported observing 30 species of fish and 17 species of macrocrustaceans. Three of the fish species observed and 8 species of crustaceans are new records for Samoa. Up to 6 of the fish species observed are endemic, and one endemic crustacean but these remain to be confirmed. Jenkins et al (ibid) observed that his results now bring to approximately 86 species of fresh and estuarine species of fish found in Samoa. Of crustaceans, an aggregated total of 22 crustaceans is now considered established here.

Of freshwater snails, Starmuller (1993) recorded 14 limnic nerite species from Savaii, Upolu and Tutuila. A more recent study (Kano, 2006)<sup>8</sup> suggests the more accurate diversity of snails is 16 species in two genera – 12 species of Neritidae and 4 of Neritiliidae.

Species introduced for research and trial purposes included one freshwater prawn (*Macrobrachium rosenbergii*) and two Tilapia species (*Oreochromis mossambicus* and *O. Niloticus*) (FAO, 2008), a goldfish species (*Carassius auratus auratus*), mosquito fish (*Gambusia affinis*) and 1 shortfin molly (*Poecilia reticulata*)<sup>9</sup>. (SPC FishBase)

Freshwater flora continues to remain unstudied.

### 2.1.4 Marine biodiversity

The marine biodiversity is better understood. Skelton and South (1999) listed 198 taxa of algae with a known species count of 287 (Shelton, 2000). Corals are represented by 14 families with at least 45 species. The family Acroporiidae is most represented at the species level with 12 species including *Acropora samoense*. Marine mammals consist of five species - Humpback whale – *Megaptera novaeangliae*, Sperm whale (*Pyseter macrocephalus*), Minke whale (*Balaenoptera sp*), Dwarf sperm whale (*Kogia sima*) and an unidentified beaked whale. The Humpback Whale (*M.novaengliae*) is believed to breed in Samoan waters. Six dolphin species are reported, namely the short-finned pilot whale (*Globicephala macrorhynchus*), Melon-headed whale (*Peponocephalus electra*), False killer whale (*Pseudorca crassidens*), Bottlenose dolphin (*Tursiops truncates*), Rough-toothed dolphin (*Steno bredanensis*) and Spinner dolphin (*Stenella longirostris*).

Reptiles are represented by three turtle species, the Green turtle (*Chelonia mydas*), the Hawksbill turtle (*Eretmochelys imbricate*) and the leatherback turtle (*Dermochelys coriacea*). All inhabit the seas off Samoa; the hawksbill turtle breeds in small numbers on the Aleipata Islands and a few beaches on Savaii Island.

Samoa's fish fauna has been claimed to be amongst the richest in the world (Jordan and Seal, 1906). The most comprehensive survey of the Samoa archipelago recorded 991 species of which 890 inhabit shallow water or reefs, 56 are found in deeper water and 45 are pelagic (Wass, 1984). A 1996 survey of reef slopes alone recorded 266 species. Other estimates put the total number of species at 961.

Invertebrates diversity are estimated to consist of 95 species, several are of high economic and cultural value (e.g. the palolo worm (*Eunice viridis*)).

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7 Jenkins, Aaron P., Keith, Philippe; Marquet, Gerald; Mailautoka, Kini Koto. 2008. A Preliminary Survey of Samoan Freshwater Macro-faunal Biodiversity. Wetlands International. 32 pp.

8 Kano, Yasunori. 2006. Faunistic survey of Limnic Neritimorph Snails on Upolu Island, Western Samoa. Unpubl. Univ of Miyazaki. 12 pp.

9 World Fish Center. ReefBase. 2009. <http://www.fishbase.org/country>

Several exotics were introduced by the Fisheries Division for restocking depleted species and to diversify for economic development and food security reasons. Introduced species (FAO)<sup>10</sup> included -

- Mussels: Philippine green mussel *Perna viridis*;
- Carp: *Carassius auratus*;
- Oysters: Pacific oyster *Crassostrea gigas*;
- Trochus: *Trochus niloticus*
- Giant clams: *Tridacna gigas* and *T. derasa*;
- Marine prawn: *Penaeus monodon*;
- Seaweeds: *Euchema Kappaphycus alvarezii* and *Euchema denticulatum*.
- Marine snails Turbo mamoratus (Shelton, et al 2004)

Two introduced algae species (*Navicula spp.* and *Chaetoceros spp.*) were reared under a JICA funded project as feed options for trochus and sea urchins (MoA, 2005)<sup>11</sup>.

Table 1: Samoa's Biodiversity Species List

Species	Endemics	Native	Introduced	Threatened	Total
Flowering plants	156	App 500	App 500	App 136	App 1000
Ferns	-	-	App 500	-	220
Land birds	15*	33	3	14	55
Sea birds	-	-	3	N/A	21
Reptiles	1	4	-	4	14
Ants	12	-	11	N/A	59
Snails	-	64*	N/A	-	64
Butterflies	3	20*	4	1	28
Moths		170*			170
Freshwater fauna (fish)	-	89*	-	-	89
Freshwater crustaceans		22*			22
Corals	-	-	4	-	N/A
Marine Vertebrates	-	-	-	4	8
Marine Invertebrates	-	-	-	14	95
Fisheries	N/A	890	2	-	991
Whales					5
Dolphins					6

Source: Based on Government of Samoa (NBSAP); \* are adjusted figures based on new information.

The complete list of Samoa's biodiversity is continually being updated as studies continue to identify new native species and exotic species introduced.

### 2.1.5 Terrestrial Ecosystems

The high altitude and varied terrain create different microclimatic conditions that contribute to the evolution of a range of plant communities and ecosystems. Whistler (1992) divided Samoa's vegetation into five plant communities, namely littoral vegetation, wetland vegetation, rainforest, volcanic scrub and disturbed vegetation. A terrestrial ecosystem mapping study (Pearsall et al, 1991) identified 21 distinct ecosystem types. Many of these are globally common such as mangrove forests and mixed

10 FAO. \_\_. Fisheries and Aquaculture Country Profile: Samoa. [www.fao.org/fishery/countrysector](http://www.fao.org/fishery/countrysector)

11 Ministry of Agriculture. 2005. Situation Analysis and Outlook for Samoa Agriculture, Forestry and Fisheries.

lowland species swamp forests. Others however, while common in Samoa, are considered globally rare and therefore of considerable importance for conservation.

The 14 highest priority ecosystems based on rarity and threat included 12 that were assessed as being of global significance because of world rarity, endangered status or the concentration of species found only in Samoa (ibid.). These 12 ecosystems are -

- i. Coastal rainforest
- ii. *Metrosideros montane* rainforest
- iii. *Cyathea disclimax montane* rainforest
- iv. Montane rainforest
- v. *Cyathea disclimax* lowland rainforest
- vi. Lowland rainforest
- vii. Cloud forest
- viii. Mixed Upland Species Swamp forest
- ix. Ridge rain forest
- x. *Pandanus turritus* swamp forest
- xi. Mixed Lowland Species Swamp Forest
- xii. Herbaceous Marsh.

To protect these ecosystems, Pearsall et al (ibid.) identified and recommended the following priority sites -

Grade 1 sites –

- Uafato-Tiavea Coastal forest;
- Saanapu-Sataoa Coastal Wetland (Mangrove Forest)
- Aleipata Islands
- Aopo-Letui-Sasina Coastal Forest
- Vaoto Lowland Forest.

Grade 2 sites –

- Apolima-Fou Coastal Wetland
- Saleapaga-Lalomanu Coastal Forest
- Vaiee-Tafitoala Peninsula
- Vaipu Swamp Forest
- Taga-Lata-Salailua Lowland Forest
- Siuvao Point
- Mulinuu-Tufutafoe.

## **2.2 National and Global Importance**

The importance of this biodiversity to Samoa cannot be overemphasized. Simply stated, it is the ecological foundation upon which Samoa exists culturally, socially and economically. The ecological services of the water, clean air, soil and vegetation renewal, biodiversity maintenance, even carbon sequestration – are heavily dependent on biodiversity. The natural stock of resources that the economy depends on - forest products, water for human consumption and electricity generation, edible plants and animals, medicinal plants, the marine resources for food and exports, and many others – are intricately linked to or constitute parts of biodiversity. Tourism is a growing sector and the branding of Samoa as a tourist destination has a strong environmental flavor. Samoa's culture of folklores and proverbs are enriched by the stories of human interactions with different species of fauna and flora.

With a population where 80% are largely subsistence and directly dependent on the terrestrial and marine environments for food, income and general sustenance, biodiversity plays a vital and central role in Samoa’s social and economic development.

Considered in the context of global conservation, Samoa biodiversity is particularly important in the context of the South Pacific. A review of conservation value of a total of 226 South Pacific Islands (Dahl, 1986) ranked three of the islands of Samoa highly. Savaii at number 23, Aleipata Is at number 30 and Upolu at number 46. Samoa’s flora is one of the most diverse in Polynesia with about a quarter of the plants endemic. The importance of the country’s birdlife, particularly the proportion of endemic species (23%) and the threats to it have been recognized by the International Council for Bird Preservation who have listed the Samoa Islands as one of the world’s ‘Endemic Bird Areas’ in need of urgent conservation attention (ICBP, 1992). Similarly in 2004, recognizing the region’s rich but vulnerable biodiversity, Conservation International (CI) classified the Polynesia area (including Samoa) as a biodiversity hotspot requiring priority urgent conservation actions.

Samoa’s endemic species and sites of global biodiversity significance because of their rarity and species richness, are therefore important parts of the planet’s total biodiversity.

### 3. Status of Samoa’s Biodiversity

Samoa’s environment, in large part due to its smallness and isolation, is thus characterized by extreme levels of social, economic and environmental vulnerability. Like other Pacific islands states, it has limited land and marine resources, and a fragile and vulnerable environment that demands the most committed of management and conservation efforts. Many of its endemic and native species are endangered, some critically. Similarly ecosystems of global and national significance are being degraded, some critically and needing immediate interventions. Others have in the course of the last two decades, have been completely destroyed as a result of human activities and by cyclones.

The status of the key components of this biodiversity is tabulated based on the latest available information

#### 3.1 Terrestrial Ecosystems

The statuses of terrestrial ecological sites of high conservation value proposed in Samoa’s NBSAP are summarized in Table 2 below.

**Table 2: Status of Ecosystems of High Conservation Value**

Biodiversity asset	Significance	Status	Main threats
Uafato-Tiavea Coastal forest;	Grade 1 site; globally significant	Largely intact but increasingly vulnerable; two management interventions targeted this site – GEF-funded SPBCP 1997-2001 concentrating on the Uafato forests; and IUCN’s MPA 2004-current, mainly on the Tiavea coast. Uafato village’s commitment to conservation has weakened due to internal disputes related to CA project. Overharvesting of <i>Intsia bijuga</i>	Overharvesting of marine and forests; agricultural clearing, overfishing & unsustainable fishing practices.



		for carving continues.	
Saanapu-Sataoa Coastal Wetland (Mangrove Forest)	Grade 1; globally significant	Largely intact but vulnerable; conservation & ecotourism development under GEF funded SPBCP 1997-2001. Now part of the Safata MPA (IUCN) Project;	Overharvesting of mangroves; unsustainable land based practices including waste management; unsustainable tourism.
Aleipata Islands	Grade 1; globally significant; habitat to several endemic bird species.	Largely intact but highly vulnerable; currently under intensive management with rat eradication activities on-going; NZAID, SPREP, MNRE. Also included as part of Aleipata MPA.	Invasive species; cyclones, poaching.  Construction of marine slipway for ship repairs nearby a potential threat.
Aopo-Letui-Sasina Coastal Forest	Grade 1; globally significant; last significant stand of <i>Intsia bijuga</i> ; a native tree spp of cultural significance.	Partially logged; degraded and threatened.	Logging; agricultural clearing; settlement including planned hotel development.
Vaoto Lowland Forest	Grade 1; globally significant;	No information available.	Cyclone damage, logging; agricultural clearing.
Apolima-Fou Coastal Wetland	Grade 2: globally significant	Severely degraded as a result of coastal reclamation; management intervention by local NGO (METI) with UNDP funding but with limited impact.	Coastal reclamation; human settlement.
Saleapaga-Lalomanu Coastal Forest	Grade 2: globally significant	Partially degraded; vulnerable; part of IUCN Aleipata MPA.	Agrodeforestation, settlement, cyclone damage. Proposed resettlement of coastal community following 2009 Tsunami will put this site under considerable pressure.
Vaiee-Tafitoala Peninsula	Grade 2: globally significant	Mainly intact. No conservation intervention.	Cyclone damage; overharvesting of fish, crabs and mangroves.
Vaipu Swamp Forest	Grade 2: globally significant	Mainly intact; but threatened by planned expansion of Afulilo hydropower project.	Hydropower development. ADB (TA 7121) currently arguing for its protection based on NBSAP classification;
Taga-Lata-Salailua Lowland Forest	Grade 2: globally significant	No current information available.	Agricultural clearing; possibly logging.
Siuvao Point	Grade 2: globally	No available information	No available

	significant		information.
Mulinuu-Tufutafoe	Grade 2: globally significant	Partially degraded and declining health.	Logging, agricultural clearing and human settlement

### 3.2 Status of Important Terrestrial Species

Table 3: Status of Terrestrial Endemic and Important Native Species

Species	Significance	Status	Main threats
<b>Mammals -</b>			
Sheath-tailed bat ( <i>Emballonura semicaudata</i> )	Native	Only five individuals found in lava caves after 3 year survey. Critically Endangered	Loss of habitat and food source due to cyclones.
Samoa flying fox ( <i>Pteropus s.samoensis</i> )	Native	Endangered.	Habitat loss due to agrodeforestation, cyclones, logging; overharvesting
White-necked flying fox ( <i>Pteropus tonganus</i> )	Native	Endangered.	Habitat loss due to agrodeforestation, cyclones, logging; overharvesting
<b>Land based Birds</b>			
Samoa moorhen – Puna’e ( <i>Gallinula pacifica</i> )	Endemic to Savaii	Critically Endangered, possible extinction; last confirmed sighting last century; unconfirmed sighting in 1984 (Bellingham & Davis).	Habitat loss due to agrodeforestation, cyclones, logging.
Toothbilled pigeon ( <i>Didunculus strigirostris</i> )	Endemic; national bird of Samoa	Endangered; probably less than 2000 individuals left;	Habitat loss due to cyclone damage, agrodeforestation and possibly logging.
Ma’o ( <i>Gymnomyza samoensis</i> )	Endemic; national bird of Samoa	Previously assessed critically threatened; recent surveys suggests situation not critical. Revised status – endangered.	Habitat loss due to agrodeforestation, cyclone damage and logging.
Samoa Ground Dove (Tuaimo) ( <i>Gallicolumba stairi stairii</i> )	Regionally endemic	Status is vulnerable	Habitat loss due to agrodeforestation, cyclone damage and logging.
Samoa white-eye Matapapae ( <i>Zosterops samoensis</i> )	Endemic to Savaii	Vulnerable	Habitat loss due to agrodeforestation, cyclone damage and logging.
Samoa fantail – Se’u ( <i>Rhipidura nebulosa</i> )	Endemic (Upolu and Savaii)	Least concern.	Habitat loss, predators (domestic cats), competitors – myna birds.
Cardinal honeyeater –	Sub-species	Least concern	Habitat loss, predators

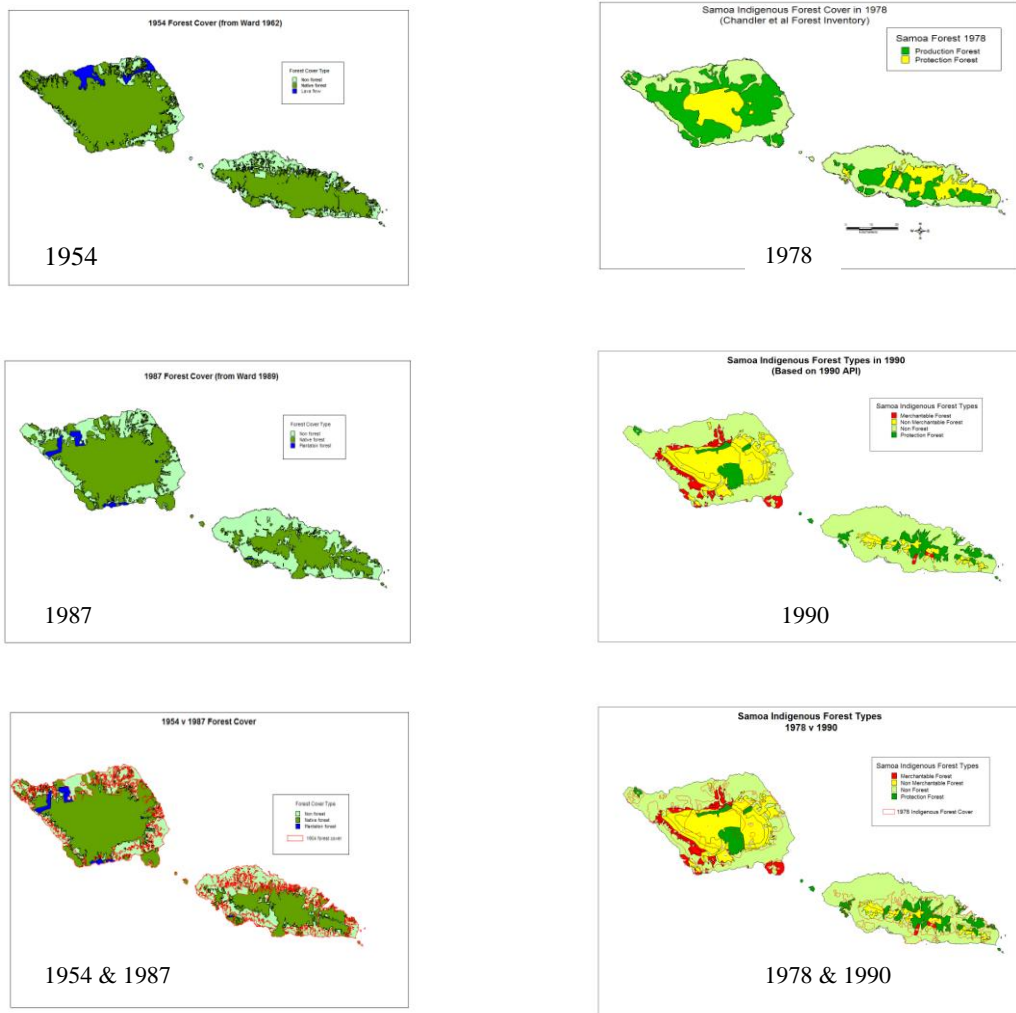
Segasegamou'u ( <i>Myzomela cardinalis nigriventris</i> )	endemic to Samoa		(domestic cats), competitors – myna birds.
Samoa starling – Fuia ( <i>Aplonis atrifusca</i> )	Endemic to Samoa and American Samoa	Least concern.	Habitat loss; competitors – myna birds.
Samoa flycatcher – Tolaifatu ( <i>Myiagra albiventris</i> )	Endemic to Samoa	Vulnerable	Habitat loss, predators including domestic cats and new competitors such as the myna bird.
Samoa parrotfinch – Segaula ( <i>Erythrura cyaneovirens cyaneovirens</i> (Upolu); <i>E. cyaneovirens gaughrani</i> (Savaii))	Sub species endemic to Upolu and Savaii	Near threatened	Habitat loss and introduced pests
Samoa triller - Mitivao ( <i>Lalage sharpie</i> )	Endemic to Samoa	Near threatened	Habitat loss, predators including domestic cats and new competitors such as the myna bird.
Samoa whistler – Vasavasa ( <i>Pachycephala flavifrons</i> )	Endemic to Upolu, Savaii and Nuutele	Least concern	
Flat-billed kingfisher – Tiotala ( <i>Todirhamphus recurvirostris</i> )	Endemic to Samoa	Least concern	
<b>Reptiles</b>			
Samoa skink ( <i>Emoia samoensis</i> )	Endemic to Samoa	No recent data	Unknown
<b>Butterflies</b>			
Samoa swallowtail butterfly ( <i>Papilio godeffroyi</i> )	Endemic to Samoa (Upolu and Savaii) & Tutuila	Rare. Critically Endangered; possible extinction in Upolu and Savaii. No sightings in recent survey both in Upolu and Savaii; 65 individuals sighted in a 2008 survey in Tutuila (Edwards, 2009).	Habitat degradation and depletion (lowland to montane forests) due to agrodeforestation, cyclones

### 3.3 Status of Samoa's Forest Cover

Samoa's forest cover has been declining steadily since the first aerial photos (1954) were taken. The rate of loss reached its highest in the early 1970's to the early 1990's when commercial logging were at their peak. The impact of the Cyclones Ofa (1990), Cyclone Valerie (1991) and Cyclone Heta (2004) further severely degraded the remaining forests, and most of the secondary regrowth areas.

The following map sequence show the decline in forest cover between 1954 and 1990 –

Figure 1: Samoa's Forest Cover 1954 - 1999



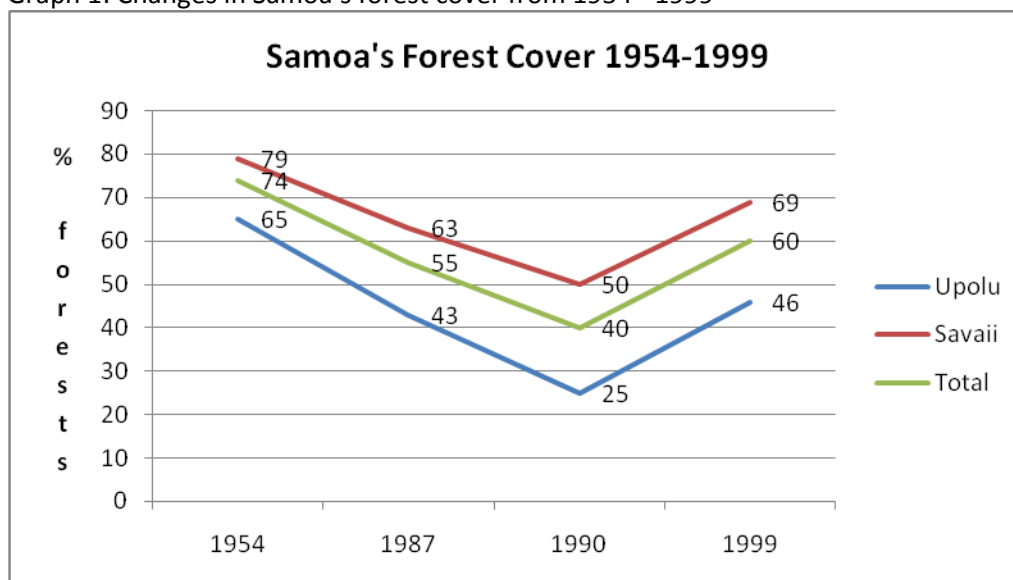
Actual quantitative estimates of loss in forest cover are indicated in the Table 4 below. It shows a steady decline in both islands with Upolu losing its forest cover considerably faster than Savaii from 1954 to 1990. An uncharacteristic increase in 1999 from the national average of 46% to 60% is not the result of any remarkable turnaround in forest growth. Rather it is due to a revised definition of forests used in the FAO 1999 analysis. The revised definition resulted in the addition of areas previously not classified as forests.

Table 4: Changes in percentage of forest cover 1954 - 1999

Year	Upolu	Savaii	Total Samoa
c. 1954	65%	79%	74%
c. 1987	43%	63%	55%
c. 1990	25%	59%	46%
c. 1999	46%	69%	60%

Source: FAO. 2005. Samoa Country Report.

Graph 1: Changes in Samoa's forest cover from 1954 - 1999



The remaining forest area based on 1999 aerial photos consists of the various forest types detailed in Table 5.

Table 5: Area proportions of forest types on Upolu and Savaii

Category	% of total forest area of Upolu	% of total forest area of Savaii	% of total forest area of Samoa
Closed forest	0	0	0
Medium forest	1	61	42
Open forest	62	19	32
Secondary forest	33	17	22
Forest plantation	2	3	3
Mangrove	1	0	0
Wetland	1	0	1

Table 5 shows that Samoa no longer has closed primary forests with most of the remaining forest classified as 'medium' forests. Most of Upolu is categorized as consisting of 'open' (62%) and secondary forests (33%).

### 3.4 Status of Samoa's Terrestrial Protected Area Network

Efforts by the Government of Samoa to protect key areas and to stem the loss of forest cover include setting aside areas for national parks and reserves. Over the last 10 years, the number of parks and reserves set aside has more than doubled. The table below lists all existing protected areas and years of establishment.

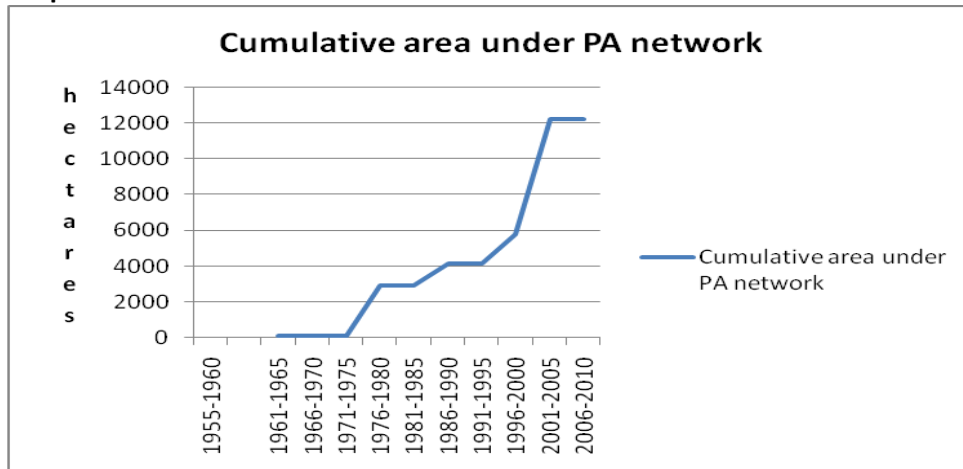
Table 6: List of Terrestrial Protected Areas

	Terrestrial Reserves	Yr estab	Area (ha)
1	Apia Central Recreational Reserve	2000	2.42
2	Vaigaga Reserve	2000	0.4

3	Maagiagi Reserve	1999	0.2
4	Vaimoso Reserve	1999	0.1
5	Fuluasou Botanical Garden	1999	8.1
7	Samoa National Botanical Garden Vailima	1978	12.1
8	Togitogiga Recreational Res	1978	0.81
9	RLS Historic Reserve	1978	0.4
10	Mt Vaea Scenic Res	1958	89
11	Sinave Res	2006	0.1
12	Lotosamasoni Res	2007	0.2
13	Mulinuu Mangrove	2003	2.42
14	Matautu tai reserve	2002	0.1
15	Ao-ole-Malo Res	2001	8.1
16	Faavae i le Atua Res	2001	0.81
17	Taumesina Res	2000	2.4
18	Vaitele East and West Res	2000	0.81
19	Falealupo Forest	1989	1,215
20	Laulii Conservation Area	2000	400.0
	Uafato Conservation Area	1997	1161
	Saanapu-Satalo Mangrove Forest CA	1997	52.9
	<b>TOTAL RESERVES &amp; CAs</b>		<b>2,957.4</b>
	<b>National Parks</b>		
1	O le Pupu Pue NP	1978	2,800
2	Lake Lanotoo NP	2003	1,050
3	Mauga o Salafai NP	2003	6,944
	<b>TOTAL PARKS AREA -</b>		<b>10,794.00</b>
	<b>TOTAL TERRESTRIAL PROTECTED AREA NETWORK</b>		<b>13,751.4 ha (~ 5% of total land area)</b>

Graph 2 below shows that the growth in terms of cumulative area brought under protection. It highlights the rapid acceleration of areas from 1989, after a lapse of about 15 years.

**Graph 2: Growth in Samoa's Terrestrial Protected Area Network 1958-2010**



The significant growth from 1996 to 2005 is attributed to the establishment of two new national parks in 2003 - the Lake Lanuto'o National Park (1050 ha) which is the second park on the island of Upolu and the Mauga-o-Salafai National Park (6,944 ha) on the island of Savaii. The rest of the new protected areas are small reserves in and around the urban area of Apia including the Fuluasou Botanical Garden (8.1 ha).

### 3.5 Status of Marine Conservation Areas

Samoa's marine conservation areas consist of the following

- Palolo Deep Marine Reserve 1.38 km<sup>2</sup>
- Aleipata MPA (19.44 sq. miles or 5,045ha) and the
- Safata MPA covering 24.6 sq. miles (6,370 ha).
- an estimated 71 village fisheries/marine reserves are still functional of the original 115 that were reported established (Hay et al, 2007), and
- Samoa's EEZ (120,000km<sup>2</sup>) which is a declared sanctuary for whales, dolphins turtles and sharks.

The Palolo Deep Marine Reserve was badly damaged by Cyclones Ofa (1990), Val (1991) and Heta (2004) but has recovered well (Skelton et al, op cit). The two MPAs, established under an IUCN Marine Protected Area Project (1996-2004) encourage sustainable use harvesting in an integrated coastal zone management approach. The Aleipata has 0.331 sq.mile and Safata MPA, 0.085 sq. mile no-take zones. The main threats to the MPAs are overfishing, coastal pollution, cyclones and climate change and variability, and infrastructural development. Regarding the latter, a marine slipway for boat repairs was recently constructed in the Aleipata MPA, and there is concern about pollution and waste related impacts on the MPA.

Table 7: Samoa's Marine Protected Area Network -

	MARINE PROTECTED AREA NETWORK	Year established	Area (ha)
	Palolo Deep MR	1979	22
	Aleipata Is MPA	2004	6,370
	Safata MPA	2004	5,045
	71 village based marine reserves	1995-2001	NA
	Samoa's EEZ – declared sanctuary for whales, turtles and sharks	2002	12,000,000
	TOTAL MARINE PROTECTED AREA		12,011,437 ha

### 3.6 Status of Coral Reefs

Samoa's reefs cover an estimated area of 490km<sup>2</sup> (Wilkinson, 2008)<sup>12</sup>. They are important economically for sustenance and income generation, and for coastal protection. Reefs are also quite vulnerable as a result of human overexploitation and cyclones; Cyclone Heta (2004) damaging an estimated 13% of Samoa's reefs.

The status of reefs, measured in terms of live coral cover, was reported by Lovell et al

12 Wilkinson.C. 2008. *Status of Coral Reefs of the World: 2008*. Global Coral Reef Monitoring Network and Reef and Rainforest Center, Townsville, Australia. 260 pp.

Samoa's coral reefs were assessed in 2002, 2004 and 2008 as part of the Status of Coral Reefs of the World monitoring (Wilkinson, C. 2002, 2004 and 2008). Assessment results saw percentage of live coral coverage fluctuating from a mean of 39% in 2002, 10.3% in 2004, and 43% in 2008. Assessment reports noted the impact of overfishing, coastal developments and cyclones as major factors, but at the same time observed that coral recovery was remarkable (Lovell et al, 2004)<sup>13</sup>. *Acropora* remains the dominant coral species.

In terms of edible reef fish, Wilkinson (op cit) noted the generally low densities of edible fish in Samoa as well as other South West Pacific countries, with Samoa recording densities in parrotfish herbivores of 388/100m<sup>2</sup>. Similar low percentage was reported for edible invertebrates (sea cucumbers, giant clams, trochus) with Samoa recording a density of 0-3/100m<sup>2</sup> (Morris et al, 2008)<sup>14</sup>.

### 3.7 Status of Selected Marine Species

Limited information restricts the scope of assessment possible in this report. The following are extracted from various studies and reports and is in complete.

Table 8: Samoa's Endangered/Threatened Marine Species

	Species	Threats
Marine Turtles	Hawksbill turtle ( <i>Eretmochelys imbricata</i> ) <b>Status</b> – Endangered. Recent surveys show small number of nesting activities in Aleipata Is.	Human – eggs and meat; rats (eggs); waste and plastic bags etc.; habitat loss particularly of beaches due to cyclones etc.
	Green turtle ( <i>Chelonia mydas</i> ) <b>Status</b> - Endangered	Human – eggs and meat; rats (eggs); waste and plastic bags etc.; habitat loss particularly of beaches due to cyclones etc.
	Leatherback turtle ( <i>Dermochelys coriacea</i> ) <b>Status:</b> Not known.	Human – eggs and meat; rats (eggs); waste and plastic bags etc.; habitat loss particularly of beaches due to cyclones etc.
Bivalves	Fluted/Scaly Giant clam ( <i>Tridacna squamosa</i> ) <b>Status:</b> Functionally extinct (Zann & Mulipola, 1995)	
	Giant clam <i>Hippopus hippopus</i> <b>Status:</b> Possibly Extinct (Skelton, et al 2004).	
	Rugnose giant clam ( <i>Tridacna maxima</i> ) <b>Status:</b> No information	Overharvesting
Crustaceans	Coconut crab ( <i>Bigros spp.</i> ) <b>Status:</b>	Overharvesting

13 Lovell, E., et al. (2004) 'Status of Coral Reefs in the South West Pacific: Fiji, Nauru, New Caledonia, Samoa, Solomon Islands, Tuvalu and Vanuatu'. *Status of Coral Reefs of the World: 2004*.

14 Morris, Cherie and Kenneth, Mackay. Eds. 2008. "Status of Coral Reefs in the South West Pacific: Fiji, New Caledonia, Samoa, Solomon Islands, Tuvalu and Vanuatu". In: Wilkinson, C. ed. 2008: *Status of Coral Reefs of the World: 2008*. Global Coral Reef Monitoring Network & Reef and Forest Research Center, Townsville, Australia. 260pp.



	Mangrove crab ( <i>Scylla serrata</i> ) Localized threat; critically endangered in some sites (Zann & Mulipola, 1995).	Overharvesting; loss of habitats (mangroves)
	Spiny lobster <b>Status:</b> No information	
	Pacific Giant triton ( <i>Charonia tritonia</i> ) <b>Status:</b> Possible extinction (Zann & Mulipola, 1995)	Overfishing for ornamental trade. (ibid.)
	Trochus ( <i>Tectus niloticus</i> ) <b>Status:</b> No assessment made	Overharvesting; habitat degradation
Fish	Red lipped mullet ( <i>Crenimugil crenilabis</i> )	Overfishing; habitat loss
	Grey mullet ( <i>Mugil cephalus</i> ) <b>Status:</b> Seriously declined.	Overfishing; habitat loss
	Milkfish ( <i>Chanos chanos</i> ) <b>Status:</b> Seriously declined (Zann & Mulipola, 1995)	Overfishing; habitat loss
	Red grouper ( <i>Epinephelus merra</i> ) Status: No information	Overfishing; habitat loss
	Humphead wrasse ( <i>Cheilinus undulatus</i> ) Status: No information.	Overfishing; habitat loss
	Big-eye tuna ( <i>Thunnus obesus</i> ) Status:	Overfishing
	Whale shark ( <i>Rhincodon typus</i> ) Status:	Overfishing
	Giant grouper ( <i>Epinephelus lanceolatus</i> ) Status: Vulnerable (IUCN)	Overfishing, habitat loss
	Bumphead parrotfish ( <i>Bolbometopon muricatum</i> ) Status: Vulnerable (IUCN)	Overfishing, habitat loss.
Marine mammals	Spinner dolphin ( <i>Stenella longirostris</i> )	
	Rough-tooth dolphin ( <i>Steno bredanensis</i> )	
	Bottlenose dolphin ( <i>Tursiops truncatus</i> )	
	Humpback whale ( <i>Megaptera novaeangliae</i> ) Status: Vulnerable	
	Sperm whale ( <i>Physeter macrocephalus</i> ) Status: Vulnerable.	
Holothurians	Sea cucumber	Overfishing

	<b>Status:</b> collapse of some fisheries due to overfishing (Skelton, et al 2004).	
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### 3.8 Status of Freshwater Biodiversity

Freshwater flora and fauna represents a major information gap in conservation management. Jenkins et al<sup>15</sup> (2008)'s newly released preliminary survey results recorded 30 species of fishes (in 21 genera and 12 families) and 17 species of macro-crustaceans (in 5 genera and 3 families). Of these 3 species of fish and 8 species of crustaceans are new records for Samoa. Up to 6 endemic species are reported with potentially 4 new taxa to science amongst them (ibid.). When cited freshwater and common estuarine fishes are aggregated there are now approximately 86 species of fishes known and 22 crustaceans.

Before that, a study of the Afulilo stream discovered the freshwater eel (*Anguilla sp.*), pipefish (*Dorichthys sp.*), jungle perch (*Kuhlia rupestris*), and two species of goby (*Sicyopterus micrurus* and *Stiphon elegans*). No recent study to confirm the status of these species was conducted.

Of the introduced Tilapia species (*Oreochromis mossambicus* and *O. Niloticus*), these have been used in several community based aquaculture development projects, to augment local marine fishery. There are unconfirmed reports of accidental introductions into local streams including tilapia from the Afulilo hydropower reservoir into the Salani River.

No information is available on the status of the introduced freshwater prawns (*Macrobrachium rosenbergii*).

### 3.9 Status of Agrobiodiversity

The main agricultural crops of cultural and economic importance are taro (*Colocasia esculenta*), bananas, breadfruits, yams, cacao and coconuts. Except breadfruits and yams, all have been the target of genetic improvement programmes to improve yields and resistance to diseases.

Taro, in particular, following the total decimation of the taro industry in 1993 by the Taro Leaf Blight (TLB) and the Giant African Snail, have been the focus of a Taro Breeding Programme that began in 1996. Many different varieties introduced from Asia and around the Pacific have been tested. There are now five identified improved varieties with superior yield and quality resistant to TLB and suitable for exports (MAF, 2008). The traditional variety (talo Niue) continues to be susceptible to TLB and requires intensive management for growing.

Coconuts has undergone similar development with new hybrid varieties introduced following Cyclone Ofa (1990) and Cyclone Valerie (1991) to revitalize the industry (MoA, 2005). The continuing shift of farmers to higher yielding varieties is forecasted in replanting programmes to replace senile coconut areas. (ibid.).

Cocoa is not experimenting with any new varieties with the favoured Trinitario variety still fetching a premium price on world markets. Local production however continues to decline as many farmers are switching to more profitable options, mainly vegetables. MAF continues to distribute cocoa planting material to farmers at around 1,000 seedlings a month but it is not matching the rate at which old cocoa is culled and pulled out of the ground (ibid.).

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15 Jenkins, Aaron P., Keith, Philippe; Marquet, Gerald; Mailautoka, Kini Koto. 2008. *A Preliminary Survey of Samoan Freshwater Macro-faunal Biodiversity*. Wetlands International. 32pp.

With bananas, over the years, many new varieties have been introduced. Daniels (1995)<sup>16</sup> recorded 53 different varieties introduced during the ACIAR projects alone. The total extent of varieties of bananas now in Samoa is not known.

Fruits is where Samoa has introduced a wider range of new species, such as rambutants, citrus, mango, papaya, five-start fruit, pummelo, vanilla and several others. The complete list of recently introduced fruit species is lacking but there is anecdotal evidence of new species being widely planted and sold in local markets.

In terms of livestock, the introduction of live sheep from Fiji (2004) is an addition to Samoa’s domesticated fauna.

## 4. Trends in Biodiversity

### 4.1 Terrestrial Ecosystems

The statuses of terrestrial ecosystem sites categorized as priority for conservation have been discussed earlier. Table 10 below looks at future trends.

**Table 10: Trends in the health of priority ecological sites**

Ecological site	Significance	Main threats	Trend s
Uafato-Tiavea Coastal forest.	Grade 1 site; globally significant	Overharvesting of marine and forests; agricultural clearing, overfishing & unsustainable fishing practices. Economic development – 2009 construction of marine slipway for ship repairs.	<b>Trend – Declining health</b> The Uafato forest continues to be harvested above its sustainable level; village by-laws regulating harvesting of marine resources have weakened since internal village dispute led to dissolution of the Conservation Committee in 2005. The Tiavea Coastal forest is part of the Aleipata MPA and is less threatened.
Saanapu-Sataoa Coastal Wetland (Mangrove Forest)	Grade 1; globally significant	Overharvesting of mangroves; unsustainable land based practices including waste management;	<b>Trend - Stable but vulnerable.</b> Ecotourism operation providing incentive for community interest.
Aleipata Islands	Grade 1; globally significant; habitat to several endemic bird species.	Invasive species; cyclones, poaching.	<b>Trend – Site conditions will improve</b> with rat eradication activities currently underway. Main threat to ecological health is cyclones.
Aopo-Letui-	Grade 1;	Logging; agricultural	<b>Trend – Declining trend.</b>

<sup>16</sup> Daniels. Jeff. 1995. Illustrated Guide to the identification of Banana Varieties in the South Pacific. ACIAR.

Sasina Coastal Forest	globally significant; last significant stand of <i>Intsia bijuga</i> ; a native tree spp of cultural significance.	clearing.	Main threat logging and agriculture. Hotel development planned for part of the area will be a contributing factor.
Vaoto Lowland Forest	Grade 1; globally significant;	Cyclone damage, logging; agricultural clearing.	No information available.
Apolima-Fou Coastal Wetland	Grade 2: globally significant	Coastal reclamation;	<b>Trend</b> – Declining health. Population settlement the main threat.
Saleapaga-Lalomanu Coastal Forest	Grade 2: globally significant	Agro-deforestation, cyclone damage	<b>Trend</b> – Declining. Degradation to forest expected with population resettlement from coastal areas following 2009 tsunami. Not considered for any conservation management intervention.
Vaiee-Tafitoala Peninsula	Grade 2: globally significant	Agrodeforestation, cyclone damage	<b>Trend</b> – Declining health. No management intervention planned.
Vaipu Swamp Forest	Grade 2: globally significant	Hydropower development. ADB (TA 7121) currently arguing for its protection based on NBSAP classification;	<b>Trend</b> – Stable but under imminent threat of degradation from planned expansion of Afulilo hydropower project.
Taga-Lata-Salailua Lowland Forest	Grade 2: globally significant	Agricultural clearing; possibly logging.	No information available.
Siuvao Point	Grade 2: globally significant	(No available information)	(No available information)
Mulinuu-Tufutafoe	Grade 2: globally significant	Logging, agricultural clearing and human settlement	<b>Trend</b> – Seriously degraded and declining with agro-deforestation and settlement expected to increase.

#### 4.2 Globally Threatened Terrestrial Species

There are 15 globally threatened terrestrial species in Samoa red-listed by the IUCN (2006). Nine are bird species, two turtles, two bats, one snail, and a palm species. One endemic bird – the Samoa moorhen (*Gallinula pacifica*) is feared extinct. The current trends of remaining 14 are indicated in Table 6 below.

Table 6: Samoa's Globally Threatened Species on IUCN's Red List

#	Scientific name	English name	Samoan name	Class	IUCN Red list Trend
1	<i>Chelonia mydas</i>	Green turtle	Laumei	Reptilia	↓
2	<i>Didunculus strigirostris</i>	Tooth-billed pigeon	Manumea	Aves	↓
3	<i>Emballonura semicaulata</i>	Pacific sheath-tailed bat	Tagiti	Mammalia	↓
4	<i>Eretmochelys imbricata</i>	Hawksbill turtle	Laumei	Reptilia	
5	<i>Gallinula pacifica</i>	Samoan moorhen	Punae	Aves	Extinct?
6	<i>Gymnomyza samoensis</i>	Mao	Maoamo	Aves	↓
7	<i>Myiagra albiventris</i>	Samoan flycatcher	Tolaifitu	Aves	↓
8	<i>Numenius tahitiensis</i>	Bristle thighed curlew	Tuliolovalu	Aves	↓
9	<i>Pteropus samoensis</i>	Samoan flying fox	Pe'a vao	Mammalia	↓
10	<i>Thaumatodon hystricelloides</i>		Sisi	Gastropoda	
11	<i>Zosterops samoensis</i>	Samoan white eye	Mata papa'e	Aves	?
12	<i>Clinostigma samoensis</i>	Samoan bush palm	Niu vao	Liliopsida	
13	<i>Drymophleus samoensis</i>			Liliopsida	
14	<i>Nesofregatta fuliginosa</i>	Polynesian storm petrel	Taio	Aves	↓
15	<i>Gallucolumba stairii</i>	Shy ground dove	Tuameo	Aves	↓

Note: Eradication of rats is currently underway on Aleipata Is that should reduce threat on hawksbill turtle *Eretmochelys imbricate*.

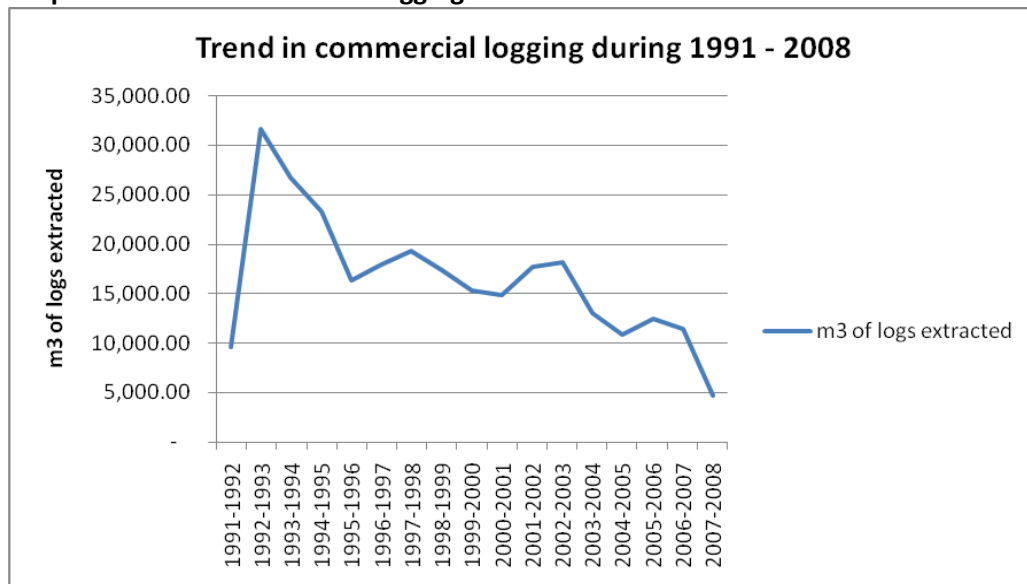
#### 4.3 Forest Cover

The degradation and fragmentation of forests will continue as a result of cyclones, agro-deforestation, and settlements. The rate of agro-deforestation is likely to increase. This is the anticipated result of a Government objective of expanding commercial agriculture as set forth in the Samoa Development Strategy (SDS) 2008-2012. The use of incentives such as the removal of import tariffs on agricultural related imports (ibid.) and the expansive network of access roads already built will facilitate this.

Logging is dwindling down to a trickle as the remaining merchantable forest runs out. However it is more likely to taper off and remain at a low level of around 1,000 – 1,500 m<sup>3</sup> a year, for the next two to five years as operators continue to operate within low density areas previously assessed as 'non-merchantable'. Two factors contribute to this assessment – (i) highly mobile chainsaw milling is enabling loggers to operate at low costs and low levels of log throughput (ii) high prices for imported timber

means millers can still make a profit. Most of this logging will likely target remnant trees in areas previously cleared for agricultural purposes, particularly those accessible along plantation access roads.

**Graph 5: Level of Commercial Logging 1991 - 2008**



Source: MNRE-Forestry (2009)

#### 4.4 Protected areas – terrestrial and marine

A number of sites may be added to the list of protected areas as national parks within the next two to three years, on the island of Savaii. On Upolu, sites for water catchment protection are being looked into (Suluimalo, pers comm.) which if set aside, will serve a useful biodiversity conservation well as ecological corridors for the movement of many bird species. The immediate focus of the MNRE Forestry Division now is in improving the management of existing parks, two of which do not have management plans, while O Le Pupū Pue NP, is currently developing one.

There is continuing community interest in funding support for marine and terrestrial conservation projects under GEF-SGP, which will see the number of community reserves increasing.

#### 4.5 Coral reefs

Coral reefs have shown remarkable recovery capacity following devastation by cyclones Ofa, Val and Heta. Threats of overfishing, land based pollution, use of unsustainable practices are increasing being brought under control as more and more villages participate in marine conservation/fisheries reserves projects.

The uncertainties of cyclones, and climate change related factors are therefore the main factors in the way of improving coral reef health.

#### 4.6 Selected marine species and ecosystems

Assessing trends in marine species and ecosystems is constrained by the lack of data. The following is therefore not a complete assessment. It is not assessed under the strict criteria of IUCN but nevertheless gives an indication of the status and trends in several species of marine resources –

Table 7: Trends of Selected Marine Species

Group	Common name	Scientific name	Trend
Turtle	Green turtle	<i>Chelonia mydas</i>	Declining trend.
Bivalves	Fluted/Scaly giant clam	<i>Tridacna squamosa</i>	Functionally extinct (Zann & Mulipola, 1995)
	Rugose giant clam	<i>Tridacna maxima</i>	Stocks have been rebuilt with introduced spats from American Samoa and Tonga.
	Giant clam	<i>Hippopus hippopus</i>	Possible extinction; only shells found with very little recent sighting (ibid.)
Crustaceans	Coconut crab	<i>Bigros sp.</i>	
	Mangrove crab	<i>Scylla serrata</i>	Declining trend - overharvesting for income is increasing despite the on-going enforcement of minimum size regulation.
	Spiny lobster		No information.
Gastropods	Pacific giant triton	<i>Charonia tritonis</i>	Seriously in decline due to overfishing for the ornamental trade. (ibid.)
	Trochus shell	<i>Tectus niloticus</i>	Introduced stocks are rebuilding seriously depleted sites.
Fish	Red lipped mullet	<i>Crenimugil crenilabis</i>	
	Reef grouper	<i>Epinephelus merra</i>	
	Humphead wrasse	<i>Cheilinus undulatus</i>	
	Bigeye tuna	<i>Thunnus obesus</i>	
	Whale shark	<i>Rhincodon typus</i>	
	Grey mullet	<i>Mugil cephalus</i>	Reported decline likely to continue.
	Milkfish	<i>Chanos chanos</i>	Reported decline likely to continue.
Marine mammals	Spinner dolphin	<i>Stenella longirostris</i>	
	Rough-toothed dolphin	<i>Steno bredanensis</i>	
	Bottlenose dolphin	<i>Tursiops truncatus</i>	

In terms of fish communities and habitat characteristics, a 1996 study of the island of Upolu provide provides insight into the statuses of fish species richness, density, biomass and coral cover. Overall, species richness and density tend towards moderate-high for most sites but coral cover and biomass are highly varies and shows no direct correlation.

## 5. Main Threats to Biodiversity and Underlying Drivers

The NBSAP 2001 identified the following major threats as factors causing the decline of biodiversity –

- Forest clearance
- Population growth
- Over-exploitation of natural resources

- Non-sustainable developments
- Natural Disasters, and
- Spread of introduced animal and plant pests

## 5.1 Forest clearing

Two main factors drove agricultural clearing in Samoa - agro-deforestation and logging. Agro-deforestation is generally followed by permanent settlements. The rate of agricultural clearing has been increasing based on anecdotal observations and a few documented studies. For instance, Holloway and Floyd (1975) estimated that primary forests were being converted to agriculture at a rate of 4000 acres a year, both through local clearance and clearance following logging. Trotman (1978) estimated agricultural clearings to be between 2,800 to 3,000 acres annually. The Forestry Division estimates a rate of 3% (3,000 hectares) a year between 1978 and 1990, or 2% of the 1978 forest area per annum (GoS, 1994; Iosua, 1994). Leavasa and Pouli (1994) reported 2,400 ha per year prior to 1993 when the Taro Leaf Blight (TLB) temporarily stemmed the increase in agricultural expansion for taro production.

Forest clearing due to logging was the most destructive in the early 1970s through to the 1990s. Trotman (op cit) estimated logging outputs of 39,600 cubic meters reaching 45,000 cubic meters in 1977 by the Potlatch operation in Western Savaii alone. This translates to about 2,343 hectares of primary forests in that year alone and not taking into account logging in Upolu by the New Samoa Industries (NSI). So much so, by 2004, a SPREP report estimated that between 1997 and 1992, 47% of Samoa's merchantable forests and 27% of its non merchantable forest were cleared, with about 13, 575 hectares of merchantable forests remaining (SPREP, 2004).

Today, merchantable forests as previously defined (i.e. minimum of 25m<sup>3</sup>/ha) is all but gone, with portable millers now mainly cutting remnant trees on previously cleared lands. The threat of logging therefore is no longer as significant.

Their impact however, in the form of degraded and fragmented forests is a serious threat to many species. Most affected are the flying foxes (*Pteropus samoensis* and *P.tonganus*) and bird species including pigeons including the tooth-billed pigeon (*D.strigirostris*) who feed on fruits of many native forest trees. The degradation of forests also contributes to the spread of invasive plant species such as *Merremia spp.* many of which relish the open sparse conditions created.

## 5.2 Population

Population as a proximate cause of forest clearing and degradation is not conclusively supported by research findings. There is however no denying its role as an underlying driver to land and resources overexploitation. The argument against its direct impact on forest clearing is seen in the following. The Samoan population more than doubled between 1936 and 1961 (Ward cited by Martel et al, 1997) and this population increase is suggested by Paulson (1994) to be closely correlated with increases in agricultural land area. On the other hand, the 1960's saw a dramatic increase in deforestation yet national population growth slowed significantly from over 3% in the 1960's to 0.5% in the late 1980s (Martel et al, op cit). Details of population growth in villages (Vailoa and Lotofaga) studied by Martel et al, also shows a declining trend in land clearing while there is a significant increase in population.

These results shows that several population dynamics at work, in combination with other factors. This view is supported by Carr (2004:2) who noted –



“A positive correlation between population growth and deforestation is widely recognized at the temporal and spatial macro-scales (i.e. over centuries and globally) but evidence for population links to deforestation at micro-scales (e.g. household and community levels) especially along agricultural-forest frontiers where most deforestation occurs on the planet – is scant. However, existing evidence suggests that, while population always acts in concert with other processes, and in many cases is not the primary immediate driver, demographic dynamics are crucial explanatory factors in deforestation.”

Samoa’s population is approaching 180,000 by 2010. The additional 15,000 people, a large number of which will live around the greater Apia urban area, will definitely exert pressures on resources and services, including new areas for cultivation.

### **5.3 Overexploitation of Natural Resources**

Over 70% of Samoan households are wholly or partly subsistence, depending to a large extent on agriculture and fishing for their daily sustenance. Where this population live on lands that are 80% customary owned, wherein communally owned resources are governed by open-access rules, the result is a ‘tragedy of the commons’ as economically rational individuals maximise their own benefits until the total resource base is inevitably depleted. This phenomenon is evident in the exploitation of nearshore marine resources in Samoa. It may have been sustainable and within the carrying capacities of resource systems decades ago when numbers were low, but with increasing populations, open-access use regimes are an invitation to over-exploitation and resource depletion.

The same ‘tragedy’ is seen in the growth of the tuna long-lining industry using double-hulled alia. The boom in alia catches in the early 1990’s when the number of fishing boats was low and catches were high, was followed by a severe drop in catches and income when alia numbers more than doubled.

It is also reflected in the overhunting of pigeons and flying foxes. This was compounded and driven by demand for exports from Guam in the late 1980’s. The severe drop in population of flying foxes following Cyclones Ofa and Valerie in 1990 and 1991 respectively disrupted this trend. Pigeon numbers followed a similar trend with numbers only now slowly recovering since the 2004 Cyclone Heta.

The allocation of user rights to customary lands is similarly governed. User rights are acquired over an uncultivated and forested area of customary land by whoever fell the forests and clear the land. The household can then use it until it is abandoned and the area returns to forest. Then the process starts again. The advent of the chainsaw has seen land clearing in customary lands increased significantly. In many cases, it is also driven by land profiteering motives – clearing the land to secure user rights which become de facto ownership rights as long as it is occupied and use.

The overexploitation of Samoa’s forest resources is different. It is the result of ineffective forest management largely brought about by unsound institutional arrangements and short-sighted policies. For instance, the 2006 Forest Policy Banning Commercial Logging was never enforced due to political interventions. The excessive logging quotas of the 1970s and 1980s reflected the Government’s strategy of maximizing foreign exchange from the export of semi processed ‘fitches’ to the Australian market. Government’s failure in the 1970s and 1980s to increase the forest rent (royalty) charged per cubic meter of log extracted as a mechanism for improving logging efficiency was because of its conflicting interest as the major shareholder of Samoa Forest Products, the largest logging and sawmilling company in the late early to late 1980’s. A major part of this complex situation is the customary ownership of most of the forest concession areas, and local villages’ tendency to circumvent official procedures for resource allocation by entering into informal and illegal arrangements with local logging companies.

The severely depleted forest resources suggests that the loss of most of Samoa's merchantable forests is irreversible, but hope still remains for the protection of some high priority conservation areas which are intact to this day.

#### **5.4 Non sustainable developments**

Forests and marine ecosystems are constantly threatened by non-sustainable developments. The most prevalent in Samoa includes coastal reclamation, sand mining and reclamation of mangrove forests. Most if not all are for resettlement purposes. There have however been major infrastructural developments such as the Afulilo hydropower project, that directly contributed to the destruction of the globally unique and significant Punataemo'o Swamp Forest.

A current private company initiative to subdivide and sell lands above the Fuluasou catchment area will not only threaten the water resources that the Apia urban area population depends on. It will also seriously degrade and fragment an important stretch of forests that provides an ecological corridor between the Lake Lanuto'o National Park, and the Robert Louis Stevens Reserve. A hotel development in the pipeline that is proposing the building of over-the-water bungalows on the edge of the Palolo Deep reserve poses a significant threat to the reserve.

The threat of unsustainable development is increasingly being reined in as the environmental impact assessment regulation gains wider compliance and public acceptance.

#### **5.5 Natural disasters**

Samoa has always been vulnerable to natural disasters, in particular, tropical cyclones. The impacts of these on forest ecosystems as well as coral reefs have been devastating. For instance, T.C. Whitmore (1984) noted that over half the exploitable forests of Savaii were destroyed by cyclones in 1961, 1966 and 1968 reducing stocks (stems per hectare) by as much as 90%. Holloway and Floyd (1975) referred to losses through natural catastrophes, observing that "...over 1000 acres of the upland forest in Eastern Savaii is believed to be affected by windblow... and through accidents such as forest fires which affected hundreds of acres of woodland in South Upolu in October 1974."

Cyclone Ofa (1990) and Cyclone Val (1991) – the latter with wind speed averaging 90 knots over a duration of 4 days – destroyed up to 90% of the remaining mahogany forests in Savaii and Upolu (Ernst and Young, 1996) and defoliated up to 90% of all vegetation (Goldin, 2002). Tropical Cyclone Heta struck Samoa in February 2004. During 2005, five tropical cyclones developed around Samoa's region, the highest number found Far East of the traditional warm pool in a single season. These included Lola, Meena, Nancy, Olaf and Percy with the latter two tropical cyclones classified as Class 5 (major hurricane), and the closest near misses for Samoa (GoS/MNREM, 2006).

Predictions of a higher frequency of cyclones with greater intensities do not bode well for biodiversity conservation. For instance, Ernst and Young (op cit) projected that Samoa can expect to experience a cyclone classified as severe once every 7.4 years. More up-to-date modelling by NIWA predicts about 9 tropical cyclones on average to be expected within the entire South West Pacific region in an ENSO-neutral season (Salinger, et al. 2005). About half the tropical cyclones that develop reach hurricane force meaning having wind speeds of at least 64 knots (118km/hr) (ibid.).

#### **5.6 Climate Change and Climate Variability**

The frequent occurrences of cyclones are not chance or isolated happenings. They are the result of changes in the global climate partly attributed to the over-accumulation of green house gas gases in the atmosphere. The cyclones may be the more dramatic manifestations of these changes. Less obvious but with increasing certainty is the warming of surface temperatures. According to Chase and Veteiyaki

(1992), three major potential impacts of climate change are: sea level rise; increasing temperature, rainfall and evapo-transpiration; and increase in frequency and severity of cyclones.

Sea level rise is likely to be associated with many climate-related factors such as the rise in sea surface temperatures (SSTs), the increase in frequency and severity of cyclones and high levels of carbon dioxide in the atmosphere and in the marine environment. The response of coral reefs of Samoa to sea level rise is therefore, difficult to ascertain. Chase & Veitayaki (ibid.) pointed out that sea level rise might be a 'powerful force' in improving the conditions of the lagoonal environment. Given various climatic factors that are associated with sea level rise and their consequences, which may include the weakening and degradation of reefs, the above scenario is unlikely.

The continuing stresses imposed by various climatic factors and anthropogenic activities on coral reefs will lead to their becoming non-resilient to strong wave action (Skelton et al. 2000).

The effect of increased air temperature, rainfall and evapo-transpiration is perceived to be minimal according to Chase & Veitayaki (1992). The inshore and offshore fishery is expected to be severely impacted, and coral bleaching will become prevalent. Samoa has a relatively high annual rainfall and this is predicted to increase if global temperatures rise. The poor water retention of the Samoan soil due to its volcanic history will likely result in increased water run-off resulting in soil erosion and high sedimentation in freshwater and in lagoon waters.

## 5.7 Invasive Species

A wide range of alien invasive species pose a constant threat to Samoa's biodiversity. The biggest threat is against many endemic species, particularly birds. Because endemic species evolved in isolation of pests and predators, their natural defensive mechanism against unfamiliar alien species are less developed. The most damaging impact of invasive species in Samoa is in agrobiodiversity. Samoa's economy is yet to fully recover from the devastating impact of the Taro Leaf Blight which all but decimated the local taro industry in 1993.

The range of invasive species threatening Samoa's biodiversity includes:

**Table 11: Invasive Species of Importance in Samoa**

	Birds	Agrobiodiversity	Forests	Others
Pacific rat ( <i>Rattus rattus</i> )	✓			✓ (turtles)
Red ants	✓			✓
Myna bird	✓	✓		
Taro leaf Blight		✓		
Giant African Snail		✓	✓	
Mint weed		✓		
Night blooming cestrum		✓	✓	
Red vented bulbul	✓	✓		
Merremia peltata		✓		
Rattan palm ( <i>Calamus</i> spp)		✓	✓	
African tulip tree		✓	✓	

There are many other species including domesticated animals of which there was debate as their inclusion in this list.

### **5.8 Unsustainable land based activities**

Poor land practices in some places in Samoa have caused high siltation and eutrophication in lagoonal areas from run-offs. Zann & Mulipola (1995) commented that increased sediment and nutrients were probably responsible for the widespread die-back between 1970 and 1985 of lagoon corals on the northern reefs. Land based activities are the main causes of this problem, which include poor agricultural and forestry practices, land clearing, housing, increasing use of agricultural chemicals and fertilizers, road construction activities and lagoon dredging.

Poor sanitation and waste management practices compounds coastal ecosystem degradation, particular lagoon ecosystems and coral reefs. The introduction of municipal waste collection throughout the country is intended to reduce this impact. Similarly a sewage collection system for the Apia urban area and the operation of a waste treatment plant planned for Sogi, will address this issue.

### **5.9 Forest fires**

Forest fires severely damaged extensive areas of forests in Upolu and Savaii in 1983. Recent trends towards extended dry seasons also saw the risk accidental fires in the western end of Savaii.

## **6. Underlying Drivers and Causes Of Threats**

The threats to biodiversity and its conservation in Samoa discussed above are driven by a number of underlying factors, the main ones being

- Economic factors
- Demographic factors
- Institutional factors
- Technological factors and
- Cultural, social and political factors.

These drivers do not operate individually but in combination with one or more playing a more dominant role in some sites. Sesega (2006) showed this in the case of deforestation, wherein several drivers contributed to the overexploitation of forest resources in western Savaii during the 1970's, with government policies promoting the accumulation of foreign exchange reserves the dominant one.

In the following section, these factors are discussed individually.

### **6.1 Economic factors**

The emergence of a cash-based economy inevitably led to the need for increased cash income and the scaling up of agricultural production from subsistence levels. Martel et al (op cit) found in their study villages of Lotofaga and Vailoa that agriculture and remittances were the main source of income. Both villages also indicated that the main reasons for forest clearing are to increase income and food production. The same study found that 71% of Lotofaga and 20% of Vailoa families produce in excess of subsistence needs to sell. Income earned is used for schooling, food and church donations. Martel et al 's findings highlighted the income needs of families in an increasingly cash based economy, and the links between this and forest clearing.

The village of Uafato demonstrates an even more direct relationship between forest clearing and income generation. Uafato's main income is from carvings, particularly kava bowls using exclusively the

native species *Intsia bijuga*. The growing scarcity of this species within the Uafato Conservation Area is a direct result of cutting for carving. Martel found the level of harvesting to be unsustainable.

The same need for cash, facilitated by open-access use regimes of communally owned resources, is encouraging fishers to catch more than their subsistence needs from nearshore fisheries, and which have led to the collapse of many of these fisheries.

At the national level, the Government of Samoa's drive for maximizing foreign exchange reserves in the early 1970's was pursued with a strategy highly dependent on the exploitation and semi-processing of logs for the Australia fitches market. Seeking to take full advantage of this market, the Government also contributed to investments made in timber treatment plant and in value added processing via a veneer production plant (Trotman, op cit). These policies encouraged the extensive logging of the native forests of western Savaii during this period.

The SDS 2008-2012's call for an expansion in commercial agriculture supported by a package of financial incentives will contribute to further agro-deforestation. In the last 15 years, a programme of constructing plantation access roads opened up previously inaccessible areas for agriculture and settlement. Similar policies promoting food security and exports justified the introduction of many exotic species of marine and aquatic fauna for mariculture and aquaculture, of new fruit trees species and taro varieties. Some of these introduced species e.g. the vanilla, is now found to be virus infected with calls going out to farmers for their immediate destruction. The rattan palm was introduced for similar objectives and is now an invasive species.

## **6.2 Demographic factors**

The role of population as an underlying driver as oppose to being a direct threat is discussed briefly in this report. The impact is heightened by the fact that most of Samoa's population is subsistence, and therefore has a direct dependence on the land and fisheries resources.

In the same way, the pressure on land for new settlement is pushing back the forest edge in many communities, with many people clearing first for cultivation, before permanently moving in.

## **6.3 Institutional and policy factors**

Several policies and institutional factors contributed to the loss of forest biodiversity by encouraging wasteful and excessive logging in Savaii during the heyday of Potlatch and Samoa Forest Products. For instance, the rent payable on a cubic meter of native sawlog was kept to a minimum \$0.12 per cubic foot, despite efforts by the Forestry Division to have it properly reflecting the scarcity value of the resource. At this low level, there was no incentive to improve efficiency of logging operations, and to minimize wasteful practices. The end result was a much faster date of deforestation than would have been with a proper forest rent in place.

The lack of clarity in the assigning of roles in the Forest Act 1967 between the Minister of Forests and the Minister of Lands is suggested by Ey (2003) to contribute to the ineffective management of the forest resource.

The absence of appropriate policies also compounds the loss of natural resources and biodiversity. For instance, the lack of proper land use zoning and use planning is now putting at risk a major water catchment area serving the Apia urban area, from being subdivided for settlement. The newly created Water Resources Division is seeking to negotiate for the protection of this important area for water resources management but is at the mercy of profit-driven land owners. One can argue that the issue is

more of Government inaction because the Taking of Lands Act 1964 empowers the Government to take such lands as are necessary for public use but this action was never taken.

#### **6.4 Technological factors**

The shift from small scaled subsistence plots to large scale commercial agriculture underpinned the scaling up in the level of agro-deforestation. Coupled with the arrival of the powersaw, the rate of deforestation increased to levels never before seen as farmers found the capacity to clear significantly larger areas that would have been possible with axes and machetes.

In recent times, as merchantable forests are depleted expectations that this will lead to the natural demise of logging operations have been proven inaccurate. This is because as forest densities decreases and logging costs per cubic meter of log increases, new milling technologies evolved to ensure costs of logging are significantly reduced. Mobile chainsaw milling technologies now allow the logging of forests previously classified as 'non-merchantable'. It means that all trees of millable form can be extracted without the constraints of high logging costs, as mobile mills are now capable of moving operations to where the resource is without concerns over high transportation costs.

Overharvesting of nearshore fisheries is also compounded by new fishing methods including fine mesh nets, many of which have been banned from many communities. Scuba fishing is an increasing trend and is resulting in the rapid depletion of bottom fish species.

Accompanying large scale and market driven agriculture is the increasing use of chemical pesticides and fertilisers. These pollutants and increased siltation from poor land management practices are washed into lagoons and coral reefs.

#### **6.5 Cultural/social/political factors**

As previously discussed, open access regimes for managing resources under customary tenure is a recipe for total depletion as the 'tragedy of the commons' is played out by self-interested utility maximizers. This consequence will continue as long as it remains unregulated in local communities.

The same arrangement applies to the use of customary lands, where lands are cleared to claim user rights which are de facto ownership rights.

Customary ownership of many areas classified as protection forests including many ecological sites of priority for conservation, is an impediment to their immediate protection. Consultations with local communities and resource owners are time consuming and even when agreement is reached, there is no guarantee of total commitment to conservation.

The lack of awareness and appreciation of biodiversity conservation values at all levels, even amongst policy makers, is a contributing factor to much of the inaction to address urgent environmental and biodiversity conservation concerns.

Now and again, political interference gets in the way of effective policy implementation to devastating consequences. This is the case with the Ban on Commercial Logging Policy that was approved in 2006, which was effectively shelved immediately afterwards allegedly due to lobbying from villages with logging concessions and private sawmilling and logging operators.

## **7. Implications of Observed Changes in the Status of Biodiversity Components**

The overall implications of observed changes in Samoa's biodiversity point to a challenging future for conservation. The combined pressure of human induced and natural threats – the latter predicted to be increasing with greater intensities – acting on an island environment already plagued with intrinsic ecological fragility, point to an ecological future fraught with uncertainties. Samoa's own customary land tenure makes conservation actions doubly difficult and time consuming.

The implication for conservation management is simple - there is no other recourse but to act decisively, proactively and strategically. The Government should seize all opportunities to declare for protection all remaining state owned forests and land of ecological significance, as soon as possible. At the same time, it should engage local communities fully using strategies that are innovative and generating side benefits to local resource owners, to ensure the full protection of ecosystems and species of priority on customary lands and coastal areas. The success of village based fisheries reserves suggest that many communities understand the gravity of their situations, and are willing to take on the responsibility of conservation and sustainable management of marine resources. But again this commitment needs to be reinforced by the use of innovative strategies that will generate side benefits in the short term, to encourage and facilitate sustainability.

The legal and policy framework for biodiversity conservation is significantly in place, thus there is no constraints preventing government agencies from being proactive and innovative, to find new strategies that are more effective in the face of the daunting challenges of threats and customary ownership of areas of conservation priority.

### **7.1 Implications for Forests ecosystems**

The remaining critical forest ecosystems most of which are on customary owned lands face the internal threat of overexploitation from economically rational individuals operating under open access resource use rules. Added to this pressure are government policies promoting the expansion of commercial agriculture.

The declining trend in logging is predicted to taper off and plateau at a low level but continuing still. Using mobile chainsaw mills, a low level of logging of remnant forests in and around agricultural areas will continue to chip away at the forest edge, pushing in vulnerable fauna species and creating open conditions preferred by many invasive weeds and creeping vines.

Efforts by the Government through MNRE to set aside areas for protection as parks and reserves are commendable. The designation of Mauga-o-Salafai as a national park is a proactive strike at securing areas legally defined as state owned. This proactive approach should be extended to other similar areas, including the upland areas of Lata and Salailua.

### **7.2 Implications for Marine ecosystems**

The overexploitation of inshore fisheries, the reef edge and drop-off zones will continue where open access use regimes exist. However the increase in the number of community based fisheries reserves is a welcome development and one that should be encouraged and supported at all costs. There is anecdotal evidence of increases in fish stocks and species diversity around no-take zones that is already benefiting local communities (Reti, 2008 pers comm.). Lovell (op cit) also suggests that the rapid recovery capacity of corals and fish biomass suggests that even the occasional opening up of reserves for community harvesting should be sustainable.

The Aleipata MPA is facing a challenge with the construction in its midst of a marine slipway for ship repairs. The 2009 tsunami that struck Samoa destroyed this facility a few weeks after its official opening. It may bring about a permanent stop to this endeavour, otherwise, the impacts of waste discharge from the slipway, and an increase in shipping traffic through this area will add pressure to the fragile marine ecosystems being protected. Both the Aleipata and Safata MPAs need Government and public support.

The possibility of additional district level collaboration to create new MPAs should be explored. Many adjoining villages are already managing fisheries reserves projects, using almost identical bylaws and management system. The foundation on which to base the scaling up to a district level MPA is therefore in place.

### **7.3 Implications for Agrobiodiversity**

The SDS 2008-2012's call for greater commercial agricultural expansion for exports suggest Samoa's recent expansion of its agrobiodiversity gene pool is likely to increase, possibly more in terms of improving newly introduced species and varieties for improved yield, quality and disease resistance.

### **7.4 Implications for Marine Diversity**

Similar trends are observed in marine resources wherein imported clams from American Samoa and Fiji were introduced to assist with restocking local reefs. A new species of Tilapia was introduced for aquaculture development in the late 1990s. The existing policy emphasis on food security and exports suggests this trend will continue.

### **7.5 Implications for Freshwater biodiversity**

Recent studies of freshwater fauna (Jenkins et al, op cit) highlights the need for more studies. A follow up of the initial study at the Afulilo fall and reservoir is necessary to establish the status of several species identified in 1991.

### **7.6 Implications for Endemic Species**

Several endemic terrestrial bird species currently endangered will continue to be under pressure as forest habitats are degraded. It is important and urgently necessary that their statuses are confirmed soonest with appropriate actions taken to ensure their protection. There is positive outlook for species conservation if the Aleipata Islands is rid of the Pacific rat and other invasives, as a possible sanctuary for some birds species, and turtles.



## **CHAPTER II. CURRENT STATUS OF NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS (NBSAP)**

### **1. Samoa's national biodiversity strategy and action plan (NBSAP)**

#### **1.1 Overview**

Samoa's NBSAP was formally approved by the Samoa Government (Cabinet) in April 2001. This culminates a planning process that began in March 1998 when the funding proposal for its development was approved by UNDP, to its official launching on May 2001 on World Biodiversity Day.

The NBSAP was formulated through a multi-sectoral and broadly consultative process involving representatives of various government agencies and NGOs, and national and international experts.<sup>17</sup> The process was led by a Steering Committee with members drawn from senior representatives of the main departments or agencies of the Government, corporations, statute bodies as well as relevant NGOs. In all, 19 Department and Ministries were represented, 3 corporations, 2 statute bodies and 8 NGOs contributed as members.

A vital part of the NBSAP formulation process was the work of Technical Groups. Members of the Steering Committee were organized into five Technical Groups who were then tasked with documenting available pertinent information, identifying key issues, and making recommendations of appropriate actions that were considered for the final Strategy and Action Plan. The five Technical Groups were -

1. Conservation Group
2. Biodiversity Review Group
3. Biodiversity Use Group
4. Financial Resources and Mechanisms Group
5. Legal and Policy Frameworks Group.

#### **1.2 NBSAP Framework – vision, themes, objectives and targets**

Samoa's NBSAP sets out the following vision –

“Samoa's biological and genetic resources are protected, conserved and sustainably managed so that they will continue to flourish and regenerate, for present and future generations.”

In pursuit of this vision, the NBSAP defines objectives, goals, and actions organized under the following 8 themes

1. Mainstreaming biodiversity
2. Ecosystem Management
3. Species Management
4. Community – empowerment, awareness, involvement, ownership and benefits
5. Access and benefit sharing from use of genetic resources
6. Biosecurity
7. Agrobiodiversity
8. Financial resources and mechanisms.

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<sup>17</sup> In particular advisory services were given by representatives of three intergovernmental organizations in the Pacific: the World Wildlife Fund for Nature (WWF); Secretariat for the Pacific Regional Programme for the Environment (SPREP) and the United Nations Development Programme (Apia).

With reference to the Convention on CBD, the following CBD thematic areas and cross-cutting issues are covered -

**Table 12: CBD Thematic Areas**

✓	Agricultural biodiversity
×	Dry and sub-humid lands biodiversity (not applicable)
✓	Forest biodiversity
✓	Inland waters biodiversity
✓	Island biodiversity
✓	Marine and coastal biodiversity
×	Mountain biodiversity (not applicable)

**Table 13: Cross-cutting issues -**

✓	Access to genetic resources and benefit sharing
✓	Alien invasive species
✓	Biological diversity and tourism
✓	Climate change and biological diversity
✓	Economics, trade and incentive measures
✓	Ecosystem approach
×	Global Strategy for Plant Conservation
×	Global Taxonomy Initiative
✓	Impacts Assessment
×	Indicators
×	Liability and redress (Art 14.2)
✓	Protected areas
✓	Public education and awareness
✓	Sustainable use of biodiversity
✓	Technology transfer and cooperation
✓	Traditional knowledge, innovation and practices

Carter, E. 2007. *The Pacific Regional Review of NBSAPs*. SPREP.

### 1.3 NBSAP – the Actionable Sections

At the heart of the NBSAP are the actionable sections – the Strategy and Action Plan - which are organized as follows:

- Theme
- Strategy Goal
- Objective(s)

Monitoring Goal

Actions

In all, the NBSAP has the following themes, goals, and objectives

**Table 14: Summary of Samoa’s NBSAP: theme, goals and objectives**

<b>Theme 1 – Mainstreaming Biodiversity</b>	
Strategy Goal - The conservation and sustainable use of biodiversity, which is vital to the development of Samoa, is integrated into national, sectoral and cross-sectoral plans, policies and programmes.	
Objective 1 – Policy	To integrate concepts of conservation and sustainable use of biodiversity into all relevant sectoral policies, programmes and plans.
Objective 2 – Multisectoral collaboration	To improve and strengthen Multi-sectoral collaboration in promoting conservation and sustainable use of biodiversity in Samoa.
Objective 3 - Legislation	To ensure that appropriate legislation is developed and effectively enforced to sustainably manage Samoa’s biodiversity.
Objective 4 – Environmental Impact Assessment	To ensure that EIAs are conducted for all development projects to minimize any adverse impacts on Samoa’s biodiversity.
Objective 5 – Capacity Building	To develop and enhance local capacity to ensure the effective implementation and enforcement of policies and legislation for the conservation and sustainable use of Samoa’s biodiversity.
<b>Theme 2 – Ecosystem Management</b>	
Strategic Goal – To increase the percentage of Samoa’s protected and conserved areas from the existing 10% of total land, including coastal areas.	
Objective 1 – Research and Monitoring	To promote and encourage research for the identification, documentation and monitoring of Samoa’s ecosystems for the implementation of appropriate management programmes.
Objective 2 – Conservation Areas	To enhance the management of existing protected areas and establish new ones to increase coverage of protected areas to 15% and achieve a full representation of Samoa’s ecosystems.
Objective 3 – Sustainable use of ecosystems	To develop and effectively manage programs that promote the sustainable use of Samoa’s ecosystems.
Objective 4 – Capacity Building	To develop and enhance local capacity to ensure the sustainable management of Samoa’s ecosystems.
Objective 5 – Public awareness and education	To increase public awareness and understanding on the importance of Samoa’s ecosystems to ensure their sustainable management.
<b>Theme 3 - Species Management</b>	
Strategy Goal – To promote the conservation of Samoa’s native and other important species and provide mechanisms for their sustainable use.	
Objective 1 – Conservation of Species	To enhance the status of native and other important species in Samoa through effective conservation programmes.

Objective 2 - Research and monitoring	To promote and encourage research for the identification, documentation and monitoring of species and the implementation of appropriate conservation and management programmes.
Objective 3 – Sustainable use and management of species.	To ensure the sustainable use and management of species for social and economic development.
Objective 4 - Public awareness and education	To enhance knowledge and understanding of the public on the conservation, sustainable use and management of species.
Objective 5 - Capacity Building	To enhance and strengthen the capacity of all Samoans to ensure the sustainable use, management and conservation of native and other important species.
<b>Theme 4 - Community</b>	
Strategy Goal – Empowering and encouraging traditional communities to protect, conserve and sustainably use and manage our biodiversity.	
Objective 1 – Traditional knowledge, Practices and Innovation	Preserve traditional knowledge and practices of Samoa that are important for the protection, conservation and sustainable use of biodiversity.
Objective 2 - Empowering communities	Empower communities to conserve and sustainably manage biodiversity under customary resource tenure.
Objective 3 - Public awareness and education	To promote, encourage and strengthen awareness and understanding of local communities on the importance of protecting, conserving and ensuring sustainability of any use of biodiversity, through appropriate awareness campaigns and educational programmes.
Objective 4 – Capacity building	To build the capacity of traditional communities in the coordination and implementation of conservation and appropriate biodiversity programmes.
<b>Theme 5 – Access &amp; Benefit Sharing from use of genetic resources</b>	
Strategy Goal - Samoa’s genetic resources are accessible for utilization and benefits derived are equitably shared amongst the stakeholders.	
Objective 1 – Access to and equitable sharing of benefits of genetic resources	To establish appropriate national measures to effectively access genetic resources and carry out fair and equitable sharing of benefits from the use of these resources.
Objective 2 - Public awareness and education	To raise awareness and understanding of all Samoans on Access and Benefit Sharing from the use of genetic resources.
<b>Theme 6 - Biosecurity</b>	
Strategy Goal – To protect Samoa’s native biodiversity from impacts of alien invasive species, through effective border control, effective quarantine and eradication programmes.	
Objective 1 – Policy and Legislation	To develop appropriate policies and legislation to ensure the effective management of biodiversity.
Objective 2 – Control and Eradication	To identify and develop appropriate programmes to ensure effective control and eradication of pest outbreaks.
Objective 3 – Research and Monitoring	To carry out systematic and scientific research based on regular monitoring of the biosecurity management system.

Objective 4 – Capacity Building	To strengthen capacity of local staff through the implementation of relevant training programmes to ensure effective border control and quarantine services.
Objective 5 – Public awareness and education	To enhance knowledge and understanding of the public on the importance of protecting and conserving our biodiversity from the impacts of alien species.
<b>Theme 7 – Agrobiodiversity</b>	
Strategy Goal – The conservation and sustainable use of agrobiodiversity contributes to national development and the preservation of traditional knowledge and practices.	
Objective 1 – Conservation and sustainable use of agrobiodiversity	To ensure the effective implementation of appropriate conservation measures for the sustainable use of agrobiodiversity.
Objective 2 – Research and development	To conduct relevant research critical to the development of agrobiodiversity.
Objective 3 – Food and health security	To fully enhance and strengthen the critical importance of food and health security through the use of sustainable agrobiodiversity practices.
Objective 4 – Public awareness and education	To raise awareness and understanding of agrobiodiversity through both formal and informal educational programmes.
Objective 5 – Capacity building	To strengthen human and institutional capacity to ensure the effective implementation of agrobiodiversity programmes.
<b>Theme 8 – Financial Resources and Mechanisms</b>	
Strategy Goal – To secure the long term financial sustainability of all conservation and biodiversity related programmes by way of access to funding mechanisms from local and international sources.	
Objective 1 – Financial Plans	To develop long term financial plans for undertaking conservation programmes.
Objective 2 – Conservation Trust Fund	To establish a conservation trust fund for the implementation of the NBSAP and relevant biodiversity work.
Objective 3 – Economic valuation	To undertake an economic valuation of Samoa’s biodiversity.
Objective 4 – Information systems	To establish information systems of all potential donor assistance.
Objective 5 - Income generating activities	To identify and promote sustainable income generating activities for the community.
Objective 6 - Partnership	To strengthen the partnership with the private sector, NGOs and local communities.
Objective 7 – Accounting system	To establish an accounting system for recording revenues and expenditures for biodiversity related activities.
Objective 8 – Capacity Building	To strengthen the local capacity in the coordinating and implementation of biodiversity and conservation projects.
Objective 9 – Public awareness	To raise public awareness of existing and potential financial resources.

#### 1.4 Incorporation of CBD Targets and Indicators

The Samoa NBSAP contains an Implementation Monitoring Matrix developed to facilitate the effective and timely implementation of prescribed actions and the reporting of progress. The full matrix is

appended (refer to Annex \_). The monitoring matrix sets out, for each Strategic Objective, intended outcomes, indicators and means of measurements. The indicators are recommended for measurement after every two years<sup>18</sup>.

Have CBD adopted targets and indicators been incorporated into the NBSAP?

The full suite of CBD indicators is only partially reflected in Samoa’s NBSAP. Several are consistent with NBSAP indicators but some are not. Several are similar but with subtle but important differences. For instance, several CBD indicators monitor trends over time; some NBSAP indicators tend to measure changes between two measuring points. For instance, the CBD indicators for ‘area under protection’ are (i) coverage of protected areas (ii) trends in extent of selected biomes, ecosystems and habitats and (iii) trends in abundance and distribution of selected species. In comparison, NBSAP indicators for the same goal are (i) the number, year established, and size of conservation/protected area and (ii) number of conservation areas with effective management in place. The differences mean that results of national level monitoring using the existing indicators will require a certain amount of processing to be fully consistent and useable in the context of determining global trends.

The table below identifies NBSAP indicators corresponding to CBD adopted ones. The matches are not always perfect and many are approximates or ‘near-fits’.

**Table 15: Have CBD indicators been incorporated into Samoa’s NBSAP?**

Goals and Targets	(CBD adopted) Relevant indicators	Have CBD indicators been incorporated into Samoa’s NBSAP <sup>19</sup> ?
<b>Protect the components of biodiversity</b>		
<b>Goal 1: Promote the conservation of the biological diversity of ecosystems, habitats and biomes</b>		
Target 1.1 At least 10% of each of the world’s ecological regions effectively conserved	<ul style="list-style-type: none"> <li>• Coverage of protected areas</li> <li>• Trends in extent of selected biomes, ecosystems and habitats</li> <li>• Trends in abundance and distribution of selected species</li> </ul>	<ul style="list-style-type: none"> <li>• YES; Indicators 1.2.2a;1.2.2b</li> <li>• YES; Indicator 1.2.3a;</li> <li>• YES; Indicator 1.2.1</li> </ul>
Target 1.2. Areas of particular importance to biodiversity protected	<ul style="list-style-type: none"> <li>• Trends in extent of selected biomes, ecosystems and habitats</li> <li>• Trends in abundance and distribution of selected species</li> <li>• Coverage of protected areas</li> </ul>	<ul style="list-style-type: none"> <li>• YES; Indicator 1.2.3a</li> <li>• YES; Indicator 1.2.1</li> <li>• YES; Indicators 1.2.2a; 1.1.1b</li> </ul>
<b>Goal 2. Promote the conservation of species diversity</b>		
Target 2.1. Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups	<ul style="list-style-type: none"> <li>• Trends in abundance and distribution of selected species</li> <li>• Change in status of threatened species</li> </ul>	<ul style="list-style-type: none"> <li>• YES; Indicator 1.2.1</li> <li>• YES; Indicators 1.1.2; 1.1.3</li> </ul>
Target 2.2. Status of threatened species improved	<ul style="list-style-type: none"> <li>• Change in status of threatened species</li> <li>• Trends in abundance and distribution of selected species</li> <li>• Coverage of protected areas</li> </ul>	<ul style="list-style-type: none"> <li>• YES; Indicators 1.1.2; 1.1.3</li> <li>• YES; Indicator 1.2.1</li> <li>• YES; Indicators 1.2.2a; 1.2.2b</li> </ul>
<b>Goal 3. Promote the conservation of genetic diversity</b>		
Target 3.1. Genetic diversity of crops, livestock, and of harvested species of trees, fish	<ul style="list-style-type: none"> <li>• Trends in genetic diversity of domesticated animals, cultivated plants, and fish</li> </ul>	<ul style="list-style-type: none"> <li>• NO.</li> </ul>

<sup>18</sup> Unless otherwise indicated.

<sup>19</sup> Numbers shown in the table are of indicators in the Samoa NBSAP Monitoring Matrix.

and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained	<ul style="list-style-type: none"> <li>species of major socio-economic importance</li> <li><i>Biodiversity use in food and medicine (indicator under development)</i></li> <li>Trends in abundance and distribution of selected species</li> </ul>	<ul style="list-style-type: none"> <li>NO.</li> <li>YES. Indicator 1.2.1</li> </ul>
<b>Promote sustainable use</b>		
<b>Goal 4. Promote sustainable use and consumption</b>		
Target 4.1. Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity	<ul style="list-style-type: none"> <li>Areas of forest, agricultural and agriculture ecosystems under sustainable management</li> <li><i>Proportion of products derived from sustainable sources (indicator under development)</i></li> <li>Trends in abundance and distribution of selected species</li> <li>Marine trophic index</li> <li>Nitrogen deposition</li> <li>Water quality in aquatic ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>NO.</li> <li>NO.</li> <li>YES. Indicator 1.2.1</li> <li>YES. Indicator 1.2.3b.</li> <li>NO.</li> <li>NO.</li> </ul>
Target 4.2. Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced	<ul style="list-style-type: none"> <li>Ecological footprint and related concepts</li> </ul>	<ul style="list-style-type: none"> <li>YES. Indicator 1.2.3b</li> </ul>
Target 4.3. No species of wild flora or fauna endangered by international trade	<ul style="list-style-type: none"> <li>Change in status of threatened species</li> </ul>	<ul style="list-style-type: none"> <li>YES. Indicators 1.1.2; 1.1.3</li> </ul>
<b>Address threats to biodiversity</b>		
<b>Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.</b>		
Target 5.1. Rate of loss and degradation of natural habitats decreased.	<ul style="list-style-type: none"> <li>Trends in extent of selected biomes, ecosystems and habitats</li> <li>Trends in abundance and distribution of selected species</li> <li>Marine trophic index</li> </ul>	<ul style="list-style-type: none"> <li>YES. Indicators 1.2.3a; 1.2.3b</li> <li>YES. Indicator 1.2.1</li> <li>YES. Indicator 1.2.3b</li> </ul>
<b>Goal 6. Control threats from invasive alien species</b>		
Target 6.1. Pathways for major potential alien invasive species controlled	<ul style="list-style-type: none"> <li>Trends in invasive alien species</li> </ul>	<ul style="list-style-type: none"> <li>YES. Indicator 1.1.2</li> </ul>
Target 6.2. Management plans in place for major alien invasive species that threaten ecosystems, habitats or species	<ul style="list-style-type: none"> <li>Trends in invasive alien species</li> </ul>	<ul style="list-style-type: none"> <li>YES. Indicator 1.1.1.</li> </ul>
<b>Goal 7. Address challenges to biodiversity from climate change and pollution</b>		
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change	<ul style="list-style-type: none"> <li>Connectivity / fragmentation of ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>Indicators 1.1.2 and 1.2.3b.</li> </ul>
Target 7.2. Reduce pollution and its impacts on biodiversity	<ul style="list-style-type: none"> <li>Nitrogen deposition</li> <li>Water quality in aquatic ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>NO.</li> <li>YES. Implicit in 1.2.3b</li> </ul>
<b>Maintain goods and services from biodiversity to support human well-being</b>		
<b>Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods</b>		
Target 8.1. Capacity of ecosystems to deliver goods and services maintained	<ul style="list-style-type: none"> <li>Biodiversity used in food and medicine (indicator under development)</li> </ul>	<ul style="list-style-type: none"> <li>NO.</li> </ul>

	Water quality in aquatic ecosystems Marine trophic index Incidence of Human-induced ecosystem failure	<ul style="list-style-type: none"> <li>• YES. Implicit in 1.2.3b</li> <li>• Yes. Indicator 1.2.3b</li> <li>• NO.</li> </ul>
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.	<ul style="list-style-type: none"> <li>• Health and well-being of communities who depend directly on local ecosystem goods and services</li> <li>• <i>Biodiversity used in food and medicine</i></li> </ul>	<ul style="list-style-type: none"> <li>• NO.</li> <li>• NO.</li> </ul>
<b>Protect traditional knowledge, innovations and practices</b>		
<b>Goal 9. Maintain socio-cultural diversity of indigenous and local communities</b>		
Target 9.1. Protect traditional knowledge, innovations and practices	<ul style="list-style-type: none"> <li>• Status and trends of linguistic diversity and numbers of speakers of indigenous language</li> </ul>	<ul style="list-style-type: none"> <li>• No corresponding NBSAP indicator. Proposed CBD indicator not applicable.</li> </ul>
Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing	<i>Indicator to be developed</i>	<ul style="list-style-type: none"> <li>• NO NBSAP indicator.</li> </ul>
<b>Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources</b>		
<b>Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resource</b>		
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.	<i>Indicator to be developed</i>	YES. Indicator 4.4.1
Target 10.2. Benefits arising out of from the commercial and other utilisations of genetic resources shared in a fair and equitable way with countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions.	<i>Indicator to be developed</i>	<ul style="list-style-type: none"> <li>• YES. Indicator 4.4.1.</li> </ul>
<b>Ensure provision of adequate resources</b>		
<b>Goal 11. Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention</b>		
Target 11.1. New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.	<ul style="list-style-type: none"> <li>• Official development assistance provided in support of the Convention</li> </ul>	<ul style="list-style-type: none"> <li>• YES. Indicators 6.2.1; 6.2.2</li> </ul>
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under	<i>Indicator to be developed</i>	<ul style="list-style-type: none"> <li>• NO.</li> </ul>



the Convention, in accordance of Article 20, paragraph 4.		
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In summary, of the 38 indicators monitoring 21 targets under 11 CBD goals, 28 indicators addressing 18 targets are similar or comparable. Samoa’s NBSAP do not have indicators corresponding to those monitoring CBD Goals 3,4,7,8, 9 and 11. For Targets 10.1 and 10.2 where CBD are still developing indicators, the NBSAP has identified indicators.

The above discussion points to the importance of having compatibility between NBSAP and CBD level indicators in order for national results to contribute to the tracking of global trends. The lack of complete congruence between those of the Samoa NBSAP and CBD should be addressed with a view to improving consistency. This needs to be done before the next National Report is due.

## 2. How NBSAP Activities contribute to the Implementation of various Articles of the CBD and the thematic programmes and cross-cutting Issues adopted under the Convention.

In this section, the matrix below does two things – (i) it lists those NBSAP activities assessed to be addressing the various specific articles of the Convention, and (ii) it assesses whether or not any progress has been made in implementing them. Note that the assessment of progress in implementation is not made using the NBSAP indicators. No proper monitoring of the NBSAP was done using its own suite of indicators. Information used to assess the extent to which each NBSAP action is implemented is derived from various Government reports (e.g. SOE), the previous CBD national reports, reports and assessments by other development partners and information received in the course of consultations with various officials and experts for this exercise. Consequently, assessment of progress is largely based on the level of activities or projects either completed or in progress, as opposed to the actual change or impact resulting from that activity.

**Table 16: CBD Articles and Corresponding NBSAP Actions Addressing them**

Article 6 – General measures for conservation and sustainable use -	Overview of progress made in implementation of priority activities
Article 6 called for the development of national strategies, plans or programmes for the conservation and sustainable use of biodiversity or adapt for this purpose existing strategies.	<p>✓The following natural resources and environmental policies have been formulated and are being implemented –</p> <ul style="list-style-type: none"> <li>i. NBSAP – the main biodiversity conservation Plan.</li> <li>ii. National Water Resources Management Strategy 2007-2017</li> <li>iii. National Water Resources Policy,</li> <li>iv. National Policy on the Conservation of Biological Diversity</li> <li>v. Population Policy,</li> <li>vi. Land Use Policy</li> <li>vii. Waste Management Policy,</li> <li>viii. Coastal Infrastructure Management (CIM) Strategy 2000</li> <li>ix. CIM Plans (Districts)</li> <li>x. Coastal Infrastructure Management Plans (Districts)</li> </ul>

	<ul style="list-style-type: none"> <li>xii. National Heritage Conservation Policy and</li> <li>xiii. National Biosafety Framework</li> <li>xiv. Water for Life – Sector Plan and Framework for Action 2008/9-2012</li> </ul> <p>✓ Coastal Infrastructure Management (CIM) Plans covering the entire country are being used at national level, as well as guiding the allocation of funds in various community based small grants schemes targeting environmental conservation generally.</p> <p>» The first area specific Sustainable Management Plans (SMPs) stipulated under the EIA Regulation is in the early formulation stages.</p>
<b>Article 7 – Identification and Monitoring</b>	
<i>Relevant NBSAP actions under Theme 2 Ecosystem Management Objective 1 – Research and Monitoring</i>	<i>Progress in implementation to date</i>
<p>1.4 Develop and implement a long term monitoring programme for Samoa’s native ecosystems including invasive species.</p>	<p>✓ MNRE-Forestry SAMFris Project developed a GIS based data management system that generates mapping data and information on the extent of forests and protected area coverage.</p> <p>✓ Species monitoring were conducted of the following rare mammals and bird species –</p> <ul style="list-style-type: none"> <li>• the sheath-tailed bat (<i>Emballonura semicaudata</i>) is considered close to extinction after a 3-year survey of lava caves found only five individuals.</li> <li>• Hawksbill turtles were surveyed in 2003/04 on the two offshore islands that are the key nesting sites.</li> <li>• A small-scale private search for the possibly extinct Samoan woodhen or moorhen (<i>Gallinula pacifica</i>) failed to find any sign of the bird though large areas of potential habitat remain unsurveyed.</li> <li>• DEC undertakes monitoring similar monitoring in 05/06 and 08/09 on Aleipata Islands.</li> <li>• A nationwide survey was conducted for tooth-billed pigeon and mao and indications are that the situation of these two species may not be critical.</li> </ul> <p>✓ MAF-Fish supports a monitoring of inshore</p>

	<p>fisheries for the existing network of village based fisheries reserves under its Village Level Monitoring.</p> <p>✓ Regular Reef Checks by MAF monitors against outbreaks of coral bleaching and crown-of-thorns.</p> <p>✓ DEC conducts similar monitoring in the Aleipata and Safata MPAs; including of monitoring of coral bleaching and COT outbreaks.</p> <p>✓ MNRE National Invasive Alien Species Implementation Action Plan (2005)</p> <ul style="list-style-type: none"> <li>• CI-SPREP/NZDoC funded Aleipata Islands Restoration Project monitors rodents population as part of its invasive species management activities.</li> <li>• MAF on-going monitoring programme for the Giant African snail.</li> <li>• MNRE-SPREP-MAF Myna Control Project monitors and seeks to control myna bird populations.</li> <li>• MNRE trial eradication of <i>Merremia peltata</i> vine.</li> <li>• MNRE also undertook a survey within the Apia harbour to identify invasive/introduced species and the status</li> </ul>
<p>1.5 Develop a list of priority research topics and monitoring techniques to be used by students and staff of natural resource sectors.</p>	<p>≠ <b>No</b> formally approved list of priority research projects exists, but a broad range of research and studies have been completed and are in progress. For instance, MNRE lists on its website 19 research projects being implemented in all areas within its broad mandate including seven (7) directly related to biodiversity conservation. (<a href="http://www.mnre.gov.ws">www.mnre.gov.ws</a>)</p>
<p>1.7 Develop a programme for the identification of genetic resources from Samoa's biological resources.</p>	<p>✓ There is no comprehensive genetic resources identification programme, but two initiatives of different scopes had taken place –</p> <ul style="list-style-type: none"> <li>- AIDS Research Alliance (ARA) and Government of Samoa (2001) collaboration on mamala (<i>Omalanthus natus</i>) for HIV-AIDS treatment.</li> <li>- Samoa-Japanese Cooperative Botanical Inventory Programme by National University of Samoa and Nihon University, Japan (1998-2000).</li> </ul>
<p>1.8 Develop and implement a programme of monitoring the</p>	<p>✓ Samoa's National Adaptation Programme of Action (NAPA) was approved in September 2005,</p>

<p>impacts on biological diversity from climate change.</p>	<p>and submitted to the UNFCCC Secretariat in December 2005.</p> <p>✓ NAPA implementation began in earnest in 2006, with funding solicitation for 9 targeted projects. Three of these projects directly promote the restoration of ecosystems through reforestation, agro-biodiversity sustainability in relations to food security and conservation of highly vulnerable marine and terrestrial areas. Project implementation continues.</p>
<p><b>Article 8: In-situ conservation</b></p>	
<p><i>Relevant NBSAP Actions under Theme 2 (Ecosystem Management) Objective 2 (Conservation Areas)</i></p>	<p><i>Progress in Implementation to date</i></p>
<p>1.4 Develop and implement management plans for the existing protected areas in Samoa</p>	<p>✓ JICA (2007-2010) funded project is currently in progress for the formulation of management plans for the Le Pupū Puē NP and the Vailima Reserve.</p> <p>✓ Management also have been completed for the Aleipata and Safata MPAs.</p>
<p>1.5 Establish conservation areas in under represented ecosystems e.g. mangrove areas.</p>	<p>✓ Eleven (11) GEF-SGP community based conservation projects targeting mangroves (5) and coral reefs (6) received funding between 2007-2008.</p>
<p>1.6 Establish large conservation areas which include more than one ecosystem, in high priority sites identified in lowland and upland ecological surveys such as Aopo, Sili, Salailua, and Eastern Upolu, utilizing community management approaches.</p>	<p>✓ Two MPAs (Aleipata MPA and Safata MPA) protecting reefs, lagoons, coastal forest areas previously reported in NR3 continues under management.</p> <p>✓ Two National Parks were established since the adoption of the NBSAP: Lake Lanoto’o National Park in 2003 an area of 201 ha on the ridge of Upolu island, and Mauga o Salafai an area of 5,974 ha on the eastern uplands of Savaii island.</p> <p>✓ Preliminary studies and consultative planning for the conservation of the Sasina-Aopo-Salailua Upland Forest were conducted in 2007. Funding for full implementation is being sought; a local land dispute is posing an unexpected threat.</p>
<p>1.7 Encourage the development of a representative system of marine protected areas built upon the existing programmes.</p>	<p>✓ MAF-Fish maintains technical support for fisheries reserves established under Village Fisheries Extension Programme.</p> <p>✓ GEF-SGP community based marine reserves in 6 new communities in 2007-2008.</p>

	<ul style="list-style-type: none"> <li>✓ A total of 117 fisheries (Hay et al 2007) reserves/marine conservation areas have been established since the start of the Samoa Fisheries Project (1990) with 70% of reserves established still functional.</li> </ul>
1.7 Develop appropriate information systems such as GIS to store and share information of ecosystems and protected areas.	<ul style="list-style-type: none"> <li>✓ FAO funded SAMFris Project (2004) now gives MNRE-Forestry GIS based data and information system, and capability to apply these to protected area management.</li> </ul>
1.8 Extend the watershed programme to all areas and the smaller village-based water catchment areas.	<ul style="list-style-type: none"> <li>✓ Watershed management planning is in progress for the Fuluasou and Apia watersheds with investigations in progress to extending planning to the main watersheds in the country.</li> <li>✓ National Water Resources Management Strategy 2007-2017 promotes the control, management and protection of water resources.</li> </ul>
1.9 Develop and implement programmes for the restoration of degraded ecosystems such as the Vaitoloa rubbish dump, mangrove area and watershed areas.	<ul style="list-style-type: none"> <li>✓ Programme for restoring degraded ecosystems is under implementation by MNRE. E.g. Vaitele Quarry site - landscaping and replanting completed; Vaitoloa site – landscaping completed; mangrove replanting continuing.</li> <li>✓ GEF-SGP with NZAID and AusAID co-financing is supporting rehabilitation of coastal ecosystems with the establishment of marine reserves and replanting of mangroves and corals.</li> </ul>
1.10 Formulate the conservation of biodiversity in traditional sites identified as important to tourism.	<ul style="list-style-type: none"> <li>✗ No concrete actions taken to date.</li> </ul>
<i>Theme 3 - Species Management ; Objective 1 – Conservation of Species</i>	<i>Progress in Implementation</i>
1.1 Establish and maintain a complete threatened species list for Samoa and provide regular updates to appropriate regional and international organizations directories.	<ul style="list-style-type: none"> <li>✓ Last comprehensive study of Samoan birds by Arthur Dahl (1980); identified 14 ‘rare and endangered’ species.</li> <li>✓ 1999 Upland Survey (Schuster, et al. 1999) updated status of several birds.</li> <li>✓ Listings in IUCN’s Red List of Endangered Birds regularly updated.</li> <li>✓ A. Whistler (1992) study of Samoa’s flora listed 136 potentially threatened or endangered species.</li> </ul>
1.2 Review list of threatened species to determine those appropriate for recovery programmes (including propagation) and develop and implement	<ul style="list-style-type: none"> <li>✓ Two endemic species considered threatened - Manumea (<i>Didunculus strigirostris</i>) and Ma’oma’o (<i>Gynnomys samoensis</i>) are the target of a project supported by MNRE, World Wildlife Society and</li> </ul>

these programmes.	<p>Australia Regional National Heritage Programme (ARNHP) (2006).</p> <ul style="list-style-type: none"> <li>✓ 2004-2005 MNRE surveys of rare species of Mao, hawksbill turtle, sheath-tailed bat, Samoa moorhen, toothbilled pigeon has since clarified the statuses of these species.</li> <li>✓ A number of endemic and native forest tree species are conserved as part of the AusAID funded Pacific Regional Initiative on Forest Genetic Resources (SPRIG) (2005).</li> <li>✓ MNRE's project on properties and uses of indigenous hardwood species of Samoa.</li> </ul>
1.3 Assess the need for Samoa's participation in international and regional efforts to protect migratory species.	<ul style="list-style-type: none"> <li>✓ Samoa supported the establishment of the South Pacific Whales Sanctuary (2002).</li> <li>✓ Samoa declared its EEZ as a sanctuary for whales, dolphins, turtles and sharks in 2002.</li> <li>✓ Samoa has also signed a MoU on the protection of cetaceans.</li> <li>✓ Samoa actively supported and participated in the SPREP coordinated conservation of sea turtles campaign 2006/2007.</li> <li>✓ Samoa is party to CITES and actively enforces protection of sea turtles from illegal trading.</li> </ul>
<b>Article 9: Ex-situ conservation</b>	
<i>NBSAP Theme 3 Objective 1 – Conservation of Species</i>	<b><i>Progress in Implementation to date</i></b>
1.3 Fully develop botanical gardens to house collections of Samoa's native plant species.	<ul style="list-style-type: none"> <li>✓ IUCN-WCPA's database lists 1 botanical reserve (Vailima Reserve) and 4 reserves established in Samoa (2009), and 14 other protected areas.</li> <li>✓ From 1999 to 2007, MNRE established 13 reserves including the Fuluasou Botanical Garden (20 acres).</li> </ul>
1.5 Explore the feasibility of establishing captive breeding spawning programmes as a security from the impacts of natural disasters and alien invasive species introductions.	<ul style="list-style-type: none"> <li>✓ Aleipata Islands Restoration Project (SPREP ,NZDoC, CI and MNRE – 2009) is actively eradicating rodents as a requisite for using these islands as sanctuary for endemic and rare bird species.</li> </ul>
1.6 Explore and assess the feasibility of setting up an aquarium/zoo for conservation of species.	<ul style="list-style-type: none"> <li>✗ No concrete actions taken to date</li> </ul>

<b>Article 10: Sustainable use of components of biological diversity</b>	
<i>Theme 2 – Ecosystem management Objective 3 – Sustainable use of ecosystems</i>	<i>Progress in Implementation to Date</i>
3.1 Develop guidelines for the sustainable use of biodiversity resources through activities such as eco-tourism, and the marketing of non-timber forests and other natural products.	✓ The GEF funded South Pacific Biodiversity Conservation Programme (SPBCP) published a Tool Kit for Community based Ecotourism and Conservation in the Pacific Islands (2003) drawing on the experience and lessons learned from 12 Pacific Islands including Samoa (2001).
3.2 Undertake economic valuation of ecosystem services for terrestrial, aquatic and marine area use.	✓ Economic valuation of Samoa's various ecosystems and species was completed as part of NBSAP process (2001).
3.3 Identify sustainable management options for the cultivation of land.	≠ There is no national land use management plan identifying sustainable management options ✓ The National Fruits and Vegetables Strategy (2009) prescribes specific measures to promote sustainable land management and environmental sustainability.
3.4 Identify options to allow all marine biodiversity to be managed sustainably.	✓ The Community Based Fisheries Management Programme (1995-2001) pioneered the establishment of village fisheries reserves which promoted the sustainable management of inshore fisheries resources. The Samoa Government continues to support this initiative to date. ✓ The GEF-SGP with NZAID co-financing supports marine conservation area using the same approach. ✓ A district level approach is promoted by the IUCN Aleipata and Safata MPAs.
3.5 Develop and promote integrated management approaches for all lands under customary tenure.	✓ Coastal Infrastructure Management (CIM) Plans developed under the World Bank funded Samoa Infrastructure Asset Management Project Phases I and II (SIAM I & II) Project, covers the entire coastal areas of Samoa (2001-2008). ✗ The PUMA Act 2004 stipulates the formulation of Sustainable Management Plans (SMPs) but no concrete progress has been made to date.
3.6 Develop and implement integrated coastal management programmes.	✓ CIM Plans are in place for all districts of Samoa. ✓ These CIM plans are increasingly being

	<p>consulted in the planning of infrastructural projects</p> <p>✓ Projects funded under CERP and GEF-SGP must be recommended by CIM Plans for them to be eligible for funding.</p>
3.7	<p>Implement the programme to complete the phase out of commercial logging operations in native forests.</p> <p>✗ A forest policy banning commercial logging was passed in 2006 but was never enforced. Logging of native forests continues unabated.</p>
<p><i>Theme 3 – Species Management Obj 3: Sustainable Use and Management of Species</i></p> <p><i>Progress in implementation to date</i></p>	
3.1	<p>Develop a management plan for the sustainable harvesting of <i>lupe</i> (Pacific pigeon – <i>Ducula pacifica</i>) as a pilot study for culturally important species.</p> <p>✗ No concrete action taken to date.</p>
3.2	<p>Build on existing programmes and extend them to cover other areas for the sustainable harvest of indigenous forest timber and non-timber trees.</p> <p>✗ A GTZ funded Sustainable Forest Management Project (1997-2003) promoted the National Code of Logging Practice but was never approved. Initial attempts at implementing it have since been abandoned.</p>
3.3	<p>Support the extension of the indigenous forest regeneration and rehabilitation programmes.</p> <p>✓ A small scale Community Forestry Programme initiated with ADB funding (1980) is continuing.</p> <p>✓ Samoa’s NAPA (2005) promotes reforestation activities as part of climate change adaptation.</p>
3.4	<p>Develop programmes for the sustainable harvest of inshore /offshore fisheries.</p> <p>✓ The Samoa Tuna Management Development Plan 2005-2009 was launched in 2005.</p> <p>✓ The marine conservation activities initiated by the AusAID funded Samoa Fisheries Project continues with funding by the Samoa Government.</p> <p>✓ GEF-SGP with NZAID co-financing has been supporting new community based marine reserves project using this approach since 2005.</p> <p>✓ MAF-Fisheries Village Level Coral Reef Monitoring Project (2001-current) supports villages in marine resource monitoring and provide results to villages to support decision making.</p>
3.5	<p>Develop and encourage sustainable aquaculture/freshwater and mariculture.</p> <p>✓ Aquaculture component of the Samoa Fisheries Project (AusAID) promoted the introduction of farmed tilapia (1995-present).</p> <p>✓ GEF-SGP supported one community based aquaculture project in 2007 (Falese’ela, Lefaga).</p> <p>✓ 39 villages participating in aquaculture trial-farming for giant clam brood stocks in 2004.(MoA,</p>



	2005) ✓ Aquaculture sector plan developed in 2005 (ibid).
3.6 Develop programmes for the sustainable harvesting of ornamental plants.	✗ No information of concrete progress to date.
3.7 Develop nurseries and botanical plots by local communities for growing medicinal plants.	✗ No concrete actions taken to date
3.8 Identify significant species important for the ecotourism industry and develop programmes that promote their sustainable use (e.g. game fishing, whale watching, bird watching, medicinal tours, mangrove tours, tropical agricultural tours etc.).	✓ The toothbilled pigeon ‘manumea ‘ ( <i>Diduncula strigirostris</i> ) was declared the national bird in 1992 and was the focus of a RARE funded conservation campaign during 1992-94. <i>D.strigirostris</i> is actively protected as part of MNRE bird conservation activities. ✓ The teuila ( <i>Alpinia purpurata</i> ) is the national plant but is not an endangered species.
3.9 Establish environmental certification (green products) for natural resource extraction within the private sector for products that are produced according to sustainable standards (e.g. forest stewardship certification, marine stewardship council and tropical fisheries).	✗ No concrete progress to date.
Provide technical, financial and marketing assistance and support for all environmentally friendly developments (e.g. organic farming).	✓ Organic farming is eligible for funding under GEF-SGP under the Sustainable Land Management focal area. ✓ 16 fully certified organic farms covering 2,286 ha; 10 more in process of obtaining certification with a Women-in-Business Inc initiative (MoA, 2005)
<i>Relevant NBSAP actions under Theme 7: Agro-biodiversity Objective 1: Conservation and Sustainable Use of Agro-biodiversity.</i>	<i>Progress in implementation to date</i>
1.1 Promote methodologies for the sustainable use of agro-biodiversity.	✓ AusAID funded Taro Genetic Resources: Conservation and Utilisation (TAROGEN) continues; ✓ SPC & USP funded Taro Improvement Programme continues to be active. ✓ Organic Farming Project under Women-in-Business Inc. On-going;

1.2	Eliminate unsustainable agro-biodiversity use.	✓ MAF's Fruits and Vegetables Strategy (2009) promotes environmentally sound and sustainable agricultural practices.
1.4	Promote environmentally sound agricultural practices such as 'farming systems', agro-forestry and organic farming.	<p>✓ Fruits and Vegetables Strategy (2009) promotes environmentally sound agricultural practices and organic farming;</p> <p>✓ The AusAID funded Samoa Agro-Forestry Project is in the pipeline with feasibility and design studies completed.</p> <p>✓ 6 village-based organic farming projects funded under the GEF-SGP since 2006.</p> <p>✓ AusAID funded organic farming project is implemented by Women-in-Business Inc.</p>
1.5	Place greater emphasis on the importance and establishment of botanical gardens.	✓ 13 botanical reserves were established between 1999 and 2007, bringing the total of botanic/marine/recreational reserves to 18.
1.6	Expand in-situ/ex-situ conservation and sustainable activities, protected areas and aquaculture/mariculture.	✓ Refer to 1.5 above.
1.7	Develop new and enhance existing programmes for the preservation of traditional species, varieties and breeds.	✓ MNRE-Forestry collaborates with SPC and other Pacific Countries under the AusAID SPRIG Project to preserve important native timber species. Key species are <i>Terminalia richii</i> , <i>Intsia bijuga</i> , <i>Securinega fluxuosa</i> .
<i>Relevant actions under Theme 7 Agrobiodiversity Objective 2 – Research and Development</i>		<i>Progress in implementation to date</i>
2.1	Develop programmes for the protection of native/useful species and varieties from the impact of alien invasive species.	<p>✓ A National Invasive Species Implementation Action Plan (NIASAP) (2005) includes objectives to strengthen existing Import Risk Assessment procedures and enhance the inspection and surveillance system.</p> <p>✓ Crops Division of MAF undertake control programmes for African land snail, rhinoceros beetle (following a renewed outbreak in 2003), and monitoring for fruit flies.</p> <p>✓ Genetic improvement programme by MAF to improve disease resistance of taro against Taro Leaf Blight (TLB).</p>
2.2	Conduct inventories and promote surveys of existing agro-biodiversity resources.	✓ MAF survey of breadfruits show signs of genetic
2.4	Establish herbaria to preserve specimens	✓ MAF maintains gene banks and tissue cultures

of native species.	for taro (as part of a regional breeding programme), coconuts, fruit trees (Atele) and other species and participates actively in the Pacific Agricultural Plant Genetic Network (PAPGREN).
2.5 Develop new and expand existing markets for local species and varieties.	✓ New varieties of taro have been successfully introduced to the local market.
2.6 Document and publish research findings.	
<i>Relevant actions under Theme 7 Agrobiodiversity Objective 3 – Food and Health Security</i>	<i>Progress in implementation to date</i>
3.1 Encourage sustainable breeding practices.	<ul style="list-style-type: none"> <li>✓ MAF's taro breeding programme trialled over 50 introduced varieties of taro following the decimation of the taro industry by the Taro Blight in the early nineties.</li> <li>✓ Similar genetic improvement programmes are continuing for bananas, and coconuts.</li> <li>✓ Fiji bred sheep has been introduced into Samoa (2004).</li> </ul>
3.2 Develop and implement agrobiodiversity programmes that not only increase food productivity but also restore and enhance agro-biodiversity.	Refer to 3.1 above.
<b>Article 11: Incentive measures</b>	
<i>NBSAP Theme 7 Obj. 1 – Conservation and Sustainable Use of Agro-biodiversity</i>	<i>Progress in implementation to date</i>
1.3 Establish incentives which encourage conservation and sustainable use of agro-biodiversity.	✗ No specific project or programme addressing this Action to date.
<i>NBSAP Theme 4 Communities Obj 2 - Empowering Communities –</i>	<i>Progress in implementation to date</i>
2.4 Establish an award/incentive scheme for environmentally friendly villages that promote conservation and the sustainable use of biodiversity.	✓ MAF-Fisheries give awards for most successful fisheries reserves and giant clams conservation projects, as part of the annual or biennial Agricultural Show.
<i>NBSAP Theme 8 Financial Resources &amp; Mechanisms Objective 6 – Partnership</i>	<i>Progress in implementation to date</i>
6.2 Establish a special award for an environmentally-friendly company to be integrated in the Exporter of the Year Award Programme.	✗ No concrete action taken to date
<b>Article 12: Research and training</b>	

<i>NBSAP Theme 2: Ecosystem management Objective 1: Research and Monitoring</i>	<i>Progress in implementation to date</i>
1.1, 1.2, 1.3 – Undertake biological surveys in freshwater, upland sites (those not visited in the National Ecological Survey of 1998), and inshore biodiversity.	<ul style="list-style-type: none"> <li>✓ Rapid resource assessment surveys for inshore fisheries are undertaken for all existing fisheries reserves projects under the Samoa Fisheries Project;</li> <li>✓ Toatuga Five Mile Reef survey completed in 2005;</li> <li>✗ Upland survey of remaining sites still outstanding.</li> <li>✓ Six (6) community based marine conservation projects funded under GEF-SGP conducted rapid ecological assessments of inshore fisheries as part of project implementation (2005-2009).</li> <li>✓ Coral reef surveys by A.Green (1996) of Samoa and A Samoan sites; Samoilys and Carlos (1991);</li> <li>✓ Bell and Mulipola's (1995) survey of marine and freshwater fisheries resources.</li> <li>✓ Lovell et al (2004) regional assessment of Pacific coral reefs including Samoa.</li> <li>✓ Jenkins et al (2009) survey of freshwater fauna completed.</li> <li>✓ Edwards E (2009) survey of butterflies completed.</li> <li>✓ Kano, Y (2006) survey of snails on Upolu.</li> </ul>
1.4 Develop and implement a long term monitoring programme for Samoa's native ecosystems including invasive species.	<ul style="list-style-type: none"> <li>✓ National Invasive Alien Species Implementation Action Plan (2005) is under implementation.</li> <li>✓ SAMFris GIS based information system is in place, providing mapping outputs for ecosystems, watersheds, protected areas, etc..</li> <li>✓ Several independent studies completed, with recent ones being Samoilys &amp; Carlos (1991), Green (1996), Skelton (2000), Jenkins et al (2009), Edwards (2009), Kano (2006).</li> <li>✓ MAF Fisheries Village Level Coral Reef Monitoring Programme (2001-current).</li> </ul>
1.5 Develop a list of priority research topics and monitoring techniques to be used by students and staff of natural resource sectors.	✗ No formal list of priority research projects compiled.
1.6 Develop a code of conduct for biodiversity and bio-prospecting research	✓ Guidelines for bio-prospecting were developed in 2003 (KVA, 2003. <i>Capacity Needs Assessment on</i>

in Samoa.	<i>Access and Benefit Sharing, and the Protection of Traditional Knowledge, Practices and Innovations</i> ).
1.7 Publish and make available to the public research reports.	✓ Reports on previous ecological surveys widely accessible and available on MNRE's website.
1.8 Develop a programme for the identification of genetic resources from Samoa's biological resources.	<p>✗ No comprehensive programme in place. Activities largely ad-hoc.</p> <p>✓ Two initiatives of contrasting scopes have been implemented -</p> <ul style="list-style-type: none"> <li>i. AIDS Research Alliance collaboration with the Government of Samoa (2001) involving <i>Omalanthus nutans</i> for HIV AIDS research; and</li> <li>ii. Samoa-Japanese Cooperative Botanical Inventory Programme between National University of Samoa (NUS) and Nihon University (Japan) from 1998-2000.</li> </ul>
1.9 Develop and implement a programme for monitoring the impacts on biodiversity from climate change.	<p>✓ Samoa's National Adaptation Programme of Action (NAPA) was approved in September 2005, and submitted to the UNFCCC Secretariat in December 2005.</p> <p>✓ NAPA implementation began in earnest in 2006, with funding solicitation for 9 targeted projects. Three of these projects directly promote the restoration of ecosystems through reforestation, agro-biodiversity sustainability in relations to food security and conservation of highly vulnerable marine and terrestrial areas. Project implementation continues.</p>
<i>Theme 3 – Species Management Obj. 2: Research and Monitoring</i>	
2.1 Establish and undertake monitoring programmes for threatened species to assess the status of those that may be included or taken off the Wild Animals Ordinance.	✓ Monitoring of endemic and threatened species are maintained albeit irregularly e.g. manumea ( <i>Didunculus strigirostris</i> ), ma'oma'o ( <i>Gymnomysa samoensis</i> ) flying fox ( <i>Pteropus samoensis</i> ) and others.
2.2 Undertake a research programme to complete the collection and identification of Samoa's fauna and flora.	<p>✓ Samoa-Japanese Cooperative Botanical Inventory Programme implemented by National University of Samoa (NUS) and Nihon University (Japan) collected and catalogued 'all' Samoa plant species (1998-2000).</p> <p>✓ Jenkins et al (2009) freshwater fauna study.</p> <p>✓ Edwards (2009) butterflies survey.</p> <p>✓ Kano (2006) study of freshwater snails.</p> <p>✓ Conservation International (CI) and MNRE 's</p>

	<p>current Key Biodiversity Area Analysis (2009) is in progress.</p> <p>✓ BirdLife International's Analysis of Important Bird Areas (IBA)(2009) is nearing completion.</p>
2.3 Develop a project to search for the Puna'e ( <i>Gallinula pacifica</i> )	<p>✓ - An unsuccessful search by MNRE DEC is reported (2007-8)</p>
2.4 Carry out a survey to determine the status of Samoa's seabird population.	<p>✗ - No concrete actions taken to date</p>
2.5 Establish a herbarium for Samoa.	<p>✗ The NUS-Nihon University collaboration included a component for the development of a national herbarium (1998-2000). The status of this component is not known.</p>
2.6 Establish a database for the technical, financial and marketing assistance for all environmentally friendly technologies and developments (e.g. organic farming)	<p>✗ - No concrete actions taken to date</p>
2.7 Develop a monitoring programme to monitor the adverse impact of coral bleaching in Samoa.	<p>✓ Samoa participates in the Global Coral Reef Monitoring Project and also undertakes regular monitoring for coral bleaching.</p> <p>✓ Several marine conservation programmes keep track of the impact of coral bleaching at specific project sites –</p> <ul style="list-style-type: none"> <li>• Community based Fisheries Management Programme (MAF)</li> <li>• Samoa Marine Biodiversity Protection and Management (IUCN)</li> </ul>
2.8 Develop monitoring programmes to monitor the effects of invasive species in Samoa.	<p>✓ National Invasive Alien Species Implementation Action Plan (NIASAP) (2005) is developed and under implementation.</p> <p>Other specific monitoring initiatives are -</p> <p>✓ MoA/FAO (2005) survey of invasive species in Samoa under the SAMFRIS Project;</p> <p>✓ Monitoring and eradication projects targeting rodents, (in Nuutele Is), myna bird, giant African snail, and <i>Merremia peltata</i> are at various stages of implementation.</p> <p>✓ A regional Pacific Islands Invasives Learning Network (PILN) coordinated by SPREP provides regular information on status of various AIS in Samoa.</p>
2.9 Evaluate and assess the effectiveness of past species campaigns approaches to assist with the development of new conservation programmes.	<p>✗ No concrete actions taken to date</p>

<i>Training activities under Theme 1 Mainstreaming Biodiversity - Objective 5 – Capacity Building</i>	<i>Progress in implementation to date</i>
5.2 Conduct national seminars involving all stakeholders on policies and plans relating to conservation and sustainable management of biodiversity.	<ul style="list-style-type: none"> <li>✓ Environmental Forum is an annual event bringing together experts, technocrats and academics to present papers and exchange views on environmental issues including biodiversity.</li> <li>✓ Several other ad hoc and project based consultations and dialogue discusses environmental issues and potential solutions e.g. Dialogue for ADB's Country Environmental Assessment in 2006.</li> </ul>
5.7 Develop training programmes for – <ul style="list-style-type: none"> <li>• All personnel involved in the formulation and implementation of conservation-related policies and legislation.</li> <li>• Communities on the enforcement of policies and legislation.</li> <li>• Inclusion of policies and regulations in educational curriculum.</li> </ul>	<ul style="list-style-type: none"> <li>✓ National Capacity Self Assessment (NSCA) report is completed (2007), identifying capacity needs and recommending priorities to support CBD implementation.</li> </ul>
5.8 Provide training for local communities on the principles and benefits of EIA, so they can apply EIA on developments at the local level.	<ul style="list-style-type: none"> <li>✓ EIA Training in progress (2009) under World Bank funded SIAM II Project, targeting community and private sector/industries representatives.</li> </ul>
<i>Training activities under Theme 2 Ecosystem</i>	
<i>Management Objective 4 – Capacity Building –</i>	<i>Progress in implementation to date</i>
4.1 Develop and implement local capacity building programmes on biological surveys, monitoring techniques and ecosystem management.	<ul style="list-style-type: none"> <li>✓ FAO funded SAMFris Project (2004) provided forestry staff GIS training and field sampling surveys.</li> <li>✓ MAF Fisheries marine monitoring training for local communities in connection with village based fisheries reserves projects.</li> </ul>
4.3 Provide and implement national local training on community-based conservation management approaches.	<ul style="list-style-type: none"> <li>✓ SPREP and USP (Fiji) offers a degree level course on community based conservation area management ; this is available for local staff.</li> <li>✓ Several training workshops, seminars, etc completed in conjunction with specific projects – e.g. <ul style="list-style-type: none"> <li>- GEF-SGP workshop on marine based community projects in Tafagamanu in</li> </ul> </li> </ul>

	<p>2008.</p> <ul style="list-style-type: none"> <li>- Community-based training in coral gardening and replanting techniques by METI (2004-2008) and MAF as part of several GEF-SGP funded marine conservation projects.</li> </ul>
4.4 Develop and implement appropriate training for communities on sustainable income generating activities.	<ul style="list-style-type: none"> <li>✓ Small Businesses Enterprises Centre (SBEC) provides training on small business management for all GEF-SGP communities with income generating activities.</li> </ul>
<i>Training activities under Theme 3 Species Management Objective 5 Capacity Building –</i>	<i>Progress in implementation to date</i>
5.1 Develop and implement local capacity building programmes on biological surveys, monitoring techniques and species management.	See 4.1 above.
5.3 Provide and implement national /local training on community-based species conservation management approaches.	<ul style="list-style-type: none"> <li>✓ MAF training on clams management in marine conservation areas;</li> <li>✓ MAF training in community-based monitoring in fisheries reserves.</li> <li>✓ METI and MNRE training on mangrove replanting.</li> <li>✓ METI training on coral gardening and replanting techniques.</li> <li>✓ SPBCP training (1997-2001) for Uafato village on ifilele (<i>Intsia bijuga</i>) replanting and management.</li> </ul>
5.4 Develop and implement appropriate training for communities to promote sustainable use of species as a possible income generating activity.	<ul style="list-style-type: none"> <li>✓ No on-going training programme in place; however, project based training for GEF SGP projects address sustainable use of ecosystems for IGAs.</li> </ul>
<b>Article 13: Public education and awareness</b>	
<i>Public Education and awareness activities under Theme 2 Ecosystem Management Objective 5 –</i>	<i>Progress in implementation to date</i>
5.1 Coordinate a programme between relevant agencies to utilize information on Samoa's biodiversity for use and integration into school curricula, youth and rural development programmes.	<ul style="list-style-type: none"> <li>✓ Collaboration between MNRE, Ministry of Education, and MAF resulted in the <i>Coastal Marine Resource Education Kit for Year 7,8,9, and 10</i>. (2008).</li> <li>✓ Samoa's Biodiversity Clearinghouse Mechanism (CHM) was initiated in 2004; a web-based database is partially developed and</li> </ul>



	publically accessible.
5.2 Develop and implement public awareness and education programme on the importance and management of ecosystems.	✓ MNRE's public awareness weekly programmes broadcasted on 2 local radio stations, 1 local TV channel and 4 local newspapers. (200_).
5.3 Develop national public awareness campaigns based on the Sea Turtle and Manumea programmes as flagship species for ecosystems.	✓ Campaigns for both species have been completed; tooth-billed pigeon (manumea) in 1993-94; sea turtles in 1999-2000.
5.4 Establish networking and information sharing on the importance of Samoa's ecosystem through educational programmes.	✓ See 5.1 and 5.2 above.
5.5 Disseminate information on the importance of Samoa's ecosystem through local media.	See 5.2 above.
5.6 Develop a core set of public awareness material and displays on conservation for public displays, promotional tours, and distribution to local communities.	✓ Wide array of print material (posters, leaflets etc.) on biodiversity already produced and readily available, promoting marine resources, indigenous hardwood species, and native birds.
<i>Public Education and Awareness Activities under Theme 3 Species Management Objective 4 –</i>	<i>Progress in implementation to date</i>
4.1 Develop public awareness campaigns to increase the appreciation of the functions and benefits of biodiversity to Samoans utilizing the previous campaign approaches.	✓ Refer to 5.1 – 5.6 above.
4.2 Develop public awareness programmes for all stakeholder groups on the sustainable use of native and other important species.	✓ No specifically designed programme but several project based awareness activities contribute to 4.2.
4.3 Integrate information on the sustainable use and management of native and other important species into the school curriculum at all levels.	✓ Refer to 5.1 above.
<i>Public Education and Awareness Activities under Theme 4 Community Objective 3 –</i>	<i>Progress in implementation to date</i>
3.1 Develop and implement public awareness programmes for village councils and relevant target groups on the functions and benefits of conserving and the sustainable use of biodiversity.	<p>✓ No specifically designed programme in place. However, most community based conservation projects contribute to raising community awareness via consultations for project planning and implementation.</p> <p>✓ MNRE's public awareness and education activities target community people include village councils.</p>

3.2 Promote and conduct public awareness campaigns and programmes through media, workshops/seminars, and information materials for communities to enable them to make appropriate decisions on the use of their natural heritage.	<ul style="list-style-type: none"> <li>✓ Many community based awareness raising activities completed;</li> <li>Current /recent media activities are TV videos promoting – <ul style="list-style-type: none"> <li>- Agrobiodiversity protection importation of alien invasive species (MAF);</li> <li>- water catchment protection and</li> <li>- water conservation (MNRE-WRD);</li> </ul> </li> </ul>
3.3 Integrate information on traditional knowledge that is important for conservation and sustainable use of biodiversity into the education curriculum.	✓ Refer to 5.1 above.
<i>Public Awareness and Education Activities under Theme 5 Access and Benefit Sharing Objective 2 –</i>	
1.1 Develop and implement public awareness campaigns on Environment (Bio-prospecting) regulations.	≠ limited progress – newspaper articles related to <i>Omalanthus nutans</i> potential for treating HIV-AIDS.
1.2 Conduct national seminars involving all key stakeholders on Access and Benefit Sharing programmes on the use of genetic resources.	✓ 2003 workshops, and media campaign using radio, newspapers and TV as part of Access Benefit Sharing Study (KVA 2003).
1.3 Coordinate and implement media programmes to raise awareness.	✓ See 4.2 above.
<i>Public Education and Awareness Activities under Theme 6 Biosecurity Objective 5 –</i>	
5.1 Develop and implement a national public awareness programmes for invasive species to prevent their illegal introductions and encourage control.	✓ MAF TV ads re importation of invasive species (2007 – continuing)
<i>Public Education and Awareness Activities under Theme 7 Agro-biodiversity Theme 4 –</i>	
4.1 Undertake national awareness programmes through all media, workshops, seminars utilizing the involvement and commitment of communities, on the sustainable use of agro-biodiversity.	✗ - many project based activities promoting sustainable use of agrobiodiversity implemented
<i>Public Awareness Activities under Theme 8 Financial Resources and Mechanisms Objective 9 –</i>	
9.1 Publish and disseminate as widely as possible information on funding mechanisms.	✗ No concrete actions taken to date.

<b>Article 14: Impact assessment and minimizing adverse impacts</b>	
<i>Under Theme 1 Mainstreaming Biodiversity Objective 4 Environmental Impact Assessments, the following activities are prescribed –</i>	<i>Progress in implementation to date</i>
4.1 Develop relevant EIA policies.	✓ EIA legislation and policy in place (2008)
4.2 Undertake biological surveys and assessments as an integral part of EIA procedures.	✓ This is a legal requirement under EIA regulation 2008.
4.3 Integrate the assessment of development impacts on biodiversity as part of the code of practice for natural resource extraction.	✓ Environmental impacts of resource extraction activities are an integral part of the EIA framework.
4.4 Integrate economic valuation into EIA as an integral part.	✓ EIA Regulation 2007 requires an analysis of costs and benefits associated with each development.
4.5 Regularly review and update existing EIA procedures.	✓ EIA regulation 2008 yet to be reviewed.
<b>Article 15: Access to genetic resources</b>	
<i>Theme 5 of the NBSAP is devoted to Access &amp; Benefit Sharing from Use of Genetic Resources. There are two objectives – (1) Access to &amp; Equitable Sharing of Benefits and (2) Public Awareness and Education. Activities under Objective 2 have been reported in this matrix under Article 13 above.</i>	
NBSAP activities under Objective 1 are -	
1.1 Finalize and enact the Environment (Bio-prospecting) Regulations.	✓ Draft legislation in draft form.
1.2 Develop procedures to ensure that the Environment (bio-prospecting) Regulations are effectively enforced and monitored.	✓ A draft National Biosafety Framework was developed and provides guidelines regarding the handling of requests for the importation of LMOs.
1.3 Review the need for a National Bio-prospecting Coordinating Body.	✗ No concrete action taken to date.
1.4 Develop benefit sharing mechanisms for holders of knowledge and owners of resources utilized in bio-prospecting.	✓ A comprehensive study was completed (2003 KVA report) with proposing specific mechanisms for benefit sharing.
1.5 Develop mechanisms for access to traditional knowledge and genetic resources.	✓ A comprehensive study was completed (2003 KVA report) with proposing specific mechanisms for regulating access to traditional knowledge and genetic resources.
1.6 Explore opportunities to restore Samoa's endemic biodiversity, held in collections outside of Samoa. Identify outside ex-situ	✗ No concrete actions taken to date.

collections holding Samoa's biological and genetic resources, and develop agreements for the restoration and repatriation of ownership rights.	
<b>Article 16: Access to and transfer of technology</b>	
<i>Relevant actions under Theme 1 Mainstreaming Biodiversity Objective 3 Legislation –</i>	<i>Progress in implementation to date</i>
3.6 Develop appropriate legislation on biosecurity to include risk assessment on genetically modified organisms, invasive alien species and effective border control.	<ul style="list-style-type: none"> <li>✓ A draft bio-prospecting legislation (2001) remains to be approved.</li> <li>✓ National Biosafety Framework prescribes risk assessment requirements for screening importation of LMOs.</li> </ul>
3.7 Develop appropriate sui generis legislation for the protection of traditional knowledge and equitable benefit sharing, which are important for the conservation and sustainable use of biodiversity.	<ul style="list-style-type: none"> <li>✓ The bio-prospecting legislation is in draft form (2001).</li> </ul>
<i>Relevant Actions Under Theme 3 Species Management Objective 2 Research and Monitoring –</i>	
2.6 Establish a database for the technical, financial and marketing assistance for all environmentally friendly technologies and developments (e.g. organic farming).	<ul style="list-style-type: none"> <li>✗ No concrete actions taken to date.</li> </ul>
<i>Relevant actions under Theme 7 Agrobiodiversity Objective 2 Research and Development –</i>	<i>Progress in implementation to date</i>
2.2 Assess the impacts on new biotechnologies (genetic expressions, LMOs or GMOs) on agro-biodiversity.	<ul style="list-style-type: none"> <li>✗ No concrete actions taken to date.</li> </ul>
<b>Article 17: Exchange of information</b>	
<i>Relevant Actions Under Theme 3 Species Management Objective 2 Research and Monitoring –</i>	<i>Progress in implementation to date</i>
2.7 Establish a database for the technical, financial and marketing assistance for all environmentally friendly technologies and developments (e.g. organic farming).	<ul style="list-style-type: none"> <li>✗ No concrete actions taken to date</li> </ul>
<b>Article 18: Technical and scientific cooperation</b>	
<i>Relevant Actions Under Theme 5 Objective 1 – Access Benefit Sharing</i>	<i>Progress in implementation to date</i>
1.6 Explore opportunities to restore Samoa's endemic biodiversity, held in collections outside of Samoa. Identify outside ex-situ collections holding Samoa's biological and	<ul style="list-style-type: none"> <li>✗ No concrete actions taken to date</li> </ul>

genetic resources, and develop agreements for the restoration and repatriation of ownership rights.	
<b>Article 19: Handling of biotechnology and distribution of its benefits</b>	
<i>Relevant Actions Under Theme 5 Objective 1 - Access &amp; Benefit Sharing –</i>	
1.4 Develop benefit sharing mechanisms for holders of knowledge and owners of resources utilized in bioprospecting.	<ul style="list-style-type: none"> <li>✓ AIDS Research Alliance (USA) collaboration with the Government of Samoa (2001) involving <i>Omalanthus nutans</i> for HIV AIDS research;</li> <li>✓ Samoa-Japanese Cooperative Botanical Inventory Programme between National University of Samoa (NUS) and Nihon University (Japan) from 1998-2000.</li> </ul>
1.5 Develop mechanisms for access to traditional knowledge and genetic resources.	✓ Refer to 1.4 above.
<b>Article 20: Financial resources</b>	
<i>Relevant activities in the NBSAP Theme 8 Financial Resources &amp; Mechanisms – Objective 1 – Financial Plans</i>	
<i>Progress in implementation to date</i>	
1.1 Develop a long term financial plan for undertaking conservation programmes in Samoa.	<ul style="list-style-type: none"> <li>✗ There is no long term financial plan for the implementation of the NBSAP.</li> <li>✓ MNRE's 3-year corporate plans sets out priorities for funding for biodiversity conservation work plans.</li> <li>✓ Samoa's NAPA (2006) has a 2008 update identifying a list of priority projects with associated budgets A number of these projects have implications for biodiversity conservation particularly the protection of coastal ecosystems.</li> </ul>
1.2 Establish a programme for increasing financial assistance for conservation work through Foundations and other aid donors.	✗ No concrete actions taken to date.
1.3 Coordinate an annual or biannual donors meeting to present biodiversity priorities for funding.	✓ Regular annual and bi-annual consultations with multilateral and bilateral donors are normal to discuss multi-sectoral priorities. Biodiversity conservation is considered within the broad framework of these priorities.

### 3. Overview of progress made in the implementation of priority actions

The foregoing section assessed the status of implementation of Samoa’s NBSAP based on the information available. It shows that actions have been taken on most activities in all 8 theme areas. Several actions have been completed but many others are in progress.

The lack of NBSAP monitoring using its suite of monitoring indicators means that the following assessment is subjective and based mainly on information of actions or projects that have been completed, or are being implemented.

The table below summarizes the number of NBSAP actions addressing each of the various sections of the Convention, indicating how many have been completed/under implementation, and how many have not been addressed.

**Table 17: Relationship between CBD Articles and NBSAP Implementation**

CBD Article	# of NBSAP actions directly related	# of NBSAP actions implemented/in progress etc	# of NBSAP actions not implemented
Art. 6	General	'> 14 strategies, plans and policies in place in post UNCED era	
Art. 7	4	3	1
Art. 8	11	10	1
Art. 9	3	2	1
Art. 10	31	21	7
Art. 11	3	2	1
Art. 12	25	18	7
Art. 13	18	15	3
Art. 14	5	5	0
Art. 15	6	4	2
Art. 16	4	2	2
Art. 17	1	0	1
Art. 18	1	0	1
Art. 19	2	2	2
Art. 20	3	2	1
TOTAL	117	86	31

The above table indicated that 85 of 117 (72.6%) actions directly addressing the various articles of the Convention have either been completed or are still being implemented. In most cases, both types are found – actions that have been completed as well as those still being implemented. Actions not yet implemented constitute 27.4%.

Many actions where activities are completed or in progress are open-ended, therefore are not rendered redundant. For instance, actions such as “Develop programmes for the eradication and control of priority invasive species” continue to be relevant despite the several actions already taken.

The distribution of NBSAP actions against CBD articles points to a comprehensive scope of implementation. Based on the number of actions per article, some articles are more intensely implemented than others. This however can be misleading. A note of caution is that one needs to look

closely at the various actions to determine the depth of implementation. The assessment below reflects this.

In terms of the 8 themes of the NBSAP, significant concrete progress has been in actions under the following Themes and Objective s -

1. Theme 1 – Mainstreaming Biodiversity - Objectives 1 (Policy); Objective 3 (Legislation) and Objective 4 (Environmental Impact Assessments)
  - i. Since the adoption of NBSAP, 4 legislation related to biodiversity conservation were enacted; 9 biodiversity –related policies and national strategies were approved 20.
  - ii. In terms of Objective 4, the enactment of the EIA legislation (2006) and its effective implementation has made EIA an integral part of the development planning process.
2. Theme 2 – Ecosystem Management, particularly in Objective 1 (Research and Monitoring) and Objective 2 (Conservation Areas).
  - i. Significant progress in community based marine conservation areas, fisheries reserves (117 reserves established with 70% reported functional)<sup>21</sup> and of two Marine Protected Areas accounts for this assessment. Many marine and fisheries reserves were initiated as part of the AusAID funded Samoa Marine Project in the early 1990s and have continued with local funding and support from small grants programs including CERP, and GEF-SGP with co-financing from NZAID and AusAID.
  - ii. Of terrestrial areas, since the adoption of the NBSAP in 2001, two new national parks have been established (Lake Lanuto’o NP (1050ha) and Mauga-o-Salafai NP (6944 ha)). Six botanical reserves were also established on the island of Upolu with one proposed for the island of Savaii. This is a significant achievement for a country where around 80% of all land are customary owned and difficult to alienate for public purposes.
3. Theme 3 – Species Management particularly under Objective 2 (Research and Monitoring) and Objective 4 (Public Awareness and Education).
  - i. The range of research activities in species management is indicated above. Key areas of research where good progress is reported are biological surveys and resources assessments. This includes surveys and assessments of Samoa’s rare endemic bird species (toothbilled pigeon, mao, tuameo) which conservation status has since been confirmed.
  - ii. All of Samoa’s endemic birds and trees species which were relatively obscure and unknown to the general public before the NBSAP are now widely known and accepted as having conservation priority. The endemic and threatened tooth-billed pigeon (*Dicunculus strigirostris*) was declared Samoa’s national bird and is a popular mascot for main sports events.
  - iii. A wide range of awareness raising materials (leaflets, posters, TV advertisements, newspaper articles) on endemic and native species of birds, forest trees and fish have been produced and are widely accessible to the public and schools at levels unfathomable in the pre-NBSAP period.
4. Theme 4 – Community, particularly Objective 2 (Empowering Communities), Objective 3 (Public Awareness and Education).
  - i. The highly successful community based approach to nature conservation, mainly of coastal and marine ecosystems, is testament to the effective participation of and

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<sup>20</sup> The policy banning commercial logging (2005) was never enforced.

<sup>21</sup> Hay, J and Suaesi, T. 2006. Samoa – Country Environmental Analysis. ADB TA. 6204-REG.

collaboration with villages that through various interventions are better informed, organized and actively participating in conservation actions.

- ii. The high level of interest and participation of local communities in GEF's Small Grants Programme and other schemes of similar nature is a reflection of communities that are empowered with information and knowledge to make informed conservation and sustainable resource management decisions, and the organizational capacity to prepare funding proposals and to manage projects.
5. Theme 6 – Biosecurity particularly in Objective 1 (Policy and Legislation), Objective 2 (Control and Eradication) and Objective 5 (Public Awareness).
- i. Bio-security issues particularly in relations to alien invasive species are amongst the mostly highly publicised through the effective use of the print and TV media.
  - ii. New legislation and framework for regulating the importation of living modified organisms (LMOs) and revised and strengthened legislation and policies for quarantine border control are in place.
  - iii. Several completed actions and others under implementation target the eradication of rats, and the containment of myna birds, Giant African snail, *Merremia peltata* vine, and other agricultural pests.
6. Theme 7 - Agro-biodiversity (Objec 2: research and development; Objective 3: Food and health Security)
- i. A broad range of agro-biodiversity actions are under implementation.
  - ii. Of significance are efforts to expand the genetic pool for several species of economic importance including taro, bananas, coconuts and fruits.

Themes where moderate progress is reported -

7. Theme 5 – Access and Benefit Sharing from the use of genetic resources.
- i. The main thrust of the NBSAP in relations to Access and Benefit Sharing is to put in place the legal framework for regulating access to and sharing of benefits from the use of the country's genetic resources. The legislation remains in draft form.
8. Theme 8 – Financial Resources and Mechanisms.
- i. Good progress has been made in promoting income generating activities from the use of biodiversity, such as in the development of ecotourism as part of community based conservation areas. Beyond that, very limited progress have been made in the majority of Objectives including Objective 1 (Financial plans), Objective 2 (Conservation Trust Fund), Objective 4 (Information Systems) and Objective 7 (Accounting System).

Cross-cutting issues of capacity building and information management are treated as Objectives under all themes. These are not easily assessable in terms of 'concrete results' achieved even though there is capacity building in various forms taking place in most areas.

#### 4. Domestic and/or international funding dedicated to priority activities

*Request from Malama indicative budgets for donor funded projects currently underway.*

**Table 18: Environmental Projects implemented by the DEC (& MNRE) 2006 - 2009**

Project	Goal/Objective	Timeframe	Inter-agency collaborations,	Funds



			arrangements and partnership	
Cyclone Emergency Recovery Project - Coastal Ecosystems Recovery component (CERP-CER)	Recovery/improved resilience of coastal ecosystems affected by the previous cyclones	2005 - 2009	CERP Steering Committee (MNRE, MoF, MWTI, METI, IPA, MWCD, WB)	ST\$1,000,000
Cyclone Emergency Recovery Project Small Grant Scheme (CERP-SGS)	Aims to 1. Strengthen the resilience of coastal communities and groups vulnerable to the impacts of natural hazards by supporting local community groups, NGOs and other eligible entities carry out non-structural and practical interventions at the community levels. 2. Provide opportunities for direct community involvement in coastal hazard management.	2005 - 2009	CERP Steering Committee (MNRE, MoF, MWTI, METI, IPA, MWCD, WB)	ST\$600,000
Samoa's International Waters (IWP) Project	Aimed at improving water catchment areas which are sources of freshwater supplies in the country. The project has a largely grassroot community driven approach - empowering grassroot communities who are landowners to practice conservation and sustainable use of their water catchment areas in partnership with government and non-governmental agencies.	2002 - 2007	MNRE, SPREP, MAF	
Samoa's Marine Protected Area (MPA) Project	This project aims to empower village communities with the capacities for conserving and using sustainably their coastal and deep sea marine resources.	2000 - 2009	MNRE, local communities, MAF, CI,	EURO 134,000
Second Infrastructure Asset Management Project (SIAM-2)	Focus is on strengthening Sustainable Growth and Resilience of coastal communities and the protection of coastal infrastructure.	2004 - 2008	CERP Steering Committee (MNRE, MoF, MWTI, METI, IPA, MWCD, WB)	
National Marine Biodiversity Conservation Programme	Aims at strengthening capacity for the sustainable management and conservation of marine biodiversity in Samoa	2006 - 2008	Marine Conservation Working Group Cetaceans Stranding Committee (MNRE, MAF, METI, NUS, SPREP, MWCD, STA, local communities,	USD100,000

National Bio-safety - Bio-safety Clearing House Mechanism	The National Biosafety Clearing-House strengthen country capacity by enhancing access to and exchange of information to support implementation of the Cartagena Protocol on Biosafety.	2007 - 2009	MNRE, MAF, Farmers Association, SPREP	ST\$97,000
Aleipata Islands Restoration Project	Eradication of invasive species from the islands	2002 - 2009	MNRE, local communities, CI, SPREP/NZDOC	ST\$250,000
Programme of Works for Protected Areas Project	Establishment of protected areas & rehabilitation of degraded ecosystems	2008 - 2009	PoWPA Steering Committee (MNRE, MAF, MWCD, SUNGO, Vaiusu bay communities,	USD130,000
Myna Control Project	Control of myna bird populations in Samoa	2007 - 2009	Invasive Task Team (MNRE, SPREP, MAF, CI, SUNGO, Pacific Invasive Learning Network (regional)	ST\$250,000
JICA-MNRE Project	Aims at enhancing Management capacity for national Parks and Reserves in Samoa	2007 -2009	MNRE, JICA,	ST\$600,000
Sustainable Land Management Project	To rehabilitate the degraded sites with mitigation and conservation measures to benefit the local communities.	2007 - 2009	Sustainable Land Management Steering Committee/Technical Committee  (MNRE, UNDP, Vaitele communities,	USD540,000
CBD Fourth National report	Compilation of 4th National Report to CBD.	2009	MNRE, Consultant	US\$20,000

### 3. NBSAP successes, constraints and lessons learned

#### 3.1 Constraints to NBSAP implementation

##### 3.1.1 Access to GEF Funding

The bulk of NBSAP actions already implemented are donor-funded including GEF. Similarly current priorities for implementation look to external grant assistance for implementation. While GEF resources are available for CBD Parties, access has not been easy and GEF requirements for co-financing have been a major impediment.

##### 5.1.2 Lack of technical and technological capacity

A lot of research oriented actions prescribed for species and ecosystems conservations include terrestrial ecological, botanical and taxonomic studies. While MNRE has made good progress in terms of building its technical capacity, some of the studies require specialised expertise not locally available. There are two local environmental NGOs and both are limited in terms of qualified staff to implement these kinds of activities. Private environmental consulting companies offer an alternative for outsourcing work, but are also limited in their range of expertise.

Many actions require technological inputs that are not readily accessible or available. For instance, aerial photography to update for GIS datasets rely on a five yearly arrangement using New Zealand military aircrafts. Activities such as invasive species control and eradication requiring aerial spraying and large scale baiting are similarly constrained. Opportunities such as when foreign military helicopters or aircrafts are in the country are seized whenever they arise for these kinds of activities but these can be months if not years in between.

### *3.1.2 Customary land tenure*

Many ecosystems of high conservation value are on customary owned land. Alienating them for biodiversity conservation purposes require protracted negotiations with local Council of Chiefs, which often tend to be more frustrating than rewarding. The Taking of Lands Act 1964 provides the legal means by which the Government can secure areas for public purposes, but it is not workable except when villages are fully cooperative and supportive.

### *3.1.3 Lack of up-to-date information*

Conservation planning depends on the availability of good up-to-date information. Yet there are significant information gaps in Samoa's biodiversity. Most of what is known about Samoa's biodiversity dates back to surveys and studies done in the early 1990's. For instance, Whistler's 1992 review of Samoa's flora and fauna is heavily relied on. Similarly, Pearsal et al's (1991) ecosystem mapping exercise is the definitive word on ecological sites of conservation priority. Some biomes and taxonomic groups remain to be studied thoroughly such as freshwater biodiversity, marine invertebrates, and snails. There are new reports just coming through on butterflies and snails but their findings highlights the need for more surveys. The statuses of many introduced species that were found of little value following research trials need to be established. Even the NBSAP itself needs to be monitored, to see what implementation gaps exist and where limited funding should be spent on.

### *3.1.4 Lack of NBSAP Monitoring*

The NBSAP was not once monitored since its approval and implementation. Reports of an initiative to formulate and implement an NBSAP monitoring plan were mentioned, but there is no Monitoring Plan to show for this. This meant while there is a matrix of indicators in the NBSAP itself, this was never used or revised for application. The lack of NBSAP monitoring is a major constraint to the compilation of this report.

### *3.1.5 Lack of interagency coordination*

Many NBSAP actions require the input of different line agencies. The amalgamation of several sectors under the Ministry of Natural Resources and Environment – lands, environment, forestry, water resources, energy, meteorology, urban planning and disaster management – have facilitated the coordination of such inputs from within this agency. Still, other actions rely of the collaboration of outside agencies including agriculture, health, tourism, works, treasury and government corporations. Often this is lacking.

Many corporations embark on major developments in sites that are ecologically sensitive without going through the development consent process that would trigger the necessary alarms where serious environmental damage are likely. As a consequence, serious ecological damage is inflicted and many sensitive environments and species are endangered.

## **4. Some Key Lessons Learned**

### **4.1 Protect biodiversity by protecting livelihoods**

There is a limit to the extent to which awareness raising and educational activities can contribute to changing and forging positive conservation behaviour. Confronted with the stark reality of making choices between meeting basic needs and conservation, most people in hardship situations will opt for the former.

It is more effective therefore to protect biodiversity by protecting livelihoods. This is already increasingly evident in community-based fisheries reserves and marine protected areas. Anecdotal evidence from communities tell of significant increases in fish catches from around no-fishing zones, and which local fishers are allowed to catch. The village of Tafagamanu Lefaga also reported unexpected increase in clams in their lagoon areas as a result of clam breeding projects in neighbouring Savaia's Marine Biodiversity Conservation Project. These livelihood benefits albeit probably unintended, reinforces community commitment to conservation objectives.

The implication for terrestrial conservation projects is the need to more strongly link forests and mangroves conservation projects to ecotourism development and other income generating activities including honey production, handicraft making and others. These co-benefits will sustain community interest in the immediate to long term, allowing ecosystems time to recover.

### **4.2 Conservation NGOs**

Local NGOs are increasingly playing active roles in nature conservation. There is a positive and healthy environment of collaboration with Government agencies, and wide acceptance within local communities. NGOs however face funding and personnel constraints and must be supported. Mechanisms must be developed for the Government to engage more productively with NGOs, including how to channel funding and outsource activities. One aspect of this capacity building relates to cultural change within Government, helping officials and politicians to see the value of utilising NGOs in implementation and to not feel threatened by such partnerships (Hay et al, 2006). Outsourcing donor-funded activities to NGOs in areas wherein they have expertise will alleviate capacity constraints facing Government agencies, as well as avoiding duplication when Government agencies seek to do the same activities.

### **4.3 Time is critical to biodiversity conservation**

Many ecosystems of high priority for conservation are under severe pressure from developments (e.g. Vaipu Swamp Forests), overexploitation, settlement and agricultural activities. At the same time, many areas in the interior of both Savaii and Upolu are slowly being opened up, with access roads. It is imminently desirable that the Government act proactively to protect many upland areas for biodiversity conservation and water resources conservation. The Taking of Lands Act 1964 empowers the State to take lands for public purposes, and have used this in the past for development and conservation purposes. The Government should use the same approach to secure other ecologically important sites because the longer the delays, the more many of these areas are degraded and species depleted.

## **5. An analysis of the effectiveness of NBSAPs**

How effective has the NBSAP been in promoting biodiversity conservation? Are observed changes in status and trends in biodiversity the results of measures taken to implement NBSAP and the Convention?

There are no quantitative indicators with which to measure the effectiveness of the NBSAP. One can only infer that the NBSAP contributed to catalyzing an action, or directly to mobilize a conservation programme or project. In most cases, where the NBSAP and CBD are catalytic, the links are not

necessarily apparent. Table 16 presented above quantified the number of actions of the NBSAP that have been or are being implemented. Many of these actions have yet to generate the desired conservation outcome.

But there is no doubt that the NBSAP has been effective in promoting biodiversity conservation since the post UNCED era. The following are suggested as evidence –

i. Progress made in expanding the protected area network

The increase in the total terrestrial and marine area now under protection and conservation management during the post-UNCED era is not coincidental. Of protected areas in particular, this was spearheaded by the Government through the MNRE, using land that are state owned. The main part of the justification is Samoa's obligations under the CBD. The NBSAP is also recognized as a formal policy instrument bearing the approval of Cabinet, hence the protection of these sites is simply Government policies translated into action.

The significant progress in fisheries reserves point to a combination of factors (i) through MAF consultations, communities recognized that resources depletion is directly the result of their unregulated harvesting, and the use of unsustainable methods of fishing (ii) the availability of Government technical backstopping ensured that implementation is well supported and (iii) there was a raised level of awareness and understanding of environmental issues and sustainable development in communities. NBSAP had a catalytic albeit indirect impact in promoting greater awareness of sustainable use and resource conservation.

ii. The increased level of awareness of biodiversity conservation generally, and of specific issues such as biosafety and access to and equitable sharing of benefits from use of genetic resources.

Issues that such biosafety, Living Modified Organisms (LMOs) and benefits related to the use of genetic resources were totally unheard of prior to CBD and NBSAP. Their introduction into everyday discussions and conversation is primarily a result of initiatives related to NBSAP, and to the implementation of NBSAP and CBD prescribed actions. This included the formulation of the National Biosafety legislation and Framework.

iii. The raised profile of key ecological sites which prior to the NBSAP were largely unknown.

The inclusion of key ecological sites identified in the NBSAP represented the first time they were incorporated into a formal Government sanctioned conservation plan. Before that, they were not known publicly and were only discussed within the narrow confines of nature conservation circles. NBSAP raised their profiles, and activities flowing from the NBSAP brought them to the public's attention. NBSAP also ensured conservation funding were directed to their conservation, including funding for the Aleipata Islands, Savaii Upland Cloud forest, and sites under the two MPAs.

Currently, the Vaipu Swamp Forest is in the centre of a debate within EPC over plans for the expansion of the Afulilo Hydropower Project. SMEC consultants engaged by ADB cited the NBSAP in support of efforts to protect it and to justify the selection of alternative augmentation options for increasing the capacity of the Afulilo dam. Consultations with MNRE confirmed Vaipu's ecological status as well as that of the NBSAP as an official policy instrument of the Government (Taulealo/Sesega/Teleki; 2009; pers comm.).

iv. The significant increase in the number of conservation activities implemented compared to the pre-UNCED era

Table 16 above listed the number of prescribed actions implemented and or under implementation. Since the NBSAP was implemented, an estimated 86 or 72.6% of prescribed conservation actions have been fully or partially implemented.

v. External Funding for biodiversity conservation

Table 18 also lists the amount of donor funding for biodiversity related actions in Samoa. The same also indicate the range of donors associated with each funded project. This is likely to be an underestimation as the information available for this report was incomplete.

vi. Increased collaboration between government agencies and NGOs on conservation related issues, building on their collective ownership of the NBSAP and its processes.

The highly consultative process with which the NBSAP was formulated brought together a broad range of stakeholders who have since continued to collaborate with MNRE in conservation management. Stakeholders included other government agencies, academic institutions and NGOs.

vii. A major theme of the NBSAP is that of establishing a framework of legislation, policies and strategies to guide the development of detailed plans and programmes addressing specific areas of conservation. Since its approval, 4 key environmental related legislation have been enacted<sup>22</sup>, supported by an estimated 10 environmental related policies in forestry, land management, population, waste management, watersheds, biosafety, climate change adaptation and biodiversity have been approved.

## **6. Is the current NBSAP adequate to address the threats to biodiversity identified in chapter 1?**

The current NBSAP has been implemented for 9 years, and many actions prescribed have been implemented, while others are in progress. Others still have not been implemented. This status in NBSAP's implementation points to the need for updating, with actions completed ticked and not completed to be reassessed. There may well be new ones and there will be gaps in implementation that needs to be plugged.

This suggested update does not imply that the NBSAP is no longer relevant to the priority threats facing Samoa's biodiversity. The threats now identified remains relevant. However some threats have assumed greater urgency than others. An obvious example is the emergence of climate change as the dominant environmental issue of the next ten years or more. Similarly, threats such as forest clearance may be declining as the last remaining merchantable forest is logged. Still, other threats including overexploitation of resources and invasive species, continue to be important.

The assessment of the NBSAP presented earlier point to some CBD articles getting more attention than others. This needs to be looked at closely, and if more actions are needed where action is light now, then additional actions can be identified. The assessment of biodiversity trends in Chapter 1 is also a pointer for where priorities should be assigned. This assessment is an important part of a review.

Other considerations for an updated NBSAP are lessons learned, and important information gaps. There are also studies and assessments currently underway by other conservation organizations that will generate new and relevant information. For example Conservation International (CI) is undertaking a Key Biodiversity Area (KBA) Assessment that is reassessing the priority ecological sites recommended in

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<sup>22</sup> Water Resources Management Act 2009, Disaster and Emergency Management Act 2004, EIA Regulations 2008 and Planning and Urban Management Act 2004

the NBSAP, and areas now under conservation management. Similarly BirdLife International is undertaking an assessment of Important Bird Areas (IBA) that will also generate new information on the status of birds and their habitats. In 2008, an update of the Oceania Wetlands Database coordinated by SPREP included an assessment of Samoa's wetland sites and a review of priorities. All these will be relevant to a review of the Samoa NBSAP.

## **7. How Can NBSAP Implementation Be Improved?**

There are key areas wherein the NBSAP can be improved. The following are the main ones -

### **7.1 Monitoring, Evaluation and Reporting**

The NBSAP has not been monitored once since it was adopted. This is a major constraint to this assessment. MNRE must as a priority develop an NBSAP Monitoring Plan and commit to its regular implementation. An integral part of the Monitoring Plan is a set of indicators that is easy to measure, and relevant. There are indicators in the NBSAP. This needs reviewing to -

- i. In some areas, focus more on tracking changes and trends.
- ii. To establish clearly defined and realistic targets pegged to clear timelines.
- iii. The NBSAP indicators should also be realigned to improve compatibility with CBD adopted indicators.

### **7.2 Rethinking Strategies: lessons learned and new challenges**

#### *7.2.1 Biodiversity and climate change*

There are areas wherein recent developments demand a review of strategies. One is the interphase between biodiversity conservation and Climate Change. The significance of forests as a carbon sink offers opportunities for an integrated approach, and for GEF funding under the Climate Change focal area.

Protecting biodiversity by protecting livelihoods

Protecting biodiversity by protecting livelihoods is an important lesson learned over the last 10 years of conservation management. Strategies heavy on public awareness and education to encourage pro-conservation behaviour should be revisited. Experience shows that it is easier to encourage pro-conservation behaviour when biodiversity actions are generating livelihood benefits. Thus links with ecotourism and other income generating activities based on sustainable resource use are important.

#### *7.2.2 Improving representativeness in Samoa's protected area network*

Significant progress has been made in expanding Samoa's protected area network with the addition of two national parks and 13 reserves of varied sizes over the last 10 years. Given Samoa's limited total land area and the increasing emphasis on commercial agriculture promoted in Samoa's Development Strategy (SDS) 2008-2012, it is important that the protected area system captures within the targeted 15% of total lands under protection, representatives of the globally significant ecosystems that Samoa possesses. At this point, no assessment of representativeness has been done for areas already under protection, and many priority sites recommended in the NBSAP for protection are not included.

MNRE needs to be strategic in selecting sites for protection to ensure they capture representatives of all ecosystems in Samoa, including those of regional and global significance.

### **7.3 Taking On Board New Information**

Three important studies and assessments – one completed in 2008 and two currently nearing completion - should provide new information that should contribute to a review of key areas of the NBSAP

- KBA Analysis – The Key Biodiversity Areas (KBA) Analysis in Samoa by Conservation International (CI) and the Government of Samoa is looking at threatened ecosystems and taxonomic groups of species to determine those most threatened. This Project's recommendations should serve as a basis for reviewing the priority ecological sites recommended in the NBSAP. The same applies to taxonomic groups of species.
- IBA – Birdlife International is also assessing Important Bird Areas (IBA) to determine the status of the various bird species and their habitats. The result of this study should also contribute to an NBSAP review of Samoa's bird species, and to an update of priority bird conservation actions.
- A regional review of wetlands and the updating of the regional (Oceania) Wetlands Database were completed in 2008 with the coordination and support of SPREP. This update includes recommendations of wetlands most threatened and needing priority actions.

#### 7.4 Addressing Information Gaps

There are important information gaps that should be plugged. At the same time, the lack of implementation of some key actions should be addressed.

Gaps in information

- *Freshwater fauna* –

Jenkins et al (2008)'s preliminary survey of freshwater macro-fauna has generated some taxonomic data including new species. But further surveys are needed to ascertain the full diversity of Samoa's freshwater fauna and flora.

- *Invertebrates* –

Not much is known about the status of Samoa's 64 land snail species.

- *Flying foxes and the sheath-tailed bat* –

The sheath-tailed bat is critically endangered with the last survey recording only three individuals. It is vital that this species is reassessed before it is too late. Similarly, the two species (*Psamoensis*, *P.tonganus*) continued to be hunted extensively. Flying foxes play an important ecological role in the regeneration of several forest species and it is important that its status is ascertained so that appropriate conservation management actions and interventions are implemented to ensure its continuing viability.

- *Status of introduced biodiversity particularly in agriculture, fisheries and forestry*

A lot of species and sub-species were introduced principally in agriculture, fisheries and forestry, for research purposes. Some have been introduced for subsistence and commercial applications. Others are not. The status of this biodiversity, particularly those not widely used, including their level of abundance and distribution, should be determined.

- *Threatened Plants* –

A thorough assessment of the current distribution, population and status of rare and endangered plants of Samoa is due. It is understood that Conservation International (CI) and MNRE are planning to undertake this assessment.



## **7.5 Incorporating Missing cross-cutting issues**

The NBSAP must incorporate actions for addressing agreed targets for the Global Strategy for Plant Conservation and Global Taxonomic Initiative. These are currently missing.

## Chapter III – Sectoral and cross-sectoral integration or mainstreaming of biodiversity considerations

### 1. Introduction

Samoa made solid progress in sectoral and cross-sectoral integration of biodiversity concerns since the last National Report (NR3). This Chapter reviewed mainstreaming of biodiversity conservation concerns at both the formal level of policies and plans, and at the activities level of projects. It adds and builds on the previous National Report 3 (2005) but organized according to the NR4 guidelines provided by the CBD Secretariat<sup>23</sup>.

### 2. Mainstreaming biodiversity conservation in national policies and plans

The overarching policy framework and strategy for national development is set out in the Samoa Development Strategy (SDS). The current one, SDS 2008-2012, outlines the Samoa Government's long term vision for the country and sets out priority areas and goals that guide developments in all sectors. The Samoa Government also works closely with her multilateral and bilateral development partners to ensure external funding and assistances are properly aligned to support these priorities.

The priority areas and goals of the SDS 2008-2012 are –

Priority Area 1: Economic Policies

1. Sustained macroeconomic stability
2. Private sector led economic growth and employment creation

Priority Area 2: Social Policies

3. Improved education outcomes
4. Improved health outcomes
5. Community development: Improved economic and social well being and Improved village governance.

Priority Area 3: Public Sector Management and Environmental Sustainability

6. Improved governance
7. Environmental sustainability and Disaster Risk Reduction

The addition of Goal 7 – Environmental sustainability and Disaster Risk Reduction – marks a significant step forward in environmental mainstreaming, and an important extension of the SDS framework to that set forth in the SDS 2005-2007. Environmental sustainability was not included in the previous SDS, which, as ADB (2006) noted, was a major policy constraint.

SDS 2008-2012 thus signals the Samoa Governments' intention of giving prominence to environmental and disaster risk management-related concerns as cross-cutting considerations in all planning activities. It is a call for the revamping of sector level plans and planning at all levels, to integrate relevant environmental concerns.

The extent to which this call for integration has so far been implemented within the various sectors is examined in the following sections of this Chapter.

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<sup>23</sup> CBD Secretariat. Guidelines for the Fourth National Report, 2008.

An observation however regarding the nature and extent of environmental integration at the national level of the SDS itself is offered below. The rationalization for environmental sustainability and disaster reduction in the SDS 2008-2012, perhaps reflecting a backdrop of three severe tropical cyclones in Ofa (1990), Valerie (1991) and Heta (2004), reflects a heavy emphasis towards the protection of human populations, livelihoods, coastal infrastructure and natural resources. The main perceived threats are natural disasters and climate change. Partially buried under this emphasis is an important and integral part of the environment which is the living ecosystems, species and genetic diversity. There are implicit references to ecosystems and ecological services particularly in relations to poverty alleviation and disaster reduction. However the protection of priority species and genetic resources is not. It is an issue of perspective and definition that should be addressed in the next SDS.

### **3. Links with the Millennium Development Goals**

Samoa is committed to the achievement of the 8 Millennium Development Goals. They are explicitly stated and form part of the overall policy framework for the SDS with environmental sustainability the new addition in SDS 2008-2012.

Integration of MDGs are also reflected in several sector and sub-sector plans including agriculture, where food security is the primary concern and main MDG link, and education where environmental education is an important part of the holistic educational approach promoted by the MESC.

Activities from the previous reporting period directly addressing the MDGs include the Samoa National MDG Programme launched in 2003. In partnership with UNDP<sup>24</sup>, this programme aims to promote awareness of the MDGs, identify the status of their achievements in Samoa and to integrate the MDGs into the Samoa Development Strategy. In 2007, a solar powered scoreboard was launch in Apia to track the MDG achievements. Most recently, a UNDP statement<sup>25</sup> regarding the status of achievements of the Goals reported the achievement of Goals 4 and 5 with others assessed as either 'on target' or 'potential'. The environmental sustainability goal was assessed as 'Potential'.

### **4. Biodiversity Conservation Integration in Key Sectors**

#### **4.1 Agriculture**

The agriculture sector strategy is currently being formulated with initial multi-sectoral consultations completed. The Ministry of Agriculture and Fisheries Corporate Plan 2005-2008 emphasise environmental sustainability generally and the sustainable use of terrestrial and marine resources.

At the sub-sector level, a recently completed (July 2009) strategy for Fruits and Vegetables promotes environmental sustainability, mainly in the area of sustainable land management. There is emphasis on newly introduced fruit tree species which have significantly diversified Samoa's agrobiodiversity. But there is little reference to issues such as living modified organisms (LMOs), alien invasive species and conservation of species germplasm.

A glimpse of the planning and consultative processes involved is offered by the list of agencies consulted; neither the Ministry of Natural Resources and Environment (MNRE) nor any environmental NGOs was involved. The level of mainstreaming is limited.

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<sup>24</sup> UNDP (2009). MDG Monitoring: Tracking the Millennium Development Goals. <http://www.mdgmonitor.org/factsheets..>  
<sup>25</sup> Samoa Observer. 25 October 2009. Page 42.

The livestock sub sector plan – Animal Production and Health Division – envisages increased genetic diversity of farm animals through importation of introduced species (e.g. Fijian sheep) and through local breeding activities, mostly using previously introduced varieties.

Mainstreaming of biodiversity conservation is more evident at the projects and activities level wherein many biodiversity conservation related activities are in progress. For instance, there are on-going research activities aimed at expanding, improving and conserving plant genetic resources. Breeding programmes for taro (*Alocasia esculenta*), coconut (*Cocos nucifera*) and bananas (*Musa spp*) have been on-going for several years to improve yield, quality and disease resistance. The level of abundance and distribution of the new varieties is already wide with many new varieties already distributed for subsistence and commercial planting. MAF also collaborates in region-wide exchange<sup>26</sup> of genetic material for the conservation of agro-biodiversity of species of national and regional importance. There are also on-going pesticides and fungicides screening programmes which, while more directly addressing Samoa's obligations under other international agreements<sup>27</sup>, are also indirectly contributing to the conservation of beneficial soil micro organisms.

In summary, biodiversity conservation mainstreaming at the sector level is not yet apparent, as the agriculture sector plan is incomplete. At the sub-sector levels, in crops and livestock, the emphasis on biodiversity conservation is in the expansion of genetic diversity using introduced species and varieties. But there is little recognition of other issues that are relevant, including living modified organism (LMOs), and alien invasive species which is a major threat to agrobiodiversity in Samoa.

There is however good progress with biodiversity mainstreaming at the projects level. Project activities in plant genetics improvement and conservation reflect compliance with obligations under Article 9 (ex situ conservation), Article 10 (sustainable use), Article 12 (research and training), Article 15 (Access to genetic resources), Article 17 (exchange of information), Article 18 (technical and scientific cooperation) and Article 19 (handling of biotechnology and distribution of its benefits).

## 4.2 Fisheries

There is no formal fisheries sector strategy or plan. The overall framework for fisheries sector planning is defined by the Fisheries Act 1988 where species conservation and sustainable use, and the protection and preservation of habitats and ecosystems are central objectives. The objectives of the Fisheries Act are

- (a) To promote the conservation, management and development of fisheries of Samoa;
- (b) To promote the exploitation of the living resources of fishery waters; and
- (c) To promote marine scientific research, and
- (d) To promote the protection and preservation of the marine environment.

The Act's objectives are reflected in the annual reports of the Fisheries Division which reported the sectors objectives and strategies, noting that the Government's mission in fisheries is "...to take actions that promote the optimum and ecological sustainable use of the country's fisheries resources, and to develop sustainable alternatives to substitute for harvesting depleted resources ..."28. In terms of the NR4, the more pertinent issue for mainstreaming in the fisheries sector is how far it has progressed.

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<sup>26</sup> The Secretariat of the Pacific Community coordinates the exchange of germplasm of several species of agricultural crops between a number of Pacific Island Countries including Samoa.

<sup>27</sup> Stockholm Convention and the Land Desertification Convention

<sup>28</sup> Cited by FAO, 2002. [www.fao.org/fi](http://www.fao.org/fi)

Fisheries resources are managed under two main divisions - inshore and oceanic. In both areas, the conservation and use of fisheries resources, including marine ecosystems, are well advanced. In terms of oceanic fisheries, the Tuna Management Development Plan 2005-2009 promotes the sustainable management and use of the main species namely albacore (*Thunnus alalunga*), yellowfin tuna (*Thunnus albacores*) and bigeye tuna (*Thunnus obesus*). Other less important species are skipjack, wahoo and dolphinfish. A multi-stakeholder advisory committee – Commercial Fisheries Management Advisory Committee (CF-MAC) – plays an important role in the review and endorsement of tuna fishery management plans and in the issuing of fishing vessels licences. The limits on the number of fishing licences is the main strategy for regulating the level of exploitation and for achieving resource sustainability (FAO, *ibid*).

The larger institutional framework within which oceanic fisheries resource is managed consists of the following regional arrangements, to which Samoa is a signatory. These arrangements are –

- Harmonized Minimum Terms and Conditions for Foreign Fishing Vessel Access;
- Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America;
- Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region.
- Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.

Regarding nearshore fisheries, MAF-Fisheries activities is centred on promoting sustainable management and use through a programme supporting the establishment of village based fisheries reserves. The approach engages local villages Councils of Chiefs to assume leadership and using village by-laws to enforce bans on the use of unsustainable fishing methods and closed ‘no-fishing’ zones for rebuilding stocks and marine ecosystem rehabilitation. Over seventy (70) village based fisheries reserves are functional according to latest reports. There is also an increasing use of a more integrated ecosystem approach to the management of community fisheries reserves project, with actions to reduce land based pollution enforced by many communities.

### **4.3 Forestry**

The Forest Act 1967 sets forth the principles of sustained yield management and conservation as the cornerstone for forest resource management. These principles are well embedded and central to the planning framework and are reflected in the following policies –

- National Forest Development Policy 1997
- National Forest Policy 2005, (updating the 1997 policy) and
- The Ban on Commercial Logging Policy 2006.

All three policies promote the objectives of conservation and sustainable use of resources that are central to the Convention on Biological Diversity.

Samoa’s implementation of these policies is patchy at best. The Forestry Division is transferred and is now part of the larger Ministry of Natural Resources and Environment (MNRE). Good progress is observed in the development of protected area plans for the Le Pupu Pue National park and Vailima reserve, but the policy banning commercial logging has not been enforced. The forestry agency’s enforcement of the Sustainable Logging Code of Practice has discontinued in part due to lack of funding.

Healthy cross-sectoral links exist between forestry, environment and conservation, and water resources at the level of government agencies. Both agencies collaborate on watershed management, sharing information and expertise on watershed and protected area management, and recently collaborating in

an ad hoc committee tasked with assessing potential land for taking for water resource management purposes<sup>29</sup>. Similar arrangements exist with the Division for Environment and Conservation (DEC) regarding the management of nature reserves, as well as in the sharing of spatial data and GIS generated information for nature conservation planning.

#### 4.4 Water resources

Biological diversity conservation objectives of conservation and sustainable use are integrated in the following legislation and policies of the water resources sector –

- The Water Resources Act 2008
- National Watershed Management Policy 1997
- National Water Resources Policy (200?)
- Water Sector Plan and Framework for Action (2008/9-2011/12)
- National Water Resources Management Strategy 2007-2017

The Water Resources Act 2008 provides the overall policy framework for all sector strategies, plans and work programmes. The Act stipulates the formulation of a Samoa Water Resources Management Plan (WRMG) is the aggregation of several planning outputs of policies, strategies and plans. As a living document, the Plan is continually revised and updated to incorporate new information and to reflect lessons learned and emerging best practices<sup>30</sup>.

Biodiversity conservation is integrated into the Water Resources Act, albeit implicitly, in several areas. Part VII (2) empowers the Minister to “...use water resources for any purposes associated with the protection or management of the environment.” Part VII 18(g) requires the Water Resource Management Plan “...to conduct an assessment of environmental flows<sup>31</sup> in specific sources”<sup>32</sup>. The precautionary principle provision (Part II (5) also empowers the Agency to make decisions irrespective of the lack of scientific certainty – a principle that may be used to justify decisions related to environmental flow determinations, and others in favour of conserving freshwater biodiversity values. Part VII (19) requires an EIA for proposed water development schemes.

A Water Sector Plan and Framework for Action (2008/9-2011/12) is in place promoting a sector wide integrated approach to water resources management that aims “...to produce tangible results in health improvement, environmental sustainability and reduced inequalities.”<sup>33</sup> Integration of environmental considerations is reflected in the Plan’s guiding principles<sup>34</sup> and in the specific strategies under Objective 3, 4 and 5. Objective 4 in particular – to maximize the benefits of other water uses (non-water supply) recognizes ‘environmental/ecological water use’.

In the National Water Resources Management Strategy 2007-2017, biodiversity conservation integration is evident under Objective 2 – To improve knowledge and develop understanding of water resources issues. Here, the main biodiversity conservation related activity is – to conduct aquatic ecosystems assessments, as well as flora and soil water assessment. Objective 3 – to develop and strengthen

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29 Sulumalemal Amataga Penaia, Oct 2009; personal communications.

30 Ibid.

31 The environmental flow is the minimum flow required to ensure the protection of freshwater fauna, flora and downstream ecosystems.

32 This provision contributed to the design of river diversion schemes being considered for hydropower generation in the Afulilo Hydropower Project under ADPB TA 7121 SAM, following consultations with the Water Resources Division of MNRE.

33 Government of Samoa. 2008. Water for Life – Water Sector Plan and Framework for Action (2008/9-2011/12. p.8.

34 Ibid. (p.44) sets forth the second principle as - “to set development within an integrated water resources management framework which addresses institutional, social, economic and environmental aspects “.

existing measures and mechanisms to protect the quality and sources of water – indirectly contributes to the protection of aquatic biodiversity through the protection of freshwater bodies as species habitats.

At the activities level, the determination of environmental flow for the Vaipu Stream is under preparation. This is of particular significance to biodiversity conservation because of the high conservation priority status of the Vaipu Swamp Forest, according to Samoa's National Biodiversity Strategy and Action Plan (NBSAP).

The aquatic ecosystems assessments targeted under Objective 2 of the National Water Resources Management Strategy 2007-2017 will also contribute to addressing a major information gap in biodiversity conservation in Samoa, that of freshwater fauna and flora. =

#### **4.5 Education sector**

The Ministry of Education, Sports and Culture (MESC)'s Strategic Policies and Plan July 2006 - June 2015 recognizes the importance of environmental sustainability as one of the goals of education in Samoa. Goal 2.4.6 is expressed in the following thus - "Poverty reduction, development of good governance, elimination of diseases and achievements of environmental sustainability".

This goal is primarily implemented through the Samoa education curriculum. Under Policies government the develop of Samoa's education curriculum, Policy Statement 3.11.3 states –

"The Samoan Curriculum emphasizes the need to develop environmentally, and socially sustainable practises. This applies not only to the physical environment but also in the way society structures itself socially, culturally and economically."

At the implementation level, one key activity advancing the integration of biodiversity conservation into the education curriculum was completion of the *Coastal Marine Resource Education Kit for Year 7,8,9, and 10*. (2008). This was a collaboration between MNRE, Ministry of Education, and MAF.

#### **4.6. Tourism sector**

The Samoa Tourism Development Plan 2009-2014<sup>35</sup> explicitly recognizes that "... the conservation and enhancement of Samoa's natural environment and biodiversity is fundamental to the sustainable development of all economic sectors, especially tourism" (p.78). It also recognizes unless threats to the environment from scuba, fishing and sand-mining and developments in protected areas and mangroves are addressed, "...general quality of life as well as quality of the tourism product will be seriously reduced" (ibid.).

The Development Plan advocates for the greater protection of key protected and conservation areas, scenic and landscape sites, and better developed and managed community based nature tourism operations. There are also calls for proper and sustainable waste management practices, noting the threat to coastal ecosystems including reefs and coral health of land based pollution (ibid.).

### **5. Institutional Arrangements for Cross-sectoral Mainstreaming**

#### **5.1 Ministry of Natural Resources and Environment (MNRE)**

The restructuring of the old Department of Lands, Surveys and Environment into one Ministry of Natural Resources and Environment (MNRE) now bring together the management of land, water, forestry, national parks and reserves, energy, meteorology, environmental protection and urban planning under one agency. The overriding rationale is to facilitate integration in the planning and management of

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<sup>35</sup> Samoa Tourism Authority. Tourism Development Plan 2009-2014.

resources and the efficient coordination in the implementation of programmes and delivery of services. Already there are clear evidences of significant improvements in integration and consultative planning in key areas including allocation of lands for development purposes, national parks and reserves, watersheds and in environmental impact assessments.

The Ministry is empowered under the Taking of Lands Act 1964 to take land for public purposes and have used this authority judiciously in setting up a rapidly increasing network of botanical reserves and national parks. A similar application to protect critical watersheds will also contribute to the protection and conservation of freshwater fauna and flora, and of ecological corridors essential for the conservation of vulnerable species of birds and flying foxes.

## **5.2 Environmental Impact Assessment (EIA)**

An important achievement in biodiversity mainstreaming during this reporting period is the enactment of the Planning and Urban Management (Environmental Impact Assessment) Regulations 2007. This legislation deals proactively with the adverse impacts of development projects by subjecting qualified project proposals to stringent environmental screening (EIA and PEAR) as part of the development consent process. Section 5 (b) of the EIA regulation states that ‘an EIA may be required where the Agency considers that the development application and its associated activities could give rise to ....adverse impacts on a place, species or habitat of environmental importance...’ and ‘...impacts on or in the coastal zone.’

On receipt of an EIA report, PUMA is also required (Section 9) to circulate the reports for comments from all agencies with a statutory or functional interest in the application. This ensures that others with legitimate interests are consulted, and the broadest range of issues and impacts are considered. Moreover, by engaging the specialised technical expertise of those interested parties, the integrity of the EIA process is enhanced.

The Water Resources Division is also required by its own Act to initiate EIA for proposed water development schemes.

## **5.3 Coastal Infrastructure Management (CIM) Plans**

Some 41 district CIM plans covering the whole of Samoa have been formulated. The process involved intensive consultations with villages and district-level meetings, as well as government agencies, corporations and NGOs. CIM Plans promote the better management of coastal infrastructure and the development of greater hazard resilience for local communities. Recognizing the importance of coastal reefs and mangrove ecosystems in the protection of coastal assets, CIM Plans strongly endorse and support reef and mangrove conservation and rehabilitation. In this sense, CIM Plans indirectly contribute to the mainstreaming of biodiversity conservation.

CIM Plans are now used to support annual planning of government agencies dealing with infrastructure management. They also contribute to the frameworks for allocating funds under several small grants funding programmes including the CERP Small Grants Programme, GEF-PEF Small Grants Programme, and the GEF-AusAID Community based Adaptation (CBA) Programme. In these programmes, project proposals for grant funding must be activities identified in CIM Plans.

## **5.4 National Adaptation Plan of Action (NAPA)**

While the focus is on the protection of coastal communities’ livelihoods and the protection of coastal assets, NAPA also recognizes the importance of protecting and rehabilitating coastal ecosystems as part of coastal protection and community resilience. Protection and rehabilitation of coral reefs, wetlands



and coastal areas are areas where climate change adaptation and biodiversity conservation objectives are complementary.

### **5.5 Sustainable Management Plans**

The PUMA Act 2004 stipulates the formulation of Sustainable Management Plans (SMP). To date, none has been completed nor has a framework been developed for assessment for this report. Consultations with the responsible Agency (PUMA) however confirm that the framework for SMPs will include a consideration of relevant biodiversity conservation issues<sup>36</sup>.

### **5.6. National Land Use Policy (200?)**

This policy is implemented by MNRE and provides policy direction in the allocation of land resources pursuant to the 1989 Lands, Surveys and Environment Act, the Taking of Lands Act 1964 and others. The importance of this policy is with respect to land allocated for uses including national parks and reserves, watersheds and other special uses with direct implications for conservation sensitive areas.

### **5.7 Waste Management Policy (2002)**

This policy is implemented by the MNRE, which facilitates significantly its integration into other areas of responsibilities of this Ministry. The proper management of wastes is critical to the protection of coastal and marine ecosystems, where land based pollutants is a major cause of degradation.

### **5.8 Multi-stakeholder mechanisms**

Critical to the mainstreaming of environmental sustainability are the operations of a number of integrative multi-stakeholder mechanisms wherein the environmental agency (MNRE) is represented. Some are ad hoc committees convened to consider specific issues, and others are interagency task forces formed to coordinate project implementation. These mechanisms are critical to dealing with cross sectoral issues including environmental ones at both the planning and implementation level.

The Cabinet Development Committee (CDC) which keeps track of the implementation of all (mostly externally funded) projects receives progress reports on biodiversity conservation projects and provides a high-level multi-sectoral setting wherein biodiversity issues are discussed. Other similar committees and task forces deal with specific issues and sectors, such as the National Biosafety Task Force which bring together representatives of various sectors including health, agriculture, education, natural resources, as well as representatives of academic institutions and NGO representatives. MORE EXAMPLES NEEDED.

### **5.9 Overall assessment**

The inclusion of environmental sustainability as one of seven objectives of Samoa's Development Strategy 2008-2012 addresses an important omission in the previous SDS that was a major policy constraint to the active involvement of external donors in biodiversity conservation funding. The emphasis of environmental sustainability implicit in the SDS point to sustainable land management and the use of natural resources.

Integration of biodiversity conservation in several sectors is limited by the lack of formalized sector strategies particularly in agriculture, fisheries and forestry. However, the legislation providing the overarching framework of objectives in each of these sectors clearly promotes sustainable use,

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<sup>36</sup> The first SMP is planned for an old quarry site and while biodiversity values will be considered in the development of a framework which will form a general template for planning, they are not likely to be relevant in this first site. (Tagaloa Jude Kolhase, A/CEO (PUMA)); personal communications, Oct 2009.)

management and conservation, which are fundamental principles of the Convention for Biological Diversity.

Sectors wherein sector policies, plans and strategies clearly integrate biodiversity conservation are water and education sectors.

Notwithstanding the varying level of integration at the sector planning level, the level of integration at the projects and activities level is very significant. Agriculture continues on the path of genetic diversification in crops and domestic animals with the introduction of new species and varieties to improve yields, disease resistance and export prospects. MAF-Fisheries leads a highly successful village based fisheries/marine reserves programme that supports communities to rehabilitate depleted inshore areas, and encourage sustainable fisheries management. An aquaculture development initiative uses introduced tilapia, giant clams and trochus. The Forestry Division now operates under the integrative umbrella of the MNRE with links to other MNRE divisions dealing with land, water resources and biodiversity conservation significantly facilitated.

Several other institutional arrangements are promoting mainstreaming of biodiversity concerns outside of these main economic sectors. The EIA regulation administered by PUMA ensures that impacts of proposed development activities on biodiversity are considered. The requirement for site specific Sustainable Management Plans (SMP) will also take into account biodiversity conservation concerns<sup>37</sup>. The existence and operation of several multi-agency and multi-stakeholder task forces and committees provide opportunities for the broader consideration and discussion of biodiversity concerns. The most prominent and significant of these is the Cabinet Development Committee (CDC) which monthly meetings receive progress reports from all donor funded activities including biodiversity conservation ones.

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<sup>37</sup> Tagaloa, Jude; pers comm., 2009.

## CHAPTER IV – CONCLUSIONS: PROGRESS TOWARDS THE 2010 TARGET AND IMPLEMENTATION OF THE STRATEGIC PLAN

The following section recaps the main achievements reported and discussed in Chapters 1,2 and 3.

### 1. Progress towards the 2010 targets

<i>Goals and Targets</i>	<i>Relevant indicators</i>
Goal 1: Promote the conservation of the biological diversity of ecosystems, habitats and biomes.	
<p>Target 1.1 : At least 10% of each of the world’s ecological regions effectively conserved.</p> <p>National Target: Increase the percentage of Samoa’s protected land and conserved areas from the existing target of 10% of land, including coastal areas.</p>	<p>Coverage of protected areas –</p> <ul style="list-style-type: none"> <li>• 13,751.4 ha (~5% of total land area) in terrestrial PA network;</li> <li>• 12,011,437 ha under MPAs and reserves</li> <li>• 71 community marine/fisheries reserves (area not available)</li> </ul> <p>Trend in extent of selected biomes, ecosystems and habitats –</p> <p>Terrestrial ecosystems – Possible designation of two more national parks within the next two years on Savaii (Lata and Salailua).</p> <p>Marine ecosystems – continued growth and expansion of marine areas under village based conservation projects is expected.</p> <p>Trends in abundance and distribution of selected species –</p> <p>Endemic bird species – most are vulnerable with declining populations in the wild except for Puna’e, which is possibly extinct. Future highly uncertain mainly due to possible impacts of cyclones, and habitat loss due to land clearing.</p> <p>Turtles – recent surveys show low level of nesting activities on Aleipata Is.</p> <p>Nearshore fisheries - abundance expected to increase;</p> <p>Freshwater fauna – preliminary studies completed; more detailed study to follow.</p>
Target 1.2: Areas of particular importance to biodiversity protected	<p>Trends in extent of selected biomes, ecosystems and habitats –</p> <ul style="list-style-type: none"> <li>• 3 of 12 priority ecological sites is under conservation management - Uafato-Tiavea Coastal forest; Saanapu-Sataoa Coastal Wetland (Mangrove Forest) &amp; Aleipata Islands</li> <li>• Most of the remaining 9 are either highly vulnerable to degradation or are</li> </ul>

	<p>critically declining towards irreversible degradation.</p> <p>Trends in abundance &amp; distribution of selected species – no available data.</p> <p>Coverage of protected areas –</p> <ul style="list-style-type: none"> <li>• 3 of the 12 sites are within the existing protected area network; i.e. Aleipata Is within Aleipata MPA; Saanapu Sataoa Mangrove Forest and Vaiee-Tafitoala Peninsula, are part of the Safata MPA.</li> </ul>
<p>Goal 2: Promote the conservation of species diversity</p>	
<p>Target 2.1 Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.</p> <p>Target 2.2 Status of threatened species</p> <p>National target: Species, habitats and ecosystems are maintained or restored.</p>	<p>Trends in abundance and distribution of selected species; including status –</p> <ul style="list-style-type: none"> <li>• 2 IUCN Redlisted turtle species (Greenturtle <i>Chelonia mydas</i>; and hawksbill turtle <i>Eretmochelys semicaulata</i>) are assessed as declining in numbers. Recent surveys (DEC) shows slight increase in numbers of hawksbill turtles on Aleipata Is.</li> <li>• 1 IUCN Redlisted bat species – sheath-tailed bat (<i>Emballonura semicaulata</i>) is critically endangered; less than 5 individuals seen in last survey.</li> <li>• 1 IUCN Redlisted bat species <i>Pteropus samoensis</i> is assessed as declining.</li> <li>• 6 IUCN Redlisted birds – <ul style="list-style-type: none"> <li>○ <i>Gallinula pacifica</i> (Punae) – possible extinction</li> <li>○ <i>Didunculus strigirostris</i> (manumea), <i>Gymnomyza samoensis</i> (mao), <i>Myagra albiventris</i> (Tolaititu) and <i>Numerius tahitiensis</i> (tuliolovalu) declining populations.</li> <li>○ <i>Zosterops samoensis</i> (matapapa'e) is not assessed; but local reports suggest vulnerable status; possibly declining population.</li> </ul> </li> </ul>
<p>Goal 3: Promote the conservation of genetic diversity</p>	
<p>Target 3.1: genetic diversity of crops, livestock and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.</p>	<p>Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance –</p> <ul style="list-style-type: none"> <li>• Taro's (<i>Colocasia esculenta</i>) genetic diversity actively being expanded to</li> </ul>

<p>National target: None</p>	<p>improve resistance to Taro Leaf Blight, and for improved yields and quality. 5 new varieties have been introduced for commercial production.</p> <ul style="list-style-type: none"> <li>• Coconuts (<i>Cocos nucifera</i>) and banana (<i>Musa spp</i>) are also part of on-going genetic improvement programmes.</li> <li>• New species and varieties of fruit trees are introduced for commercial production e.g. rambutant, Hawaiian papaya, etc..</li> <li>• Freshwater species introductions for aquaculture include – 2 tilapia species (<i>Oreochromis mossambicus</i> and <i>O.Niloticus</i>), and 1 freshwater prawn species ( <i>Macrobrachium rosenbergii</i>)</li> <li>• Domesticated animals – goats and Fijian sheep introduced.</li> </ul> <p>Trends in abundance and distribution of species –</p> <ul style="list-style-type: none"> <li>• all new varieties of taro, bananas, coconut, and fruit trees are now commercially planted.</li> <li>• Tilapia species are widely spread, mainly through fish bonds but there are anecdotal accounts of accidental introductions into local streams.</li> <li>• Status and distribution of the freshwater prawn introduction is not known.</li> <li>• Fijian sheep – limited to selected research farms with large scale introduction planned for future.</li> </ul>
<p>Goal 4: Promote sustainable use and consumption</p>	
<p>Target 4.1 Biodiversity based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.</p> <p>National NBSAP Target – To ensure the effective implementation of appropriate conservation measures for the sustainable use of agrobiodiversity.</p>	<p>Area of forest, agricultural and aquacultural ecosystems under sustainable management.</p> <p>Forests – none</p> <p>Agriculture – 16 fully certified organic farms (2,286 ha); 10 more farms in process of obtaining full certification.</p> <p>Aquaculture – none reported.</p> <p>Marine trophic index – no data</p> <p>Nitrogen deposition – no data</p> <p>Water quality in aquatic ecosystems – no data.</p>
<p>Target 4.2 Unsustainable consumption, of biological resources or that impacts upon</p>	<p>Ecological footprint and related concepts</p> <p>Total land area under forest cover (based on</p>

<p>biodiversity, reduced.</p> <p>National target: increase protected area network target from current 10% of total land including coastal areas.</p>	<p>1999 aerial photos) – 60%; future trend point to continuing loss of forest cover due to cultivation, settlement and damage due to cyclones. Impact of logging is reduced.</p>
<p>Target 4.3 No species of wild flora or fauna endangered by international trade</p> <p>National target – Species, habitats and ecosystems are maintained or restored.</p>	<p>Changes in trends of threatened species Turtles – No longer exported; export banned in late 1990’s. Flying fox – hunting ban in place since early 2000s. No longer exported. Corals – black coral no longer exported.</p>
<p>Goal 5: Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.</p>	
<p>Target 5.1 Rate of loss and degradation of natural habitats decreased.</p> <p>National Target: Species, habitats and ecosystem processes are maintained or restored.</p>	<p>Trends in extent of selected biomes, ecosystems and habitats Forests – overall reduction from 74% (1954) to 60% in 1999. Trend – declining. Mangroves – 1% of total forest cover (1999); declining. Wetlands – 1% of total forest cover (1999); declining. Marine trophic index – no data</p>
<p>Goal 6: Control threats from invasive alien species</p>	
<p>Target 6.1 Pathways for major potential alien invasives species controlled.</p> <p>National Targets:</p> <ul style="list-style-type: none"> <li>- Protect Samoa’s native biodiversity from impacts of alien species, through effective border control, effective quarantine and eradication programmes.</li> <li>- Appropriate policies and legislation to ensure the effective management of biosecurity, established.</li> <li>- Local capacity build to control impacts of alien invasive species introduction.</li> </ul>	<p>Trends in invasive species –</p> <ul style="list-style-type: none"> <li>• Increased effectiveness of border control quarantine services at both international airports, and seaport.</li> <li>• On-going activities to prevent inter-island spread of Giant African Snail (from Upolu to Savaii Island).</li> <li>• Eradication activities targeting rats, myna birds, Giant African Snails, continuing.</li> </ul>
<p>Target 6.2 Management plan in place for major alien species that threaten ecosystems, habitats or species.</p>	<p>Trend in invasive alien species –</p> <ul style="list-style-type: none"> <li>• National Invasive Species Implementation Action Plan (NIASAP) (2005) in place.</li> </ul>
<p>Goal 7: Address challenges to biodiversity from climate change, and pollution</p>	
<p>Target 7.1 Maintain and enhance resilience of the components of biodiversity to adapt to climate change.</p>	<p>Connectivity/fragmentation ecosystems –</p> <ul style="list-style-type: none"> <li>• Mauga-o-Salafai National Park protect extended stretch of upland forest</li> </ul>

National target: None	<p>ecosystem in Savaii.</p> <ul style="list-style-type: none"> <li>Community based marine reserves provide some albeit limited connectivity for inshore fisheries. Terrestrial PA provided limited ecological connectivity.</li> </ul>
Target 7.2 Reduce pollution and its impact on biodiversity	<p>Nitrogen deposition – no data Water quality in aquatic ecosystems – no data</p>
National Target: None	
<b>Goal 8: Maintain capacity of ecosystems to deliver goods and services and support livelihoods.</b>	
Target 8.1 Capacity of ecosystems to deliver goods and service maintained. National target – None.	<p>Water quality in aquatic ecosystems – no data Marine trophic index – no data Incidence of human induced ecosystem failure – localized inshore fisheries sites collapsing due to overfishing; berch de mer similarly collapsed reportedly due to overexploitation for exports.</p>
Target 8.2 Biological resources that support sustainable livelihoods, local food security and health care, especially for poor people maintained. National target – - Local communities and resource owners manage their resources cooperatively for conservation and sustainable development.	<p>Status and trends of linguistic diversity and numbers of speakers of indigenous languages –</p> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> <p>Biodiversity used in food and medicine –</p> <ul style="list-style-type: none"> <li>Harvesting of flying fox for food is a continuing threat; possibly increasing.</li> <li>Harvesting of pigeons and other bird species limited.</li> <li>Harvesting of plants for medicinal purposes is a continuing use; most are from domesticated sources with limited amounts collected from the wild.</li> </ul>
<b>Goal 9: Maintain socio-cultural diversity of indigenous and local communities</b>	
Target 9.1 – Protect traditional knowledge, innovation and practices. National target – National measures for access and benefit sharing from the use of genetic resources, established.	<p>Status and trends of linguistic diversity and numbers of speakers of indigenous language –</p> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>
Target 9.2 Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including the right to benefit sharing. National target - National measures for access and benefit sharing from the use of genetic resources, established.	<p>Legislation regulating bio-prospecting is in place; Precedent in benefit-sharing arrangements has been set by a Government of Samoa Agreement with AIDS Research Alliance (US company) over sharing of benefits resulting from any successful application of genetic material from <i>O.nutans</i>.</p>

Goal 10: Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources	
Target 10.1 All access to genetic resources is in line with the CBD and its relevant provisions.	<i>No indicators developed</i>
Target 10.1 Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with countries providing such resources in line with CBD and its relevant provisions. National target - National measures for access and benefit sharing from the use of genetic resources, established.	None to date. Refer to 9.2 above.
Goal 11: Parties have financial, human, scientific, technical and technological capacity to implement the Convention.	
Target 11.1 New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20. National targets – <ul style="list-style-type: none"> <li>- Increased funding from local and national sources.</li> <li>- Increased commitment by international community to financing NBSAP implementation.</li> <li>- Development new conservation funding mechanisms.</li> </ul>	Official development assistance provided in support of the Convention. <ul style="list-style-type: none"> <li>• US\$2.1M ODA funds administered directly by MNRE since 2000.</li> </ul>
Target 11.2 Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	<i>(No indicators developed)</i>

## 2. Progress towards the Goals and Objectives of the Strategic Plan of the Convention

### Goal 1: Promote the conservation of the biological diversity of ecosystems, habitats and biomes.

Samoa made limited but notable progress in the conservation of its ecosystems, habitats and biomes. The expansion in its protected area network saw significant additional areas being designated as parks and reserves between 2000 and 2009. The establishment of two national parks in 2003-2004 are important milestones. Since then, several but small reserves have been added. The new national parks set aside an important and extended upland forest area on the island of Savaii, much of it unexplored and inaccessible for human exploitation. Relative to national target of above 10% to 15%, PA system now stands at 5% of total land area. There is still a considerable way to go.



Samoa's marine protected areas remain unchanged since its Third National Report, at least in the statistics of area given above. The two Marine Protected Areas are fully functional although the construction of a marine slipway for ship repairs has been a setback to the Aleipata MPA. According to 2007 figures, 71 marine reserves of the 110 originally established over the last 15 years of the Samoa Fisheries Project, continues to be functional. No area estimate has been made to date thus its' non inclusion in the statistics on marine protected areas indicated above. This network of reserves is continually expanding with new reserves being funded under GEF's Small Grants Programme. Whilst small, they provide sanctuaries for many marine species to rebuild stocks. Where reserves are contiguous or near contiguous in the spatial dimension, as many are, they provide an extended corridor for species migration.

Samoa's efforts to protect its priority ecosystems of global significance are constrained by a number of factors. Two of the 12 designated high priority conservation areas (Aleipata Is and Uafato-Tiavea Forests) are currently under conservation management. Funding is limiting progress of work in the Savaii Moist forests project, which includes two priority ecological sites in the NBSAP. Dealing with customary landowners on sites under their control is another. Several of these sites are critically endangered with one irreversibly damaged by the 1990-91 cyclones. A coastal wetland site (Apolima Fou Coastal Wetland) is severely degraded as a result of coastal reclamation.

Since 2002, Samoa's EEX is a declared sanctuary for whales, turtles, sharks and dolphins.

### **Goal 2: Promote the conservation of species diversity**

Samoa's 15 species currently red-listed by IUCN continues to face a challenging future. Threats of loss of habitats, invasive species and overharvesting are amongst the main causes. The impact of cyclones, predicted to occur in higher frequencies and intensives in the coming years, makes protection of habitats and populations in the wild even more daunting. One bird species (*Gallinula pacifica*) is expected extinct with no confirmed sightings for over a decade. The sheath-tailed bat, another endemic, is critically endangered with less than five individuals reported during the last survey conducted. Other species, including the endemic national bird the toothbilled pigeon (*D.strigirostris*) appears to be gaining in numbers but not yet out of the endangered category. The hawkbill (*Eretmochelys semicaulata*) turtle is similarly reported to be increasing in numbers on the Aleipata Is but still vulnerable.

There are on-going actions to protect these priority species including work on threats such as invasive species, and public awareness and educational activities to raise appreciation of their conservation significance. For many of them, there is concern over declining populations.

### **Goal 3: Promote the conservation of genetic diversity**

Genetic diversity of agricultural species continues to increase with several introductions in the main economic crops, namely taro, bananas, coconuts and fruit trees. Taro (*Colocasia esculenta*) is yet to fully recover from the impacts of the Taro Leaf Blight which all but wiped out the taro export industry in 1993. Since 1996, a taro genetic improvement programme was initiated with 5 new varieties now introduced for commercial production. A similar expansion in the gene pool of bananas (*Musa spp*) has been underway with reports of 53 different varieties being introduced and tested locally by ACIAR. Several new species of fruit trees have been introduced with some now commercially planted for local consumption. These include rambutant, abiu, Hawaiian papaya, new lime varieties and others.

Similar introductions in freshwater fauna have been made. These included 2 tilapia species (*Oreochromis mossambicus* and *O.Niloticus*), and 1 freshwater prawn species (*Macrobrachium rosenbergii*). The tilapia is widely distributed for pond farms but there have been reports of accidental

releases into local streams. Two algae introductions for tilapia fish feed are also being researched and tested.

In terms of forest trees, several hardwood timber species are being improved with provenance trials and selective breeding using superior seed trees. These include *Terminalia richii* and mahogany (*Swietenia macrophylla*). Sandalwood (*Santalum austrocaledonicum*) was introduced in early 2000's and is slowly being out planted as a possible export crop.

#### **Goal 4: Promote sustainable use and consumption**

Depleted nearshore marine resources due to open-access use regimes is the prime motivation for the expansion of community based marine reserves. As indicated above, 71 reserves (and growing) are seeking to restock inshore areas through a combination of no-take zones, banning of unsustainable fishing methods and sustainable use. The two MPA applies the same approach with no-take zones and bans on various practices effectively enforced as community bylaws.

Samoa's pelagic fishery particularly the tuna species are facing fluctuating levels of catch. A fishing vessel based licensing system regulates the number of licensed fishing vessel as the main tool for keeping catches within sustainable levels.

The absence of sustainable management of Samoa's forest resources over the last 30 plus years is now taking the merchantable forest resource to the brink of total depletion. Small scale logging continues but mainly on remnant trees on land previously cleared for agriculture.

#### **Goal 5: Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.**

There is inadequate data to enable a thorough assessment of progress in this Goal. In this report, forest cover as an indicator of habitat loss, and loss of forests to other land use including agriculture is used. Using this parameter, Samoa's situation is not clear. This is due to changing definitions of 'forests' used in past assessments. Data and aerial photo interpretations from 1954 to 1990 saw the total forest cover for Samoa decrease from 74% to 46%. A revised definition of forests for the 1999 data saw the remaining forest cover increased to 60%. The density of much of this forest however is considerably sparse and low.

#### **Goal 6: Control threats from invasive alien species**

There is strict control on the importation of live animals and plants, and food as part of the strict border control quarantine procedures at the two international airports and seaport. This is well supported by a public education and awareness programme using TV that warns against the importation of live animals and plants.

The National Invasive Alien Species Implementation Action Plan (NIASIAP) was formulated and finalized in 2005. This is now providing the overall framework for invasive species management actions. Some on-going programmes include the eradication programmes for myna birds, rats (*Aleipata* Is), and Giant African Snail.

#### **Goal 7: Address Challenges to biodiversity from climate change and pollution.**

Samoa completed its National Adaptation Plan of Action (NAPA) in 2005 and this plan is now under implementation. Apart from the protection of infrastructure and settlements, NAPA promotes the protection of coastal ecosystems that are important to sustaining livelihoods. Protection of coral reefs and coastal ecosystems through marine reserves, mangrove replanting projects etc have been

supported for many communities through the World Bank funded Cyclone Emergency Rehabilitation Project (CERP) small grants scheme, and through the GEF-SGP.

Several communities involved in the management of marine reserves are taking an integrated approach to coastal zone management, recognizing that land based pollution is a major threat to the health of coastal marine ecosystems and fishery. Community by-laws banning dumping of rubbish into the lagoon and promoting proper waste management, and bylaws banning the use of chemical pesticides are increasingly being enforced. The two MPAs are similarly managed.

In terms of protected area management to combat ecosystem fragmentation and promote connectivity, little progress is made. The Le Pupu Pue NP – Samoa’s first NP which spans from the top of the Upolu island to the sea (ridge-to-reef) encourages connectivity and allows species migration to higher altitudes and cooler habitats. The Mauga-o-Salafai NP extends along the ridge top for most of Savaii’s upland forests.

**Goal 8: Maintain the capacity of ecosystems to deliver goods and services and support livelihoods.**

There is little in terms of gathering of edible plants in the wild as the main source of food in Samoa. Most subsistence households grow their own food and fish for protein. Where food hunting threatens biodiversity is the hunting of flying foxes and pigeons, and to a lesser extent other bird species. Hunting flying fox is continuing and is likely to increase. Likewise pigeons, which is a delicacy to many elderly people. There is a seasonal ban on pigeon hunting but this is not well enforced. Hunting for turtles is carried out by a few villages, but it is a fading practice possibly as a result of educational awareness campaigns.

**Goal 9: Maintain socio-cultural diversity of indigenous and local communities**

**Not applicable**

**Goal 10: Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources.**

The Government of Samoa entered into agreement with an American research company AIDS Research Alliance in 2001 over the use of genetic material from the mamala tree (*Omalanthus nutans*) for AIDS HIV treatment. This agreement guarantees the sharing of benefits amongst all parties including traditional healers whose knowledge contributed to the discovery of this species’ pharmaceutical potential.

There has not been any other reported event of bio-prospecting since then, nor has this agreement been put to the test yet.

**Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention.**

Samoa has been accessing GEF funds for the implementation of activities under the Convention and NBSAP. Similarly other bilateral and multilateral donors have been contributing. Table (page 32) of Chapter 2 lists projects and amounts of ODA funding administered by MNRE for the period 2000-2009. Total amount of ODA funding for biodiversity related projects amounts to US\$2.1M. This excludes funding received by NGOs, GEF-SGP funding for biodiversity conservation projects and other sources.

### **3. Conclusions**

#### **3.1 Overall assessment**

The implementation of the Convention on Biological Diversity through the NBSAP has been a major catalyst to the conservation of biodiversity in Samoa. In the three main areas of the CBD, - conservation

of biodiversity, sustainable use of resources, and access to and benefit sharing – the most progress was observed in the former two – conservation and sustainable use. To an extent, this is because both directly relates to livelihoods. Communities were already feeling the impact of past unsustainable practices with the depletion of livelihood resources such as nearshore fisheries. Consequently the concept of sustainable use was introduced at a time when it was most relevant and needed. Community buy-in and support to initiatives aimed at replenishing resources, and curbing unsustainable practices was immediate because people could relate to them. Many can still remember how resources used to be more abundant. The other contributing factor is the availability of project funding including those from GEF, and of technical support through various Government agencies, principally MAF-Fisheries and MNRE, and NGOs.

The lack of progress on access and benefit sharing arising from the use of genetic resources is indicative of its novelty as an issue. Many people are unfamiliar with it and there were not any concrete examples of access benefit sharing that people can relate to. The signing of the agreement between the Government of Samoa and AIDS Research Alliance, a US based outfit, lifted the profile of this issue but only temporarily. But it is real-life applications such as these that sustain widespread interest and give impetus to more focused actions. Even to this day, not many examples of benefit sharing can be pointed to, both in Samoa and around the Pacific region.

Several institutional rearrangements promoted effective NBSAP implementation. The amalgamation under the Ministry of Natural Resources, Environment and Meteorology of responsibilities for the management of lands, forests including national parks and reserves, water resources, meteorology and urban planning, enabled decision related to the allocation of state-owned lands to be expedited. This is most evident in the allocation of lands for parks and reserves wherein significant strides were made in the last 10 years. The integration of environmental impact assessments (EIA) was made easier as part of the development consent process administered by MNRE through PUMA. In much the same way, several policies for the management of natural resources – forests, biodiversity, watershed areas - were adopted. Cross-sectoral issues such as waste management and climate change adaptation that have strong biodiversity conservation links were similarly facilitated.

## **4. Lessons learned during implementation**

### **4.1 Protect biodiversity by protecting livelihoods**

The community based approach to the conservation and sustainable use of resources over customary owned lands was pioneered before the NBSAP through other initiatives. NBSAP implementation built on it, and together with other practitioners, found several lessons. One is related to links between conservation and income generating activities. In brief, protecting biodiversity by protecting livelihoods will ensure sustained community commitment and support. Ignoring this will result in waning commitments to conservation objectives as local communities focus their energies and resources on their immediate priority – livelihoods.

#### **4.1.1 Information Needs a Priority**

Having up-to-date information is essential and priority should be given to resource and ecosystems assessments, species surveys etc.. They are the basis for the reviewing of conservation priorities, particularly in the case of endangered species and ecosystems, so that limited conservation funds are allocated to where the greatest biodiversity threats are. There are also areas such as freshwater biodiversity, of which little is known.

#### **4.1.2 Using all available capacity**

It is vital to engage all players, including NGOs and private sector operators, in NBSAP implementation. There is limited technical expertise and capacity within government agencies and some NGOs are

particularly successful in specific areas. Consultants in the private sector, both local and abroad, can also contribute in many areas including technical reviews and assessments, data gathering exercises and planning.

#### **4.1.3 NBSAP Monitoring using proper targets and indicators**

In the absence of any NBSAP monitoring since the NBSAP was approved, it is difficult to properly assess progress in NBSAP implementation. After nine years of implementation, a review is overdue. The NBSAP needs strengthening in several areas, including having a monitoring plan with well thought through monitoring targets and indicators. Several relevant studies are in progress that will generate relevant information with which to review of the statuses of priority species, taxonomic groups and ecological sites.

#### **Summary of Future Priorities**

The following are some immediate priorities for the future –

- A review of the 2001 NBSAP including the development and implementation of a Monitoring Plan.
- Addressing key gaps in information –
  - Freshwater fauna
  - Invertebrates
  - Threatened plants
  - Update on the status of priority ecological sites
  - Update on the status of vulnerable, endangered and critically endangered species including the sheath-tailed bat.
  - Status of all introduced species of agriculture, marine and freshwater fauna including an assessment of abundance and distribution.
- Training for MNRE, other relevant agencies, institutions and NGOs in a number of areas including, techniques and methods of natural resource assessments and species surveys, biodiversity valuation methods, and other areas.
- Update of the biodiversity clearinghouse mechanism as a repository of information, including relevant reports and published scientific papers of completed studies.
- Taking a strategic approach to expanding the protected area system – to improve ‘representativeness’ of all ecosystems including sites of high priority, and promoting ecological connectivity and corridors.

#### **Actions that Need to be Taken at Regional and Global levels –**

All training can either be done nationally or regionally if there is a similar need from other Pacific Island Countries.

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**Appendix I - INFORMATION CONCERNING REPORTING PARTY AND PREPARATION OF NATIONAL REPORT**

**A. Reporting Party**

<b>Contracting Party</b>	
<b>NATIONAL FOCAL POINT</b>	
Full name of Institution	<b>MINISTRY OF FOREIGN AFFAIRS &amp; TRADE</b>
Name and title of contact officer	<b>Aiono Mose Su'a Chief Executive Officer</b>
Mailing address	Private Mail Bag
Telephone	(685) 21171, 25313
Fax	(685) 21504
E-mail	
<b>CONTACT OFFICER FOR NATIONAL REPORT</b>	
<b>Full name of institution</b>	<b>MINISTRY OF NATURAL RESOURCES, ENVIRONMENT &amp; METEOROLOGY</b>
Name and title of contact officer	<b>Taule'ale'a La'avasa Malua</b>
Mailing address	Private Bag, Apia, Samoa
Telephone	(685) 30966
Fax	
E-mail	taulealeausumai.laavasa@mnre.gov.ws
<b>SUBMISSION</b>	
Signature of officer responsible	
For submitting national report	
Date of submission	

**B. Process of preparation of national report**

A Consultant was contracted by the Government of Samoa to compile the draft report. The following process was followed –

- I. Commission of consultancy – briefing on terms of reference, CBD Guidelines for the Fourth National Report; clarification of process.
- II. Collation of relevant reports with the assistance of MNRE
- III. Desk study reviewing available reports.
- IV. Face-to-face consultations with representatives of key agencies, discussing issues and seeking all relevant information.
- V. Preparation of draft report.
- VI. Consultative workshop on 17 December, 2009 for presentation of draft report and for comments.
- VII. Incorporation of comments from workshop.
- VIII. Finalization of Report and submission to MNRE.

**List of people consulted including participants in Consultative Workshop –**

Ministry of Natural Resources and Environment (MNRE) – Division of Environment and Conservation	Faleafaga Tony Tipamaa, Assistant CEO – Environment & Conservation Malama Taumomoemausu, Principal Officer – Marine Conservation Juney Ward, Senior Marine Conservation Officer Elizabeth Kirsten, Senior Parks and Reserves Officer Abe Hitofumi, JICA Adviser, National Parks Niualuga Evaimalo, Principal Terrestrial Conservation Officer
MNRE – Water Resources Division	Suluimalo Amataga Penaia, A-CEO WRD Francis Reupena, Principal Officer – Regulatory and Policies Yvette Kerslake, Principal Officer – Watersheds Malaki Iakopo – Senior Officer – Regulatory and Policies Sam Semisi, Senior Officer - Watersheds
MNRE – Forestry Division	Maturo Paniani, A-CEO Forestry Tagaloasa Pau Ioane, Principal Mapping Officer Aukuso Leavasa, Principal Planning Officer Tolusina Pouli, Principal Forest Research Officer Susau Siolo, Senior Forestry Officer
MNRE – Planning and Urban Management Agency (PUMA)	Tagaloa Jude Kolhase, A-CEO PUMA
MNRE – Division of Land Management	Patea Malo Setefano, A-CEO Land Management
MNRE – Waste Management	Fuatino Leota, Principal Chemicals Officer Katrina Rasch, Senior Chemicals Officer
Samoa Tourism Authority (STA)	Karin Swarbrick, Environmental Tourism Adviser Eira Esera,
Ministry of Agriculture and Fisheries	Emele Ainuu, Principal Research Officer (Crops) Pueata Tanielu, Principal Development Officer (Crops) Leasiolagi Seiuli, Policy Officer So’o Jnr. I’uvale, Information Officer
Secretariat for the Pacific Regional Environment Programme (SPREP)	Tepa Suaesi – Ecological Monitoring and Evaluation Officer.
UNDP - Apia	Easter Galuvao, Assistant Resident Representative (Environment)
Pacific Environment Consultants Ltd (PECL)	Iosefatu Reti, Co-Managing Director and Principal Consultant
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## Appendix II – FULL LIST OF INFORMATION USED

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**Appendix III – PROGRESS TOWARDS TARGETS OF THE GLOBAL STRATEGY  
FOR PLANT CONSERVATION AND PROGRAMME OF WORK ON PROTECTED  
AREAS**

<b>Target</b>	<b>Title</b>	<b>National actions taken</b>
Target 1	A widely accessible working list of known plant species, as a step towards a complete world flora	Samoa's list of known terrestrial plants is widely accessible, and is continually being added to with new findings. Information on Freshwater flora is lacking.
Target 2	A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels	An assessment of selected species of known plants has been done but this is mainly limited to plants and trees of economic and cultural importance. For instance, indigenous forest hardwoods species of importance and local medicinal plants have been assessed.
Target 3	Development of models with protocols for plant conservation and sustainable use, based on research and practical experience	No progress.
Target 4	At least 10 per cent of each of the world's ecological regions effectively conserved	National target 15% of total land area protected; about 5% achieved to date.
Target 5	Protection of 50 per cent of the most important areas for plant diversity assured	No national target. 3 of the 12 NBSAP ecological sites of high priority is under conservation management. Work is currently underway to review Key Biodiversity Areas (KBA) and Important Bird Areas (IBA).
Target 6	At least 30 per cent of production lands managed consistent with the conservation of plant diversity	No relevant information to report.
Target 7	60 per cent of the world's threatened species conserved in situ	1 bird and 1 bat species are critically endangered, possibly extinct. Other endemic and native species are under various IUCN Statuses, and all are conserved in situ. Many other endemic species and sub-species not considered threatened are thriving in situ.
Target 8	60 per cent of threatened plant species in accessible <i>ex situ</i> collections, preferably in the country of origin, and 10 per cent of them included in recovery and	No inventory has been done on threatened plants within botanical gardens and reserves. Five species of forest trees of importance for timber production is conserved under the

	restoration programmes	AusAID funded SPRIG initiative.
Target 9	70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained	No information of progress to report.
Target 10	Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems	The National Invasive Species Action Plan target the major invasive alien species of priority in Samoa.
Target 11	No species of wild flora endangered by international trade	Black corals are no longer exported.
Target 12	30 percent of plant-based products derived from sources that are sustainably managed	No progress to report.
Target 13	The decline of plant resources, and associated indigenous and local knowledge innovations and practices, that support sustainable livelihoods, local food security and health care, halted.	No progress to report.
Target 14	The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.	Plant diversity and the need for conservation has been successfully incorporated in communication, education and public awareness programmes.
Target 15	The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy	More people/staff are getting trained in plant and biodiversity conservation as more opportunities become available.
Target 16	Networks for plant conservation activities established or strengthened at national, regional and international levels	None at national level. Local members of regional and international networks including PACINET, BIONET and e-mailing lists like Coral-Listing.