

BELIZE NATIONAL BIODIVERSITY STRATEGY

**National Biodiversity Committee
Ministry of Natural Resources and the Environment
Belmopan, Belize, Central America**

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Authorship

This report is the joint effort of the Project Preparatory Team (PPT), under the direction of the National Biodiversity Committee (NBC) and the Technical Advisory Biodiversity Sub-committee (TABS). Members of the PPT worked under contract with the National Biodiversity Strategy and Action Plan Project.

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Richard Belisle
Chairman
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Foreword

As the new millennium approaches, the Government and People of Belize are proud to express to the world, the state of the country's natural and cultural resources. Though in a relatively pristine state, the country's natural resource base faces the many threats which result from unsustainable development practices and a steady increase in human population growth. Strategic planning is necessary to obtain guided exploitation of biological resources and to ensure that the integrity of critical habitats and ecosystems is maintained.

The National Biodiversity Committee was established in 1996 and is charged with the responsibility of providing guidance to the Government of Belize, on policies necessary to conserve and sustainably use Belize's biological resources. The NBC consists of five Government Ministries (Natural Resources and the Environment, Economic Development, Human Resources, Tourism, and Agriculture, Fisheries and Cooperatives), two umbrella NGOs (Association of National Development Agencies and Belize Association of Conservation NGOs), a representative from United Nations Development Programme, and one from the University College of Belize. The first major task of the NBC has been the formulation of the National Biodiversity Strategy and Action Plan. The National Biodiversity Strategy and Action Plan Project started in September 1997 and ran for fourteen consecutive months.

The Technical Advisory Biodiversity Sub-Committee (TABS) is the technical arm of the NBC, which provides multi-disciplinary advice and guidance during processes such as the formulation of the Strategy and Action Plan. It consists of a cross-section of technical, social and special interest/commodity personnel from the Public and Private Sectors. Draft strategies and actions were developed by six national consultants for the following areas: Forest and Wildlife Management, Medicinal Plants, Coastal and Marine Resources, Agriculture and Tourism, Environmental Planning and Geographic Information Systems, and Legal and Policy Framework. During the planing process, eight consultations for the Strategy and four for the Action Plan were held over the six administrative districts. Three TABS workshops and eight NBC meetings were also held. Over 400 Belizeans directly participated during these consultations. In addition, thousands were informed by radio, television, newspaper articles, posters, comic books, biodiversity flags, and an essay competition.

The Biodiversity Strategy of Belize is based on the principle that the sustainable use of the nation's biological resources can only be achieved if conservation is the focus of all programmes and actions. This principle is consistent with the spirit of the CBD and is conducive to sustainable use and conservation of the resources for future generations. The present strategy encompasses long term objectives, but is subject to periodic reviews as may be deem necessary. The Action Plan was developed for an initial implementation period of five years (1998-2003), to provide for periodic evaluations of plan implementation activities. These evaluation exercises will provide the justification necessary for reviews to the Strategy.

The biggest challenge for the Government and people of Belize is the formulation and implementation of programmes which coordinate and consolidate the protection of biological diversity with socio-economic needs. In most cases, success will be dependent upon the role of the community in the implementation of such programmes and on the distribution of benefits derived thereof. Essentially, the processes of biodiversity conservation and national sustainable development must be centered on the betterment of life for all Belizeans.



Richard Belisle
Chairperson,
National Biodiversity Committee

Acronyms

AAC	Annual Allowable Cut
ALIDES	Alliance for Sustainable Development
BBRC	Belize Barrier Reef Committee
BCES	Belize Center for Environmental Studies
BEST	Belize Enterprise for Sustainable Technology
BGA	Banana Growers Association
BLPA	Belize Livestock Producers Association
BTIA	Belize Tourism Industry Association
BTOA	Belize Tour Operators Association
CARICOM	Caribbean Common Market
CBD	Convention on Biological Diversity
CBO	Community-Based Organization
CCC	Coral Caye Conservation
CCRE	Caribbean Coral Reef Ecosystems Program of the Smithsonian Institution
CEDS	Conservation and Environmental Data Systems
CET	Common External Tariff
CFRAMP	Caricom Fisheries Resources Assessment and Management Program
CITES	Convention on International Trade in Endangered Species
cm	centimeter
CSO	Central Statistical Office
CZMP	Coastal Zone Management Project
CZMU	Coastal Zone Management Unit
CZST	Coastal Zone Steering Committee
CZTC	Coastal Zone Technical Committee
DOA	Department of Archaeology
DOE	Department of the Environment
EEC	European Economic Commission
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
EPZs	Export Processing Zones
ESTAP	Environmental, Social and Technical Assistance Project
FAB	Fisheries Advisory Board
FAO	Food and Agricultural Organization of the United Nations
FPMP	Forest Planning and Management Project
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GIS	Geographic Information System
GOB	Government of Belize
IBCs	International Business Company
ICAM	Integrated Coastal Areas Management
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
IMICS	Improved Milpa Cropping Systems
IUCN	International Union for the Conservation of Nature
kg/ha/yr	kilograms per hectare per year
LBSP	Land-Based Sources of Pollution
LIC	Land Information Center
LIS	Land Information System
LUA	Land Utilization Authority
MAF&C	Ministry of Agriculture, Fisheries and Cooperatives
MT/Yr	Metric Tonnes per Year
NAFTA	North American Free Trade Agreement

NBC	National Biodiversity Committee
NBO	National Biodiversity Office
NBSAP	National Biodiversity Strategy and Action Plan
NDFB	National Development Foundation of Belize
NEAC	National Environmental Appraisal Committee
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organization
NM	Natural Monument
NP	National Park
NTFP	Non-timber Forest Products
PACT	Protected Areas Conservation Trust
PfB	Programme for Belize
PGIA	Philip Goldson International Airport
ppt	parts per thousand
PPT	Project Preparatory Team
RAMSAR	Convention on Wet Lands
RBCMA	Rio Bravo Conservation and Management Area
SDAs	Special Development Areas
SIF	Social Investment Fund
SPECTE	Society for the Promotion of Eco-cultural Tourism and the Environment
SOS	Systems of Sustainability
TEA	Toledo Eco-tourism Association
TIPS	Trade Investment Promotion Services
TSFDP	Toledo Small Farmer Development Project
TSV	Taura Syndrome Virus
UCB	University College of Belize
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VAT	Value Added Tax
WCS	Wildlife Conservation Society
WRI	World Resources Institute
WS	Wildlife Sanctuary
WWF-US	World Wildlife Fund – US

Executive Summary

Belize is one of the smallest countries in Mesoamerica and the least populated. On the mainland, the described and documented biological diversity (fauna) are 576 species of birds, 163 species of mammals, 122 species of reptiles, 43 species of fresh water fish, 116 species of total inland fish, 158 mollusks, 42 species of amphibians, 288 species of Lepidoptera, 176 Odonata, 10 species of other insects and two other terrestrial invertebrates; there are also 2 amphibians and 1 reptile documented as endemic. Of the estimated 4,000 species of native flowering plants, 2,500 species are dicotyledons and 1,500 are monocotyledons (including 317 species of bromeliads/orchids). Six hundred and thirteen species of plants have medicinal value.

Seventy nine percent of the Mesoamerican Reef System is in Belizean territorial waters. Available information suggest that 594 genera and 1,040 species of organisms occur in coastal Belize while there are 634 genera and 1,302 species in marine areas. Most of the species in coastal and marine areas are invertebrates, mainly crustaceans, mollusks and marine algae. The coastal zone of Belize is home to viable populations of crocodiles, manatees, rare species of fish and many species of bio-prospecting interest. This species richness may be attributed to the fact that approximately 70% of Belize's territory is still under closed forest cover and most water resources, mangrove forests and other coastal habitats remain in relatively pristine conditions.

These habitats and species are threatened by a series of activities and factors which do not contribute to sustainable use and conservation. Among the most obvious of these are: a lack of an adequate solid and liquid waste management system; pesticides, herbicides, biocides and inorganic nutrients from agricultural and aquacultural activities; deforestation for agriculture, tourism and residential developments; mangrove clearance for tourism and residential developments; destruction of beach habitats by tourism and other activities; unsustainable fishing practices; unsustainable harvesting of forest products; indiscriminate killings and illegal hunting; inappropriate legislation; poaching; lack of monitoring and enforcement; introduction of exotic species; population growth; an ever decreasing literacy rate; dredging and sand mining; mechanical damage to the reef from trampling by divers, boat anchors and dynamiting; unregulated maritime transportation of toxic substances; and natural disasters such as hurricanes, floods and wild fires.

The Strategy seeks to address all of the threats mentioned above and recommends the establishment of a National Biodiversity Office (NBO) as the overall 'coordinating body' for biodiversity conservation in Belize. Other major recommendations of the Strategy include: the formal adoption of the National Protected Areas System Plan, the removal of legislative overlaps as a pre-requisite to effective coordination among agencies, the formulation of legislation specific to biodiversity, the development of enforcement mechanisms, the development of a management framework for marine reserves and other protected areas, major education and public awareness campaigns, substantive investments in human and institutional capacity, and legislation to ensure compliance with Belize's commitments under the CBD and other international agreements relevant to biodiversity. The Strategy strongly emphasizes community participation as one of the major pillars on which implementation procedures for the Action Plan are to be structured.

This National Biodiversity Strategy provides a long term framework for Belize to conserve and sustainably use its biological resources. It outlines priorities for actions based on what is realistically achievable, with the underlying assumption that the successful conservation of Belize's biodiversity will only be achieved if community participation is maximized and equitable distribution of benefits is ensured. Being the first Biodiversity Strategy for Belize, this national effort can be used to demonstrate that with wide stakeholder participation and consultation, planning processes of this nature can make a difference in Belize's sustainable development. The Action Plan which was developed to implement this Strategy will guide the implementation process for the next five years (1998-2003).

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1.0. INTRODUCTION

Biodiversity is a rather new term in Belize and has rarely been mentioned in national planning exercises prior to 1993. Nevertheless, protection of the natural environment, critical habitats and species has gained increased focus over the last 25 years, mainly through the establishment of Protected Areas.

The National Protected Areas System Plan (NPASP), prepared by the NARMAP in 1995, provides guidance for the establishment of Protected Areas; recommends Protected Area coverage and management objectives; suggests an enabling administrative and managerial structure; identifies resource requirements and support mechanisms; and integrates the National Protected Areas System (NPAS) within the national land use and economic development planning, as a component of national policy. So far, this unwritten policy is based on the underlying principles of protecting critical habitat, seeking collaborative management options and promoting sustainable use in the buffer areas of Protected Areas. The National Environmental Action Plan of 1996 further supports this policy.

Even though there is no comprehensive and written policy on the conservation of biological diversity, the centerpiece of biodiversity conservation in Belize is the National Protected Areas System, which consist of more than 60 declared state and private reserves in both the terrestrial and coastal/marine environment. In addition, the National Botanic Garden of 1,000 acres (400 Ha) is currently being set up on the southeastern border of Belmopan, the nation's capital.

The protected area network is dominated by the bloc of statutory reserves occupying the Maya Mountain/Mountain Pine Ridge massif. The Maya Mountain bloc constitutes the second largest in northern Central America and probably the most biologically diverse in the Maya Lowlands. The Rio Bravo Conservation Management Area and the Aguas Turbias National Park form a single conservation management unit. This is separated from Crooked Tree Wildlife Sanctuary to the east, but joins directly on to the Maya Biosphere Reserve via the Rio Azul National Park, itself linking to the Calakmul Biosphere Reserve in Mexico. The Rio Bravo therefore constitutes the Belizean portion of the largest conservation area, and the largest remaining tract of forest, in Mesoamerica, and one of the most important in the American Neotropics. The value of these two sites on a regional and international level must not be underestimated. (National Protected Areas System Plan for Belize: Synthesis Report, page 55). Their current quality is further enhanced by being embedded in an area dominated by natural vegetation. At present, it is still possible to walk through natural habitats the length of the country from the Columbia River Forest Reserve to Shipstern Nature Reserve. Indeed, via the Rio Bravo one can continue over 200 km to the west into the Lacandon and 150 km to the north into the heart of the Yucatan Peninsula. These connections are, however, now being broken. As part of the consultative process under the Mesoamerican Biological Corridors Project, these links were recommended as essential for the conservation of biodiversity of Belize and as an integral part of the National Protected Areas System Plan.

Several Government Ministries and Departments have mandates for the establishment and management of Protected Areas. The Forest Department is responsible for establishing and managing Forest Reserves, National Parks, Nature Reserves, Natural Monuments and Wildlife Sanctuaries. Fisheries Department is responsible for the establishment and management of Marine Reserves and the Lands Department is responsible for the establishment and management of Special Development Areas. The roles of all these institutions are conducive to biodiversity conservation, even though there is no specific legislation on biodiversity.

Private initiatives in the conservation of biodiversity have also been quite notorious. Examples are Shipstern Nature Reserve, Slate Creek Preserve, the Belize Botanical Garden at Du Ploys Resort, the Rio Bravo Conservation Management Area, among others.

Probably the most effective approach to the conservation of biological diversity in Belize are the Protected Areas within the coastal and marine ecosystem. This *in-situ* approach to conservation encompasses protection of entire habitats and their associated biodiversity. There are presently 15 established protected

areas, namely: Hol Chan Marine Reserve, the Burdon Canal Nature Reserve, the Blue Hole National Park, Laughing Bird Caye National Park, Bacalar Chico National Park and Marine Reserve, Half Moon Caye National Monument, Sapodilla Caye Marine Reserve, Southwater Caye Marine Reserve, Glovers Reef Marine Reserve, Shipstern Nature Reserve, Man-o-War Caye Crown Reserve, Little Guana Caye Crown Reserve, Doubloon Bank Caye Crown Reserve, Bird Caye Crown Reserve and Pigeon Caye Crown Reserve. Adding to the protection offered by Marine Reserves, are **seven sites** on the Barrier Reef that were designated **World Heritage Sites** in December of 1996 under the World Heritage Convention.

Since the establishment of the Forest Department in 1927 as the first national entity to address issues of forest and wildlife conservation in Belize, to 1997 when the NBSAP process was initiated, huge steps have been taken to develop policies for the conservation of the country's biological diversity. As the year 2000 approaches and with the help of its global partners, Belize will continue to strive for the conservation its biological diversity as patrimony to humanity.

Belize signed the Convention on Biological Diversity on June 13, 1992 in Rio de Janeiro, Brazil and ratified it in December 1993. The first interim National Biodiversity Committee was formed in late 1995. In January 1998, the GOB submitted its First Interim Report to the Convention on Biological Diversity; the first National Report and the country's Strategy and Action Plan should be ready for submission before the end of 1998. At the regional level, Belize also made serious steps by signing the Central American Agreement on Biodiversity in 1992 and the Alliance for Sustainable Development (ALIDES) in 1994.

Other important international Conventions/Agreements to which Belize has become a party include CITES (1981), RAMSAR (1998) and the International Convention for the Regulation of Whaling (1982), among others. Belize may soon become party or signatory to the following Conventions and Agreements:

- Inter-American Tropical Tuna Commission (IATTC).
- International Dolphin Conservation Program (IDCP).
- International Commission for the Conservation of Atlantic Tunas (ICCAT).
- Inter-American Convention for the Conservation and Protection of Marine Turtles.

Please refer to Annex 13 for more details on these international Conventions/Agreements.

2.0. BACKGROUND

2.1. General Ecological Context

Belize is located between 15° 53'- 18° 30'N and 87° 15'- 89° 15'W and is bounded to the north by Mexico (the states of Quintana Roo and, in the extreme north-west, Campeche), to the west and south by Guatemala (the departments of Peten and, in the extreme south, Izabal) and to the east by the Caribbean Sea. In form, the country is roughly rectangular, extending 280 km from north to south and 109 km from east to west. Maximum east-west extension is 180 km, including the territorial sea. Total land area, including the cayes, is 8,867 mls² (22,960 km²) in a total national territory including territorial sea of c. 18,000 mls² (46,620 km²). The country is divided into six districts, 9 municipalities and more than 240 villages (NPASP for Belize, 1995).

In spite of its small size, Belize is composed of a diversity of landscapes. Inland, the Maya Mountain/Mountain Pine Ridge Massif is the dominant physical feature and rises to 3,688 ft (1,124 m) at its highest point. It is surrounded by rugged karst limestone hills. Beyond that, most of the north of the country and the entire coastal area, including Toledo in the south, consists of low-lying plains. Nine land regions, each comprising a particular combination of topography, soils and vegetation, and thus a distinctive landscape, have been distinguished. These are:

1. The upland massif of the Maya Mountain Land System, including both the Maya Mountains and the Mountain Pine Ridge, constitutes the dominant topographical feature of the country. The geology of the area comprises Carboniferous and Permian metasediments (quartzites, shales, slates) with granite intrusions. Most of this land system is characterized by steep slopes and shallow soils which are leached, acid, infertile and fragile.
- b. The five Hills Land Regions are characterized by hilly terrain made up of thick beds of hard Cretaceous limestones that have eroded into an extremely rugged scenery known as Akarst@. King *et al.* (1993) identified four land regions as follows:
 - i. Central Foothills - located in the northern flank of the massif
 - ii. Western Foothills - of the Vaca Plateau and Chiquibul National Park
 - iii. Eastern Foothills - overlooking the coastal plain
 - iv. Southern Foothills - located in north-western Toledo
 - v. Bravo Hills - located in the north-west of the country including the Yalbac Hills and uplands above the Booth=s River Escarpment
- c. The coastal plains make the three other land systems as identified by King *et al.* (1993):
 - i. Southern Coastal Plain - lies on the Toledo Beds and is further divided into the Machaca (marginal agricultural suitability) and Temash plains(poorly drained, acid and infertile)
 - ii. Northern and Central Coastal Plain - are conveniently described together since both are underlain by Tertiary limestone, marl and calcareous clays, with the most recent limestone outcropping on the north coasts and on Ambergris Caye.

Rainfall varies from less than 1,300 mm per year with a four-month dry season in the north, to over 4,500 mm and a shorter dry season in the south. The natural vegetation is quite varied and 49 distinct types are recognized even after simplification under a revised classification system(NPASP for Belize, 1995).

This pattern of biological diversity also applies to the coastal zone and marine ecosystems. The Belize Barrier Reef is the second largest in the world and the largest in the Western Hemisphere. It is, however, only part of a complex and largely intact coastal ecosystem of exceptional value in global terms. In December, 1996, seven sites on the Barrier Reef were designated **World Heritage Sites** under the World Heritage Convention. The importance of this coastal ecosystem was recognized by Mexico, Belize, Guatemala and Honduras, who have combined their management and conservation efforts in the **Mesoamerican Reef Initiative**, duly signed and ratified as the Tulum Declaration on June 5, 1997. More details on the biodiversity resources are presented in Section 5 (Jacobs, 1998).

In the preliminary classification scheme developed under the Protected Areas System Plan, four regions are distinguished in the coastal zone that reflect differences in sediments, bathymetry, topology and hydrology,

and represent marine equivalents of the terrestrial land systems. They are in turn separated into seventeen divisions, each representing a distinct marine environment. These four coastal regions, running from north to south, are:

2. ***Ambergris Region - extends from the Mexican waters in the north southward to a line connecting Little Rocky Point, Hick=s Caye and St. George=s Caye.***
3. ***Belize Region - extends from the line connecting Little Rocky Point, Hick=s Caye and St. George=s Caye south, to a line drawn due east from the mouth of Mullins River.***
4. ***Stann Creek Region - extends from the mouth of Mullins River south, to a line drawn between Pine Ridge Creek and Silk Cayes.***
5. ***Punta Gorda Region - extends from a line drawn between Pine Ridge Creek and Silk Cayes to the southernmost section of Belizean waters (NPASP for Belize, 1995).***

2.2. Socio-economic Context

The population of Belize stands at 230,000, of which 50% is urban (1997 mid-year estimates). Population densities in the countryside averages 10 persons per /sq. km., one of the lowest in the world, although the density of 197 persons per sq. km. of cultivated land is higher than nearby Honduras and Nicaragua. This is partly due to a large influx of Central American refugees, primarily Salvadorans and Guatemalans who tend to settle in rural areas as well as the higher fertility rates in the rural areas. Most Belizeans who emigrate do so from urban areas, contributing even more to high population densities in rural areas. Population growth estimated at 2.6% per annum and is considered to be high when compared to other countries in the region.

Population growth and high population density in rural areas have important consequences for environmental and natural resource management in Belize. A high population in rural areas translates into more land clearing for agriculture and residential developments, more game hunting, more enforcement problems and more exploitation pressure on the resources (Population Unit, 1998).

Belize is classified as a developing country with a medium Human Development Index of 0.806 in 1995. The population statistics for 1996 is as follows: population growth rate of 2.6% (doubling rate of 27 years); the birth rate was 23.3 per 1,000 inhabitants; the mortality rate 4.3 per 1,000; the fertility rate 4.2 children/woman; and life expectancy was 73.7 years. In 1991, the literacy rate was 70% for males and females. In 1991, 64.15 % of the population were below 24 years. In 1995, 25.3 % of households were considered poor and 9.6 % as extremely poor; the southern districts reporting the higher percentages. Data from 1996 indicate that the per capita GDP was \$2,307 US and the real GDP growth was 3.8% (Human Development Report-UNDP, 1997; Taking Stock: National Human Development Report, 1997).

2.3. Development Context

Provisional figures in 1996 showed that agriculture, forestry and fishing, all activities which transform the natural resource base of the country, made up 20.4% of the GDP. The Tourism Sector comprised 18% of the GDP, manufacturing 16.8%, mining 0.71%, and construction and utilities (power and water only) 7.9%. The main sources of foreign exchange are from the export of traditional agricultural commodities (sugarcane, citrus, bananas, timber, and marine products) and from tourism, especially eco-tourism. The Tourism Sector is steadily growing and may soon become the highest foreign exchange earner. The Agriculture, Fisheries and Forestry Sectors use the highest percentage of the labor force available in the country, followed by the Tourism Sector. The labour force in 1997 was 35.4 % of total population while the unemployment rate was estimated at 12.7% (Central Statistics Office, 1997)

Agriculture and forestry land-use patterns conform to the distribution of good agricultural land, a resource that is distinctly limited in extent. Approximately 66% of Belize consists of land that is marginal for agriculture. The recent deforestation study by the Land Information Center (LIC) of the Ministry of Natural Resources and the Environment, showed that there were 78,076 ha cleared during the period 1989 and 1994, 9% of which were cleared within Protected Areas (White, W.A., 1996)

2.4. Significance of Biodiversity to Belize and Its People

2.4.1. Habitat Diversity

Belize displays as much habitat diversity at low altitude as any Mesoamerican country (Spellman *et al.*, 1975).

It is estimated that the terrestrial flora of the country comprises c.4000 species (Dwyer & Spellman, 1981; Spellman *et al.* 1975). Species diversity of both flora and fauna is more appropriately addressed in Section 5.1. Most of the terrestrial plant species are found throughout northern Central America and many are indeed of wide distribution in the warmer Americas, but more restricted biogeographical affinities can be identified for a significant proportion. Biogeographical ranges are as follows:-

- i. **Caribbean/Yucatec** - ranges including the near-Caribbean (particularly Cuba) and the Yucatan Peninsula.
- ii. **Atlantic Northern Central American** - distributed through Belize, the Mexican states from lowland Chiapas to Yucatan, eastern Guatemala in the Departments Peten, Izabal and Alta Verapaz, and in northern Honduras.
- iii. **Greater Peten** - including Belize, and particularly from the Maya Mountain/Mountain Pine Ridge massif northwards, the Peten and the Mexican states from lowland Chiapas to Yucatan. This is a grouping characteristic of the lower rainfall areas of the moist and hill forest areas in Belize. There is a distinct **Yucatan** element typical of still drier conditions that touches the extreme north-east of Belize, that could warrant separation (NPASP for Belize, 1995). These groupings have already been observed by Standley & Record (1936) who, working from the Flora of Yucatan (1930), noted the affinity of the Belizean flora with that of Yucatan and Campeche (with a regional endemicity level of 17%) and the occurrence of the Caribbean/Yucatec species (NPASP for Belize, 1995).

Distributional information on the Belizean fauna is uneven both in overall coverage and in quality. Comparisons between sites based on species inventory must therefore be avoided at the present time. Nonetheless, there is sufficient information to identify areas of biogeographical affinity across Belize, each liable to represent faunal assemblages with distinctive characteristics. Northeastern Belize (including Ambergris Cay) is Yucatecan in character, whereas northwestern Belize south to the Maya Mountain divide, has affinities with Peten. The lowland savannas are similar to those of Honduras, while the Maya Mountain/Mountain Pine Ridge is unique. Toledo is distinct again, and the coast is Caribbean in its affinities. This regionalization of the fauna mirrors that noted for the vegetation (NPASP for Belize, 1995).

2.4.2. Belizean Endemics

The Belizean endemics are of special concern as their conservation is, on present evidence, wholly dependent upon national measures; **fifty-eight such species** have been listed (Balick, in press). Analysis is confounded by inequality in data coverage across the country and known distributions show clear bias towards the sites where collecting effort has been concentrated. Some species may prove to have wider ranges, although undoubtedly rare within them, but some general conclusions can be drawn. The most important feature is the relatively high proportion of endemics in pine ridge, savanna and their transitional habitats, both in the hills and the lowlands. The special botanical interest of the savannas and similar habitats has already been pointed out (Dwyer & Spellman, 1981) and has a good biogeographical basis, in that similar habitat is not otherwise found in the region, except at altitude, until well to the north and south (NPASP for Belize, 1995).

Species inventory information has proved inadequate for direct comparisons of species diversity between Protected Areas. Diversity of vegetation communities, in close juxtaposition of biogeographic regions and Holdridge Life Zones, and the known distribution of endemic species are therefore used as indicators of relative diversity. The lowland savannas are also known to carry a concentration of endemic plants, primarily recorded from the Manatee Lagoon and south-central coastal plain but, also further north in the Freshwater Creek and Northern Highway area. This accords with the isolated nature of the community. The potential

value of the savannas for biodiversity conservation requires greater prominence in the management of such areas within the protected area network (NPASP for Belize, 1995).

A range of Yucatecan endemic forms is known from the Shipstern area and not further south, although they may potentially reach Freshwater Creek. Inclusion of Shipstern and Bacalar Chico within the protected area network has filled this gap. Finally, the more species-rich coastal habitats (e.g. littoral forest, coastal scrub, mixed mangrove) are highly distinct from inland communities. Although mainly including widespread Caribbean species, they are very restricted at a national level and at least one species (a lizard) is endemic (NPASP for Belize, 1995).

2.5. Biodiversity-related Legislation and Policy

Approximately twenty-two Acts with multiple Regulations directly impact on biological resources, though not specific to biodiversity. The main Acts which address biological resources are the Fisheries Act, the Forest Act, the Wildlife Protection Act and the National Parks Systems Act. The Environmental Protection Act and the Land Utilization Act also provide blanket protection for biological resources (Ellis, Jacobs, Tillet, 1998).

Several policies have been developed which will have an impact on biodiversity, once they are formally adopted. Among these are the Cayes Development Policy, Mines and Minerals Policy, a Tourism Policy and a Forest Policy (Ellis, Jacobs, Tillet, 1998). Laws and policies are addressed in detail in Section 5.2.

2.6. Protected Areas System

The protected area network is dominated by the bloc of statutory reserves that occupy the Maya Mountain and Mountain Pine Ridge Massif. This one area comprises 16 statutory reserves (including all management categories), with a further five as outliers. It is connected to the coastal plain and coastal zone at two points, via the Manatee FR to Manatee Lagoon and the Manatee SDA, and via Deep River FR to the Payne's Creek NP and proposed Port Honduras conservation area. At present, the area is managed on a site-by-site basis but should be envisioned as a single conservation management unit, incorporating the most important single inland area in Belize for the protection and wise use of biodiversity, scenic values, renewable natural resources, water resources and cultural heritage. The area across the international frontier in Guatemala is also formally protected, but constitutes a narrow strip. Satellite imagery of this strip indicates that the hinterland, and indeed the protected area itself, is extensively cultivated. This effectively closes off the bloc to the west. The Maya Mountain bloc constitutes the second largest in northern Central America and probably the most diverse in the Maya Lowlands (NPASP for Belize, 1995).

The Rio Bravo Conservation Management Area and the Aguas Turbias National Park form a single conservation management unit. This is separated from Crooked Tree Wildlife Sanctuary to the east, but joins directly on to the Maya Biosphere Reserve via the Rio Azul National Park, itself linking to the Calakmul Biosphere Reserve in Mexico. The Rio Bravo therefore, constitutes the Belizean portion of the largest conservation area, and the largest remaining tract of forest in Central America, and one of the most important in the American tropics. Man and the Biosphere status has been proposed for the reserves of the Maya Mountain massif and for the RBCMA, which is contiguous with the block formed by the Maya and Calakmul Biosphere Reserves. This latter combination would form a tri-national park spanning Belizean, Guatemalan and Mexican territory (NPASP for Belize, 1995).

The Barrier Reef is also a World Heritage Site. Crooked Tree Wildlife Sanctuary was nominated as a RAMSAR Site when Belize ratified the Convention in early 1998 (Jacobs, 1998).

Even though the Ministry of Natural Resources and the Environment has not officially adopted the National Protected Areas System Plan, as recommended by the NARMAP Project in 1995, work has continued since then to declare Protected Areas such as Bacalar Chico Marine Reserve and National Park, Agua Caliente National Park, Caye Caulker Forest Reserve, Caye Caulker Marine Reserve, Gales Point Manatee Wildlife Sanctuary, among others. Similar efforts have also facilitated the consolidation of the Northern and Southern

Biological Corridors for which GEF financing is currently being sought(Chun,1998, *personal communication*).

3.0. GOALS AND OBJECTIVES

The goals and objectives of this Biodiversity Strategy were developed through a highly participatory process involving stakeholders, the Project Preparatory Team, the Technical Advisory Biodiversity Sub-committee and the National Biodiversity Committee.

3.1. The Goal of The National Strategy on Biodiversity

The importance of biodiversity resources to Belize's development is a well-accepted fact, as was expressed by the many participants at nation-wide consultations held during the formulation of the Strategy. The citizens of Belize recognize that the conservation of biodiversity resources provides significant economic, social, cultural, environmental, scientific and educational benefits for all Belizeans; that there is need for more knowledge and better understanding of Belize's biodiversity resources; that there is an urgent need to strengthen current actions and improve or amend policies, practices and attitudes to achieve the conservation and sustainable use of Belize's biodiversity and that we as Belizeans should recognize that we share planet Earth with all other life forms that have intrinsic value and warrant our respect, whether or not they are of benefit to us.

The need to define and clarify a goal for the NBSAP was recognized by the National Biodiversity Committee (NBC) who together with the Project Preparatory Team (PPT) prepared a strategy statement which was distributed at the consultations for improvements by stakeholders. It reads as follows:

A To promote the sustainable use of Belize's biological and cultural resources by educating society to properly conserve biological diversity in order to maintain and enhance the quality of life for all Belizeans . This will be achieved by ensuring local participation and equitable access to benefits, through adequate institutional and human capacity building and collaborative research and development.@

3.2. Objectives of the Strategy

In order to attain the goal of the NBSAP, the strategy recognizes the necessity to fulfill the following major objectives. Therefore the Belize Biodiversity Strategy should:

1. Foster and enhance human and institutional capacity building to effectively plan and manage Belize's biodiversity resources.
2. Create an awareness of the importance of biodiversity resources to Belize's development and to the welfare of its people.
3. Promote community participation and decentralize the management and use of Belize's biodiversity resources.
4. Determine, document and monitor the status and value of Belize's biological resources.
5. Strengthen and consolidate *in-situ* conservation.
6. Promote *ex-situ* conservation of Belize's biological resources as a complement to *in-situ* conservation.
7. Promote the sustainable use, equitable access and distribution of benefits derived from Belize's biological resources.
8. Formulate policies on biosafety and intellectual property rights.
9. Amend legislation to ensure that Belize's biodiversity is developed and used sustainably.

A deep-rooted respect for indigenous knowledge, a strong commitment to technology transfer between nations, and international collaboration will be the cornerstones for the achievement of these objectives.

3.3. The Guiding Principles

The Strategy accepts the following principles as a basis for the achievement of the strategy's objectives and actions:

1. Belize's biological and cultural resources are national patrimony and should be jointly conserved.
2. Baseline data on Belize's biodiversity resources is indispensable for long term monitoring and management.
3. Ecological and economic sustainability should be the driving forces in developing Belize's biodiversity.
4. Belize's biodiversity is best conserved *in-situ*.
5. Conservation should be community-based and targeted; each community can identify its own biodiversity resource interest.
6. Belize's biodiversity is best conserved when traditional knowledge is respected and benefits arising from the use of this knowledge are equitably shared.
7. Public education (*bio-literacy*) is required to improve and enhance the appreciation of biodiversity conservation at all levels, but should focus on youths.
8. Belizeans, in concert with global partners, are dependent on biodiversity and have a responsibility to contribute towards its conservation.
9. Belize's biological resources should be conserved in coordination with regional and global initiatives.

4.0. METHODOLOGY FOR STRATEGY DEVELOPMENT

4.1. The Phases of the Process

Phase 1 included the formation of the pro-tempore National Biodiversity Committee, the preparation of the Project Document, and the identification and access of funding for the project implementation.

The NBC contracted the services of a legal consultant to prepare a pre-assessment report which addressed existing documentation on Belize's biodiversity, sought gaps in existing legislation on biodiversity, and analyzed the many cross-sectoral issues which directly and indirectly impact on biodiversity. This report was used to assist the six consultants that were hired to conduct an Assessment and Analysis of the thematic areas described further in the Strategy.

Phase 2 is the actual implementation of the project (September 1997 to September 1998). This consisted of the assessments and analyses by the six consultants, eight country-wide consultations to develop the strategy and three regional consultations to finalize the Action Plan. In addition to the six administrative districts, consultations were also held in two focal areas of development: San Pedro, Ambergris Caye for tourism, coastal development and fishing; and Independence/Placencia for tourism, fishing, aquaculture and the banana industry.

During the implementation phase, the NBC and the TABS provided guidance to the process by conducting timely meetings and attending consultation workshops. To improve the quality of the process and products, the NBC contracted the services of an International Consultant on Biodiversity Planning, who provided technical inputs at the beginning of the process and during the last three months of the process. Please refer to Annex 1 for details of implementation.

4.2. The Outputs of the Process

Three major outputs of the Biodiversity Planning Process were identified:

- Output 1: Institutional framework (NBC, TABS, PPT) established; hiring of national and international consultants and other practical dispositions to facilitate project implementation.
- Output 2: National Biodiversity Strategy and National Biodiversity Action Plan
- Output 3: First Country Report to the Conference of the Parties (CoP)

4.3. Stakeholders Participation in the Process

The eight district consultations for the development of the Biodiversity Strategy were attended by more than 400 Belizeans while the three Regional Consultations on the Action Plan were attended by 200 Belizeans. The participating stakeholders included members of the NBC and TABS, relevant GOB Ministries and Departments, environmental and developmental NGOs, CBOs, environmental youth groups, women groups, traditional healers, the clergy, private sector (commercial and industrial) and civil society at large. While the participation of Belizean youth was most encouraging, more participation from the private sector could have enhanced the process.

4.4. The Consultative Process

There were two types of consultations, namely:

- i. Eight Consultations for the Strategy Document:- the Project Preparatory Team presented to stakeholders strategic recommendations identified during the assessment and analysis exercise. Each of the six consultants made 30 minute presentations, highlighting those issues needing

immediate attention in order to conserve and sustainably use Belize=s biological resources. The participants were then divided into six groups to elicit their inputs in finalizing the strategic objectives. These inputs were incorporated into the strategic recommendations developed by the consultants for each thematic area.

- ii. Four consultations for the Action Plan Document:- the Project Preparatory Team, on finalizing their sectoral strategic recommendations then proceeded to prepare, a draft list of actions required to achieve the strategic objectives. This draft was then presented, discussed and inputs received from the workshop participants. During these three Action Plan consultations, the Project Office invited participants from other regions of the country, in order to enrich the consultative process and make it more national in scope. This mode of participation was widely accepted and contributed to a better Action Plan Document.

4.5. The Public Awareness Programme (PAP)

In order to inform and sensitize stakeholders and the general public on this Biodiversity Planning exercise, a dynamic public awareness programme was launched and coordinated by the Project Office. The components of the PAP were:

- Launching ceremony for the entire NBSAP;
- Monthly newspapers articles;
- Presentations on National Television;
- Essay competition for high schools and Sixth Forms on the importance of Biodiversity in Belize=s development beyond the year 2000;
- Participation at the National Agriculture and Trade Show with a booth on the NBSAP; also delivered the winning prizes of the essay competition; reading of the winning essays on national radio during the agricultural show;
- Preparation of biodiversity posters, biodiversity flags and bumper stickers;
- Re-printing of the booklet on the Convention on Biological Diversity(CBD);
- Development of major sections of articles of the CBD in comic book format in order for the general public to understand those sections; and
- Regular press releases on national radio and print media on the progress of the NBSAP Planning process.

4.6. The Thematic Areas of the Strategy

This National Biodiversity Strategy calls for actions from twelve main thematic areas which were developed and recommended from a series of consultations during a twelve months period. These headings include: *in-situ* and *ex-situ* conservation; laws and policy; human and institutional capacity building; research, monitoring and sustainable use; community participation; public education and awareness; institutional collaboration and coordination; access to genetic resources; equity and benefit sharing; information management; population and biodiversity and biosafety.