GOVERNMENT OF SAMOA

NATIONAL REPORT
TO THE
CONVENTION ON BIOLOGICAL DIVERSITY

DECEMBER 1998
DIVISION OF ENVIRONMENT AND CONSERVATION
DEPARTMENT OF LANDS SURVEY AND ENVIRONMENT
APIA, SAMOA

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ACRONYMS

AusAID: AUSTRALIAN ASSISTANCE FOR INTERNATIONAL DEVELOPMENT
CBD: CONVENTION ON BIOLOGICAL DIVERSITY
COP: CONFERENCE OF THE PARTIES
DEC: DIVISION OF ENVIRONMENT AND CONSERVATION
DLSE: DEPARTMENT OF LANDS SURVEY AND ENVIRONMENT
FSS: FAASAO SAVAII SOCIETY
GTZ: GERMAN TECHNICAL ZUSAMMENARBEIT
ICRI: INTERNATIONAL CORAL REEF INITIATIVE
IUCN: THE WORLD CONSERVATION UNION
MAFFM: MINISTRY OF AGRICULTURE FORESTRY FISHERIES AND METEROLOGY
NEMS: NATIONAL ENVIRONMENT MANAGEMENT AND DEVELOPMENT STRATEGY
NES: NATIONAL ECOLOGICAL SURVEY
NZODA: NEW ZEALAND OVERSEAS DEVELOPMENT ASSISTANCE
OLSS: O LE SIOSIOMAGA SOCIETY
SPBCP: SOUTH PACIFIC BIODIVERISTY CONSERVATION PROGRAMME
SBSTTA: SUBSIDIARY BODY FOR SCIENTIFIC, TEHNICAL AND TECHNOLOGICAL ADVICE
SES: SUSTAINABLE ECONOMIC STRATEGY
SPREP: SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME
SVB: SAMOA VISITORS BUREAU
SUNGO: SAMOAN UMBRELLA NON-GOVERNMENT ORGANISATION
WWF-SPP: WORLD WIDE FUND FOR NATURE- SOUTH PACIFIC PROGRAMME

1. EXECUTIVE SUMMARY

Samoa ratified the Convention on Biological Diversity in December 1993 when the Convention came into force of December the same year. In response to Decision II/17 of the Conference of the Parties, Samoa's national report is addressing Article 6 of the Convention.

Samoa is an independent small island developing state located in the South Pacific region, with a total land area of approximately 2935sq. km., a total area of 120,000sq.km. inhabited by a population of approximately 165,000 people. The country is geologically young in origin compared to other Pacific Island countries, thus its biodiversity is not as diverse. Nevertheless, the geographical isolation of the island from major continental landmasses contributes to the very high species endemism of over 30% of its total biodiversity. This factor makes the conservation of Samoa's biodiversity vital to the survival of the global biodiversity. Additionally, the high dependence of the local populations on subsistence livelihood augurs well with the need to develop sustainable use mechanisms for the future of Samoa.

Samoa has undertaken several activities to fulfill its obligations of the Convention of Biological Diversity. These include the establishment of its Biodiversity Conservation Unit with the Department of Lands, Surveys and Environment as the main implementing agency for the Convention. Efforts are proceeding to integrate conservation and sustainable use of biodiversity into some of its national and sectoral planning and policies. A draft national biodiversity policy and national biodiversity strategy were developed and will be completed with the availability of funding through the Global Environment Facility's Enabling Activity. To identify and monitor the status of the biodiversity, Samoa has undertaken ecological surveys of terrestrial and marine environments and established a national biodiversity database to develop monitoring guidelines. The surveys have identified important areas for conservation, which resulted in the establishment of new conservation areas, and the amendment of animal's ordinance and fisheries regulations on threatened species and ecosystems. To ensure the effective implementation of the Convention obligations, the Government of Samoa increased the staff of its Biodiversity Conservation Unit from two technical personnel in 1992 to seven in 1998, along with increase budget allocation.

CBD implementation is Samoa involves a wider participation of all stakeholders in national decision-making process with the involvement of NGO's and local communities on all government organised task teams and committee's. Furthermore, to ensure total commitment from the customary resource owners, which own over 80% of the land resources of the country, environment and development work are expected to include incentive measures for the resource owners.

Inspite of the numerous activities currently undertaken by the country to meet its obligations, the lack of trained staff and financial constraints will continue to hinder the effective implementation of the activities. Most of the activities currently undertaken in-country are the direct result of outside technical and financial assistance.

2. FA'ASAMOA (SAMOAN CULTURE)

One of the unique characteristics of Samoa like other Pacific Islands is the customary resource tenure system in which around 80 percent of the lands and coastal areas are owned by local villages.

The customary resource tenure system refers to traditional villages, clans or communities with traditional rights over land or coastal areas for which they reside or have ancestral claims upon. These rights were bestowed upon the groups prior colonisation's and recognised up to present times in national legislation. The villages or clans have sole authority in making decisions for the future of its lands and resources

through negotiations on land use, or harvesting forest resources. Most legislation prohibits customary owners from selling land, but are allowed to lease them.

Customary resource tenure provided for the sustainable harvesting of resources in the islands with strict management and control by respective traditional leaders. That is, certain tapu or bans and restrictions are imposed by the traditional leaders over areas or stocks that appear to be in decline or threatened. Furthermore, certain resources have restriction of harvesting. The communities enforce all customary bans imposed by the community leaders with punishments issued accordingly.

3. STATUS OF SAMOA'S BIODIVERISTY:

a. THE BIODIVERSITY OF SAMOA

Nineteen Biogeographic Provinces have been defined in the South Pacific (Dahl 1980), and Samoa falls within Province 9 along with American Samoa and Wallis and Futuna. If Samoa is to make its contribution to the conservation of the world's biodiversity it will be necessary to define and then manage for conservation a series of representative ecosystems within Biogeographic Province 9. A review of the conservation value of a total of 226 South Pacific Islands (Dahl, 1986) ranked three of the islands of Samoa highly, Savaii number 23, the Aleipata Islands number 30 and Upolu number 46. The South Pacific Biodiversity Conservation Programme recognises Samoa as one of five countries participating in the programme that are particularly important for their wealth of biodiversity (SPREP, 1993). Many of the plants and animals found in these island ecosystems are endemic; i.e. found nowhere else, so their conservation is entirely a Samoan responsibility.

There have been several biological surveys in Samoa in recent years and Whistler (1992) reviewed knowledge. The DEC has carried out further surveys since then though significant gaps still remain - the terrestrial invertebrate fauna is poorly described for example. However this cannot be used as an excuse to delay important conservation management decisions which need urgent implementation.

b. VEGETATION

Whistler (1992) divided the vegetation into 19 plant communities in five broad categories: littoral vegetation, wetland vegetation, rainforest, volcanic scrub and disturbed vegetation, as follows:

Littoral vegetation: four communities of vegetation situation on the seashore are recognised and the best remaining examples are at Aleipata Islands, O le Pupu-Pue and sites on the south (central) coast of Savaii.

Wetland vegetation: four communities are recognised: coastal marsh, montane marsh, mangrove scrub/forest and swamp forest. Only a few intact areas of each type remain (see Whistler, op.cit.. for details).

Rainforest: four communities are recognised on an altitudinal gradient: coastal, lowland, montane and cloud forest. The few remaining significant areas of coastal forest are at the Aleipata Islands, Apolima and possibly Tafua Crater; Lowland forest sites were surveyed by Park et. al. (1992) who identified 14 as the minimum needing protection to achieve adequate representation of this habitat. Montane and cloud forest (above c. 1000m) areas have not yet been surveyed in detail, but their extent has been mapped (Pearsall & Whistler, 1991) and recommendations made for the protection of some sites.

Volcanic vegetation: two communities, lowland volcanic scrub and upland volcanic scrub, are recognised and these occur only on recent lava flows on Savaii.

Disturbed vegetation: four communities derived from a combination of human activities and weather is recognised: managed land, secondary scrub, secondary forest and fernlands.

c. PLANTS

There are nearly 500 species of native flowering plants and about 220 species of ferns in Samoa, making this one of the most diverse floras in Polynesia (Whistler, 1992). About 25% of the plants are endemic to Samoa (i.e. found nowhere else) and 32% endemic to the Samoan archipelago. A further 500 or so species of plants have been introduced to the islands since the first Samoans brought the coconut, taro and other species for cultivation about 10,000 years ago.

Today, about half the plants in the country are exotic, i.e. have been introduced by humans. While some of these plants are beneficial for agriculture, others have become destructive weeds.

d. MAMMALS

Terrestrial:

There are 13 species of terrestrial mammal now present in Samoa and of these only three are native, two flying foxes (or fruit bats), the Samoan Flying-fox (*Pteropus s. samoensis)* and the Tongan or White-necked Flying-fox (*P.tonganus)*, and a small insectivorous bat, the Sheath-tailed Bat (*Emballonura semicaudata).* The flying foxes are important for the long-term survival of the forests for they pollinate the flowers of many species and disperse seeds of the fruits they eat through the forest. It has been estimated that almost one in three Samoan forest trees depend on bats in some way (Mickleburgh et al., 1993).

Of the introduced species, the early Polynesian voyagers brought the Polynesian rat (*Rattus exulans)*, pigs and dogs to the islands. Cattle, horses, goats, cats, two more species of rats (*Rattus norvegicus and R. rattus)* and the house mouse (*Mus musculus)* arrived with Europeans.

Marine

Several whale species and one dolphin, the spinner dolphin (*Stenella longirostris)*, have been recorded in Samoan waters), though specific surveys have not been carried out. The Humpback Whale (*Megaptera novaengliae)* is believed to breed here and the Sperm Whale (*Physeter catadon)* may do so.

e. BIRDS

Thirty five species of land birds and 21 sea and shore birds have been recorded in Samoa. Eight of the land birds are endemic (there are an additional six endemic sub-species) while four species have been introduced, the most recent being the Common Myna (*Acridotheres trisis)*, released in Apia in the late 1960's and spreading through cultivated areas on Upolu.

One native species the Samoan Wood Rail (*Pareudiastes pacificus)* is probably extinct though a population may persist on upland Savaii. The Samoan storm-petrel, a dark form of the white-throated storm petrel (*Nesofregetta albigularis)* has only been recorded as a single specimen in recent years. Further work is needed to determine the current status of many other species, but of the 14 listed as "rare or endangered" (Dahl, 1980), the following are apparently of most concern: Tooth-billed Pigeon (*Didunculus strigirostris)*, Mao (*Gynnomyza samoensis)*, Samoan Ground Dove (*Galliclumba stairii)*, Island Thrush (*Turdus poliocephalus samoensis)* Samoan White-eye *(Zosterops samoensis)*, White-browed Crake *(Poliolimnas cinereus)* and Sooty Rail (*Porzana tabuensis).*

The breeding seabird fauna is poorly known with only 9 species confirmed breeding compared to over 20 in American Samoa. The difference is largely made up of terns and burrowing shearwaters and petrels and work is planned in 1995 to determine which nest here.

The importance of the country's birdlife, particularly the number of endemic species, and the threats to it have been recognised by the International Council for Bird Preservation who have listed the Samoan Islands as one of the world's Endemic Bird Areas" in need of 'urgent' conservation attention (ICBP, 1992).

f. REPTILES

Fourteen species of lizards and 1 snake (Pacific Boa (*Candola bibroni)* have been recorded in Samoa. Most of the lizards appear fairly abundant and only one (Samoan Skink (*Emoia samoensis)* is endemic to the Samoan archipelago. Two species of sea turtle, the green turtle (*Chelonia mydas)* and the hawksbill (*Ereimochelys inbricata)* inhabit the seas off Samoa and the latter breeds in small numbers on the Aleipata Islands and a few beaches in Savaii.

g. FISH

Fresh Water

There has not been a detailed study of the native freshwater fish fauna. Brief surveys conducted as part of Environment Impact Assessment of the Afulilo Hydroelectric Power Project (winders et al. (1987), Waugh et at (1991) noted a relatively sparse fish and insect fauna with some very common crustacea. A study of wetlands in American Samoa identified 17 species of finfish and eight species of crustacea (Biosystems, 1992) and most of these may occur in Samoa. In recent years four species have been introduced to Samoa: Mosquito Fish (*Gambusia* spp) and Topminnows (*Poecilia mexicana)* were introduced early this century for mosquito control purposes. Goldfish (*Carassivs auratus)* have an established population in the crater Lake Lanotoo. African Tilapia (*Oreochromis mombassica)* were originally introduced for aquaculture as a tuna bait fish and have now established populations in most bodies of freshwater. (Note : It is proposed to eradicate these populations where possible and replace them with Israel Tilapia (*Oreochromis niloticus),* a more acceptable species for aquaculture (Zann 1991)).

Marine

Samoa's marine fish fauna was is quite diverse with a recent survey of the Samoan archipelago as a whole recorded 991 species of which 890 inhabit shallow water or reefs, 56 are found in deeper water and 45 are pelagic (Wass 1984). However with ongoing degradation of coral reefs, natural occurrences and overfishing there are likely to have been significant declines in almost all the harvested fish species.

h. INVERTEBRATES

Terrestrial

Little is known of the terrestrial invertebrate fauna of Samoa but as elsewhere it is likely to be much more diverse than the vertebrate fauna and will contain a large number of endemic species. There is some information on three groups in particular:

i. BUTTERFLIES

Samoa has 21 species of butterflies, all of which are shared with other islands, but two are endemic to the Samoan Group as a whole. These are the Swallowtail (*Papilio godeffroyl)* which is thought to be threatened and the more common *Hypolimnas thompsoni.*

j. LAND SNAILS

Land snails have undergone an extensive radiation throughout the islands of the Pacific (Cowie, 1992). While the land snail fauna of Samoa is still relatively poorly studied in comparison to that of American Samoa, there are more than 20 species known here including four post-European introductions. Recent collecting work by DEC in the lowlands is currently being analysed and work in the uplands is planned. The Samoan archipelago holds 19 endemic species, two endodontids, nine charopids and eight partulids. One endodontid species, *Thaunatodon hystrellicoides,* is listed as threatened and five of the eight partulids are known to occur here (*Eua expansa, E. montana, Samoana stevensonia, S. canalis and S. conica)* though their present status is uncertain.

The most significant threat to the land-snails comes from the recent establishment in the country of the vegetarian Giant African Snail (*Achatina fulica)* (current outbreak began in 1990 and three areas now infested). Many islands (including American Samoa) have reacted to the arrival of this agricultural pest by introducing two carnivorous snails (*Euglandina rosea* and *Gonaxis kibweziensis).* These have had little impact on the target species but decimated native land-snail populations, causing mass extinctions on Hawaii for example. The South Pacific Commission argues strongly against this approach in a recent pest leaflet. Eradication efforts are continuing but with very limited success due to the shortage of staff and financial resources.

k. ANTS

Ants of this region have been of interest to ecologists and evolutionists because the native species on each island have been joined by as many new species introduced by human activity. There is thus likely to be considerable competition between the different species. In their report on the ants of Polynesia, Wilson and Taylor (1967) list 59 species for Samoa of which 12 are endemic. A more recent study has just been completed by Dr Jim Tetterer and his work is likely to add to this list.

Introduced ants are implicated in local extinction's of land snails and several snail species are now considered to be restricted to higher altitudes as a result (Pearsall, 1992).

l. OTHER GROUPS

During a pilot survey of the uplands of O Le Pupu Pue National Park, a combination of hand-collecting, malaise trapping and light trapping sampled beetles (Coleoptera), bugs (Hemiptera) and moths (Lepidoptera) (Clarkson et al., 1995). A high degree of endemism was observed among the moths with 57% of the 109 species collected endemic.

m. FRESHWATER ENVIRONMENT

No comprehensive survey has been carried out. During the Afulilo EIA (Waugh et al, 1991) one short-clawed crayfish collected from a site below the falls had not been found elsewhere in Upolu and its taxonomy is unknown, indicating the need for more work on this group. A consultant interested in bio monitoring (August 1995) collected freshwater invertebrates from catchments near Apia and his results may be available soon.

n. MARINE ENVIRONMENT

The mangrove, lagoon and coral reef environments support an enormous diversity of marine invertebrates, many of which are harvested as important food sources. Some such as the Palolo Reef Worm (*Eunice viridis)* are also of great cultural significance to Samoan. Pearsall (1992) lists 14 threatened species including several corals and clams, and the coconut crab (*Birgus latro).*

There are several aquaculture projects either ongoing or planned involving introduction of new species such as the red alga (*Eucheuma* sp) the Trochus shell (*Trochus niloticus)* and the Giant Clam (*Tridacna gigas)* or

the supplementation using aquaculture of severely depleted native species such as the clam *Hippopus hippopus* which is thought to have become extinct throughout Samoa from over-exploitation.

TABLE 1: SAMOAN BIODIVERISTY SPECIES LIST

SPECIES	*ENDEMICS*	*NATIVE*	*INTRODUCED*	*THREATENDED*	*TOTAL*
FLOWERING PLANTS	156	App.500	App.500	App.136	App.1000
FERNS					220
LAND BIRDS	8	33	3	14	35
SEA BIRDS		-	-	N/A	21
REPTILES	1	4	11	4	14
ANTS	12		N/A	N/A	59
SNAILS		16	4		20
BUTTERFLIES	2	19		1	21
AQUATIC FAUNA		25	4		29
CORALS					N/A
MARINE VERTEBRATES				4	8
MARINE INVERTEBRATES				14	95
FISHERIES	N/A	890	2		991

4. THREATS TO BIODIVERSITY

The natural environment in Samoa has been greatly affected in recent years through increased forest clearance for agriculture, logging operations and particularly in coastal and marine areas, by pollution and over-exploitation of the sea's natural resources. In addition, two very severe cyclones, Cyclone Ofa (March 1990) and Cyclone Val (December 1991), the most destructive storm in living memory, have caused extensive damage to the natural areas remaining on the islands.

Deforestation has been identified as one of the key problems to be addressed by the NEMS. Approximately one third (23885ha) of the country's forests were cleared between 1977 and 1990 and the forest clearance rate in the last five years of 3% per annum is one of the highest in the world. At the current rate of clearance (50ha/year on Upolu, where there are no commercial logging licenses, and 1000ha/year on Savaii) all merchantable forests will be gone within the next five to six years (Groome Poyry 1993). The term "merchantable" can roughly be equated with "lowland", i.e. lowland forests have been almost eliminated and the conservation of the remaining remnants is an urgent priority.

Over-exploitation of natural resources has occurred in terrestrial and marine systems. Hunting of pigeons, doves and fruit bats has apparently reached un-sustainable levels, particularly in the immediate aftermath of the cyclones when they were easier to hunt. The numbers and average size of fish caught in the lagoons have declined dramatically and local populations of turtles have been reduced to apparently critically low numbers. Such hunting pressures are made worse by the demands of a steadily increasing population.

An increase in major development projects also poses a threat to the remaining natural areas, though the introduction of Environmental Impact Assessment legislation should allow for minimisation of such impacts

in the future. The Afulilo Hydro Scheme indicates the difficulties of balancing conservation and development needs on small islands without such legislation. Its construction resulted in the loss of a unique area of swamp forest that was recognised as the country's most important site in terms of global conservation (Pearsall & Whistler, 1991). Reclamation of mangrove and lagoon areas at the edge of Apia by other agencies of Government also illustrates this problem.

Invasive species being introduced for developmental purposes or accidentally have created major problems for the natural biodiversity, as they overtake natural habitats and eradicate native species. The NBSAP, the new SPREP invasive species programme, and the CBD invasive species programme to be discussed at SBSTTA4 will be used to formulate management options.

In spite of all these pressures many areas of the natural world of Samoa remain and, with proper conservation management, can recover and once more make their contribution to the great natural beauty of these islands and to the conservation of the world's living resources.

5. ACTIONS TAKEN IN RESPONSE TO THE CONVENTION ON BIOLOGICAL DIVERSITY

5.A. LEGISLATIVE FRAMEWORKS

a. LANDS AND ENVIRONMENT ACT 1989

Part 8 of the *Lands and Environment Act 1989* defines the work of the Division of Environment and Conservation through definition of the positions of Principal Environment Officer and Conservation Officers. One of the principal functions under part 8 is to ". Ensure and promote the conservation and protection of the natural resources and environment of Western Samoa". Among recommendations to be made to the Minister under this act are those for the establishment of national parks and reserves, for carrying out investigations and research relevant to protection and conservation of natural resources and the environment and for the promotion of public awareness of the importance of the environment and its conservation.

The more specific items of legislation relevant to Biodiversity Conservation are the *National Parks and Reserves Act 1974 the Protection and Conservation of Wild Animals Regulations 1993,* and the *Local Fisheries Regulations 1995.*

b. DRAFT ENVIRONMENT BILL:

The proposed Environment Bill in its final stages of consultation before submission for Parliament approval by early 1999. The new Bill has incorporated aspects of meeting CBD obligations that were missing from the Lands and Environment Act 1989. Features of the Environment Bill of particular relevance to biodiversity work include the establishment of a Department of Environment and Conservation, inclusion of Environmental Impact Assessment, an environment fund, an environment council, and provisions to develop regulations to manage natural and genetic resources in conjunction with international and regional agreements.

c. TABLE 2: BIODIVERSITY RELATED LEGISLATIONS

LEGISLATIONS	SCOPE OF ACT	RESPONSIBLE AGENCIES
LANDS AND ENVIRONMENT ACT 1989	To ensure and promote the conservation and protection of the natural resources and environment of Samoa. The main agency responsible for the conservation and sustainable use of biodiversity	Division of Environment and Conservation
NATIONAL PARKS ACT 1974	To establish and manage protected areas in Samoa.	Division of Environment and Conservation
FISHERIES ACT 1988	To promote the protections and preservation of the Marine Environment	Fisheries Division
FISHERIES REGULATION 1995	To protect the fish harvesting sizes and conservation measures	Fisheries Division
PLANTS ACT 1984	To regulate the export of plants materials from Samoa	
PLANT AND SOIL IMPORTATION REGULATIONS 1950/1951	To regulate the importation of plant and soil materials into Samoa	Agricultural Division
ANIMALS AMENDMENT ACT 1971		Agricultural Division
FOREST ACT 1967	To manage and sustaianbly use the forest resources of Samoa	Forestry Division
WATERSHED MANAGEMENT REGULATIONS 1992	To protect and manage the five identified water catchment areas in Samoa	Forestry Division
VILLAGE FONO ACT 1989	Recongise the traditional management systems for the control of village resources and village management	Ministry of Internal Affairs
PROTECTIONS AND CONSERVATION OF WILD ANIMALS REGULATIONS 1993	To protect threaten and endangered wild animal biodiveristy of Samoa	Division of Environment and Conservation
PROPOSED LEGISLATIONS		
ENVIRONMENT BILL	Framework Act for the management of Samoa's environment and biological diversity	Division of Environment and Conservation
EIA REGULATIONS	Identifies the need for all developments to undertake EIA	Division of Environment and Conservation
ACCESS TO GENETIC RESOURCES REGULATIONS	To regulate access to Samoa's genetic resources and the equitable sharing of benefits derived from its uses	Division of Environment and Conservation

5.B. ARTICLE 6: GENERAL MEASURES FOR CONSERVATION AND SUSTAINABLE USE

a. NATIONAL BIODIVERISTY STRATEGY AND ACTION PLAN:

Samoa developed its draft national biodiveristy strategy in 1995 through the NZODA technical assistance programme and in association with the development of the National Biodiversity Policy under the NEMS programmes. This draft was not completed due to the lack of staff and funding to complete it. The draft will be revised and improved as part of National Biodiversity Strategy and Action Plan (NBSAP) project funded, through the UNDP as an executing agency of the Global Environment Facility to be completed by early 2000.

b. NATIONAL POLICIES AND PLANS

i National Biodiversity Policy

The national biodiversity policy committee is currently developing the policy and the national biodiversity strategy for Samoa. The process was established in 1996 but has been on hold due to the lack of funding to complete the process.

ii. Forest Policy

The National Forest Policy aims at restoring the balanced multi-use functions of forestry, strengthening forestry administration and encouraging customary owners to become more committed to the protection of the remaining indigenous forests and reforestation activity.

To maintain, and establish where necessary, areas of forest adequate to protect the climate, soil and water resources of the country. As far as possible to provide, on a sustained yield basis, the forest produce requirements of the people and the industry of the country and to encourage an export trade, and to ensure the best use of all forest lands for the general benefit of the country.

This involves the issuing of licenses to control logging of conserved areas, and also places that have significant values. Laws on protection against fires. Control on importation of logs and forest produce to avoid bringing in of pests and diseases that will cause great damage and infestations to our forests.

iii. Land Use, Waste Management, Population and Water Resources Draft Policies

The above-mentioned draft policies were completed as part of the NEMS. All the draft policies having been drafted by and inter-agency task team did not integrated conservation and sustainable use components into it respective policies. The NBSAP process will integrate conservation and sustainable use of biodiversity into the draft policies.

iv. Other NEMS related Policies

The development of integrated policies for the remaining key environmental areas identified in the NEMS document will proceed at the approval of the present draft policies by Cabinet

5.C. ARTICLE 7: IDENTIFICATION AND MONITORING

Samoa has undertaken several biological surveys to assess identify the full scope of its biodiversity, and to design mechanisms for the conservation and sustainable use of its biodiversity.

The earliest biological survey using modern ecological methods was carried out in 1974 by Holloway and Floyd (1975) who recommend a Conservation Reserves system for Samoa consisting of six National Parks, twenty four Nature Reserves, eighteen Historic Sites, five Wildlife Sanctuaries and six Recreation Areas. Following this survey, Whistler (1978) described the vegetation of the montane region of Savaii. Dahl (1980) used these surveys together with an earlier one of American Samoa (Banks, 1982) to describe the range of ecosystems in the Samoan Archipelago as a whole. He recognised 70 Ecosystem Types in the South Pacific within a range of habitats from the deep ocean to the highest mountain top. Thirty-six of these Types occurred within the Biogeographical Province that includes Samoa (ten found only on the atolls of American Samoa).

Using this basic classification as a guide, a joint project was begun in 1987 by the Government of Samoa and the South Pacific Regional Environment Programme (SPREP). The report (Pearsall and Whistler 1991) identified 14 ecosystems as the highest priority for conservation based on rarity and threats in Samoa. (Map

3) To further emphasise the conservation significance of Samoa they considered that 12 of these 14 ecosystems were of global importance because of world rarity, endangered status or the concentration of species found only in Samoa.

Within these ecosystems they listed 26 sites in order of priority for conservation. Following Cyclone Ofa, a National Ecological Survey (NES) was carried out in the coastal lowlands of Samoa (Park et al. 1992). The recommendations of this detailed ground survey resulted in some modifications and additions of extra lowland sites to the list of Pearsall and Whistler (1991). The NES selected fourteen lowland sites which were regarded, as the minimum needed to establish a serves of representative ecosystems of the lowlands of Samoa. It also identified thirteen Grade III sites.

Cyclone Val in December 1991 caused additional damage to these key sites and a further survey was commissioned in March/April 1992 to assess this damage. Lovegrove et.al (1992) were able to visit eleven of the fourteen key sites identified during the NES, repeating standard bird surveys to assess the biological effects of Cyclone Val on each. These surveys showed that many forest birds had declined in number, the pigeons and doves in particular being hardest hit. Though the remaining vegetation at most sites was already beginning to recover, the pigeon and fruit bat populations that rely on fruit from the forest will take years to return to previous levels.

A second survey emphasised the urgent need for the implementation of a comprehensive conservation management programme centred around the key lowland sites identified by the NES.

In 1995 Samoa through the New Zealand Overseas Development Assistance was able to undertake ecological survey of its upland forest. The results of this survey are being compiled but its is anticipated to provide an updated status of Samoa's biodiversity and define priority aspects for the conservation and sustainable use of its upland forest ecosystems.

The data collected from all the ecological surveys are being stored in the national biodiversity database at the Division of Environment and Conservation for evaluation and monitoring of the Samoa's biodiversity. At present, the national biodiversity database is being assessed to increase its capabilities to store and monitor all information collected as part of the National Biodiversity Strategy and Action Plan. The information from these surveys is being used for national environmental and development decision-making. Despite the collection of information, the data has been derived from rapid analysis, which do not necessarily provide a comprehensive scientific data due to shortage of funds and time constraints.

5.D. ARTICLE 8: IN-SITU CONSERVATION

a. PROTECTED AREAS MANAGEMENT

Samoa has played a leading role in the past as the first Pacific Island nation to establish a National Park (O Le Pupu Pue in 1978) and one of the first to establish a Marine Reserve (Palolo Deep in 1979).

To date six conservation management strategies have been used in Samoa. Except for the first strategy, all the rest are community-based management approaches, which empower traditional landowners to fully participate in the conservation and sustainable use of resources.

- The proclamation of National Parks and Reserves on land acquired and owned by the Government. The Department of Lands, Surveys and Environment, Division of Environment and Conservation (DEC) is responsible for the management of these lands. Sites protected in this way include: O Le Pupu-Pue

National Park, Mt Vaea Scenic Reserve, Vailima Botanic Garden, Stevenson Memorial Reserve and Palolo Deep Marine Reserve.

- Joint projects between village communities, Government or NGOs and aid donors seeking to conserve and sustainably manage important areas for biodiversity in communal village ownership. The DEC is the lead agency for three such projects at Aopo-Sasina, Saanapu-Sataoa and the Aleipata and Safata Districts while the OLSS is the lead agency for the fourth community conservation area at Uafato.

- Conservation Covenants have been developed for three natural areas on Savaii, the Falealupo Rainforest Preserve, Tafua Rainforest Preserve and Aopo Cloud Forest Reserve. These have been negotiated between conservation organisations and local Matai and have involved overseas fund-raising to provide development aid such as school buildings in exchange for an agreement over 50 years (20) in the case of Aopo) to manage the natural environment on these customary lands.

- Management of complete catchments is an approach that has been applied with some success within the Vaisigano Catchment above the town of Apia. This approach looks at improving total land management in close consultation with customary land owners. In addition to potentially implementing conservation management on the natural areas remaining in the catchment, it addresses improvements to farming and road building practices and rehabilitation of degraded areas to achieve better overall management of the catchment's water resources. Work has recently been extended to the Fuluasou Catchment area.

- Traditional Fishery Reserves is a joint programme by AusAID and the Fisheries Division in which villages are encouraged to establish fisheries reserves within traditional lands. The villages undertake these plans and management of the reserves while technical support and guidance on establishing by-laws for the reserves are supplied by the project. The project supports the development of alternative income activities for the villages by providing some financial assistance for village identified developments such as aquaculture, tourism or near-shore fishing boats. There are 32 village fishery reserves ranging in size from 1500 - 16,000 square meters.

- Community-based Indigenous Forest Management programme is being implemented through German Aid to assist local communities understand and managed its indigenous forests.

TABLE 3: CONSERVATION AREAS IN SAMOA

NAME	TYPE	MANAGEMENT	DONOR
O LE PUPU-PU'E NATIONAL PARK	NATIONAL PARK	DEC	GOVERNMENT OF SAMOA
PALOLO DEEP MARINE RESERVE	NATURE RESERVE	DEC	GOVERNMENT OF SAMOA
VAILIMA BOTANICAL GARDEN	NATURE RESERVE	DEC	GOVERNMENT OF SAMOA
VAILIMA NATURE RESERVE/RLS MEMORIAL RESERVE	HISTORICAL RESERVE	DEC	GOVERNMENT OF SAMOA
SAANAPU/SATAOA CONSERVATION AREA	COMMUNITY-BASED CONSERVATION	DEC/SAANPU-SATAOA VILLAGES	SPBCP
UAFATO CONSERVATION AREA	COMMUNITY-BASED CONSERVATION	OLSS/UAFATO VILLAGE	SPBCP
FALEALUPO PRESERVATION	COMMUNITY-BASED CONSERVATION	FALEALUPO VILLAGE	SEACOLOGY
TAFUA PENINSULAR CONSERVATION AREA	COMMUNITY-BASED CONSERVATION	OLSS/TAFUA,FAALA,SALE LOLOGA VILLAGES	SNF
AOPO MONTANE FOREST RESERVE	COMMUNITY-BASED CONSERVATION	OLSS/AOPO VILLAGE	SNF

ALEIPATA-SAFATA MARINE PROTECTED AREA	MARINE PARK	DEC/ALEIPATA,SAFATA DISTRICTS (19VILLAGES)	GEF/IUCN
SAMALAEULU INDIGENOUS FOREST RESERVE	COMMUNITY-BASED CONSERVATION	FORESTRY DIVISION/SAMALAEULU VILLAGE	GTZ
TRADTIONAL FISHERIES RESERVES	COMMUNITY-BASED CONSERVATION	FISHERIES DIVISION/ 42 TRADTIONAL VILLAGES	AusAID

b. SPECIES CONSERVATION MANAGEMENT:

The Wild Animals Ordinance 1993 and the Fisheries Regulations 1995 are the two main regulations controlling the loss of threatened biodiversity in Samoa. These were developed utilising results from biological surveys conducted by the Fisheries Division and DEC respectively. Evaluation of these regulations will be part of the NBSAP preparations.

Though relevant regulations have been developed, the effective management of such regulations has been hindered by the shortage of manpower in regulating agencies. New options for effective management of these regulations such utilising the traditional village councils are being discussed as part of the NBSAP's.

Additionally, highly threatened species such as sea turtles, and the tooth-billed pigeon were used as flagship species in national awareness campaigns. The 19995 Pacific Year of the Sea Turtle and the 1997 Pacific Year of the Coral Reef were regional public awareness campaigns of threatened species.

Integrated Pest Management programmes are being undertaken to discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and safe for human health and the environment. The include the biological control of pests and weeds, giant African Snail eradication program, host testing and treatment of fruit flies, utilisation of leguminous plants (symbiosis), effective micro-organisms (EM), organic farming, agroforestry kit, plant inventor agricultural diversification's such as intercrossing and beekeeping for pollination, taro leaf blight selection and breeding programme.

The establishment of the South Pacific Regional Initiative on Genetics (SPRIG) within the Forestry Division is also another very important idea of protecting the generic build up of local Exotic species.

The German government Aid agency (GTZ) is also running a project on the natural forest management in the island of Savaii on logged over forests.

Plantation and Community Forestry

The continuation of the reforestation programme in both islands on village leased lands and some state lands bring about a safe and sure protection to areas that are not good for agricultural purposes. An ongoing investment in reforestation is required for the following reasons:

The future reforestation programme will be environmentally sound, and will be a joint effort by the public sector, private sector, village landowners and individual landholders.

Indigenous Production Forest:

The Indigenous Forest Monitoring Unit (IFMU) is responsible for the monitoring of logging activities and managing indigenous forest utilisation on sustained yield principles. It has been recommended that the need for a phase-out period for existing mill. The desire for a perpetual log cut of 1000cu.m. per year to ensure that Samoan timbers are available for limited decorative and customary uses for future generation. The

eventual protection of approximately one third (5,000 ha.) of remaining merchantable indigenous forest area.

An establishment of a Code of Logging Practices for Samoa will be considered and be taken into great consideration by the Forestry Division. As being part of practices taken as a priority management tool by other South Pacific Country's. Participation of logging officers for training under this programme took place within this year in Vanuatu.

c. DEGRADED BIODIVERSITY

The NBSAP is anticipated to identify a programme to address the rehabilitation of areas of degraded biodiversity, which at the moment is not part of the current work plans for most of the organisation working in biodiversity within Samoa.

d. LEGISLATION FOR RECONGITION OF TRADITIONAL KNOWLEDGE

Several legislation's such as the recently adopted Intellectual Property Rights Law 1998, and the Village Fono Act 1989, and the proposed Access to Genetic Resources Regulations shall be sufficient to provide a general framework for the recognition of ownership of traditional knowledge by indigenous people. The implementation of these legal frameworks and the storing of the traditional knowledge shall be addressed in the NBSAP.

e. AGRICULTURAL BIODIVERSITY

The strategy set out in the Fifth Development Plan (1985 - 87) encourages crop diversification to overcome pest/disease constraints and market uncertainties. Examples include the diversification of the agricultural base with the introduction of exotic fruit trees as well as the development of economically viable crops in ecologically suitable and sustainable farming systems for production by farming communities.

Following the Taro Leaf Blight Disease, the AusAID-Western Samoa Farming Systems project assisted the diversification to other root crops and bananas. *Aiocasia sp., Xanthosoina sp,* yams and sweet potato.

Germplasm that has been imported from overseas has been multiplied and maintained at both USP-Alafua and MAFFM Tissue Culture Laboratories before releasing to farmers.

The Western Samoa Farming Systems Project goal was to create opportunity and income by improving and sustaining farm productivity of rural households/traditional farming communities and to develop economically viable crops, forestry, livestock and fisheries in ecologically suitable and sustainable farming systems. Local bananas, sweet potato, manioc, ginger, cocoa, coconuts, coffee and fruit trees like mango, lime, orange, etc. Has been multiplied and distributed to local growers.

Other activities/Research: Biological control of pests and weeds, Giant African Snail eradication program, Host testing and treat treatment. For fruit flies, utilization of leguminous - plants (symbiosis). Effective micro-organisms (EM); organic farming. Agroforestry Kit: Plant Inventory; conservation Practices like intercropping and (honey) be keeping for pollination, etc..

Cooperator Farmers/Peer Group - A large portion of MAFFM efforts is mobilized through farmers/growers adopting MAFFM recommendations e.g. Livestock production and fruit tree cultivation.

5.E. ARTICLE 9: EX-SITU CONSERVATION:

The existing Environmental Acts do not identify measures for ex-situ conservation of components of biodiversity. Nevertheless, such facilities have been established such as the Vailima botanic Garden, which its management plan identified its main objective as being for the ex-situ conservation of rare and endanagered plant biodiversity. Despite the completion of the management plan, implementation have been severely limited due to the shortage of trained staff and the lack of financial resources to effectively implement the management plan.

An ausAid sponsored intiative called the South Pacific Regional Initiative on Genetics is exploring options for ex-situ conservation of important native timber trees in the Samoa amongst other Pacific Island countries

5.F. ARTICLE 10: SUSTAINABLE USE OF COMPONENTS OF BIOLOGICAL DIVERSITY

a. NATIONAL ENVIRONMENT MANAGEMENT AND DEVELOPMENT STRATEGY (NEMS)

The government of Samoa approved the NEMS in 1993, which established frameworks for environmental planning. The NEMS document was developed through an inter-agency task force, which included government and non-government agencies. The NEMS document identified inter-agency committee's to produce national sectoral policies, The first set of polices have been produced (waste management, water resources, pollution, and plan use) and awaiting cabinet endorsement. The forest policy produced parallel to the aforementioned four has been approved by cabinet. The biodiversity policy is currently being developed alongside the national biodiveristy strategy and action plan. Additional to the sectoral policies, the government produced a Statement of Economic Strategy annually to substitute the previously national development plans. The SES incorporates elements of biodiversity conservation as part of the national planning.

b. STATEMENT OF ECONOMIC STRATEGY*:*

The previous three year National Development Plans have been substituted with annual Statement of Economic Strategies. These plans emphasis sustainable development in government works programmes. The inclusion of environmental and conservation activities is a clear indication of government commitment to addressing biodiversity.

Samoa's SES envisioned to overcome low productivity, low growth and dominant public sector that have failed to achieve economic growth which reduces dependency on foreign aid, foreign loans and remittance from expatriate Samoans. The establishment of the NEMS, state government commitment to sustainable development. The development of policies with different sectors of government will support the active management and implementation of various concerns from areas of Population, land use, and waste management.

Conservation and Protected Areas systems in Samoa provide low environmental impact generating activities. This is shown through Ecotours managed at the conservation sites such as Saanapu/Sataoa Conservation Areas, Falealupo Preservation, and Tafua Conservation Area, and handicraft development in the Uafato Conservation Area.

5.G. ARTICLE 11: INCENTIVE MEASURES

The nature of the customary resource tenure in Pacific islands such as Samoa augurs well with the need to create opportunities for incentive measures to stimulate the conservation and sustainable use of biodiversity. The need was long recognised by government and has created the atmosphere for its programmes to ensure incentive measures are available to the resources owners. Such incentive measure has become an integral part of the development of conservation areas in traditional owned lands. Examples in the protected area systems identified in actions for Article 8. reflect the growing examples of such incentive measures include, ecotourism, sustainable fisheries programmes, and handicraft. The proposed Access to genetic resources regulations will further stimulate incentives for bioprospecting in conservation areas, as well the establishment of an environment fund through the Environment Bill.

Other sectoral programmes to diversify the primary industry sector such as offshore fisheries, and agroforestry need to be supported to control the increased deforestation and overharvesting of inshore fisheries.

5.H. ARTICLE 12: RESEARCH AND TRAINING

The lack main constraint with implementation work in small island developing states such as Samoa is the limitation of trained technical staff. The situation in Samoa is such that although there is an increase in staff, they are not well trained to carry out scientific research and training for the local population. The high turnover of trained staff means there is a continual need for new staff to be adequately trained in scientific research methods.

Although this article refers specifically to scientific and technical education programmes, it also suggests and promotes an integrated approach combining the social and ecological disciplines. For Samoa, it lacks specialists (eg botanists, biologists etc) within the DEC but there are existing institutions in the country such as the USP/NUS etc where such expertise may be available.

5.I. ARTICLE 13: PUBLIC EDUCATION AND AWARENESS

The Division of Environment and Conservation's through its Environmental Education Unit and Biodiversity Conservation Unit have been very active in conducting Public Education and Awareness programmes. The staff have been trained in audio-visual presentations which lead to production of several biodiversity related videos and resource materials being distributed country-wide. the inter-agency relationships in Samoa have further improved with numerous collaborative campaigns between different agencies visiting rural areas. The country also undertook several national campaigns to promote threatened species and ecosystems such as the Year of the Coral Reef, Year of the Sea Turtle, the Manumea (Tooth-billed pigeon) Conservation campaign. Additionally the country celebrates the Biodiversity Day amongst its National Environment Week and Arbor Day.

DEC in addition has an on-going public awareness programme through seminars and workshops targeting different groups of stakeholders at all levels. DEC also collaborate and work together with other agencies in promoting environmental and biodiversity issues such as the Roadshow where DEC joined together with the Samoa Visitor's Bureau and other national agencies in the effort to raise awareness on our environment and natural resources.

5.J. ARTICLE 14: IMPACT ASSESSMENTS

Samoa does not have an Environmental Impact Assessment (EIA) legislation at present. A draft regulations has been developed and is now being incorporated to the draft Environment Bill which is anticipated to be passed in early 1999. This EIA process will incorporate the need to assess the potential impacts of development activities on the biodiversity.

Although Samoa has not yet passed the Draft EIA Regulations, this does not mean that EIA is not undertaken at all. There are existing administrative mechanisms that address EIA and related issues. For example, Treasury has produced a Manual on Project Planning where EIA features as one of the main requirements for appraising projects that goes through the Cabinet Development Committee. There are also other agencies such as the Development Bank and the Department of Trade, Commerce and Industry that also have EIA as an administrative requirements for projects requesting funding from these agencies. On the whole, EIA is more or less conducted on an ad hoc basis.

5.K. ARTICLE 15: ACCESS TO GENETIC RESOURCES

At present the Plant Act 1984 is the only legislative framework regulating access to Samoa's genetic resources. The Plant Act is only limited to the exportation of plant material, but it does not specify benefit sharing mechanisms for the use of such resources. Over the years, several of Samoa's biodiversity have been exported without legally binding agreements with resource owners for equitable benefit sharing measures on the use of its genetic resources.

Samoa is currently developing regulations for access to genetic resources, which is anticipated to be attached to the proposed Environment Bill. The access to genetic resources regulations describes the process for bioprospecting in Samoa and the benefit sharing mechanisms for the use of such resources.

5.L. ARTICLE 16:ACCESS TO AND TRANSFER OF TECHNOLOGY

Samoa has not taken the necessary steps to address this issue, mainly due to the lack of technical know-how in-country to effective pursue it. It is anticipated that the NBSAP project will provides some guidelines for addressing this area.

6. PARTNERSHIPS AND COLLABORATIONS

To date the DEC has obtained excellent partnerships with relevant government departments, NGO's and village communities except the private sector in forwarding it biodiversity work. This include the involvement of such agencies in the decision-making process established by DEC. Table 3 lists some of the partnerships undertaken within Samoa to implement the Convention on Biological Diversity

On the regional and international, Samoa has forged very good collaborative work with other Pacific Island countries through the work of the South Pacific Regional Environment Programme, and inter-governmental environmental agency. Additionally, assistance for implementing Samoa's CBD implementation has been largely through its donour partners of NZODA, AusAID, UNDP, and other international NGO's such as WWF, Rare Center, IUCN and USAID.

The activities listed provide considerable inventory information to document Samoa's biodiversity and those activities that threaten it. They also include several initiatives aimed at the conservation/sustainable use of certain key sites and the management of existing protected areas.

The number of different donor agencies who have funded biodiversity conservation projects in Samoa up to now provides considerable optimism that a co-ordinated plan of action set out in a NBSAP could be implemented. It is intended that they be kept informed of the project's progress to maximise linkages with their own programmes.

The NBSAP project is another example of the partnership and collaboration in environmental work of all the sectors in Samoa. The NBSAP will be assisted and monitored by a Steering Committee based on a Biodiversity Policy Committee which has already been formed within the NEMS (National Environmental Management Strategies) process. Membership of that committee consists of the following: DEC (convener and secretary); Forestry Division, Ministry of Agriculture, Forests, Fisheries and Meteorology (MAFFM); Fisheries Division,; Agriculture Division,; Faasao Savaii (a Savaii-based conservation Non-Governmental Organisation (NGO); O Le Siosiomaga Society (a national conservation NGO); Samoan Umbrella Non-Government Organisation (SUNGO) Samoa Visitors Bureau; Ministry of Foreign Affairs; Department of Internal Affairs; University of the South Pacific; National University of Samoa.

TABLE 4: NATIONAL AND REGIONAL BIODIVERSITY ACTIVITIES IN SAMOA

NATIONAL BIODIVERSITY ACTIVITIES	DONOR
National ecological survey of the biological diversity of the coastal lowlands by the New Zealand Department of Conservation through New Zealand Overseas Development Assistance	NZODA
Ecological survey of upland ecosystems, 1996/98	NZODA
Conservation and Management of Sea Turtles	SPBCP/UNDP
Provision of a Biodiversity Adviser to the DEC, 1993-1996	NZODA
Bird surveys and management	SPREP
Re-development of Vailima Botanic Garden,	AUSAID
Management Plan for Palolo Deep Marine Reserve	SPREP
Conservation and sustainable management of the islands, reefs and lagoons of Aleipata District (Planning grant)	UNEP
Protection of the lowland forests of Aopo-Letui-Sasina (Planning grant)	Biodiversity Conservation Network
Promoting Protection Through Pride (Tooth-billed Pigeon)	RARE Center for Tropical Bird Conservation
Community-based conservation area projects for Saanapu-Sataoa (by DEC) and Uafato (by O Le Siosiomaga Society	through the (SPBCP)/UNDP
Natural Forest Management	GTZ/Forestry Division
Marine Protected Area pilot project (Aleipata and Safata District)	GEF, IUCN
Development of regulations for access to genetic resources and use of traditional knowledge,	WWF-SPP
Community-based Fisheries Reserves	Fisheries Division, AusAID
Preservation of Falealupo Forest	Seacology
Preparation of NBSAP	GEF/UNDP
Conservation of Tafua Peninsular	OLSS, FSS, Swedish Nature Foundation
REGIONAL INITIATIVES	
Action Strategy for Nature Conservation in Pacific Islands (1994-1998), (1999-2002)	SPREP
Regional Environment Programme Assistance	NZODA
Regional assistance with implementation of the CBD in South Pacific Countries	WWF-SP
South Pacific Regional Initiative on Forest Genetic Resources (SPRIG),	Forestry Division, AusAID
Regional Marine Mammals conservation Programme	SPREP
Regional Avifauna Programme	SPBCP
Pacific Strategy for Coral Reef	SPREP, ICRI
Regional Invasive Species Programme	SPREP/NZODA
Pacific Regional Strategy for Wetland Conservation	SPREP
International Waters/ Strategic Action Plan	SPREP/GEF

7. FINANCIAL MECHANISMS

The Government of Samoa has increased its national budget allocation for the implementation for the Biodiversity Conservation Unit since its establishment in 1990 from $50,000.00 to $510,145 (Samoan tala) in 1998/99. The Biodiversity Unit budget is used mainly for human resources, public awareness activities and general maintenance of the existing protected areas.

Most of the funding for implementing activities under the CBD at the present situation is dependent on overseas financial assistance. These have been in the form of projects identified in the partnerships and collaborations section.

The NBSAP is anticipated to identify and formulate sustainable financial mechanisms for its implementation such as the Environment Fund stipulated in the proposed Environment Bill.

8. MONITORING AND EVALUATION

The monitoring and evaluation of the biodiversity will be addressed at the preparation of the NBSAP, through upgrading of the national biodiversity database and the development of monitoring indicators for the implementation of the NBSAP. The NBSAP will further identify and allocate tasks for an inter-agency monitoring and evaluation team.

Additionally, SPREP is coordinating a Pacific Conservation Roundtable, which is developing monitoring indicators for the Action Strategy for Nature Conservation in the Pacific Islands. It is anticipated the monitoring indicators for the Action Strategy and the NBSAP, would be translated to the NBSAP process.

9. REFERENCES

Anon. (1989) *The Status of Sea Turtles In Western Samoa.* FAO/UNDP SAM/89/002 Field Report no. 9.

Banks R. C (ed) (1982) *Wildlife and Wildlife Habitat of American Samoa II Accounts of flora and Fauna.* Fish and Wildlife Service, Department of the Interior, USA

Butler D, et.al *National Ecological Survey of Upland Forest Ecosystems of Samoa* (in press)

Butler, D., *Draft Western Samoa National Biodiversity Conservation Strategy* (unpublished)

Cowie, R.H. 1992. *Evolution and extinction of Partulidae, endemic Pacific Island land snails*. Phil. Trans. R. Soc. Lond. B 335: 167-191.

Dahl, A. L (1980) *Regional Ecosystems Survey of the South, Pacific Area*. South Pacific Commission Technical Paper No 179, Noumea, New Caledonia.

Dahl A.L (1986) *Review of the Protected Area System in Oceania*. IUCN Conservation Monitoring Centre Cambridge United Kingdom.

Glowka, L. *et al.,* (1994). **A** Guide to the Convention on Biological Diversity. IUCN Gland & Cambridge. xii + 161pp**.**

Groome Poyry. 1993. *Western Samoa Forestry Policy Review: Revised Draft April 1993.* Report No. 135/1993. Groome Poyry Ltd, Auckland, NZ.

Hay, R (1985) *Bird Conservation in the Pacific Islands.* Topics Review No. 25, South Pacific Regional Environment Programme, South Pacific Commission, Noumea. New Caledonia.

Hollowav, C.W. and Floyd C.H. (1975) *A Natural Parks System for Western Samoa* UNDAT-IUCN, Lovegrove, T., Bell, B. and Hay, R.

ICBP. 1992. *Putting Biodiversity on the Map: Priority Areas for Global Conservation*. Cambridge, UK.: International Council for Bird Preservation.

Jordan, D. S. and Seale, A. 1906. *The Fishes of Samoa. Description of the species found in the Archipelago, with a provisional checklist of the fishes of Oceania*. Bulletin of the U.S. Bureau **of** Fisheries 25:173-488

Lovegrove, T., Bell, B. and Hay, R (1992). *The Indigenous Wildlife of Western Samoa, Impacts of Cyclone Val and a Recovery and Management Strategy*. New Zealand Department of Conservation, New Zealand Ministry of External Relations and Trade.

Lovell,E.R. and F. Toloa. 1994. *Palolo Deep National Marine Reserve: A Survey, Inventory and Information Report*. Apia, Western Samoa. SPREP, 1994.

Mossman, R. 1987. *Managing Protected Areas in the South Pacific a Training Manual*. Report of NZ Department of Conservation to SPREP, South Pacific Commission and IUCN Commission on National Parks and Protected Areas. 127pp.

Park, G., Hay, J., Whistler, **A.,** Lovegrove, T and Ryan, P. (1992).*The National Ecological Survey of Western Samoa: The Conservation of Biological Diversity in the Coastal Lowlands of Western Samoa*. New Zealand Ministry of Conservation.

Pearsall, S.H. 1992. *Country Basic File: Western Samoa*.

Pearsall, S.H. and Whistler, W.H. 1991. *Terrestrial Ecosystem Mapping for Western Samoa : Summary, Project Report and Proposed National Parks and Reserves Plan.* Government of Western Samoa, South Pacific Regional Environment Program, East-west Center, Environment and Policy Institute.

Robinson, A.C. and J.F. Haska. Eds. 1994. *Palolo Deep Marine Reserve Draft Management Plan*. department of Lands, Surveys and Environment, Apia, Western Samoa. 99pp.

Sandford, -M.K. 1993. *Western Samoa Visitor Services Plan*. Environmental Design Pty Ltd, Melbourne, Australia.

Schuster. C.M.L. , Robinson,. A.C. , Mulipola, A. , Butler, D.J. and S. Time . t in press) - 1995. *Status of Sea Turtles in Western*

Wass, R.C. 1984.*: An annotated checklist of the fishes of Samoa.* NOAA Technical Report SSRF-781. Department of Commerce, USA.

Whistler, W.H. (1978) *Vegetation of the montane region of Savaii,Western Samoa* Pacific Science 32. 79-94

Whistler, W.H. (19921): *National Biodiversity Review of Western Samoa*. Unpublished Report for S.P.R.E.P. Apia Western Samoa

Zann, L. P. 1991.: A Review of introduction of aquatic species into Western Samoa and an assessment of their environmental impacts. *FAO/UNDP SA@%1/89/002 Field Report 10*

Zann, L. P. & Bell. L. 1991. *: The effects of the Crown of Thorns Starfish (Alamea) on Samoan Reefs.* FAO/UNDP SAM/89/002 Field Report No. 8

DEC, *National Biodiversity Strategy and Action Plan Project Document*