

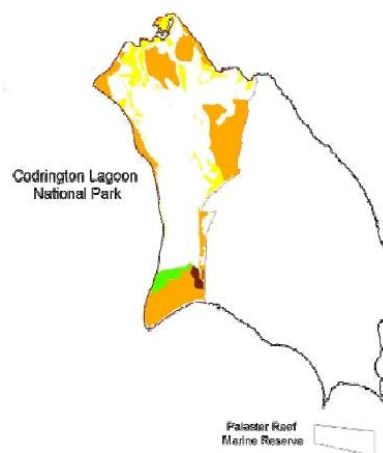
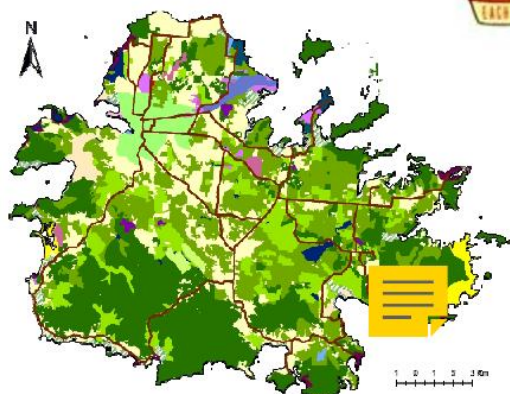
*"Living in Harmony with nature"*

*Antigua & Barbuda National Strategic  
Biodiversity Action Plan*

**2014 -2020**



# *Antigua & Barbuda National Strategic Biodiversity Action Plan*



Government of Antigua and Barbuda  
(2014-2025)



**FOREWORD**



*The* Government and People of Antigua and Barbuda have long been committed to the principles of Sustainable Development. However, in the face of mounting challenges from the global economy and environment, we have strengthened our resolve to ensure our unique natural environment does not count itself a casualty of globalization. To this end, we have developed our National Biodiversity Strategy and Action Plan (NBSAP) to safeguard our natural resources and ecosystems while still allowing for their efficient and sustainable utilization as a driver of economic growth and development.

The NBSAP seeks to establish a strong and effective management system for specific species, vulnerable ecosystems and protected areas. A key component of this management is the establishment of a national fund to facilitate the sustained management of the country’s ecosystems and protected areas. The Fund will be supported by local stakeholders

and international partners. This Fund will be enshrined in the Environment Protection and Management Bill that will greatly enhance Antigua and Barbuda’s ability to achieve environmental protection.

As a Small Island Developing State, Antigua and Barbuda recognizes the importance of our physical environment not only for its uniqueness but also because our environment is the foundation of our economy and our general way of life. From colonization to post-independence, agriculture to tourism, our environment has been the mainstay of every facet and fiber of our society. It is therefore with pride and pleasure that we present our NBSAP to our national and international partners. We invite you to not just see our plans but to see how you can support us in safeguarding our biodiversity and environment for future generations.

Our NBSAP is a testament to the countless hours spent by government workers, NGOs, researchers and development partners not only in consultation but also in applying actions on the ground to ensure this document is insightful, challenging and appropriate. It is the physical culmination of our experiences and thoughts and we are certain that through committed and earnest implementation, this document will not only safeguard and elevate the status of our biodiversity but also enhance the lives of our citizens and visitors as a whole.

.....  
Honourable Molwyn Joseph  
Minister of Health and the Environment  
Antigua and Barbuda

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## LIST OF ABBREVIATIONS

ABS	Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (Nagoya Protocol)
APUA	Antigua Public Utilities Authority
BAA	Biomaterial Access Agreement
CARDI	Caribbean Agricultural Research and Development Institute
CBD	Convention on Biological Diversity
CNA	Competent National Authorities
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
DCA	Development Control Authority
EAG	Environmental Awareness Group
ED	Environment Division
EIA	Environmental Impact Assessment
EIMAS	Environmental Information Management Advisory System
EPMB	Environmental Protection and Management Bill
GAPs	Good Agricultural Practices
GARDC	Gilbert Agricultural and Rural Development Centre
GEF	Global Environment Facility
GEF STAR	System for Transparent Allocation of Resources
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
MoA	Ministry of Agriculture, Lands, Housing and the Environment
NBSAP	National Biodiversity Strategy and Action Plan
NCM	National Coordinating Mechanism
NEMMA	North East Marine Management Area
NEMS	National Environmental Management Strategy
NFP	National Focal Point
NGO	Non Governmental Organization
NIE	National Implementing Entity
NP	National Park
NPDP	The National Physical Development (Land Use) Plan
OAS	Organization of American States
OICP	Offshore Island Conservation Program
PAs	Protected Areas
PAS	Protected Areas System
RAMSAR	The Convention on Wetlands (Ramsar, Iran)
SGP	Small Grant Programme
SIDS	Small Island Developing State
SIRF	Sustainable Island Resource Fund
SIRMM	Sustainable Island Resource Management Mechanism
UNCBD	United Nations Convention on Biological Diversity
USAID	United States Agency for International Development
UWI	University of the West Indies



## Executive Summary

The overall objective of the NBSAP is to ensure the biological diversity of Antigua and Barbuda is sustainably and equitably used, protected and conserved so that it contributes positively to the social and economic development of the country. In achieving this objective, the strategy seeks to ensure the realization of the following goals:

- A national system, including protected areas, for the management and conservation of biodiversity is established.
- The strengthening of the capacity of government natural resources management institutions, as well as non-governmental organizations, to support the objectives and achieve the overall aim of the NBSAP.
- Ecological legislation providing adequate protection of biological diversity is improved or developed where necessary, enacted and enforced.
- Public awareness of environmental issues, ecological education and public participation in decision-making is strengthened.

To achieve these goals the strategy envisaged for the NBSAP is a four-pronged strategy encompassing:

- The sustainable use, protection and conservation of Antigua and Barbuda's biodiversity;
- The effective coordination of all efforts and activities involving the sustainable use, protection and conservation of biodiversity;
- The enforcement of all policies, regulations and legislation affecting these efforts and activities; and
- The knowledge and understanding of the processes governing biodiversity, and the information required to guide and coordinate the activities involving the sustainable use, protection and conservation of biodiversity.

Together, these four themes of the strategy address the recognized obstacles to effective biodiversity management and planning for Antigua and Barbuda. Such obstacles, including institutional, scientific and legislative issues, have been prevalent causes of delays in the successful achievement of previous biodiversity targets. Developing the strategy under these four categories also seeks to improve and maintain the well-being of the people of Antigua and Barbuda as well as the productivity and diversity of the country's ecosystems.

In fulfilling this aim and the country's international obligations, the outline of the strategy covers the full scope of the CBD. To this end, the strategy has been divided into actionable activities based on the five goals of the UNCBD strategic plan for 2011-2020. To supplement this, additional support activities have been identified for implementation by Antigua and Barbuda over the period 2014 to 2020. These have been developed to ensure effective implementation of the envisaged outputs. The strategic goals and agreed national targets have been outlined within this document in Chapters Five to Six.

In an effort to facilitate easier reading and to explicitly show linkages to the CBD, the action plan guiding the strategy is outlined on the basis of the CBD strategic goal and Aichi Biodiversity Targets for 2011-20. Chapter Five highlights the strategic goals and the resulting targets the Government of Antigua and Barbuda has established in comparison to the Aichi Targets. Each section within the chapter also highlights the planned activities that will form a baseline from which future assessment of the country's achievements may be made. In addition to the information highlighted, the suggested agencies requested to implement

the activities have been noted. It is anticipated that each agency will work together with the National Focal Point, Environment Division, to monitor and evaluate the targets as well as collect the relevant data necessary to report on the targets.

Effective environmental management requires a highly coordinated management system, therefore one of the main aims of the NBSAP is the achievement of an integrated, coordinated and inter-sectoral approach to biodiversity policy planning and management. In order to accomplish this as well as fulfill the mandate of the last NBSAP, the Environment Division was delegated to take the lead in planning and programming for the country's natural resources and successful environmental management. In this role, the Division solicits inputs from stakeholders on various activities including the implementation of the NBSAP as well as initiating preventive actions where necessary and beneficial. At present, co-management between the Environment Division and a few other critical agencies forms the basis of a holistic institutional system with a mandate to effectively manage the environment and natural resources of Antigua and Barbuda. However, the capacity of these institutions needs to be increased if they are to achieve their respective mandates.

This is especially important as the Division does not solely focus on the biodiversity, but coordinates environmental management. In an attempt to address this gap, one of the key tools to assist the Division in its mandate is the National Coordinating Mechanism (NCM) for environment related conventions. Though limited in scope, it is anticipated that with its formal establishment through the Environment Management Bill by the end of 2014, it will lay a foundation for further policies on the environment and natural resource management.

The strategy focuses on capacity development, environmental monitoring, evaluation, and institutional management and implementation.



## 1 INTRODUCTION

### 1.1 WHY A BIODIVERSITY STRATEGIC ACTION PLAN?

Globally, it is recognized that humans depend on the world's natural resources for development and as such, development must consider and protect biodiversity. Many countries have signed the UNCBD acknowledging the threat posed to human survival by the continued destruction of biodiversity. The UNCBD sets out a framework obligating countries to undertake measures to conserve and use their biodiversity in a sustainable manner. An important mechanism of the UNCBD is the NBSAP, which is a key implementation tool to enhance national efforts of conservation and sustainable use of biodiversity; it is also a requirement under article 6(a) of the Convention. The NBSAP strives to ensure that countries move more effectively towards planning for biodiversity protection in a strategic manner while addressing all three objectives of the Convention; namely, conservation of biodiversity, sustainable use of the components of biodiversity and fair and equitable sharing of the benefits derived from the utilization of genetic resources.

Antigua and Barbuda ratified the Convention in April 1993. In compliance with the Convention, this document presents the national strategy and action plan to conserve what remains of Antigua and Barbuda's unique biodiversity. Although it remained a draft, the initial preparation of the last Biodiversity Strategy and Action Plan (BSAP), completed 11 years ago, provided the guiding framework in which biodiversity could be sustainably used and conserved. Now in an effort to meet the new requirements of the UNCBD, Antigua and Barbuda began the formal process of reviewing and updating this draft in 2012 with the intention of it becoming the national strategy. Since 2001, the country has worked to secure renewed political commitment not only to the issues of Biodiversity but sustainable development on a whole. Emphasis has been placed on assessing progress to date including the development and implementation of a system of protected areas, and addressing the remaining gaps in implementing the outcomes of the major summits on Biodiversity as well as sustainable development. At the 10<sup>th</sup> meeting of the Conference of the Parties (COP) to the CBD in 2010, the parties approved an ambitious strategic plan<sup>1</sup> for implementation between January 2011 and December 2020. Included in this strategic plan are 20 time-bound Aichi Targets with an understanding that countries will report to the Convention on the conversion of these into national targets and update NBSAPs at the latest by COP 12 in 2014. Achievement of these Aichi targets<sup>2</sup> is emphasized in this NBSAP as well as the new and emerging challenges brought about by climate change.

Antigua and Barbuda, like most of the other Caribbean countries, is a biodiversity hotspot. Recognized regionally and internationally<sup>3</sup>, the country is home to a number of flora and fauna in various states of protection and or threat. The economic development of Antigua and Barbuda, based primarily upon tourism, is highly dependent upon the quality of this fragile environment. This quality is determined by the health of the inter-related ecological functions and physical processes that are the country's biodiversity. The importance of preserving and protecting these natural resources is well recognized by the Antiguan and Barbudan citizenry. A number of these species, highlighted throughout this document, are not only important to the environment but also critical to Antigua and Barbuda's economic growth. It is within

<sup>1</sup> Strategic Plan for Biological Diversity 2011-20 <https://www.cbd.int/sp/>

<sup>2</sup> For a list of the targets please see: CBD Aichi Biodiversity Targets, <http://www.cbd.int/sp/targets/>

<sup>3</sup> Critical Ecosystem Partnership Fund (n.d), Caribbean Island Biodiversity Hotspot Ecosystem Profile Summary, Retrieved October 18, 2013, Retrieved from: [http://www.cepf.net/SiteCollectionDocuments/caribbean/Caribbean\\_EP\\_Summary.pdf](http://www.cepf.net/SiteCollectionDocuments/caribbean/Caribbean_EP_Summary.pdf)

this context that the country's commitment is renewed to preserve and effectively manage its natural resources through the development and implementation of its NBSAP.

## 1.2 THE PROCESS OF DEVELOPING THE NBSAP

The development of a NBSAP is through a participatory, interactive process. Stakeholders arrived at consensus and agreement on the aims, objectives, activities, and deliverables.

The course of completing the NBSAP began with consultations on the previous draft NBSAP finalized in 2001. A stocktaking exercise evaluating the current issues relating to biodiversity nationally and those identified between 2001 and 2012 as well as a review of the 20 Aichi Targets and their application to Antigua and Barbuda. Three consultations were held for the latter discussions and a final suite of targets and indicators was deliberated and agreed upon. Consultations were also held on the revised NBSAP and the final document with all necessary amendments now presented. Compared to the level of awareness and interest exhibited in 2000 when the first NBSAP public consultations were held, awareness levels have improved drastically and this has been helpful in ensuring the final revision of the NBSAP is reflective of the situation in country.

Recognising that the NBSAP is a plan for the biodiversity of the entire country, and because it will influence the lives of the entire population, efforts were made to ensure the process was an open and participatory one. In this process, stakeholders were able to increase their awareness of problems, resources and opportunities, and shared their ideas and suggestions for solutions to the problems.

Thus, the NBSAP has been developed through a participatory process including individual consultations with experts and stakeholders, as well as through national consultations. All relevant ministries, governmental departments and agencies, non-governmental organizations, business and industry, professional societies, educational institutions, advisory councils and interested individuals were invited to participate in these consultations and to comment on the draft documents presented at each stage of the NBSAP development process. This final NBSAP was also circulated for consultation with identified key stakeholders who depend on the country's biodiversity for their livelihood e.g. farmers, livestock owners, fisher-folk, charcoal burners, herbalists, craft persons, tour operators, and others who are involved in the conversion of land from its natural state, like developers, real estate agents, surveyors and any other whose decisions and plans would greatly influence how land is used and habitats are preserved or destroyed. By recognizing the views and concerns of stakeholders, it is believed that this will ensure that the participatory process continues through implementation of the NBSAP.

Biodiversity has an intrinsic value that should be protected regardless of its economic value to humans. This argument focuses on the conservation of all species, even if they are not ecologically equivalent. Biodiversity also performs a number of ecological services to humankind that have economic, aesthetic or recreational values.

## 1.3 COUNTRY PROFILE AND BACKGROUND

Antigua and Barbuda is an archipelagic state located in the Caribbean Sea approximately 250 miles southeast of Puerto Rico. It is the most central of the leeward island chain that starts with the Virgin Islands in the West and ends with Dominica in the South (Map1). There are several tiny uninhabited islands

surrounding Antigua; Redonda (0.6 sq. miles or 1.6 sq km) being the largest. The precise coordinates of Antigua is 17°10' latitude, 61°55' longitude, Barbuda is 28 miles north of Antigua at latitude 17°35' and longitude 61°48'. Antigua is roughly round and has an area of 108 sq. miles (280 sq. km) while Barbuda is 62 sq. miles (160 sq. km). Antigua and Barbuda has an estimated exclusive economic zone of 110,071 sq. km.

As a SIDS in the Eastern Caribbean, Antigua and Barbuda (including Redonda) has very significant resources that may be drawn on to provide a solid base for development. However, the country also experiences major challenges in achieving sustainable development. The country's primary resources include a very agreeable climate, outstanding land and seascapes, extensive areas of high ecological value, an engaging history, democratic governance, a well-educated and healthy population, and significant natural resources (beaches, agricultural lands, fish stocks etc.). While the country's natural resources were of primary economic importance throughout much of its history, the other resources listed, coupled with the ease of accessibility to North America and Europe, have led to a thriving tourism industry. Though economically beneficial to the country however, it has exacerbated the problems for the country's natural and environmental resources.

Antigua and Barbuda, like most of the other Caribbean countries, is a biodiversity hotspot. Recognized regionally and internationally<sup>4</sup>, the country is home to a number of flora and fauna in various states of protection and/or threat. The importance of preserving and protecting these natural resources is well recognized by Antigua and Barbuda. A number of these species, highlighted throughout this document, are not only important to the environment but also critical to the continued economic growth of the country. It is within this context that the country's commitment is renewed to preserve and effectively manage its natural resources.

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<sup>4</sup> Critical Ecosystem Partnership Fund (n.d), Caribbean Island Biodiversity Hotspot Ecosystem Profile Summary, Retrieved October 18, 2013, Retrieved from: [http://www.cepf.net/SiteCollectionDocuments/caribbean/Caribbean\\_EP\\_Summary.pdf](http://www.cepf.net/SiteCollectionDocuments/caribbean/Caribbean_EP_Summary.pdf)

## 2 IMPORTANCE OF BIODIVERSITY

This section highlights the biodiversity of Antigua and Barbuda and its contributions to the overall sustainable development of the country. The main resources described in this section are forests, marine and coastal resources as well as agro biodiversity.

### 2.1 NATURAL RESOURCES

Antigua and Barbuda's economic development is based primarily upon tourism. Consequently, the tourism sector is highly dependent upon the quality of the environment and the health of the inter-related ecological functions that comprises the country's biodiversity. These processes include, for example, the creation and preservation of soils, the storage and distribution of water including the effect on water quality, and the regulation of coastal and atmospheric conditions. They also include the storage and cycling of nutrients essential for life, e.g. carbon, nitrogen and oxygen; re-charging of groundwater, protection of catchment basins and buffering of extreme water conditions. Furthermore, they involve the production of soil and its protection from excessive erosion; absorption and break down of pollutants, including organic wastes, pesticides, and heavy metals. They also provide the basis for improvements to domesticated plants and animals.

In Antigua and Barbuda, the inter-relationships of these ecological functions and physical processes result in a number of ecosystems. These include:

- 1) Evergreen forests
- 2) Xerophytic (dry) forests
- 3) Watersheds
- 4) Scrubland Ecosystems
- 5) Grassland Ecosystems
- 6) Mangrove forest Ecosystems
- 7) Herbaceous swamp Ecosystems
- 8) Salt pond Ecosystems
- 9) Marine and Coastal Ecosystems - Sandy beaches, rocky shores, coastal lagoons, sea grass beds, coral reefs and oceanic islands and rocks.

Ecosystem variety is enhanced by presence of caves in many sections of the island, and by natural seasonal drainage channels and ponds.

#### 2.1.1 Forests & Watersheds

The Forest types of Antigua and Barbuda are influenced by geology, soils, elevation and rainfall. Lumber is not harvested, however forests contribute to the protection of watersheds, critical water resources particularly within the agricultural sector for crop and livestock farming. The canopy cover of forests creates a microclimate necessary for valuable flora and fauna that contribute to island safari eco-tours and birding trails on the island.

### Box 1: A major contribution by Forests in Antigua



#### **Photo 1: Body Ponds Watershed**

This is the largest watershed in Antigua and covers an estimated area of 4,000 hectares. This watershed yields an estimated 390,000m<sup>3</sup> per annum of ground water. The canopy cover of forests within this area reduces the rate of evaporation from this much needed water resource as well as provide a microclimate essential for topsoil and a variety of fauna. The area is also a stopping point for Island Safari Eco-Tours and Birding Trails. However, with the growing prevalence of the lemon grass, an invasive species, in addition to forest fires, this watershed has experienced significant top soil and water loss particularly during extreme weather associated to climate change.

Continued protection, preservation and sustainable use of forests will reduce further loss of valuable flora and for the fauna to which they provide habitats, particularly bird species. Antigua and Barbuda hosts several birding trails and bird watching events that also contribute to the tourism sector.

#### 2.1.2 Marine and Coastal Ecosystems

Antigua and Barbuda is known for the quantity and quality of its beaches which were used to frame and sustain the country's policy for beach and seaside tourism<sup>5</sup>. The beaches of Antigua and Barbuda remain attractive to hotel development and residential realty as well as being valuable as a recreational asset to local communities.

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<sup>5</sup> Government of Antigua and Barbuda (2012). Sustainable Island Resource Management Zoning Plan for Antigua and Barbuda (including Redonda)



Antigua and Barbuda sits on a shallow rock-floored shelf covered by a variety of reefs. The edge of the shelf is at depths of 90 – 180 m where it drops to oceanic depths. Along the south coast of Antigua the shelf is very narrow; it drops to over 305 m within a mile (1.6 km) of the shore. The coral reefs thrive on this shelf. The estimated reef coverage varies from a high of 25.4519 km<sup>2</sup> to a low of 15.820 km<sup>2</sup>. There are four main types of coral reefs found in Antigua and Barbuda. The first type is the barrier reef located on the Southern shore of Antigua parallel to a steep slope at the edge of the narrow shelf. The second type is the bank barrier reef that is predominant off shore Antigua and located on the Northeastern and Southwestern flanks. The fringing reefs are the third type and are found protecting the eastern, northern and southern coast. Patch reefs are mainly found in Barbuda.

**Box 2: Resources contributing to the tourism sector**



**Photo 2: Rendez-vous bay. One of the few beaches that remains undeveloped**

Tourism contributes to 77.8% of the GDP; of this percentage, Hotels account for 10% of its contribution. As Antigua and Barbuda prides itself on its sun, sea and sand most of Antigua and Barbuda's hotels are along beaches. This now threatens both coral reefs and mangroves

Coral reefs contribute to the formation and protection of beaches. However, Antigua and Barbuda's reefs are under continuous stress both from natural and human forces. A large percentage of the islands reefs are now dead particularly due to the passage of a number of hurricanes. In addition to hurricanes, the improper discharge of untreated sewage into the sea, sediment loading due to land erosion, fertilizers, dredging and boating activities have further added to the stress of coral reefs.



Photo 3: Dead and dying coral reefs along the North West Coast of Antigua.  
(Photo courtesy Chere Reid, 2007)

Barbuda is unique with its coastal lagoon, extensive tidal flats, sand bars, underwater sand dunes, salt ponds, cliffs, caves, ‘blue holes’ and “highlands”, all providing special habitats for wildlife, some of which have developed physical, behavioral and physiological adaptations to and in these habitats.

The small isolated, precipitous and rocky island of Redonda is likewise unique, however its biodiversity faces serious problems because of the activities of man. In previous years, seabirds nested abundantly on its shores, and goats, hermit crabs, and lizards were also plentiful. The Burrowing owl, *Athene cunicularia amaurota*, that became extinct in Antigua following the introduction of the mongoose, was still resident in Redonda. Within recent years man’s activities have jeopardized Redonda’s biodiversity. For example, the presence of rats and goats, both introduced by man has resulted in this important landmark (historically, culturally, and environmentally) being left in a severely degraded state. The once abundantly nesting Seabirds now exist in numbers significantly below the thousands. Only a few old trees still stand and they themselves are in danger. The Magnificent Frigate bird (*Fregata magnificens*) depends heavily on the trees for nesting so their loss may mean the loss of this particular breeding population of the bird. The Redonda tree lizard *Anolis nubilis* is also dependent on the trees and other vegetation on the island. Additionally, the soil has become severely overgrazed and unstable. The reptiles found on Redonda, including the *Ameiva atrata*, are no longer abundant. In fact, some have become extinct, and one (not yet formally described gecko) is considered critically endangered. There are no longer any hermit crabs on Redonda (EAG, 2013). To help replenish the island with its once bountiful biodiversity, the EAG has been working with other agencies on varying programs including a proposed rat eradication program.

### 2.1.3 Mangroves

Antigua and Barbuda has one of the most extensive mangrove wetlands in the Eastern Caribbean. There was an estimated 4,900 ha of mangroves for the twin island state before the 1980s (equating to just about 12% of the total land mass of the islands combined). However, research work completed between the 1980s



to 1991 suggests this estimate fell to 1500 ha (Putney, A.D.1982) and further to 1,175 ha (Bacon P.R. 1991) within this time frame. Previously, it was estimated that in the 1980s approximately 11% of Antigua and Barbuda was covered with wetlands. In 1991, a survey of sites estimated that mangrove wetlands covered only 3% of the land area in Antigua and 22% in Barbuda (Bacon, 1991). Based on the current data collected from the country's EIMAS however, the mangrove coverage for Antigua and Barbuda based on the 2004 photos was 902 ha or 3.22% of the total land mass for Antigua and 807 ha or 5.04% of the land mass of Barbuda. FAO's assessment in 2005 estimates mangroves in Antigua has actually been reduced to 700 ha.

There are thirty-six (36) mangrove sites in Antigua and nine (9) sites in Barbuda. In Antigua, the sites range from very small single layer stands of trees to large, complex swamps. In Barbuda, there is the luxuriant 352 ha fringe mangrove of Codrington Lagoon and the narrow scrubby borders of mangroves around the salt ponds. Four species of mangroves exist in Antigua and Barbuda. They are *Rhizophora mangle* (red), *Avicennia germinans* (black), *Laguncularia racemosa* (white) and *Conorcarpus erectus* (buttonwood).

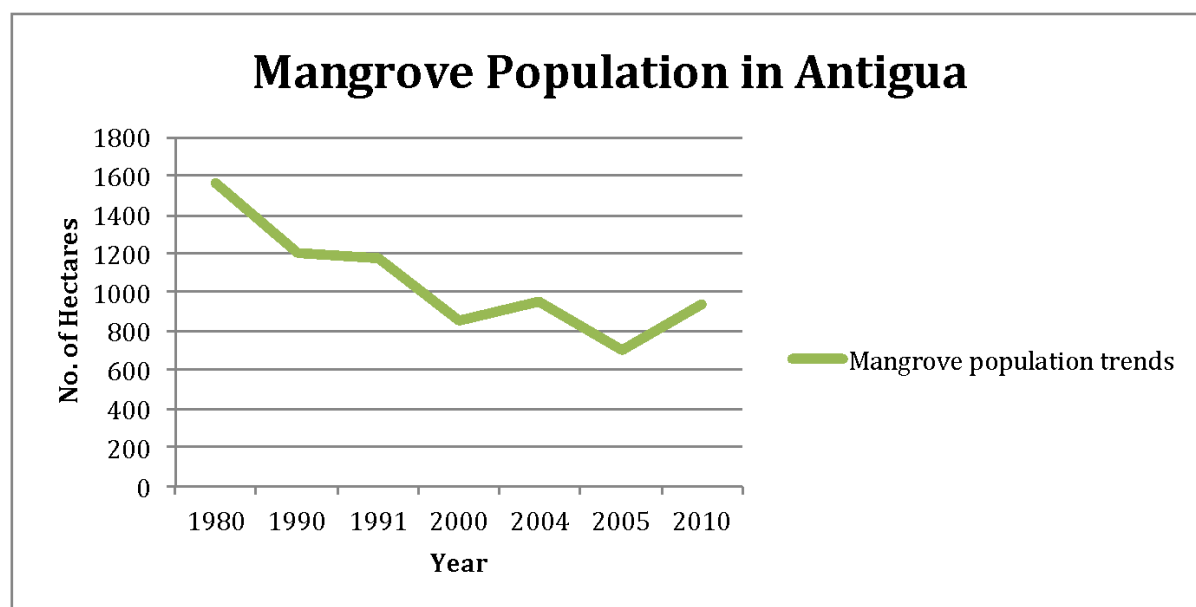


Figure 1: Mangrove Population trend in Antigua

Source: Forestry Department. Global forest resources assessment 2005: Thematic study on mangroves Antigua; 2010 EIMAS image layers

Based on the report presented by the FAO and that which is available in the GIS based EIMAS system for Antigua and Barbuda, it is apparent that some further ground work needs to be completed to assess the current status of the mangroves for both islands. The situation actually points to the current problems in country relating to the availability of accurate and reliable data on the condition of the environment and the country's natural resources. It is for this reason that the action plan to implement the NBSAP will focus on ensuring availability of accurate data on the biodiversity both in Antigua as well as Barbuda. The critical importance of this activity is highlighted with acknowledgement of the number of international organizations presenting less than accurate information on the country's natural resources. Since credible sources are not usually cited with such information, it becomes difficult for the relevant agencies to effectively address this problem internationally.

#### 2.1.4 Agricultural Biodiversity (agro-biodiversity)

Antigua and Barbuda's fourth National report to the CBD Convention cites agricultural biodiversity to include cultivated crops, harvested and managed wild plants for food, domesticated animals, wild animals hunted for food, wild and farmed fish, pollinators (bees and butterflies), pests, predators, insects involved in the soil cycle, earthworms and micro-organisms (including rhizobia, fungi and disease-producing pathogens).

During the colonial era, Antigua and Barbuda lost its primary forests as they were destroyed to support an agricultural sector that was based on a cash crop monoculture policy for sugar cane and sea-island cotton. This culture has since changed owing to the death of the sugar cane as a viable produce. Agriculture has since diversified to produce a large variety of vegetables, fruits, livestock and cash crops such as the sea-island cotton. The agriculture sector contributed an estimated 3% to the country's GDP<sup>6</sup> in 2008 and has been increasing as part of the Government's sustainable development initiatives to increase food security through the Ministry of Agriculture.

Given the growing emphasis on national food and nutritional security, an agricultural policy was developed to guide the development of this important sector. The policy ensures that the capability of the agricultural sector's strategic role in national development is sustained and enhanced in light of the new and emerging challenges facing agricultural development. This is because global imperatives require agriculture to become internationally competitive; unfortunately, not all areas in agriculture in Antigua and Barbuda can realistically become competitive. Thus, the policy focuses on new approaches to increase productivity and competitiveness, deepen linkages with other sectors, venture into new frontier areas as well as conserve and utilize natural resources on a sustainable basis.

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<sup>6</sup> World Bank. 2010. World Development Indicators

### 3 CURRENT SITUATION: BIODIVERSITY RISKS

The following chapter summarizes the threats facing Antigua and Barbuda's national biodiversity, and briefly highlights the status of ecosystems and natural resources resulting in the national targets.

#### 3.1 CHALLENGES FACED BY NATIONAL BIODIVERSITY

There is a current trend in the loss and extinction of biodiversity globally, and more specifically to Antigua and Barbuda initiated in earnest by the clearing of its original vegetation for the cultivation of sugar cane and cotton as well other economic developments.

This trend towards exploitative uses of the country's biodiversity, unsustainable use of resources, and short-term approaches to development in Antigua and Barbuda has continued throughout the years. Threats to national biodiversity have been primarily due to human activities in pursuit of economic and social development. However, in addition to human development activities, the country is facing more emerging threats mainly in the form of invasive species and climate change associated impacts. Addressing these threats have become increasingly difficult given the country's small size and human population of 86,656<sup>7</sup> and inherent challenges. The biodiversity challenges faced by the country are relatively similar to that of many other SIDS. The major challenges include:

- Fragile terrestrial and marine ecosystems such as mangrove wetlands and coral reefs endangered by development projects, pollution and misuse.
- Vulnerability to external economic and natural environmental shocks, such as economic recessions, hurricanes, and climate change. Droughts and hurricanes have severely impacted the bird population, as well as vegetative communities and their dependent fauna.
- Lack of human resource capacity in key biodiversity areas and other related fields.
- Conflicting land use pressures, especially among housing, tourism and agricultural activities.
- Land degradation; and limited institutional capacity to manage the development process because the presence of weak and fragmented land use and development control mechanisms.

#### Threats

- The loss of habitat primarily through the sub-division of lands for housing, tourism development, agriculture and the mining and dredging of sand.
- Fragmentation of natural communities by road-ways, and other man-made features that form a barrier to the movement and dispersal of species.

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<sup>7</sup> Government of Antigua and Barbuda. 2014. 2011 Population and Housing Census. Statistics Division

- The introduction of non-native species, like the Giant African Snail, mongoose, lemon grass and Lion Fish that have a detrimental effect on native wild species by acting as predators, parasites or competitors.
- Overgrazing by livestock mainly goats, sheep, cattle and donkeys that pose a serious threat, particularly in upper watershed areas.
- Pollution as a result of excessive nutrients or sewage discharge into coastal waters, as well as the unregulated and excessive use of pesticides.
- Natural and anthropogenic activities that stress coral reefs (directly and indirectly including through overfishing)

The purpose of development is to improve the quality of human life through utilization of and access to the resources provided by biodiversity. However, the main trend shows that although almost all of Antigua and Barbuda's development has been based on the utilization of our environmental resources, the pathway to development has failed to find an environmentally sustainable course. If this biodiversity is used in non-sustainable ways, the quality of human life both in the present and the future is being compromised.

From a marine perspective, for example, habitat modification and destruction, overcrowding, over-exploitation, and destructive fishing methods increasingly threaten Antigua and Barbuda's biodiversity. Mangroves that function as nurseries, breeding grounds and habitats for both marine and terrestrial wildlife are being destroyed for coastal development, especially associated with the tourist sector. For both Antigua and Barbuda, the sea turtle populations are being impacted by the destruction of critical nesting and foraging habitats through coastal construction, sand mining, pollution and over-fishing. Additionally, the regulatory mechanisms, though effectively enhanced with the enactment of the new Fisheries Act and its accompanying regulations, is undermined as the necessary capacity to enforce these laws to protect nesting and foraging turtles and their habitats is inadequate. In Barbuda, the sustainable use and protection of the Codrington Lagoon and its mangroves are critical to the biodiversity of Barbuda, particularly the conservation of the Frigate Bird Sanctuary and nursery areas for commercially significant species such as the spiny lobster. Yet, efforts to protect this important natural feature, until recently, were minimal at best. Today, with an increased awareness of the impact of climate change and the importance of the country's natural resources to its economic survival, renewed efforts have been undertaken to prioritize the protection of such natural resources in the country. This has had significant successes as the government, in partnership with a number of international and regional organizations, has begun the necessary steps to establish and implement a system of protected areas, and develop other policies for natural resource protection and management.

Sea grass beds that provide food for fish and turtles and also function as nurseries for young conch, spiny lobsters, shrimp and a variety of fish are being destroyed. Coral reefs are in very poor condition, stressed by high sedimentation, and activities like over-fishing, destruction by the anchoring of boats, improper placement of fish traps, garbage, breakage by recreational diving, and the release of partly treated sewage from coastal holiday developments directly into the sea. These impacts are exacerbated by climate change and climbing global temperatures which has caused bleaching events in Antigua and Barbuda as well as other places in the region.

In general, fishing and tourism are the main activities that directly impact Antigua and Barbuda's marine biodiversity. However, sand mining still constitutes a significant threat to coastal properties and resources. Agro-diversity is being destroyed through the over-use and misuse of herbicides and pesticides, though the

number of different kinds of pesticides and the amount of pesticides used are now better managed through the Pesticides Control Board. Still, one concern is the disposal of obsolete chemicals and other hazardous wastes.

### 3.1.1 Alien Invasive Species

Over the past 16 years, almost 20 invasive species are known to have been introduced into Antigua and/or Barbuda. The table below summarizes the species and their impact on the country:

Table 1: Identified invasive species in Antigua and Barbuda

Species Name	Common Name	Type	Introduction	Habitat	Impact
<i>Achatina fulica</i>	Giant African Snail	Snail	Accidental through the agro-industry	Jolly Hill/ Bolans, Burma and Cooks	Very destructive for local agricultural farms. There is also the health risk of Meningitis
<i>Pterois volitans</i>	Lionfish	Fish	Accidental Introduction	Sea	Causing damage to the fishing industry as it has no natural predators here
<i>Cymbopogon spp</i>	Lemon Grass	Grass		Body Ponds and other areas in Antigua	Inhibits the natural growth of native species and is highly flammable
<i>Osteopilus septentrionalis</i>	Cuban Tree Frog	Frog	Unintentional introduction		Displaces native frog species
<i>Helogate parvula</i>	The Mongoose	Small Carnivorous Mammal	Intentional Introduction for pest control in the plantation era		Attacks and eats native species. Was responsible for the near annihilation of the Antiguan Racer Snake population
Plant Hopper ( <i>Myndus crudus</i> )	Lethal Yellowing	Plant Disease spread by a bacteria known as the Plant Hopper ( <i>Myndus Crudus</i> )			Destruction of palms and coconut trees
<i>Rattus rattus</i>	Black Rat	Small omnivorous mammals	Ships		Carry disease. Prey on local wildlife
<i>Rattus norvegicus</i>	Brown Rat	Small omnivorous mammals	Ships		Carry disease. Prey on local wildlife



**Photo 4: Lion Fish**



**Photo 5: Giant African Snail consuming agricultural produce**

Based on stakeholder consultation, the following table captures the main drivers of major biodiversity resources.

Table 2: Summarized perceptions of factors contributing to the loss of national biodiversity

<b>Ecosystem/Resources</b>	<b>Status</b>	<b>Pressures</b>	<b>Drivers</b>
Beaches	Increased rates of Erosion	Integrity compromised due to demand for Tourism Developments Erosion related to reef loss Sand mining	Commercial and Residential growth Climate change impacts
Coral Reefs	Majority of Coral Reefs destroyed by frequent hurricanes and storm as well as land based sources of pollution	Demand for Tourism development Improper sewage/liquid waste disposal practices Invasive species Increased occurrences of soil erosion, runoff of fertilizers and other chemicals	Land based developments to support economic, and residential developments Climate change impacts
Fisheries	Declining near shore fisheries. Pelagics largely untouched	Habitat loss related to reef and mangrove decline. Over exploitation of near shore species Introduction and lack of regulation of FADs. Illegal fishing by foreign vessels	Economic demand Climate change impacts

Mangroves	Relatively constant after major destruction of Mangroves for tourism development; some filled in or blocked thereby hindering ecosystem functions	Demand for Tourism development, marinas and private docks  Frequent occurrence of extreme weather event	Employment & Economic demands Preferred investment areas. Climate change impacts
Forests	Initial mass clearance during colonial era. Modern situation is slow decline.	Invasive Species Forest Fires	Indiscriminate land clearing for agriculture, commercial and residential developments Climate Change Impacts



## 4 STOCKTAKING: REVIEW OF NBSAP

Although draft, the NBSAP in 2001 provided the framework to guide national efforts in meeting the obligations of the UNCBD. This section recalls the core strategic objectives and assesses national efforts to advance these objectives thereby establishing the foundations and way forward for the updated strategy. It summarizes the achievements made thus far as well as highlights constraints and gaps for increased effectiveness in the sustainable management of national biodiversity.

### 4.1 NATIONAL PROGRESS

The initial goal of the overall strategy was aimed at the sustainable use and conservation of biological diversity in Antigua and Barbuda through a four-pronged strategy that was captured as follows:

- The sustainable use, protection and conservation of Antigua and Barbuda's biodiversity;
- The coordination of all efforts and activities involving the sustainable use, protection and conservation of this biodiversity;
- The enforcement of all policies, regulations and legislation affecting these efforts and activities; and
- The knowledge and understanding of the processes governing biodiversity, and the information required to guide and coordinate the activities involving the sustainable use, protection and conservation of this biodiversity.<sup>8</sup>

Stemming from four core strategies, four major objectives emerged to ensure that the biodiversity of Antigua and Barbuda is sustainably and equitably used, protected and conserved so that it contributes positively to the social and economic development of the country. These have been captured as follows:

- Objective 1: A national system, including protected areas, for the management and conservation of biodiversity conservation is developed and established.
- Objective 2: The capacity of governmental natural resources management institutions, as well as non-governmental organizations, to support the objectives and achieve the overall aim of the NBSAP is strengthened.
- Objective 3: Ecological legislation that provides adequate protection of biological diversity is developed, improved, enacted and enforced.
- Objective 4: Public awareness of environmental issues, ecological education and public participation in decision-making is strengthened.

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<sup>8</sup> Government of Antigua and Barbuda. 2001. Draft Biodiversity Strategic Action Plan

Much work has been done to realize these objectives, however their full attainment remains incomplete. As a result, activities within this current NBSAP will remain aligned to these strategic goals and objectives. The table below captures national efforts in achieving the objectives set out in 2001:

Table 3: Efforts undertaken since initial NBSAP draft 2001

Objectives	Link to the CBD	Activities	Activities Breakdown	Status	Comments
Objective One: A national system, including protected areas, for the management and conservation of biodiversity is developed and established	Articles 7,8,9,10, 14,15	1.1 Establish a Protected areas System for terrestrial and marine conservation in Antigua and Barbuda	Identify critical habitats and species for conservation and limited sustainable use (Terrestrial and Marine)	On-Going – A total of 9 protected areas (marine & terrestrial) have been declared. A red list for plant species as well as Pteridophytes was completed by the EAG. The EAG also facilitates the housing of plant herbarium samples in the UWI St. Augustine.	Much work has been done in identifying individual species, habitats and ecosystems vulnerable to human disturbances. However further efforts are need in taxonomy and programmed monitoring.
			Identify, map and characterize areas to be included in a Protected Areas System (terrestrial and marine)	Completed – Declared and proposed PAs have been mapped and exists within the EIMAS.	A system plan was developed and will be updated to characterize all the areas to be included in the system. Sustainable and strategic management and rehabilitative efforts have not yet begun. The SPPARE Project will demonstrate the management structure.
			Develop and implement management plans for protected areas (terrestrial and marine)	On-Going -Management plans have been developed for the NEMMA, the Cades Bay Marine Reserve, Codrington Lagoon National Park and the proposed Wallings Protected areas.	The Nelson's Dockyard national Park needs to be revised.
		1.2 Identify and develop management	Review available information to identify the	Incomplete	A few reports exist on particular species, such as

		plans for critical habitats and species (terrestrial and marine) that may be used sustainably	individual species, habitats and ecosystems that can be used, and develop recommendations for their sustainable use		bats, turtles and birds and the Antiguan racer. However, work remains outstanding in identifying utilized natural resources and their subsequent sustainable use plans.
			Undertake relevant investigations to determine sustainable levels of use of biodiversity	Not yet initiated	An overall biodiversity capacity assessment has not been completed
			Develop and implement plans for fisheries, agriculture and eco-tourism development, and establish appropriate limits (carrying capacity) for the sustainable use by these activities	On-going	Plans have been developed for agriculture, however Fisheries and Tourism are currently being developed
			Develop and implement, where appropriate, pilot projects to demonstrate sustainable practices that are compatible with biodiversity conservation	On-going	Continuous efforts are made. Examples of this, IWCAM – Proper sewage management practices; SIRMM - Resource management, particularly for critical ecosystems; SPPARE – Biodiversity management
			Initiate a Mariculture Development Program to reestablish over-fished areas, and to increase the use of available and not fully utilized natural species	Not yet initiated	Currently, the Fisheries department encourages the development of aquaponic farms
			Adopt measures to prevent over-fishing including a ban on destructive fishing gear and spear-gun fishing	On- going	Measures have been adopted in marine PAs and declared reserves

			Promote collaboration with the private sector to develop eco-tourism	On-going	Both the EAG and Ministry of Tourism have been promoting eco-tourism. The EAG has recently developed a new birding trail in the Christian Valley area as well as in the Body Ponds watershed. Canopy tours within the Wallings area as well as plans for a co-management strategy between the local community group and the Government.
		1.3 Develop and implement a system for monitoring changes in use patterns and the status of the ecosystems (terrestrial and marine)	Identify appropriate parameters, criteria and methods of monitoring biodiversity	On-going	Currently, monitoring is done for sea turtles, and bats, snakes, and nesting birds. This is done by NGOs however there is need for a more formal protocol.
			Collect relevant baseline and other data on relevant biodiversity components	On-going	Collection of some Information has begun and is being included into the EIMAS.
			Collect periodic surveys of threatened species of flora and fauna	On-going	Information collected by research students and other agencies is provided to the Environment Division. However, national surveys are not regularly collected
			Establish and maintain a national bio-geographic (ecosystem) database	On-going	EIMAS is in the process of being developed and constantly updated.
			Evaluate and mitigate the activities that threaten	On-going	Through the development plan process and use of

			biological diversity		EIMAS, development plans are evaluated based on their proximity to critical habitats and mitigations measures recommended.
			Provide accurate and timely information on the specifics of population size and trends especially of threatened species	On-going	Information on populations for the Antiguan racer snake, sea turtles, birds and bats are regularly submitted to the ED.
			Take appropriate legal and regulatory action when the measures governing the protection and sustainable use of the areas selected under activities 1.1 and 1.2 are infringed	Incomplete	Currently, the Fisheries Division exercises legal jurisdiction and enforcement controls for marine PAs and reserves. The EPMB is now before Parliament and pending enactment to protect all ecological resources.
		1.4 Conserve, protect and or sustainably use the genetic resources of Antigua and Barbuda	Conserve medicinal plants and protect vegetative communities that provide habitats to these plants: Starting with the collection housed in the museum investigate use of medicinal plants, catalogue and improve the recording of such uses and make the info more readily available to the general public	Initiated	In 1995 a Country Report was submitted to FAO on Plant Genetic Resources. There have been no further updates to this. Both the GARDC and the Analytical Services Department (Dunbars Lab) established a medicinal herb garden but these have since been destroyed.
			Maintain viable populations of local crop and livestock races: establish seed banks and relevant guidelines, plant nurseries (forest and agriculture in particular),	On- going	The ED is managing the development of the Botanical Gardens and is managing a successful plant nursery. The Ministry of Agriculture through its Crop Research

			botanical gardens reestablished to include an expanded collection of plants, expand the herbarium initiated by the EAG and forestry division		Unit, agricultural stations and Livestock Division maintains a database and monitors crop and livestock production
			Develop and implement guidelines for controlling access to genetic resources	On-going	Through the Plant Protection Act, access and control of GMOs is addressed. The Plant Protection Unit issues a biomaterial access Agreement (BAA) for the research and removal of genetic resources in and out of the country. The country is also signatory to the International Standards on Phytosanitary Measures and as such are bound to those regulations.
Two: The capacity of governmental natural resources management institutions as well as non-governmental organizations, to support the objectives and achieve the overall aim of the BSAP is strengthened	Articles 11,12,16	2.1 Develop and enhance the capacity to manage protected areas and areas identified for sustainable use together with their associated biodiversity	Establish an appropriate policy and institutional framework including capacity building for management and protection of the country's biodiversity: obtain policy document from cabinet on the protection of the environment	On-going	The NEMS to 2010, previously developed, has concluded and will be reviewed and updated for a further 10 years.
			Conduct institutional review for the effective protection of the country's biodiversity. Based on the review establish an appropriate framework for natural resource management	On-going	The SIRMM, NEMS and draft NBSAP enables the review and establishment of appropriate resource management framework.

			Provide training to facilitate the conservation and sustainable use of the country's biodiversity	On-going	Training and awareness programs are conducted as part of the Environment Education Unit within the ED. Training for mapping natural resources are done three times a year. The EAG has conducted training internships for regional and local students in the management of offshore islands.
		2.2 Conduct research on the inter-relationships between abiotic, biotic and anthropogenic factors affecting biodiversity, and develop recommendations for the mitigation of these effects	Identify gaps in current information required for making conservation management decision and recommend appropriate research programs to address them	Incomplete	Although regular reports are done on various issues and species, they need to be consolidated and utilized in policy more efficiently.
			Collect baseline data required to ascertain gaps	Completed	Gaps have been identified through a variety of projects and reports, notably the SIRMM Project, GEF Protected Areas and the IWCAM Project.
			Conduct research on the ecological requirements of priority species and communities, especially those that are rare and endangered	On-going	Research done for the Antigua Racer snake, migratory and wetland birds.
			Provide an information sharing forum for improving conservation of	Completed	This is achieved through the Environment Division's website.



			biodiversity		
			Identify current and future risks associated with biotechnology and make recommendations for policy development	Not done	This has not yet been undertaken.
		2.3 Facilitate national financing for biodiversity conservation	Review sectoral and national budgets for biodiversity conservation in the context of proposed institutional changes required to implement the BSAP	Incomplete	Although budgetary biodiversity allocations were made, this has since drastically reduced given economic recession.
			Examine options for cross-budget schemes to promote the conservation and sustainable use of biodiversity by other agencies	On-going	This has been recognized by the NCM but no formal policy or instruments exist.
			Maximize resources by bringing projects that have the same objectives together to coordinate and synchronize their activities and objectives	Ongoing/Completed	All projects are managed through a national technical advisory committee that reports to a project management committee. This facilitates synergies and avoids duplication of efforts.
			Seek assistance from the private and NGO sectors to finance specific aspects of the BSAP	On-going	The Ministries of Agriculture and Environment have and continue to collaborate with NGOs and CBOs.
			Consider feasibility of the introduction of user fees for at least some aspects of eco-tourist activity	On-going	User fees are already in existence for the National Parks Authority and other user fee systems are under development for other

					areas of high ecological value.
			Conduct training for key ministry employees and NGOs in project development and grants applications suitable for national and international donors	On-going	Through the Ministry of Social Transformation and Community development as well as the ED and the National SGP, training sessions are undertaken to build the capacity of NGOs and CBOs in project development.
			Continue to seek international assistance for the conservation and sustainable use of the country's biodiversity	On-going	The country continues to access GEF Funds and other international donors through project development grants to address biodiversity, climate change, and land degradation.
		2.4 develop and implement policies to promote sharing of appropriate technologies	Develop international and bilateral agreements to facilitate the sharing of appropriate technologies	Initiated	Consultation held and the country has applied to UNEP to undertake a technology needs assessment.
			Develop appropriate protocols to facilitate technical and scientific cooperation	Not Done	
			Ratify other conventions that complement the implementation of the BSAP (CITIES, RAMSAR, TRIPS etc)	Completed	The country has ratified a number of conventions, <i>see annex 1.</i>
			Utilize the monitoring regime established in 1.3 to facilitate the country's reporting obligations under	Incomplete	There is no formal monitoring process established. Data is often collected randomly and

			a number of international conventions treaties and agreements (including equipment and training)		most often based on project related requirements.
			Develop and implement protocols to regulate the import and export of endangered species, in line with international agreements (CITIES)	Completed	Permits are applied for through the ED, Plant Protection Unit and Fisheries Division.
			Develop and formalize regional agreements relating to cooperation in conservation of biological resources.	On-going	
Three: Ecological legislation that provides adequate protection of biological diversity is developed, improved, enacted and enforced		3.1 Establish the necessary policy and legal framework to facilitate the management sustainable use and protection of the country's biodiversity	Review, update and enact legislation to support the general policy statement/ decision from Cabinet and Parliament regarding the protection of the environment developed under activity 2.1. Review the draft forestry and wild life act (1988), pesticide and toxic chemicals act, enact legislation for endangered species, provide legal protection for Great Bird island, improve beach protection, regulations for biodiversity use, regulations for activities in sensitive areas, training for those involved in legislative aspects of the management framework	On-going	EPMB is now pending enactment.

					<p>EIA Procedures established under the Physical Planning Act 2003, in addition to the SIRMZP development planning guidelines.</p> <p>Under the Plant Protection Act, applications are required and screened by the Plant Protection Unit for the importation of any non native species.</p>
			Review impact assessment procedures to take into account specific impacts on biodiversity		
			Provide direct incentives to promote positive biodiversity conservation through incentive packages, tax privileges polices, develop and implement an annual competition for nationally recognized awards for environmentally friendly management by business, service organizations etc.	Ongoing	

			Establish disincentives relating to negative impacts on biodiversity, the polluter pays principle reviewed and implemented, capacity building to implement disincentive measures for relevant agencies, regulations to curb the importation of potentially invasive species that pose a danger to biodiversity		
		3.2 develop the legal and institutional framework necessary to ensure the safety of biotechnology as well as to ensure that maximum benefits accrue to Antigua and Barbuda from the exploitation of its biological resources	Establish a policy on GMOs that will ensure maximum benefits to the country, ensure safety, develop a policy to address biotechnology in relation to relevant international instruments, develop and implement the legal and institutional framework to govern the safety of biotechnology and equitable sharing of benefits	On-going	The enacted Plant Protection Act addresses the issue of GMOs. Formal policy procedures have also been established through the Plant Protection Unit.
Four: Public awareness of environmental issues, ecological education and public participation in decision-making is strengthened.	Articles 13,17,18	Increase public awareness of the benefits to be derived from biodiversity	Develop collaborative public education programmes and campaigns to increase public awareness of the importance of biodiversity to everyday life: provide resources relating to environmental education to the ministry of education, develop innovative public education materials,	Completed/ On-going	Through the ED, a public awareness, communications and education strategy has been developed and is updated annually. The on-going development of the ED's botanical gardens will feature issues relevant to the Rio Conventions.

			develop special programs targeting specific groups and service organizations that contribute to public education and stakeholder awareness		
			Develop public awareness of policies and laws relating to biodiversity through radio and television programs, print media etc.	Completed/ Ongoing	A number of education awareness programs have been implemented through the Education Unit of the ED as well as through partnerships with NGOs, CBOs, etc.
			Develop mechanisms for inter-sectoral biodiversity information sharing including the repatriation of information held within other nations, develop and implement protocols to clarify rights of accessibility to and ownership of biodiversity information and specimens that are collected by foreign agents	Not Done	
NBSAP Management		Determining the way forward in managing the NBSAP	Establish a coordinating mechanism or entity for environmental management and implementation of the BSAP	On-going	The establishment of the Environment Division as lead coordinating entity. The National Coordinating Mechanism and technical advisory committee also facilitate the coordination and mainstreaming of policies.
			Monitor and report on the implementation of the BSAP annually, nationally and internationally	On-going	Reports sent as required by the UN CBD.

			Carry out periodic evaluations of the implementation of the NBSAP and other environmental strategies and action plans.	To be initiated	With the submission of this document, further strategies and programs implemented will be regularly evaluated.
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## 4.2 CONCLUSION

Since the completion of the draft NBSAP in 2001, the Government of Antigua and Barbuda has taken many strides to sustainably manage national biodiversity and meet its obligations under the Convention on Biological Diversity. One of the most notable accomplishments was enhancing institutional capacity by establishing the Environment Division, now currently under the Ministry of Health and Environment. The development of a GIS based platform, the EIMAS, through the SIRMM project provided a critical tool for decision makers in land use planning and biodiversity considerations. It also establishes a platform for spatial analysis of natural resources. Partnership with NGOs and community groups have greatly contributed to the knowledge, management and monitoring of specific species and habitats. The approval of the country's National Environmental Management Strategy (NEMS) 2004-2010 is also an indication of the country's pledge to the management of biodiversity. It is anticipated that this commitment will continue to be seen throughout the review of the NBSAP by 2025. However, as highlighted, a number of activities are incomplete and remain ongoing until more formal procedures can be established.

Over the last ten years, the Government of Antigua and Barbuda has embarked on programs aimed at the sustainable use, protection and conservation of the islands' biodiversity. The Government has initiated much work in protected areas identification, legalization and development for example. Additionally, the country has worked through a number of projects to develop a sustainable island resource management mechanism (SIRMM) for biodiversity, the revision of policies to ensure the completion of EIAs prior to development so effective measures to conserve biodiversity during development can be implemented. There is also a move to integrating the issue of biodiversity into the general programs of all agencies that are directly related to biodiversity and those that are indirectly related.

A number of protected areas, marine reserves and at least one national park have been declared over the last 10 years. However, there is still much to be completed to ensure full achievement of this goal. The strategy is being designed to fill the existing gaps including the identification and development of management plans for critical habitats and species that may be used sustainably in the country; the development and implementation of a monitoring system for ecosystem status; and the conservation and protection as well as sustainable use of genetic resources in the country.

Much work has been done in identifying individual species, habitats and ecosystems vulnerable to human disturbance, for example, a Red List of Plant species has been prepared, a Red List of Pteridophytes (vascular plants (plants with xylem and phloem) that reproduce and disperse via spores, for example, ferns) was also completed. Additionally, the housing of some plant species has been facilitated at the herbarium of the UWI St. Augustine campus and some commercial species also have been housed by the CARDI for safe keeping. In relation to protected areas, initial work has been done to develop a systems plan for protected areas in country. This document is now currently under revision and should be completed by 2015. Further to this, management plans have been developed for a number of protected areas including the Nelsons Dockyard National Park, the Codrington Lagoon National Park and the NEMMA. Some research has also been completed on existing species such as bats, turtles and birds frequenting or resident to Antigua and Barbuda. Data has also been collected and reports presented on the management of the Antiguan Racer. Some investigative and continuous removal/control work has also been done for invasive species as mentioned in chapter three. The development of pilot projects to promote sustainable practices has also had a critical impact on the process of biodiversity conservation and management in Antigua and Barbuda. The work undertaken in the Mckinnons Pond area under the IWCAM Project, the work being completed on sustainable island resources and that completed in a number of other protected areas and proposed protected

areas has helped to raise awareness of the need for sustainable development methods. The activities, which have been facilitated through help from a number of government, regional and international funds, have been key to ensuring the continued success in the protection of the country's biodiversity.

However, there is still a large gap in the existing data that will require a complete understanding of the biodiversity of Antigua and Barbuda. Facets relating to periodic data collection and monitoring protocols remain outstanding, primarily due to insufficient technical capacity and finances. Furthermore, increased capacity and knowledge in taxonomy as well as maintaining a database of national biodiversity that consists of management and sustainable use plans is still lacking and will be achieved in the long term.

The action plan created as part of this strategy in Chapter 5 highlights how some of these gaps will be filled. The development of national policies such as the one being developed for agriculture and tourism, have also helped in promoting the process of sustainable development. Inter-sectoral linkages are critical to the process of biodiversity conservation and protection. The country has recognized this and is currently working on making its efforts towards biodiversity conservation a nationally coordinated mission. Once this is achieved, knowledge sharing and mainstreaming mechanisms on biodiversity will be further strengthened and enhanced.

Based on the above review of the draft NBSAP of 2001, it is evident that the core objectives have not been fully achieved although great strides have been obtained.

## 5 THE STRATEGY GOING FORWARD

As previously captured in the review of the progress made in achieving the strategic goals and objectives highlighted in 2001, it is evident that there is still much work needing to be done. As a result, to ensure attainment of these goals, the overall objectives will be taken forward to 2020 and beyond to ensure the sustainable foundation of managing national biodiversity. These have been divided into actionable activities based on the five goals of the UNCBD strategic plan for 2011-2020. Support activities to be implemented by Antigua and Barbuda over the period 2014 to 2020 have also been developed through stakeholder consultations to ensure effective implementation. Together, the national targets and support activities of the strategy address the obstacles to biodiversity planning and rehabilitation, including institutional capacities, scientific knowledge and research as well as challenges in the legal and policy considerations. They are aimed at improving and maintaining the well being of the people of Antigua and Barbuda as well as the productivity and diversity of the country's ecosystems.

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*Vision: the NBSAP will strive to ensure that the biological diversity of Antigua and Barbuda is sustainably and equitably used, protected and conserved so that it contributes positively to the social and economic development of the country.*

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To ensure that the full scope of the CBD is encompassed in this NBSAP, the National targets have been aligned to the 2020 Aichi Targets and strategic goals. This has been compiled in the table below:

Table 4: Aichi Targets set against National Strategic goals and targets for Biodiversity

Strategic Goals	Aichi Targets	National Targets
Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably
	Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting as appropriate and reporting systems.	Target 2: By 2020, biodiversity values have been integrated in national physical development plans and local area plans and the millennium development initiatives for Antigua and Barbuda
	Target 3: By 202, at the latest, incentives including subsidies harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity and developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.	Target 3: By 2020, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations taking into account national socio economic conditions.
	Target 4: By 2020, at the latest, Government, business and stakeholders at all levels have taken steps to achieve or have implementation plans for sustainable production and consumption that have kept the impacts of use of natural resources well within safe ecological limits.	Target 4: By 2020 at the latest, all stakeholders, (public, private, and civil) have taken steps to implement plans for sustainable production and consumption of natural resources keeping impacts within safe ecological limits as far as possible.
	Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	Target 5: By 2020 an effective monitoring protocol for critical habitats, mainly forests, mangroves and coral reefs has been implemented to assist in reducing degradation and fragmentation and

Reduce the direct pressures on Biodiversity and promote sustainable use		measures developed and undertaken to reduce the rate of loss by 10%.
	Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stock, species and ecosystems are within safe ecological limits.	Target 6: By 2020 Policies and sustainable use plans are put in place for the sustainable management of Fisheries resources.
	Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably ensuring conservation of biodiversity	Target 7: By 2020 The capacity of governmental natural resources management institutions as well as non-governmental organizations, to support the objectives and achieve the overall aim of the NBSAP is strengthened
	Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	Target 8: By 2020, 20% of pollution, including from excess nutrients within specific demonstration areas, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
	Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	Target 9: By 2020 invasive alien species and pathways are identified and prioritized, priority species are controlled, measures are in place to manage pathways to help prevent their (re)introduction and (re)establishment as far as possible.
	Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems such as the NEMMA, Cades Bay and Codrington Marine Reserves impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	Target 11: By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape	Target 11: A national system, including protected areas, for the management and conservation of biodiversity is developed and established by 2020 This will include, terrestrial areas, wetlands, areas important to migratory species and marine environments.
	Target 12: By 2020, extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained	Target 12: By 2020 Implement protection measures for threatened species including the racer snake, marine turtles, Redonda Dwarf Gecko, Redonda Ground Lizard, threatened plants, and threatened birds.
	Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity	Target 13: By 2020 maintain genetic diversity of local plants by storing germ stocks for re-population should current stocks become contaminated. Maintain stocks of deer in Barbuda to ensure no mixing of breeds
Enhance the benefits to all from biodiversity and ecosystem services	Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, the poor and vulnerable	Target 14: By 2020 at least 2 major watershed and mangrove wetland areas are effectively protected
	Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems thereby contributing to climate change mitigation and adaptation and to combating desertification.	Target 15: By 2020 Restoration of biodiversity hotspots in Antigua and Barbuda thereby contributing to climate change mitigation and adaptation and to combating desertification
	Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the fair and Equitable Sharing of	Target 16: By 2015, national legislation consistent with the Nagoya Protocol on Access to Genetic

	Benefits Arising from their Utilization is in force and operational, consistent with national legislation	Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational.
Enhance implementation through participatory planning, knowledge management and capacity building	Target 17: By 2020, each Party has developed and adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan	Target 17: By 2020, Antigua and Barbuda has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated NBSAP (this current document).
	Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities at all relevant levels.	Target 18: The Formal integration of local communities into the co- management process of Biodiversity in country by 2020
	Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	Target 19: By 2020 Implementation of a knowledge management system for biodiversity within Antigua and Barbuda
	Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.	Target 20: The capacity of governmental natural resources management institutions as well as non-governmental organizations, to support the objectives and achieve the overall aim of the NBSAP is strengthened by 2020

## 5.1 STRATEGIC GOALS AND INDICATORS

*In* an effort to facilitate easier reading of this document as well as to allow for consistency, the action plan is outlined on the basis of the CBD strategic goal and Aichi Biodiversity Targets for 2011-20. The following section highlights the strategic goals and the resulting targets the Government of Antigua and Barbuda has established through stakeholder consultation and available means of data collection. Each section also speaks to the planned activities for each target as well as the progress made in these areas over the last ten years. This will form a baseline for the targets in an effort to make an effective assessment of the achievements in the future. In addition, the suggested agencies that have been asked to implement the activities have also been noted. It is anticipated that each agency will work together with the Environment Division to monitor and evaluate the targets as well as collect the relevant data necessary to report on the targets. These management issues are more clearly identified and expanded on in the final chapter on implementation of the NBSAP.



*Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.*

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Indicators:

- By 2020 there are at least three requests for training and awareness-building programs by stakeholders to governments and or NGOs involved in biodiversity related activities per quarter;
- By 2020 at least three awareness building activities per quarter are hosted by NGOs and/or Government on Biodiversity related issues;
- By 2020, at least 3 regularly scheduled programs or infomercials on local media and social networks on biodiversity issues are in place with documented reviews of stakeholder groups per quarter;
- By 2020, at least 1,000 persons have come to and utilized the environmental information centers created in the Botanical Gardens.

Activities to be implemented:

- An integrated, coordinated and participatory framework with the capacity for managing the country's biodiversity and implementing the NBSAP is operative.
- Trained personnel in relevant agencies and organizations implement the NBSAP through the integrated, coordinated and participatory framework.
- A collaborative environmental public education programme is to be carried out in Antigua and Barbuda involving all relevant agencies; with relevant agencies and institutions committed to making information accessible, and to sharing information.
- Maximize resources and impact by organizing collaborative, targeted programmes that utilize the capacities of all agencies that carry out environmental education programmes.
- Provide support for and work collaboratively with NGOs, community groups and service organizations that contribute to public education and stakeholder awareness.
- Develop special programmes targeting specific groups of stakeholders such as tour operators and their guides, charcoal burners and land clearers.
- Research the connotations of words used by Antiguan in normal speech to describe the environment.
- Based on this research, develop innovative public education materials that take advantage of the cultural and spiritual side of biodiversity. For example, Antiguan perceive the sea as being clean and cleansing. They probably also have attitudes towards other ecosystems. A project could be developed to elicit some of these attitudes so they can be used to good effect in public educational programmes.
- Provide information, advice and resources relating to environmental education to the Ministry of Education.
- Allocate and mobilize adequate resources for the effective implementation of this component.
- Develop public awareness of policies and laws relating to biodiversity.
- Conduct workshops, radio and television programmes, as well as use printed media spots to educate resource users and the society at large, about the laws, regulations and procedures relating to the management and conservation of biological resources as well as issues relating to the biodiversity related conventions including CITES, CMS and the CBD.

- Selected target audiences are sensitized to the importance of biodiversity in Antigua and Barbuda and informed of biodiversity studies completed including all biodiversity valuation studies.
- Relevant personnel in the legal field and the judiciary are sensitized to environmental laws and regulations.
- Environmental information is freely shared among all relevant sectors through the most appropriate forums.
- Ensure adequate resources are mobilized for the development of innovative materials and the conduct of environmental public education programmes.
- Complete the biodiversity and environment resources kiosks in the Botanical Gardens in an effort to provide all relevant information on biodiversity and its link to sustainable development.
- Initiate the afterschool program within the Botanical Gardens to ensure the continued provision of information to the younger generation on biodiversity, its values and its relation to sustainable development.
- Initiate activities aimed at building capacity in natural resource valuation for biodiversity.

Target 2: By 2020, biodiversity values have been integrated in the national physical development plans and local area plans and the millennium development initiatives for Antigua and Barbuda

Indicators:

- Completed policy documents have the importance of biodiversity values integrated into them.
- By 2020, the EPMB and sections relevant to the processes for EIAs approved and practiced.

Activities to be implemented:

- Updated and new environmental legislation, including the use of EIAs, is enforced.
- Collaborate with the Development Control Authority to develop local development frameworks that include Biodiversity contributions as part of local area planning guidelines.
- Assist the Ministry of Agriculture and relevant agencies to ensure the inclusion of the importance of biodiversity values in the millennium development initiative currently being under taken.
- Conduct a biodiversity valuation study that can be used in guiding the development of the relevant policies and legislations.
- Initiate activities aimed at building capacity in natural resource valuation for biodiversity.

Target 3: By 2020 incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, including CITIES, taking into account national socio economic conditions.

Indicators:

- By 2020 relevant legislation is enacted and being implemented in the country.
- By 2020 relevant policies for incentive measures are reviewed and reforms initiated.

Activities to be implemented:

- Promote, encourage and facilitate a general policy statement/decision from Cabinet/Parliament regarding the protection of the environment that would serve to guide all agencies.

- Promote collaboration with the private sector to develop eco-tourism as well as sustainable business.
- Work with the Bureau of Standards and other relevant agencies to ensure direct incentives and disincentives are provided to promote the conservation and protection of Antigua and Barbuda's biodiversity.
- Provide direct incentives to promote positive biodiversity conservation
- Through a process of consultation, develop and provide a package of incentives, including direct incentives, to promote the conservation and sustainable use of biodiversity.
- Identify options for, and if appropriate, implement a tax privileges policy for businesses undertaking environmentally friendly methods of operation.
- Develop and implement an annual competition for nationally recognized awards for environmentally friendly management by business, service organizations etc, to be given wide publicity.
- Establish disincentives relating to negative impacts on biodiversity.
- Review legal mechanisms by which financial responsibility for pollution and negative environmental impacts rest with the polluter.
- Develop and implement mechanisms for the enforcement of disincentives, including capacity building within the relevant agencies.
- Develop regulations to curb the importation of potentially invasive species that may pose a danger to biodiversity.
- Develop mechanisms to enforce sustainable levels of use of biodiversity including sanctions and penalties against environmental crimes

Target 4: By 2020 at the latest all stakeholders, (public, private and civil) have taken steps to implement plans for sustainable production and consumption of natural resources keeping impacts within safe ecological limits as far as possible.

Indicators:

- Reports presented by the Farmers under their GAPs program
- Records on chemicals regulation by the Pesticide and Toxic Chemicals Control Board
- Fisheries reports on landings, beach measurement and habitats
- Reports/Records of monitoring completed by the EAG
- Records of updates and request for information for use of the EIMAS

Activities to be implemented:

- Develop mechanisms for inter-sectoral biodiversity information sharing particularly among natural resource management agencies.
- Initiate programs/projects aimed at ensuring GAPs.
- Implement resource conservation measures contained in the fisheries act.
- Initiate programs and projects aimed at reducing the unintentional leaching of hazardous chemicals into the natural environment.
- Review and make recommendations relating to the accessibility and sharing of biodiversity and related information among agencies and with the public.
- Review and develop training and awareness programs aimed at ensuring farmers and other parties engage in sustainable conservation and production methods.
- Regional and international agreements to facilitate technical cooperation with national, regional and international organizations in an equitable manner are honored.
- A policy on biotechnology is developed and implemented.

*Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use*

Target 5: By 2020, an effective monitoring protocol for critical habitats, including forests, mangroves and coral reefs has been implemented to assist in reducing degradation and fragmentation and measures developed and undertaken to reduce the rate of loss by 10%.

Indicators:

- The EIMAS developed in the Environment Division.
- Consistent updating of the system and use of the system to show trends in development within environmentally sensitive areas in collaboration with other relevant agencies
- Established management and rehabilitation programs with CBOs and NGOs in the identified areas

Activities to be implemented:

- Integrated management together with appropriate internal management structures within the coordinating unit developed.
- Clear and measurable environmental outcomes based on environmental indicators
- A systematic monitoring regime, and maintenance of the necessary capability to monitor and mitigate based on the information generated by the monitoring programs.
- Implementation of a systematic data gathering program to support the continued updating of the EIMAS in collaboration with the relevant agencies.
- Implement habitat monitoring programs for critical forests, coastal and marine areas.

Target 6: By 2020 Policies and systems are put in place for sustainable management of Fisheries resources

Indicators:

- Implementation of the Fisheries Act and regulations by 2014
- Sustainable management and use plans and policies developed by the Fisheries Division

Activities to be implemented:

- Review the feasibility of initiating an aquaculture development programme to reduce the pressures on over-fished areas, and to increase the use of available and not fully utilized natural species.
- Initiate programs aimed at effective ocean zoning and marine conservation.
- Adopt measures to prevent over-fishing including a ban on other destructive fishing gear not covered by the Fisheries regulations.
- Develop and implement measures to rehabilitate nurseries, marine habitats and improve species variety.

Target 7: By 2020 the capacity of governmental natural resources management institutions as well as non-governmental organizations, to support the objectives and achieve the overall aim of the NBSAP is strengthened

Indicators

- Provision of budgets to the relevant agencies to manage natural resources
- The local management plans
- Logs of strategic training for personnel involved in governmental and non-governmental agencies in areas of natural resource and associated areas management

Activities to be implemented:

- Work with the Ministry of Finance and the Ministry of Agriculture to ensure the continuous yearly provision of financial support for the Environment Division and other agencies to meet their mandates with regards to natural resource management.
- Work with international organizations such as the CBD and IPBES through their capacity building activities to improve the capacity of the local agencies and organizations in their management of biodiversity and natural resources.
- Work with all government agencies in developing policy documents and management plans that include consideration for natural resource management.
- Training – human resource development - is one of the key elements of institutional strengthening and environmental management. There will be an increased focus on training at all levels, with training at degree level including basic environmental management. This is particularly crucial for personnel of agencies and organizations with regulatory functions. The country will seek to explore and provide opportunities for improving the capabilities of local technicians, through appropriate training. It will provide sensitization, awareness raising and training for all those involved in the legislative and regulatory aspects of the management framework (e.g. legal draftsmen, lawyers, the judiciary, policemen, planning) re the need for environmental enforcement. Provide training to other agencies in developing project proposals and executing projects aimed at natural resources management and/or fulfilling their agency's mandate with regards to natural resources management.

**Target 8:** By 2020, 20% of the pollution, including from excess nutrients within specific demonstration areas, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Indicators:

- Quantitative and qualitative data collected for identified demonstration areas
- Water quality guidelines completed for the country

Activities to be implemented:

- Collection and review of data collected for the Mckinnons watershed, an identified biodiversity hotspot in Antigua and Barbuda with pollution problems from land based sources.
- Commissioning of the treatment plan at the Mckinnons area to reduce the sewage pollution currently being deposited in the watershed from businesses and homeowners.
- Seek to collect and review information on the St. John's harbor and identify potential improvement in water quality within this area.

**Target 9:** By 2020 invasive alien species and pathways are identified and prioritized, priority species are controlled, measures are in place to manage pathways to help prevent their introduction and establishment as far as possible

Indicators:

- Reports on the identification of the invasive species and the pathways identified
- Number of border control officers (and any other agencies responsible for monitoring species) trained in identifying the alien species
- Monthly monitoring reports from the relevant agencies within the Ministry of Agriculture and all other relevant ministries and NGOs
- Completed protocol document on managing the relevant invasive species

Activities to be implemented:

- Collate existing information on the programs currently under way on the management of invasive species as baseline for effective management of invasive species.
- Initiate training programs for border control officers on invasive species identification and management.
- Establish reporting links between the Environment Division and relevant NGOs on work being undertaken regarding invasive species.
- Utilize the EIMAS to initiate monitoring and management of invasive species.
- Source regional and international information to strengthen the work at the national level on invasive species.
- Develop a legal policy document on invasive species.

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems such as the NEMMA, Cades Bay and Codrington Marine Reserves impacted by climate change or ocean acidification, are minimized so as to maintain their integrity and functioning.

Indicators:

- Monitoring reports on ecosystem health
- Management and zoning plans developed

Activities to be implemented:

- Develop management zoning plans for the marine parks and reserves that have already been declared and developing plans for those being identified for future declaration.
- Develop management and reporting protocols for ecosystem health in the identified management areas.

*Strategic Goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*

Target 11: A national system, including protected areas, for the management and conservation of biodiversity is developed and established by 2020. This will include terrestrial areas, wetlands, areas important to migratory species and marine environments.

Indicators:

- By 2020 Antigua and Barbuda has a plan for the effective management of a system of protected areas approved by Government
- By 2020, 17% of the terrestrial and inland water areas of Antigua and Barbuda and 10% of the coastal and marine areas have been protected by the Government and/or measures put in place to sustainably manage these areas

Activities to be implemented:

- Review of the System Plan for Protected Areas by 2015.
- Establish a Protected Areas System for terrestrial and marine conservation in Antigua and Barbuda under the completed PA system plan.
- Identify critical habitats and species for conservation and limited sustainable use in Antigua and Barbuda (terrestrial and marine).
- Review available information to identify the individual species, habitats and ecosystems that are most vulnerable to human disturbance and develop recommendations for their protection, both within and outside protected areas.
- Identify, map and characterize areas to be included in a Protected Areas System (terrestrial and marine).

- Conduct inventories and select priority areas to be protected.
- Map areas to be protected.
- Submit recommendations of areas to be accorded protected area status to the relevant Authorities, for declaration under the appropriate Acts.
- Develop and implement management plans for protected areas (terrestrial and marine).
- Develop and implement guidelines for the management of protected areas with emphasis on the protection of biological resources.
- Establish an Integrated Pest Management Programme.
- Identify those areas for sustainable use, establish guidelines for this sustainable use, and determine the parameters of this sustainable use.
- Undertake relevant investigations to determine sustainable levels of use of biodiversity.
- Develop and implement plans for fisheries, agriculture and eco-tourism development, and establish appropriate limits (carrying capacity) for the sustainable use by these activities.
- Develop and implement, where appropriate, pilot projects to demonstrate sustainable practices that are compatible with biodiversity conservation.
- Enhance the country's capability to manage protected areas and their associated biodiversity.
- Identify/Select appropriate parameters, criteria and methods of monitoring biodiversity.
- Collect relevant baseline and other data on relevant biodiversity components.
- Conduct periodic surveys of threatened species of flora and fauna.
- Establish and maintain a national bio-geographic (ecosystem) database.
- Evaluate and mitigate the activities that threaten biological diversity.
- Provide accurate and timely information on the specifics of population size and trends especially of threatened species.
- Take appropriate legal and regulatory action when the measures governing the protection and sustainable use of the areas selected are infringed.

Target 12: By 2020 Implement protection measures for threatened species including the racer snake, marine turtles, Redonda Dwarf Gecko, Redonda Ground Lizard, threatened plants, and threatened birds.

Indicators:

- Population densities for identified species
- Successful re-introduction of ex-situ specimens
- Successful eradication of known Alien Invasive predators
- Establishment of a sanctuary for ex-situ specimens within the Botanical gardens and other relevant areas
- Protection of critical habitats for threatened species

Activities to be implemented:

- Support the current work being undertaken to identify threatened species as indicated in the target.
- Initiate a process aimed at identifying ex-situ specimens for re-introduction to the country.
- Initiation of work to identify known alien invasive predators of the species being protected and means of ensuring their eradication.
- Initiation of work to identify critical habitat areas for the identified species and the means of ensuring their preservation.



Target 13: By 2020 maintain genetic diversity of local plants by storing germ stocks for re-population should current stocks become contaminated. Maintain stocks of deer in Barbuda to ensure no mixing of breeds.

Indicators:

Species present in the botanical gardens and other gene bank areas

Activities to be implemented:

- Re-establish the Botanical Garden, to include expanded collection of plants.
- Tissue culture to be encouraged and Antigua and Barbuda will seek to establish intellectual property rights for certain genetic resources, for example the Antigua Black pineapple.
- Maintain viable populations of local crop and livestock races.
- Survey and document all traditional crop and livestock varieties.
- Develop the infrastructure, and technical and managerial base for seed banks, gene banks, museum collections and similar mechanisms.
- Develop guidelines for the collection of materials for the seed banks.
- Collect seed material from specified crops for the seed banks.
- Conserve medicinal plants.
- Undertake an investigation into the occurrence and use of local medicinal plants, including the potential for bio-prospecting. The collection housed at the Museum is a good starting point.
- Catalogue and improve the recording of such uses of medicinal plants, and make the information more readily available to the general public.
- Protect representative samples of the country's vegetation communities, which provide habitat to numerous medicinal plants (as well as invertebrate and other fauna).
- Conserve natural enemies of endemic pest species.

*Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services*

Target 14: By 2020 at least 2 major watershed and mangrove areas are effectively protected

Indicators:

- Developed management plans for the watersheds
- Completed water management strategy
- Areas officially protected

Activities to be implementation:

- Identify two critical watersheds to be protected for Antigua and Barbuda.
- Demarcation of the boundaries for the watersheds to be protected.
- Completion of the development and management plans for the identified watersheds.
- Completing the necessary legal and policy activities necessary to declare the identified watersheds protected.

Target 15: By 2020 Restoration of biodiversity hotspots in Antigua and Barbuda thereby contributing to climate change mitigation and adaptation and to combating desertification

Indicators:



Number of areas replanted with native species and mangroves

Activities to be implemented:

- Establish plant nurseries, in particular a forest and agricultural nursery, for the propagation of, and research on required planting stock – improving existing facilities where appropriate.
- Rejuvenate and continue to expand the herbarium that was initiated by the Environmental Awareness Group (EAG) in collaboration with the Forestry Division. Begin a collection programme for microorganisms.
- Rehabilitate and restore degraded areas based on the areas identified under strategic goal C number 11.
- Identify the current and future risks associated with biotechnology and make recommendations for policy development.

Target 16: By 2015, national legislation consistent with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational.

Indicators:

- The Environment Management Bill with the regulations for the Nagoya Protocol enacted
- The instrument of ratification deposited with the United Nations

Activities to be implemented:

- Develop and implement guidelines for controlling access to genetic resources.
- Identify and access information from other countries with successful policies and mechanisms for controlling the exploitation of genetic resources.
- Promote, to the extent possible, a regional approach to controlling access to, and control of, genetic resources.
- Seek to ratify the Nagoya Protocol on ABS by completing the following activities:
- Create legal certainty, clarity and transparency through the development of national legislation for ABS. The legislation should clearly identify fair and non-arbitrary rules and procedures for ABS to genetic resources.
- Establish clear rules and procedures for prior informed consent and mutually agreed terms for access as well as implement benefit sharing policies that may be monetary or non-monetary. Arbitration rules should also be established.
- Provide for issuance of a permit or equivalent when access is granted.
- \*Consider the importance of genetic resources for food and agriculture for food security.
- Take measures to monitor the utilization of genetic resources after they leave the country including by designating effective checkpoints at any stage of the value-chain: research, development, innovation, pre-commercialization or commercialization.
- Establish national focal points (NFPs) and competent national authorities (CNAs) to serve as contact points for information, grant access or cooperate on issues of compliance.
- Establish an Access and Benefit-sharing Clearing-House to share information, such as domestic regulatory ABS requirements or information on NFPs and CNAs.
- Develop in-country research capability and institutions for ABS.
- Establish mechanisms that will protect the unique genetic resources of Antigua and Barbuda and provide security measures against disasters and extinction.
- Undertake the building of a structure to maintain these genetic resources: secure, strong room(s) with controls and back-ups for the storage of any important land race that needs to be protected e.g. the local eggplant, table squash, local pumpkin, herbs and shrubs.

- Repatriate information held within other nations.
- Develop protocols and submit requests for the repatriation of information about biodiversity in Antigua and Barbuda currently held within other nations by organizations or individuals.
- Develop and implement protocols to clarify rights of accessibility to, and ownership of, biodiversity information and specimens that are collected by foreign agents.
- Develop and implement policies to promote sharing of appropriate technologies.
- Identify options and develop national policies aimed at promoting equity and fairness in the sharing of appropriate technologies and the benefits arising from their use.
- Promote international and regional cooperation and exchange of technology.
- Develop international and bilateral agreements where appropriate, to facilitate the sharing of appropriate technologies.
- Develop appropriate protocols to facilitate technical and scientific cooperation.
- Strengthen CITIES operations within country to regulate the import and export of endangered species.
- Develop and formalize regional agreements relating to cooperation in conservation of biological resources.

*Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building*

**Target 17:** By 2015 Antigua and Barbuda has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated NBSAP.

**Indicators:**

- Completed NBSAP approved by Cabinet.
- Implementation monitoring reports and updates on the NBSAP process.

**Activities to be implemented:**

- Information and research required for continuous updating and implementing the NBSAP is available on a timely basis.
- Antigua and Barbuda submits reports for compliance with international treaties and conventions as required.
- Ratify other Conventions that complement the implementation of the NBSAP.

**Target 18:** The Formal integration of local communities into the co-management process of Biodiversity in country by 2020

**Indicators:**

- Completed Environment Bill with formal integration of funding dedicated to the work of NGOs and Local Communities on Environment related issues
- Reports from consultations held with local communities on issues relevant to biodiversity and land usage in their communities
- Establishment of Fisheries Advisory committees under the Fisheries Act

**Activities to be implemented:**

- The development and maintenance of appropriate and effective relationships with all stakeholders.

- Ensure an on-going communication and consultation between different people and agencies, especially Non-Governmental Organizations (NGOs) and Community Based Organizations (CBOs), the private sector, and other stakeholders, together with the coordination and integration of their activities.
- Initiation of the funding mechanism developed through the EPMB to support NGOs in implementing natural resource related projects.
- Legal establishment of the Codrington Lagoon National park Management stakeholder group.

Target 19: By 2020 Implementation of a knowledge management system for biodiversity within Antigua and Barbuda

Indicators:

- Knowledge management database created and operational arrangements implemented

Activities to be implemented:

- Provide a forum where researchers, conservation managers and decision makers can share information and determine the type of information that is most useful for improving the conservation of biodiversity.
- Establish the relevant clearing house mechanisms required through the UNCBD for biodiversity, biosafety and ABS issues.
- Establish an effective knowledge management system through the Environment Division.

Target 20: The capacity of governmental natural resources management institutions as well as non-governmental organizations, to support the objectives and achieve the overall aim of the NBSAP is strengthened by 2020.

Indicators:

- Amount of funds allotted by Government annually for biodiversity management
- The amount of funds obtained from funding agencies to manage biodiversity on an annual basis

Activities to be implemented:

- Critical financial or in-kind resources provided to all relevant agencies through adequate budgets.
- The capacities and mandates of the agencies involved in biodiversity-related activities will need to be assessed so that their needs are identified and their personnel are included in the capacity-building programmes.
- Carry out an analysis of institutional strengthening needs of all relevant institutions, governmental and non-governmental, to establish the activities and resources required to enable these institutions to participate effectively in coordinated management of the environment of Antigua and Barbuda.
- Based on the institutional review, establish an appropriate institutional framework for the management of the national system for the management and conservation of biodiversity.
- Review sectorial as well as national budgets for biodiversity conservation in the context of proposed institutional changes required to implement the NBSAP.
- Examine options for cross-budget schemes to promote the conservation and sustainable use of biodiversity by other agencies.
- Maximize resources by bringing projects that have the same objectives together to coordinate and synchronize their activities and objectives.
- Seek assistance from the private and NGO sectors to finance specific aspects of the NBSAP.
- Consider the feasibility of the introduction of user fees for at least some aspects of eco-tourist activity.

- Continue to seek international assistance for the conservation and sustainable use of the country's biodiversity.

## 5.2 ASSUMPTIONS FOR ACHIEVING THE STRATEGIC GOALS

Assumptions relate to conditions that must be realized in order for an objective to be achieved, however these conditions do not fall under the control of the implementing agency, the Environment Division. Nevertheless, the Environment Division will undertake all efforts to ensure that these conditions exist to ensure that the strategic goals are attained. The major critical assumptions to achieve this NBSAP are outlined below.

### 5.2.1 Political Support

The political directorate must maintain its support to protect Antigua and Barbuda's biodiversity. The NBSAP objectives will not be achieved if the political directorate of Antigua and Barbuda does not sustain its actions in communicating the importance of the NBSAP to preserve the country's biodiversity. It will also be very difficult to achieve the objectives if the political support is not forthcoming. As a result of this, the Cabinet of Antigua and Barbuda needs to endorse the NBSAP through a Cabinet decision indicating its support. It is anticipated therefore that the NBSAP will be guided by a Cabinet Decision accepting this document as the road map for biodiversity conservation in Antigua.

### 5.2.2 Resource Availability

Resources, both human and financial, have to be made available nationally, and mobilized externally, for the implementation of the activities required to achieve the outlined strategic goals. Currently, adequate financial resources remain elusive. Budget cuts suggest that this will remain an inherent problem in biodiversity management for the country until an effective and sustainable financial mechanism is established for natural resource management. Though this is currently being developed, there is still some work to be done on this issue. More information on resource mobilization can be seen section 6. This NBSAP is developed however on the basis that adequate resource will be available for its implementation.

### 5.2.3 Mainstreaming the NBSAP

In order for the NBSAP to be implemented as desired and for the relevant objectives to be achieved, it is necessary to ensure the relevant information as well as monitoring and implementing activities are mainstreamed into the departmental policies of the relevant agencies. Individuals and agencies are committed to the protection and sustainable use of Antigua and Barbuda's biodiversity and sustain their support for the implementation of the activities required to achieve the targets outlined under the strategic goals. The NBSAP is a fluid document with activities cross-cutting a number of different agencies. These agencies including the Ministry of Agriculture, which currently hosts the Fisheries Division, the Forestry Division and the Environment Division, will be critical to the implementation of the objectives. To achieve this, it is assumed that all departments have been briefed on the NBSAP as well as the roles they will need to play in implementing the activities that fall within their departments. Additionally, there will need to be regular monitoring of their reporting based on pre-established reporting requirements. Based on the current human resource constraints, each department will have to be advised of their roles and asked to support

their continued participation in the update process for the NBSAP through the regular provision of reports and data. To achieve this it is anticipated that the capability of relevant individuals and agencies to manage the protection and sustainable use of Antigua and Barbuda's biodiversity is enhanced. Additionally, personnel in the public, private and NGO sectors have to "buy in" to the concept of integrated planning and programmes being promoted through this document. Furthermore personnel in the relevant departments accept the need for an integrated, coordinated and participatory framework.

## 6 INSTITUTIONAL ARRANGEMENTS & SUPPORT

This chapter summarizes the existing and future support systems to ensure the successful implementation of the NBSAP. The implementation of the NBSAP will require a great deal of resources, including financial, infrastructural and human. The revised NBSAP is currently in alignment with the national priorities for natural resource management in Antigua and Barbuda, not only as it relates to biodiversity but also as it relates to other issues including climate change. In light of this a concerted and integrated effort is currently being made to sustainably manage the country's resources. To maximize the use of the relatively limited resources available in such a small island state, a number of innovative measures have been developed to provide resources not only for the implementation of the NBSAP but for effective environmental management on a whole.

### 6.1 INSTITUTIONAL RESOURCES

Effective environmental management requires a highly coordinated management system, which is one of the main aims of the NBSAP which will provide the foundation for a holistic institutional system with a mandate to effectively manage the environment and natural resources. In order to achieve this directive of an integrated, coordinated and inter-sectorial approach, the Environment Division was established to take the lead in planning and programming, soliciting inputs from stakeholders, and implementing the NBSAP as well as taking preventive actions aimed at overall environmental protection. However, its capacity needs to be increased if it is to achieve this important mandate. This is especially important as the Division does not only focus on the NBSAP, but also coordinates environmental management generally to guarantee all environmental issues are managed in a synchronized manner.

In addition to the Environment Division, one of the key management mechanisms worth mentioning here is the National Coordinating Mechanism (NCM) for Environment Conventions. Though limited in scope, it is anticipated that with its formal establishment by the Environment Protection and Management Bill at the end of 2013 it will build on the existing foundation for further policies on the environment and natural resource management, nationally. Notwithstanding these institutions however, there is still a lack of adequate structures and mechanisms in place for effective natural resource management in Antigua and Barbuda.

In this context, the following activities are recommended to maintain a sustainable institutional structure for effective environmental management in Antigua and Barbuda:

#### 6.1.1 Capacity Development for the Environment Division

In an effort to ensure the relevant national capacity is in place to implement the NBSAP, Annex one presents a list of the relevant organizations which will be highly involved in the monitoring and implementation process. It is clear however that the country will need to develop the capacity and legislative powers of the Environment Division to ensure effective environmental management and the implementation of the NBSAP.

- Enact the EPMB in an effort to clearly define the role and functions of this mechanism and establish its mandate and terms of reference as well as ensuring provision of relevant legislative authority to carry out all relevant activities.

- Ensure adequate staffing of the Environment Division to ensure efficient environmental monitoring and implementation of the legislation and the mandate from the NBSAP.
- Support the Environment Division with adequate funding to carry out all the relevant activities including the implementation of the NBSAP.

### 6.1.2 Valuation of Biodiversity

Another innovative strategy currently being reviewed for the funding of the NBSAP is undertaking a biodiversity valuation study. This is being reviewed as a means of incorporating ecosystem services into an effective means to finance the NBSAP implementation. Once the valuation study has been completed, it is anticipated that companies that utilize the services of the ecosystems in which they are located will be more inclined and supportive of measures being implemented to finance biodiversity management in country.

### 6.1.3 Monitor and report on the implementation of the NBSAP

In an effort to ensure the NBSAP meets its objectives, its implementation and the overall monitoring of its implementation will be critical activities. The following two points emphasize the critical issues that are the focus of the implementation plan:

- Conduct annual reviews and monitoring of the plan in relation to established targets and implementation plans, and with a view towards making appropriate adjustments.
- Produce national and other reports to fulfill reporting requirements, including compliance with environmental treaties and conventions that have been ratified by Antigua and Barbuda.

### 6.1.4 NBSAP Evaluation.

- Develop a monitoring program that measures the performance indicators, participatory methods, tracks public expenditure, cost benefits and effectiveness and impacts of actions aligned to the strategic goals and objectives.
- Monitoring and evaluation should also consider synergies with other environmental policies and initiatives nationally and regionally.
- Program periodic monitoring activities based on the protocols established above to ensure adequate reporting of implementation of the NBSAP. This must be done in line with the national implementation plan currently being completed.
- Periodic evaluation should be based up to 2020 or beyond to ensuring the achievement of the Aichi Biodiversity targets.

## 6.2 RELEVANCE TO THE NATIONAL ENVIRONMENTAL MANAGEMENT STRATEGY

It is noted that the re-formulation of the NBSAP and the current strategy outlined is in line with the country's sustainable development policies and programmatic framework. This is evident in the following documents:

- National Environment Management Strategy (NEMS) developed for implementation up to 2010.
- The National Physical Development (Land Use) Plan (NPDP)
- National Plan for the Development of a System of Protected Areas
- The Environmental Management Bill



Though the NEMS and Protected Areas System Plan are currently under revision, the environmental concepts have been expounded on and incorporated into this revised NBSAP. This will form the basis for any further revision of the NEMS. The recently approved NPDP is the newest commitment from the government to ensure the protection and conservation of areas critical to the survival of vulnerable biologically rich areas. The strategy has been designed to assist in the implementation of aspects of the NPDP aimed at ensuring effective biodiversity conservation. To support the implementation of the NBSAP, the completed Draft Environmental Protection and Management Bill is now under review by the Ministry of Legal Affairs for presentation to Parliament and the Bill's subsequent enactment. The EPMB is a comprehensive piece of legislation dedicated to creating an umbrella environment for the governance of biodiversity in country.

### 6.3 RESOURCE MOBILIZATION

In an effort to address the issue of effective biodiversity management, one of the key threats identified is that of adequate financial resources. To circumvent this potential problem in implementing the NBSAP, the government of Antigua and Barbuda has embarked on a sustainable financing plan for biodiversity and in particularly protected areas management. This financing mechanism, the SIRF (Sustainable Island Resource Fund), is a self-sustaining non-profit entity that once enacted (through the Environment Management Bill by December 2014) will earn revenue and attract funding to care for the protected areas and reduce fossil fuel consumption in Antigua and Barbuda. The SIRF will be established to own assets from which it will generate an income. In the first instance these assets will be wind turbines, solar panels, sewage treatment systems and a system to recycle waste oil. The services of sewage treatment, electricity and water generation will be purchased by APUA, or directly by specifically targeted consumers. The "profits" generated will be used for environmental management in general.

It is anticipated that this fund will operate with little or no central government financial support. The main source for the fund will be from the sale of electricity generated through renewable energy (wind) to the APUA through an agreement already signed. Presently, it is expected that the energy project will generate up to 20 megawatts of electricity per year with a value of between four to eight million United States dollars (ten to twenty million Eastern Caribbean Dollars). Other potential sources for stimulation of the fund include the Green Climate Fund, the Adaptation fund, the GEF, bilateral agreements, the Caribbean Biodiversity Fund, water levy (co-financing), proceeds from investments and soft loans. Essentially therefore, the sources of income will include sale of renewable energy technology, small loans facility, recycling of used oil, sewage services, micro-financing facility, where possible payments from the Government (debt for climate swaps) and grants from international agencies. Presently, the purpose of the fund entails primarily the provision of financing for biodiversity conservation and sustainable use particularly as it relates to protected areas as well as climate change adaptation.

The SIRF will not be a statutory body but a department within the Government. The department will have its own accounts and be independent without the high overhead cost of a statutory Body. The SIRF Fund will have minimal staff which is funded through its own earnings. Only 10% of the funds will be allocated to salaries and administration. The board of the SIRF will be comprised of permanent secretaries, NGOs, Private Sector, Finance specialists (e.g. commercial banks and credit unions) and donors. The core board will be five persons and will have observers from the private sector, and donors. The secretariat to the Board will be the Environment Division. Board members will not be paid a stipend, but their cost of participation can be funded (for e.g. transportation, meals and other similar expenses). This structure will follow as much as possible the current structure used under the central Government.



The fund will have several funding windows. The main funding windows are general environmental management, protected areas, and a window for NGOs and CBOs. These windows will be established by the Act and any new windows can be established by regulations.

A Director and necessary administrative and technical staff will manage the day-to-day business of the Board. The director and the Board will have a Technical Advisory Committee established to assess the impacts of funding decisions including programs and projects.

The fund will have an open and transparent management system, which will include a redress mechanism.

Since the concept of the fund was first proposed, the Division has managed to secure over 8M USD to start the various windows of the Fund. By 2015, the fund will be in a position to achieve the following:

- Provide green electricity at a lower rate than that of the cost of fossil fuel energy. The electricity will be generated from several sites around the country and then transmitted via the national grid. As a prerequisite the project requires an agreement with the Government and APUA to generate up to 20MW of power from green technologies by 2020.
- Provide capital for the establishment of marine and terrestrial Parks;
- Recycle all of the used oil from APUA and other areas.
- The fund also includes a component to implement activities which would result in watershed restoration. This is important in the generation of cheaper water from surface areas as well as an adaptation measure. This will also include funding for the restoration of at least one dam.
- The sale of sewage treatment services on a non-profit basis to hotels and homes. There is already one sewage treatment system that will come online in 2015. The relevant windows of the SIRF will fund elements of the NBSAP.

### 6.3.1 Other sources of Funding

The Environment Division as well as other relevant departments administer and implement a number of projects funded through various regional, bilateral and international agencies. The major source of project funding for the country presently includes the GEF, USAID, OAS and the European Union. Throughout the years, the Division has been able to access funding for projects for up to US\$3Million in order to address the issue of biodiversity. In fact, Antigua and Barbuda is one of the few Caribbean countries that consistently utilize their GEF STAR allocations in each four-year cycle. It is anticipated that as part of the strategy, funding support for a number of projects aligned to attaining the goals of this NBSAP will be sought and implemented. Any project being developed through the Environment Division will incorporate aspects of sustainable development and biodiversity management in their design to support and sustain efforts.

Secondly, in an effort to maximize the potential positive impact of accessing donor funding for the conservation of biodiversity, the Government of Antigua and Barbuda is currently seeking to become an internationally recognized National Implementing Entity (NIE) for GEF and World Bank as well as other donors. It is anticipated that this will become effective by the end of 2014. With this status, the country, through the Environment Division, will be able to not only access funding from the relevant donor agencies directly, but also for other countries within the region as well.

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