

# **Convention on Biological Diversity**

## **FOURTH NATIONAL REPORT for JAMAICA**



**2005 – 2009**



## Table of Contents

List of Acronyms/Abbreviations .....	iv
List of Figures .....	vi
List of Tables .....	vi
Executive Summary.....	2
Chapter 1 Overview of Biodiversity Status, Trends and Threats.....	6
1.1 Introduction .....	6
1.2 Biodiversity .....	7
1.2.1 Terrestrial.....	7
1.2.1.1 Possible Extinction in the Wild .....	8
1.2.2 Marine and Coastal Areas .....	8
1.2.2.1 Marine and Coastal Biodiversity .....	8
1.2.2.2 Beach Erosion .....	9
1.2.2.3 Coral Reefs .....	9
1.2.2.4 Marine Fisheries Protection and Sustainable Use.....	10
1.2.2.5 Marine Genetic Resources .....	11
1.2.2.6 National Consultations .....	11
1.2.3 Agriculture and Agricultural Ecosystems.....	11
1.2.3.1 Plant Health .....	12
1.2.3.2 Animal Genetic Resources for Food and Agriculture (AnGRFA).....	12
1.2.3.3 Plant Genetic Resources for Food and Agriculture (PGRFA).....	14
1.2.4 Biosafety .....	16
1.2.5 Forests and Mountain Ecosystems.....	17
1.2.5.1 Forest Act (1996) .....	18
The Forestry Act is under review. A revised Act would reflect new objectives and policies. In 2008 the Forestry Department was declared an Executive Agency in transition and the revised Act would also reflect changes resulting from the Forestry Department being constituted as an Executive Agency.....	18
1.2.5.3 Deforestation and Reforestation .....	19
1.2.5.4 Sustainable Forestry .....	19
1.2.5.5 Incentives .....	20
1.2.5.6 The Forest Conservation Fund .....	20
1.....	20
1.2.5.7 National Consultations .....	20
1.2.6 Inland Waters .....	20
1.2.6.1 Freshwater Biodiversity .....	20
1.2.6.2 Watersheds .....	21
1.2.6.3 Watershed Rehabilitation .....	23
1.2.7 Dry and Sub-humid Lands.....	24
1.2.8 Islands .....	24
1.2.8.1 Cays .....	24
1.2.9 Communication, Education, and Public Awareness.....	25
1.2.10 Protected Areas.....	25
1.2.10.1 BJCMNP .....	26
1.2.10.2 Gaps: Protected Areas.....	26
1.2.10.3 Financial Support/Mechanism for Protected Areas .....	27
1.2.10.4 Ramsar Sites .....	30
Jamaica has three Ramsar sites – the Black River Lower Morass (5,700 ha) which was declared in 1997, the Palisadoes-Port Royal Protected Area (7,523 ha) declared in 2005, and the Portland Bight Wetlands and Cays (24,542 ha) in 2006. ....	30
1.2.10.5 National Consultations.....	30
1.3 Tourism .....	30
1.3.1 Carrying Capacity .....	31

1.3.2 National Consultations.....	31
1.4 Enforcement Statistics .....	31
1.5 Trends.....	32
1.6 Main Threats/Constraints to Biodiversity Conservation and Sustainable Use.....	32
1.6.1 Natural Threats.....	32
1.6.1.1 Invasive Species.....	32
1.6.1.2 Marine Diseases .....	33
1.6.2 Anthropogenic Threats .....	33
1.6.2.1 Threats and Concerns Highlighted During National Consultations.....	33
1.6.3 Climate Change.....	34
1.6.4 Constraints .....	35
1.7 Implications of Changes.....	36
Chapter 2. Current Status of Implementation of National Biodiversity Strategies and Action Plans .....	38
2.1 An Overview of the NBSAP .....	38
2.1.1 Sources of Funding for Biodiversity Related Activities .....	49
2.2 Successes in Biodiversity Conservation and Sustainable Use .....	49
2.3 Lessons Learned.....	49
2.4 Analysis of the Effectiveness of the NBSAP.....	50
Chapter 3 Sectoral and Cross-Sectoral Integration or Mainstreaming of Biodiversity Considerations .....	50
3.1 Introduction .....	50
3.2 Existing Framework for International Biodiversity Related Conventions .....	50
3.2.1 Environmental Management Division .....	51
3.2.2 NEPA.....	51
3.2.3 Forestry Department .....	51
3.2.4 Fisheries Division .....	52
3.3 Tourism .....	52
3.4 Energy.....	52
3.5 Mining and Quarrying .....	53
3.6 Vision 2030 Jamaica: National Development Plan .....	53
3.7 National Spatial Plan.....	54
3.8 Health Sector .....	54
3.9 Agro-Forestry.....	54
3.10 Fisheries.....	55
3.10.1 Draft Fisheries Policy .....	55
3.11 Economic Infrastructure .....	55
Chapter 4 Conclusions: Progress Towards the 2010 Target and Implementation of the Strategic Plan .....	56
4.1 Progress Toward the 2010 Targets .....	56
Goal 1: Promote the Conservation of the Biological Diversity of Island Ecosystems, Habitats and Biomes .....	56
Targets .....	56
Progress.....	56
Goal 2: Promote the conservation of island species diversity .....	56
Targets .....	56
Progress.....	56
Goal 3: Promote the conservation of island genetic diversity .....	57
Targets .....	57
Progress.....	57
Goal 4: Promote sustainable use and consumption .....	57
Targets .....	57
Progress.....	57

Goal 6: Control threats to island biological diversity from invasive alien species. ....	58
Targets .....	58
Progress.....	58
Goal 7: Address challenges to island biodiversity from climate change and pollution. ....	58
Targets .....	58
Progress.....	58
Goal 8: Maintain capacity of island ecosystems to deliver goods and services and support livelihoods. ....	59
Targets .....	59
Progress.....	59
Goal 9: Maintain socio-cultural diversity of indigenous and local communities on islands. ...	59
Targets .....	59
Progress.....	59
Goal 10: Ensure the fair and equitable sharing of benefits arising out of island genetic resources. ....	60
Targets .....	60
Progress.....	60
Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention. ....	60
Targets .....	60
Progress.....	60
4.1.1 Indicators used for Measuring Progress .....	60
4.1.2 Obstacles Encountered .....	61
4.2 Progress Towards the Goals and Objectives of the Strategic Plan of the CBD.....	61
4.2.1 National Goals.....	61
4.2.2 Progress Towards Goals and Objectives.....	61
4.2.3 Obstacles to the Implementation of the Convention on Biological Diversity .....	61
4.3 Opinion on Progress Towards Goal 1 at the Convention Level.....	62
Goal 1: The Convention is Fulfilling its Leadership Role in International Biodiversity.....	62
1.1 The Convention is setting the global biodiversity agenda .....	62
1.2 The Convention is promoting cooperation between all relevant international instruments and processes to enhance policy coherence .....	62
1.3 Other international processes are actively supporting implementation of the Convention, in a manner consistent with their respective frameworks .....	62
4.4 Cartagena Protocol on Biosafety .....	63
4.4.1 The Cartagena Protocol on Biosafety is widely implemented .....	63
4.4.2 Biodiversity concerns are being integrated into relevant sectoral or cross-sectoral plans, programmes and policies at the regional and global levels.....	63
4.5 Conclusions.....	63
4.5.1 Overview .....	63
4.5.2 Lessons Learned .....	63
4.5.3 Future Priorities and Capacity-Building Needs .....	63
4.5.4 Suggestions for Actions that Need to be Taken at the Regional and Global Level to Enhance Implementation of the Convention at the National Level.....	64
Appendix I – Information Concerning Reporting Party and Preparation of National Report.....	65
Appendix II – Progress Towards Targets of the Global Strategy for Plant Conservation and the Programme of Work on Protected Areas.....	66
Appendix III– References .....	74
Appendix IV – Additional Information .....	79
Some Endemic Bird Species and Conservation Status .....	79
Some Endemic Butterflies .....	79
Some Endemic Plants .....	79

## List of Acronyms/Abbreviations

ABIS	Agricultural Business Information System
ADRAM	Agricultural Disaster Risk Management
AECI	Spanish Agency for International Co-operation
AnGRFA	Animal Genetic Resources for Food and Agriculture
BJCMNP	Blue and John Crow Mountains National Park
CABA	Caribbean Agri-Business Association
CAHFSA	Caribbean Agricultural and Food Safety Agency
CARDI	Caribbean Agricultural Research and Development Institute
CAST	Caribbean Alliance for Sustainable Tourism
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CCAM	Caribbean Coastal Area Management Foundation
CHA	Caribbean Hotel Association
CHM	Clearing-House Mechanism
CIDA	Canadian International Development Agency
CISWG	Caribbean Invasive Species Working Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Centre for Marine Sciences, University of the West Indies, Mona
CRFM	Caribbean Regional Fisheries Mechanism
EC	European Community
EEZ	Exclusive Economic Zone
EFJ	Environmental Foundation of Jamaica
EIA	Environmental Impact Assessment
EMD	Environmental Management Division
EMS	Environmental Management Systems
EU	European Union
EUBSP	European Union Banana Support Programme
FAO	Food and Agriculture Organization
FSPID	Food Storage and Prevention of Infestation Division
FW	Freshwater
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographical Information System
GMO	Genetically Modified Organism
GOJ	Government of Jamaica
ha	Hectare
HACCP	Hazard Analysis Critical Control Points
IABIN	Inter-American Biodiversity Information Network
IAS	Invasive Alien Species
IDB	Inter-American Development Bank
IICA	Inter-American Institute for Cooperation on Agriculture
IJAP	Improving Jamaica's Agricultural Productivity Project
IOJ	Institute of Jamaica
ISA	International Seabed Authority
IUCN	International Union for Conservation of Nature
IWCAM	Integrated Watershed and Coastal Area Management
JA CHM	Jamaica Clearing House Mechanism, Institute of Jamaica
JANEAP	Jamaica National Environmental Action Plan

JCDT	Jamaica Conservation and Development Trust
JCRMN	Jamaica Coral Reef Monitoring Network
JET	Jamaica Environment Trust
JIRG	Jamaica Iguana Recovery Group
JIS	Jamaica Information Service
JNHT	Jamaica National Heritage Trust
LBS	Land-Based Sources of Marine Pollution
LFMC	Local Forest Management Committee
MBMPT	Montego Bay Marine Park Trust
MDG	Millennium Development Goals
MoAF	Ministry of Agriculture and Fisheries
MOU	Memorandum of Understanding
MRE	Ministry with responsibility for the Environment
NBC	National Biosafety Committee
NBSAP	National Strategy and Action Plan on Biological Diversity in Jamaica
NCST	National Commission on Science and Technology
NCU	Northern Caribbean University
NEGAR	National Ecological Gap Assessment Report
NEPA	National Environment and Planning Agency
NFMCP	National Forest Management and Conservation Plan
NGO	Non-Governmental Organization
NHMJ	Natural History Museum of Jamaica
NRCA	Natural Resources Conservation Authority
ODPEM	Office of Disaster Preparedness and Emergency Management
OPM	Office of the Prime Minister
PA	Protected Area
PASMP	Protected Area System Master Plan
PCA	Pesticide Control Authority
PGRFA	Plant Genetic Resources for Food and Agriculture
PHCC	Plant Health Coordination Committee
PIOJ	Planning Institute of Jamaica
PoWPA	Programme of Work on Protected Areas
RADA	Rural Agricultural Development Authority
RPPD	Rural Physical Planning Division
SIDS	Small Island Developing State
SPAW	Specially Protected Areas and Wildlife
SRC	Scientific Research Council
STATIN	Statistical Institute of Jamaica
TNC	The Nature Conservancy
TPDCo	Tourism Product Development Company
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
UWI	University of the West Indies
WMU	Watershed Management Unit
WRA	Water Resources Authority
WTO	World Trade Organization

## List of Figures

Figure 1. The Ten Hydrological Basins of Jamaica .....	22
Figure 2. Terrestrial and Marine Protected Areas of Jamaica .....	28
Figure 3. Proposed Terrestrial and Marine Protected Areas of Jamaica.....	29

## List of Tables

Table 1. Terrestrial Species Diversity in Jamaica .....	7
Table 2. Estimates of Marine Species in Jamaican Shallow, Shelf, or Shore Waters.....	8
Table 3. Coral Cover at Selected Reefs in Negril and Port Royal Cays for 2005.....	10
Table 4. Types of AnGRFA and Their Locations .....	13
Table 5. Types of PGRFA Collections and Their Locations .....	15
A number of projects have been funded under this Fund and include the Dolphin Head Forest Conservation and Appropriate Resource Utilization Project and Forest Conservation in the Blue Mountains. ....	20
Table 6. NEPA's Enforcement Statistics for 2005 – 2009 .....	32
Table 7. Constraints Identified by Government Agencies to Biodiversity Conservation and Sustainable Use .....	35
Table 8. Status of NBSAP Project Profiles.....	38
Table 9. Examples of Some of the Gaps/Challenges Identified in Jamaica's NBSAP and the Status of Implementation and Obstacles.....	47





## Executive Summary

The Fourth National report provides a summary of the Government of Jamaica's implementation of the objectives of the United Nations Convention on Biological Diversity for the reporting period of May 2005 – March 2009.

### 1. Introduction

The Convention on Biological Diversity (CBD) opened for signature at the United Nations Conference on Environment and Development (UNCED), (Rio Summit), in Rio de Janeiro in June 1992. It came into force on 29 December 1993 and currently has 191 Parties. Jamaica ratified the Convention on January 6, 1995. The objectives of the Convention are:

- the conservation of biological diversity;
- the sustainable use of its components; and
- the fair and equitable sharing of benefits arising out of the utilisation of genetic resources.

The implementation of the Convention is by way of decisions taken by the Conference of the Parties, the governing body of the Convention. There are seven thematic programmes of work and several cross-cutting issues that Parties are obligated to implement. Parties have also adopted a Strategic Plan of the Convention whereby they have committed themselves to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth. These targets were subsequently endorsed by the World Summit on Sustainable Development.

The Fourth National Report has been prepared in compliance with Article 26 of the Convention which states that Parties are required to prepare periodic reports of the measures taken to implement the provisions of the CBD and their effectiveness. It aims to provide an assessment of the status, trends and threats relating to Jamaica's biodiversity, and to report on the actions, progress in implementation, obstacles encountered and future priorities for the country's biodiversity.

### 2. Overall status, trends and threats to biodiversity

Since becoming a Contracting Party to the CBD, milestones achieved by Jamaica include:

- preparation of the National Strategy and Action Plan on Biological Diversity (NBSAP) 2003;
- accession to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on 24 Jan 1997;
- formulation a National Environment Action Plan (1997);
- development of a Policy for Jamaica's System of Protected Areas (1997);
- formulation of a Forest Policy (2001), and Forestry Plans;
- initiation of the formulation of a national Biosafety framework which includes a draft Biosafety Policy;
- establishment of a National Clearing-House Mechanism at the Natural History Museum of Jamaica, of the Institute of Jamaica (IOJ);
- development of the Biosafety Clearing House at the IOJ;
- formation of an Invasive Alien Species Working Group; and
- declaration of three RAMSAR sites.

## **Status and Trends**

Various components of Jamaica's biodiversity have been inventoried and researched over the past few decades. However, there are gaps, for example fungi, and lower plants, which need to be addressed. In addition, the current status of most previously described endemic species is not known.

Jamaica has a number of endemic terrestrial species, a total of approximately 921 plants, 505 land snails, 9 grapsid crabs, 45 fireflies, 22 amphibians and 5 mammals. The marine environment could prove as rich in diversity as the terrestrial environment, but more research work needs to be conducted, both for the nearshore and for the deep sea.

Natural processes and human activities such as agriculture, forest plantations, mining, human settlements and large coastal developments, have resulted in a decrease in the diversity and distribution of Jamaica's flora and fauna.

## **Threats**

Threats to Jamaica's biodiversity include: 1) habitat loss, 2) over-exploitation, 3) the impact of invasive alien species, 4) weak law enforcement, 5) inadequate awareness of the value of natural resources, 6) poor spatial planning and land use, 7) pollution and 8) climate change.

## **Implications of biodiversity loss**

The loss and degradation of Jamaica's biodiversity has serious implications for its society and economy. Ecosystems provide many essential services such as the provision of clean water and air, prevention of soil erosion, pollination of crops, provision of medicinal plants, nutrient cycling, provision of food and shelter and the meeting of spiritual, cultural, aesthetic and recreational needs. Large portions of the country's economy are heavily dependent on biodiversity including tourism, horticulture and agriculture. Many Jamaicans are highly dependent on natural resources for their livelihoods, a situation which has been greatly aggravated by the declining economy and increased unemployment.

In addition, intact ecosystems (i.e. ecosystems which are in a natural or near-natural state) are likely to play an important role in providing cost-effective resilience to the impacts of climate change, including buffering human settlements and activities from the impacts of extreme climate events and sea level rise.

## **3. Key actions supporting CBD objectives**

Jamaica has a variety of policies, strategies and action plans, laws and regulations to address environmental and planning issues but these are fragmented. Most of the legislation pertaining to biodiversity is the responsibility of the agencies and departments under the Office of the Prime Minister and the Ministry of Agriculture and Fisheries and its agencies. Much of this legislation is outdated and many gaps and overlaps have been identified and this hinders progress in the environment and sustainable development arena. To support its obligations under the CBD and the achievement of its objectives, Jamaica has been developing a policy and legislative framework for biodiversity management and its sustainable use, in support of the development agenda of the country.

### **General measures for conservation**

Article 6 of the CBD calls for the establishment of general measures for conservation and sustainable use of biodiversity. Jamaica's NBSAP was drafted and finalised as a Policy document in 2003. In addition the country prepared the Jamaica Environment Action Plan (1997), and a National Action Program for the Convention to Combat Desertification (2001), a Forestry Policy, and Forestry Plans, and other policies and plans. All these plans and policies broadly share the common objectives of the CBD. Hence, Jamaica has made good progress with regards to the development of appropriate action plans and policies for the conservation of biological diversity.

Vision 2030 Jamaica, prepared by the Planning Institute of Jamaica (PIOJ), with input from various governmental, non-governmental and academic stakeholders, will help to integrate these policies. One of Vision 2030 Jamaica's goals is, "Jamaica has a healthy natural environment through sustainable management and use of environmental and natural resources, hazard risk reduction and adaptation to climate change, and sustainable urban and rural development."

### **Sustainable use and community-based natural resource management**

Jamaica has adopted legal measures for the minimization of adverse impacts on biological resources through the use of environmental impact assessments for some new developments. Jamaica has used the mechanism to involve the private sector and indigenous/local communities in biodiversity conservation. The government also plans to implement Strategic Environmental Assessments (SEA).

The National Forest Conservation and Management Plan (2001) encourages community based resource management of natural resources through the formation of Local Forest Management Committees (LFMCs) at the community level. Proactive advocacy with local traditional leaders and community members is an ongoing initiative led by the Forestry Department of the Ministry of Agriculture and Fisheries.

With regard to tourism, Jamaica has adopted legal measures for the assessment of impacts on biological resources by tourism activities through the enforcement of environmental impact assessments for any new development or project related to tourism. There is also the Master Plan for Tourism Development (2001-2010) which makes recommendations for sustainable tourism. However, its implementation has been slow

## **4. Progress on national implementation**

The NBSAP identified 37 project profiles of which 8 were identified as high priority. Thirteen of the project profiles have either been completed, or are at various stages of completion, and or implementation.

A number of reports have been completed such as the GEF/UNDP/GOJ National Capacity Self Assessment (NCSA), (2005) and the National Ecological Gap Assessment Report (NEGAR) (2009), a component of the proposed Protected Areas System Master Plan.

Through the UNEP/GEF/GOJ Project on the Development of the National Biosafety Framework, Jamaica has drafted a National Biosafety Policy . This project ended in September 2004. The policy meets not only international obligations in the Cartagena Protocol, but is tailored to the Jamaican needs and requirements. Also, though funding from this project, biosafety legislation is being developed and the Jamaica Biosafety Clearing-House has been established at the IOJ (<http://jamaicachm.org.jm>).

With the extreme pressures on the natural environment due to socio-economic and physical demands, the sustainable management and utilisation of Jamaica's biodiversity continues to be a challenge.

Limited public participation and stakeholder involvement in biodiversity issues remain major obstacles. A critical challenge still remains in integrating biodiversity issues into all sectors of government and society. This lack of mainstreaming and integration of biodiversity issues into the activities of all sectors results in poorly planned large scale developments which negatively affect initiatives to manage and protect biodiversity. Vision 2030 Jamaica seeks to mainstream and integrate environmental issues into the activities of all sectors.

Several studies, such as the National Capacity Self Assessment (2005) (NCSA) , the National Ecological Gap Assessment Report (NEGAR) (2009) and input from public consultations have identified areas of weakness, which include but are not limited to:

- mainstreaming biodiversity issues within the various sectors;
- insufficient human and financial resources;
- inadequate monitoring and enforcement;
- lengthy delays in the drafting and implementation of plans, policies and legislation relating to biodiversity; and
- limited research.

The challenge of scientific research capacities to support biodiversity management is still a major one. There are insufficient numbers of scientists with the requisite skills, for example, in taxonomy. The loss of biodiversity and the corresponding goods and services it provides are not properly understood and documented.

The general lack of capacities for local communities to make informed decisions on biodiversity management, often results in the further erosion of biodiversity and critical ecosystems. The Forest Act however, provides for the formation of Local Forest Management Committees for forest reserves, forest management areas and protected areas which enables the direct participation of communities in forest management.

Government agencies/departments such as the National Environment and Planning Agency (NEPA), Fisheries Division, the Institute of Jamaica (IOJ), universities such as the University of the West Indies (UWI), and NGOs such as the Jamaica Conservation and Development Trust (JCDDT), the Jamaica Environment Trust (JET), and The Nature Conservancy (TNC) are involved in educating Jamaicans about biodiversity conservation and sustainable use. The government has incorporated information on biodiversity and biodiversity management into the school curriculum.

## Chapter 1 Overview of Biodiversity Status, Trends and Threats

### 1.1 Introduction

Jamaica is the third largest island in the Caribbean Sea located south of Cuba at 18° 15" N, 77° 30" W and has an area of 10,991 km<sup>2</sup>. Jamaica's topography consists of a mountainous interior with a backbone of peaks and plateaus running the length of the island (over 60% of Jamaica has an altitude of over 230 m), surrounded by flat or gently sloping coastal plains. The plateaus are dissected by faults and have varying degrees of karstification. The Cockpit Country in Western Jamaica is an important ecological area due to its high endemism, it has the most developed karst topography, and the area is relatively undisturbed.

Parts of the coastal plain are waterlogged and the most important waterlogged areas, or wetlands, are the Upper and Lower Black River Morass in St. Elizabeth, the Negril Morass in Hanover and Westmoreland, and the Great Morass in St. Thomas. Other wetlands are the Great Salt Pond, the Cabarita Swamp, the Cockpit Salt River Swamp, Pear Tree, Canoe Valley Swamp and the Salt Marsh, in St. Catherine, Westmoreland, Clarendon, St. Ann, Manchester, and Trelawny, respectively (NEPA 2004). According to NEPA, as recently as 1996, wetlands accounted for 2% of Jamaica's land area, but although current numbers are unknown, wetlands have declined drastically due to road construction, port expansions, and tourism development.

Jamaica's coastline is 885 km long, and includes straight cliffs, mangrove swamps and black sand beaches on the south coast, while on the north coast, the coastline is very rugged, with several white sand beaches. On the north coast, the coastal plains are narrow (less than 3.2 km wide) but on the south coast, the plains are much wider and most agricultural activities occur there. The coral reef area of Jamaica is 1240 km<sup>2</sup>, with the better-developed reefs occurring along most of the north and east coasts, and patchy fringing reefs on the broader shelf of the south coast, and on the Pedro Banks and Morant Cays.

The island's topography, geology, and climate allow for a diversity of habitats, however, most of these habitats have been affected by anthropogenic activities such as poor agricultural practices, and mining (NEPA 2003; PIOJ 2009e). Jamaica's forests are the main sources of terrestrial biodiversity and according to the PIOJ (2009e), 94% of forests have been disturbed, including forest reserves, and 30% of mangrove forests have been destroyed.

The forest types that occur in Jamaica are (NEPA 2003):

- Lower montane mist;
- Montane mist;
- Dry limestone;
- Wet limestone;
- Mangrove;
- Woodland;
- Herbaceous swamp; and
- Marsh Forest.

Jamaica is an archipelagic state and has stewardship over an Exclusive Economic Zone (EEZ) of approximately 235,000 km<sup>2</sup>. Within this zone are the Pedro Bank and the Morant Bank. The Pedro Banks, 80 km to the south-east of Jamaica is the largest of the off-shore banks and is also an important commercial and artisanal fishing area, especially for the Queen Conch.

In Jamaica's report on Millennium Development Goals (MDG) to the United Nations (UN) Economic and Social Council Annual Ministerial Review in 2009, it was noted that Jamaica was lagging in environmental sustainability (PIOJ 2009b). Indicators used in the report showed the following (PIOJ 2009b):

- the percentage land area covered by forest was 30.6% in 2007 (in 1997 it was 30.6%, in 1998 it was 30.1%);
- carbon dioxide emissions increased between 2000 and 2004;
- proportion of total water resources used increased between 2000 and 2007;
- proportion of marine area protected in relation to total territorial waters remained constant between 2000 and 2007 at an estimated 3.6%;
- proportion of species (plants) threatened with extinction was 18.6% in 2007; and
- the reduction in consumption of all ozone depleting substances by 67 metric tonnes between 2000 and 2006.

## 1.2 Biodiversity

### 1.2.1 Terrestrial

Jamaica is rich in biodiversity, with high rates of terrestrial endemism. There are over 3,304 vascular plant species in Jamaica (of which 27.9% are endemic), 579 species of ferns, 133 species of butterflies, and 67 species of land birds and 39 species of shore and seabirds (NEPA 2003). Table 1 shows terrestrial species diversity in Jamaica. As can be seen from the table, endemism is very high in land snails (98%), grapsid crabs (100%), fireflies (~94%), and amphibians (100%). The Cockpit Country and the Blue and John Crow Mountain National Park (BJCMNP) have some of the highest terrestrial endemism in Jamaica (Rosenberg 2005; The Nature Conservancy 2008). In 1997, the Blue and John Crow Mountain National Park (BJCMNP) was included in the World Wildlife Fund and International Union for the Conservation of Nature (IUCN) list of globally important sites for conservation of plant biodiversity. Due to its high plant endemism, there are "some unique floral compositions in the forests of the Blue and John Crow Mountains and the Cockpit Country" (Jamaican Clearing-House Mechanism 2005).

**Table 1. Terrestrial Species Diversity in Jamaica**

Fauna and Flora	Total Number of Indigenous Species	Number of Endemic Species
Rotifers	211	<21
Land Snails	561*	505*
Grapsid Crabs	9	9
Jumping Spiders	26	20
Fireflies	48	45
Butterflies	133	20
Ants	59	6
Amphibians	22	22
Reptiles	43	33
Shore and Sea Birds	39	1
Land Birds	67	30
Bats	21	4**
Other Mammals	2	2
Bromeliads	60	22
Orchids	230	60
Ferns	579	67
Cacti	20	10
Palms	10	7

Fauna and Flora	Total Number of Indigenous Species	Number of Endemic Species
Grasses	~200	1

Source: NEPA, "National Strategy and Action Plan on Biological Diversity in Jamaica" (Kingston, 2003)

\*Source: Gary Rosenberg, "Biotic Survey of Jamaican Mollusks and other Terrestrial Invertebrates" (online, 2005).

\*\*Source: Hugh H. Genoways, Robert J. Baker, John W. Bickham and Carleton J. Phillips, "Bats of Jamaica" (Lubbock 2005).

Some endemic [birds](#), [butterflies](#), and [plant](#) species and information on their conservation status can be found in Appendix IV, Lists and Tables. All birds are protected under the Wild Life Protection Act, and birds not listed under the CITES appendices are listed and protected under Schedule IV of the Endangered Species (Protection, Conservation and Regulation of Trade) Act 2000.

### **1.2.1.1 Possible Extinction in the Wild**

Three years after it was first discovered in the Cockpit Country in 2003, the cactus *Mammillaria jamaicensis* has not been seen and is now believed to be extinct in the wild.

## ***1.2.2 Marine and Coastal Areas***

### **1.2.2.1 Marine and Coastal Biodiversity**

Warner and Goodbody (2005) give a conservative estimate of 3,502 different plants and animals (not including bacteria, viruses and fungi) in the shallow, shore or shelf waters of the Jamaican marine environment. Table 2 gives estimates of marine species found in shallow waters.

**Table 2. Estimates of Marine Species in Jamaican Shallow, Shelf, or Shore Waters**

Taxon	Number of Species
Phytoplankton	374
Macroalgae	386
Porifera	194
Cnidaria	204
Ctenophora	6
Nematoda	81
Annelida	100
Crustacea	455
Mollusca	825
Bryozoa	64
Chaetognatha	10
Echinodermata	88
Hemichordata	2
Chordata	75
Cephalochordata	1
Vertebrata	637

Source: George R. Warner and Ivan Goodbody, "Jamaica" *In* Caribbean Marine Diversity: The Known and the Unknown (Lancaster: DEStech Publications, 2005), 57-70

Seagrasses can be found throughout the Jamaican coastal areas, but are more abundant on the south coast where the island shelf is broader (Creary 2008). The three species of seagrasses found in Jamaican waters are *Halodule wrightii*, *Thalassia testudinum*, *Syringodium filiforme*.



The Bottlenose dolphin (*Tursiops truncatus*) is the most abundant cetacean found in Jamaican waters, other dolphins seen include the Atlantic Spotted dolphin (*Stenella frontalis*), the Pantropical Spotted dolphin (*S. attenuata*), Risso's dolphin (*Grampus griseus*), and the Striped dolphin (*S. coerulealba*). Other cetaceans observed in Jamaican waters include the Killer whale (*Orcinus orca*), the Short-finned Pilot whale (*Globicephalus macrocephalus*), the Melon-headed whale (*Peponocephala electra*), the Sperm whale (*Physeter catodon*), the Pygmy Sperm whale (*Kogia breviceps*) and the Humpback whale (*Megaptera novaeanglae*) (Creary 2008; O'Sullivan 2006). Presently, there is no island-wide network for marine animal rescue but Dolphin Cove Limited and the Port Royal Marine Laboratory are used as marine rescue areas.

There are four species of sea turtles found regularly in Jamaican waters, and they are the Green sea turtle (*Chelonia mydas*), the Hawksbill sea turtle (*Eretmochelys imbricata*), the Leatherback sea turtle (*Dermochelys coriacea*), and the Loggerhead sea turtle (*Caretta caretta*). All sea turtles are protected under the Endangered Species (Protection, Conservation and Regulation of Trade) Act (2000), and the Wild Life Protection Act (1945).

The American Crocodile (*Crocodylus acutus*) is the only species of crocodile native to Jamaica. The crocodile is protected under both the Wild Life Protection Act and the Endangered Species Act and is found mainly on the south coast in mangrove swamps, marshes, shallow bays, rivers, and other water bodies. Like sea turtles, crocodiles nest on coastal beaches and are therefore susceptible to the same environmental disturbances as the turtles.

Many species of sea birds forage in Jamaican waters and nest along coastal areas and offshore cays. All sea birds are protected under the Wild Life Protection Act. Some species found in Jamaica's territorial waters are the Masked Booby (*Sula dactylatra*), Red-Footed Booby (*Sula sula*), Brown Booby (*S. leucogaster*), Audubon Shearwater (*Puffinus lherminieri*), Roseate Tern (*Sterna dougalli*), Sooty Tern (*Sterna fuscata*), Brown Noddy (*Anous stolidus*) and the Laughing Gull (*Larus atricilla*).

Jamaica, through the Centre for Marine Science (CMS) at UWI, is participating in the Census of Marine Life – an initiative to assess and explain the diversity, distribution, and abundance of life in the oceans (Creary 2008).

#### **1.2.2.2 Beach Erosion**

Beach erosion is occurring along several beaches in the western end of Jamaica and in particular Negril. Several causes have been identified and include environmental and building practices and illegal dumping of pollutants in rivers and coastal waters, resulting in the destruction of sea grass and coral reefs, thus reducing their effectiveness in protecting the beaches from erosion. There is presently a programme which monitors the rate of erosion in Negril and solutions are being devised to arrest and reverse the existing situation.

#### **1.2.2.3 Coral Reefs**

The Jamaica Coral Reef Monitoring Network (JCRMN) conducted monitoring exercises in 2005, in Negril at Bloody Bay, El Punto Negrilo, Ireland Pen and Little Bay, and the Port Royal Cays at Drunkenman's Cay and Lime Cay (Jones 2005). Table 3 shows the results obtained.

**Table 3. Coral Cover at Selected Reefs in Negril and Port Royal Cays for 2005**

Date	Location	Monitoring Site	Coral Cover (%)	Conclusions
September 2005	Negril	Bloody Bay	15.6% at 4m 30.0% at 10m	Deeper transects displayed relatively high percentage cover which is an increase from 2004 figures
		El Punto Negril	6.3% at 4m 32.5% at 10m	
		Ireland Pen	3.1% at 4m 15.6% at 8m	
		Little Bay	9.4% at 5m 32.5% at 8m	
November 8, 2005	Port Royal Cays	Drunkenman's Cay	20.6% at 4m 34.4% at 7m	Relatively high percent cover but an overall decline from the 2003 assessment.
November 17, 2005		Lime Cay	20.0% at 5m 23.8% at 7m.	Fairly good coral cover

*Source:* Loureene Jones, "The Jamaica Coral Reef Monitoring Network" *In* Jamaica Clearing-House Mechanism (online 2005).

The CMS UWI is conducting the following projects/research work related to marine biodiversity and ecosystems:

- Port Royal Cays Coral Reef Monitoring for Long Term Changes – long-term assessment of coral reef ecosystems of the Port Royal Cays and examinations of the effects on reefs by storms;
- Rackham's Cay Cut Face Monitoring for Coral Recruit Recovery;
- Spatial Distribution and Population Abundance of the Sea Urchins in the Port Royal Area, Jamaica – to detail the spatial distribution and abundance of all the sea urchin types found along sections of Port Royal Cays;
- Jamaica Coral Reef Management Network – the objective is to stimulate interest in the monitoring of Jamaica's coral reefs, train persons in coral reef monitoring methodologies, and develop a sustainable coral reef monitoring programme for the island; and
- St. Thomas Coastal Habitat Project which is sponsored by the Environmental Foundation of Jamaica (EFJ), and will be an ecological assessment of the Morant Wetland area including seagrass areas, coral reefs, water quality, planktonic communities, and basic oceanography. (The project officially started in March 2006 with field work beginning in 2007).

#### **1.2.2.4 Marine Fisheries Protection and Sustainable Use**

The first two declared fish sanctuaries in Jamaica were Bogue Islands Lagoon (1979), and Bowden Inner Harbour (1986), to the western, and eastern ends of the island, respectively. However, due to over-fishing, land-based pollution, and other stressors, the fish catch in Jamaican waters has continued to decline. In 2009, in seeking to address this problem, the Ministry of Agriculture and Fisheries declared eight additional fish sanctuaries (MoAF 2009):

1. [Orange Bay](#) Fish Sanctuary in Negril in Hanover;
2. [Bluefields Bay](#) Fish Sanctuary in Westmoreland;
3. Galleon Fish Sanctuary near to Black River in St. Elizabeth;
4. [Salt Harbour](#) Fish Sanctuary in Clarendon;
5. [Galleon Harbour](#) Fish Sanctuary in Old Harbour, St. Catherine;
6. [Three Bays Area](#) Fish Sanctuary in Old Harbour, St. Catherine;
7. [Montego Bay](#) Marine Park Fish Sanctuary in St. James; and
8. [Discovery Bay](#) Fish Sanctuary in St. Ann.

The management of the fish sanctuaries will be a collaborative effort between the GOJ, and local community based organizations.

Enforcement has been problematic for the Fisheries Division. In a report to the FAO in 2005, some of the problems cited were:

- the duality of roles of fisheries inspectors as both extension officers and enforcers; as
- inadequate funding of the Fisheries Division; and
- lack of suitable vessels by the Jamaica Defence Force Coast Guard to conduct patrols.

The Fisheries Division also cited as constraints, the lack of a comprehensive enforcement strategy, and outdated fines in the laws and regulations. .

Jamaica has sought to build capacity through numerous training opportunities with respect to better understanding and accessing our fish stocks. An Officer of the Fisheries Division was trained in 2009 at the United Nations University in Iceland over a 6-month period in fish stock assessment. This training will strengthen the institution in reviewing its current data sampling plan with a view to more accurately estimate fish production and hence landings for the fishing industry.

#### **1.2.2.5 Marine Genetic Resources**

NEPA has responsibility for regulating the access to all genetic material in Jamaica and issues permits for the collection, possession, and export of marine plant and animal material. There is the potential for Jamaica to earn income from the sustainable use of marine organisms, however, legislation for access and benefit sharing of genetic resources is lacking.

#### **1.2.2.6 National Consultations**

Concerns raised by stakeholders and NGOs during National Consultations include:

- impact of land based activities (including coastal developments) on sea grass beds, coral reefs and mangroves;
- mitigation measures taken (mangrove replanting) have not been successful; and
- weak enforcement and insufficient monitoring in protected areas (due to inadequate funding).

### ***1.2.3 Agriculture and Agricultural Ecosystems***

Plantation (sugar cane, banana, coconut, coffee, and citrus) agriculture in Jamaica has historically been associated with activities having a negative environmental impact, such as, land

clearing, deforestation, soil erosion and pollution (Mitchell *et al.* 2008). However, agriculture employs 18.7% of the labour force and contributed 4.8% to GDP in 2008 (PIOJ 2009a). Small and medium sized farms (5 ha or less), comprise most of the sector, and these account for 85.6% of total agricultural holdings (PIOJ 2009a).

Traditional export crops grown in Jamaica are sugar cane (*Saccharum officinarum* L.), coffee (*Coffea arabica*), *Citrus* spp., coconut (*Cocos nucifera* L.), pimento (*Pimenta dioica* (L.) Merr.), and banana (*Musa sapientum* L.) (PIOJ 2009a). Non-traditional export crops are yams (*Dioscorea* spp.), ackee (*Blighia sapida* K. Konig), papaya (*Carica papaya* L.), sweetpotato (*Ipomoea batatas* (L.) Lam), pumpkin (*Cucurbita pepo* L.), dasheen (*Colocasia esculenta* (L.) Schott.), mango (*Mangifera indica* L.), herbs and spices, fruits, vegetables, and horticultural crops (Mitchell *et al.* 2008). Domestic crops are vegetables, legumes, fruits, plantain (*Musa x paradisiaca*), roots & tubers, cereals and condiments (PIOJ 2009a). Livestock reared are beef cattle and dairy cows, sheep, goats, poultry and pigs (PIOJ 2009a).

The GOJ is currently pursuing organic farming in respect of cocoa (*Theobroma cacao* L.), coffee and pimento. Sustainable agriculture is being pursued with water harvesting and integrated farming being practised in some areas. However, there is no direct policy that addresses environmental concerns in agriculture.

Crop zoning is an ongoing process between the MoAF and the Rural Agricultural Development Authority (RADA), and a Crop Zoning Tracking Module is being developed using the Agricultural Business Information System (ABIS) database platform. A pilot project will be launched in July 2010..

### **1.2.3.1 Plant Health**

The MoAF, through RADA, helps to keep Jamaica free from pests such as the Mediterranean fruit fly (*Ceratitis capitata*), the Giant African snail (*Achatina fulica*) and the Papaya mealy bug (*Paracoccus marginatus*). An island-wide West Indian Fruit Fly (*Anastrepha obliqua*) Surveillance Pilot Project was launched in 2008.

Through on-going pest surveillance, pest outbreaks are identified at early stages, managed and/or contained. For example in 2007 the Pink Hibiscus mealybug (*Maconellicoccus hirsutus*) was discovered in the eastern end of the island, and is being successfully controlled by an introduced biological agent.

A Plant Health Coordinating Committee (PHCC) was established (2004), and actively functions. Also, an Agricultural Pest Response System was established in 2005. A Plant Health Policy has been drafted and public consultations held (2009).

### **1.2.3.2 Animal Genetic Resources for Food and Agriculture (AnGRFA)**

Animal genetic resources for food and agriculture in Jamaica comprise introduced and adapted animal species including cattle, sheep, goats, pigs, equine, bees and poultry. The Ministry of Agriculture (MoAF) through the National Coordinator for Animal Genetic Resources produced Jamaica's country Report for the 2007 production of FAO State of the World's Animal Genetic Resources for Food and Agriculture.

*In-situ* and *ex-situ* conservation and utilization occurs for AnGRFA in Jamaica. Table 4 shows the numbers and types of AnGRFA being conserved and utilized, and the agencies/organizations involved.

**Table 4. Types of AnGRFA and Their Locations**

Type of Collection	Location	AnGRFA	Number (Census of Agriculture 2007)
<i>In-situ</i>	MoAF: Bodles Members Breed Societies Farmers Association	<b>Dairy Cattle:</b> Jamaica Hope Holstein	11,728
	MoAF: Montpelier Minard Estate Members Breed Societies Farmers Associations	<b>Beef Cattle:</b> Jamaica Brahman (Polled, Horned) Jamaica Black Jamaica Red Poll	71,378
		Dual Purpose	11,858
	MoAF: Bodles Hounslow Farmers Associations	<b>Sheep:</b> St. Elizabeth Kathadin Dorper Barbados Black Belly	7,255
	MoAF: Bodles Hounslow CARDI Ebony Park, HEART/NTA Farmers Associations	<b>Goat:</b> Native Boer Nubian Alpine Spanish	482,345
	Breeders' Association Farmers	<b>Equine:</b> Horses Donkeys Mules	9,363
	MoAF: Bodles , Montpelier Farmers' Association	<b>Bees:</b> <i>Apis miliflora miliflora</i>	11,895 boxes
	MoAF: Bodles Newport Genetics Farmers' Association	<b>Pigs:</b> Large White Land Race Duroc Cross breeds	223,954

Type of Collection	Location	AnGRFA	Number (Census of Agriculture 2007) of
	Commercial Companies Contract Farmers Farmers' Association / Groups	<b>Poultry:</b> Broilers Layers Hatching eggs  Other: Turkeys, ducks guinea fowl, Naked (peel ) Neck, Frizzle Fowl, (Sensi) , Common(crossbred) fowl	6,008,562 * 765,959 N/A  108,305
<i>Ex-situ :</i> <i>In-vitro</i>	MoAF: Bodles	<b>Cattle Semen:</b> Jamaica Hope Jamaica Red Poll Jamaica Black	>2,500 straws
	WINDALCO	<b>Cattle Semen:</b> Jamaica Hope Jamaica Red Poll  <b>Cattle Embryos:</b> Jamaica Hope Jamaica Red Poll	>1,500 straws  30
	Newport Genetics	<b>Pig Semen:</b> Large White Land Race Duroc	>2,000 ampules

Source: MoAF, pers. comm. May 2010

\* Broiler populations are transient having a life cycle of 5 – 6 weeks.

Conservation programmes for animals are mainly *in-situ* but also include *ex-situ* cryo - conservation of semen and embryos (FAO 2007). A current constraint to conservation of AnGRFA is insufficiency of breeding stock (FAO 2007).

### **1.2.3.3 Plant Genetic Resources for Food and Agriculture (PGRFA)**

PGRFA in Jamaica include native and non-native crops such as sugar cane, coffee, cassava (*Manihot esculenta* Crantz), hot pepper (*Capsicum chinense* Jacquin), longan (*Euphoria longan* (Lour.) Steud.), lychee (*Litchi chinensis* Sonn.), carambola (*Averrhoa carambola* L.), mountain guava (*Psidium montanum* Sw.), and yams (Mitchell *et al.* 2008). There is however, no complete data on PGRFA in Jamaica due to a lack of ongoing research, although there are inventories and surveys that have been performed that are located in universities and botanical gardens overseas.. *In-situ* and *ex-situ* conservation occurs for some PGRFA in Jamaica. The numbers and types of PGRFA being conserved and agencies/organizations can be seen in Table 5. The MoAF also maintains a seed collection (Mitchell *et al.* 2008).

**Table 5. Types of PGRFA Collections and Their Locations**

Type of Collection	Location	PGRFA	Number
<i>Ex-situ</i>	Bodles, Orange River, and Top Mountain Research Stations	Pepper, pumpkin, sorrel, pigeon pea, cow peas, cassava, sweet potato, mango, star apple, <i>Annona</i> spp., pomegranate, cashew, june plum, breadfruit, ackee, otaheite apple, guava, nutmeg, West Indian cherry, miracle fruit, lychee, cherimoya, longan, mamey apple, camu camu, cocona	Bodles has two ackee accessions. No numbers were given for the other PGRFA
	Coconut Industry Board	Coconut	Over 54 accessions.
	Bodles but operated by Banana Board	Banana	147 accessions.
	UWI (Biotech Centre)	Medicinal Plant Collection	At least one plant of each of 50 – 100 species.
	CARDI	West Indian Red pepper, sweet potato	No numbers were given for pepper, but 8 for sweet potato.
	Citrus Growers Association	Citrus	Over 38 accessions
	Bodles, Orange River	Avocado	16 but many varieties have been lost.
	Jamaica Bauxite Institute	Castor beans	several
	Orange River Research Station	Cocoa	~6 accessions
	Orange River Research Station	Mango	Over 48 accessions
	Bodles and CARDI	Scotch Bonnet	No numbers given.
	Orange River Research Station	Pimento	No numbers given.
	Top Mountain Research Station	Sweet potato	22 accessions
	Bodles Research Station	Cassava	7 accessions
	Jamaica Bauxite Institute	Cassava	3 – 4 accessions
Hope Botanical Gardens	Medicinal Trees	No numbers given.	

Type of Collection	Location	PGRFA	Number
<i>Ex-situ - In-vitro</i>	SRC	Banana, plantain, Cassava, Sweet potato, Yam, Pineapple, Coffee, Ginger, Sorrel, Turmeric, fever grass, vanilla, boston fern, natal plum, jack fruit, rose apple and sugar cane, bamboo, jasmine, gloxinia, kalanchoe, pink ginger, pink rose, syngonium, white begonia.  Anthuriums, African violet, bamboo, jasmine, gloxinia, kalanchoe, pink ginger, pink rose, syngonium, white begonia, orchids	Banana and plantain (58); Cassava (9); Sweet potato (12); Yam (2); Pineapple (2); Coffee (n/a); Ginger (4); Sorrel (2); no numbers for Turmeric, fever grass, vanilla, boston fern, natal plum, jack fruit, rose apple and sugar cane, bamboo, jasmine, gloxinia, kalanchoe, pink ginger, pink rose, syngonium, white begonia. Anthuriums (25), African violet (5), orchids (8)
	UWI (Biotech Centre)	Aloe, ackee, arrowroot, bottle brush, cerasee, chainy root, ginger, fever grass, medina, neem, pepper elder, pineapple, sarsaparilla, scotch bonnet pepper, spirit weed, strong back, tuna cactus ( <i>Opuntia cochenillifera</i> ), turmeric, wicker, yam	Pineapple (2); strong back (3), but no numbers given for Aloe, ackee, arrowroot, bottle brush, cerasee, chainy root, ginger, fever grass, medina, neem, pepper elder, sarsaparilla, scotch bonnet pepper, spirit weed, , tuna cactus ( <i>Opuntia cochenillifera</i> ), turmeric, wicker, yam

Source: Sylvia Mitchell and M. Ahmad, "Protecting our Medicinal Plant Heritage. The Making of a New National Treasure" *In* Jamaica Journal (Kingston, 2005/2006), 28-33.

### 1.2.4 Biosafety

Jamaica signed the Cartagena Protocol on Biosafety in June 2001, but is not a Party to the Protocol. This protocol aims to ensure an adequate level of protection in the field for the safe transfer, handling, and use of Genetically Modified Organisms (GMOs), in particular transboundary movements through planned or accidental import or export. Jamaica has drafted a National Biosafety Policy which is intended to be implemented in conjunction with other complementary national laws and policies such as:

- The Plant Quarantine Act (1993);
- Animals (Diseases and Importation) Act (1969);



- NRCA Act (1991);
- Food and Drugs Act (1964);
- Public Health Act (1985);
- Standards Act (1969); and
- Draft Science and Technology for Socio-Economic Development: A Policy for Jamaica (2006).

Biosafety legislation is being developed and drafting instructions state that the Biosafety Act is intended to bring the Jamaican legal system into closer alignment with international standards. The Act is intended to supplement, and be read in conjunction with the National Biosafety Policy for Jamaica. The scope of the law is such that it allows for some measure of flexibility in a regulatory area that is developing in international and regional law and policy.

Several agencies or ministries will implement the policy, the lead implementing agency being the Ministry with responsibility for the Environment (MRE). Other implementing agencies include NEPA, MoAF, Ministry of Education, as well as the Jamaica Customs Department. Policy development and advice on biosafety matters will be provided by the National Biosafety Committee (NBC) which is a multi-sectoral body. The secretariat for the NBC is currently at the NCST. The Biosafety Clearing-House resides at the IOJ.

The Draft Biosafety Act requires that two statutory bodies be formed (the NBC and the Biosafety Clearing-House) for the implementation of the law. These two bodies exist but need to be formalized statutorily to give effect to the provisions of the Act. The drafting instructions address among other things, the intentional release of GMOs into the environment, the unintentional release of GMOs into the environment, and the concomitant fines.

### ***1.2.5 Forests and Mountain Ecosystems***

Approximately 335,900 ha or over 30% of Jamaica is covered by [forest](#), 88,000 ha of which is closed broadleaf forest with a closed canopy and minimal human disturbance, and approximately 8% of the island is natural forest with little human disturbance (Forestry Department 2001; PIOJ 2009f). The remaining forest is either natural dry open forest (also referred to as woodland or scrub) or forest showing varying degrees of human disturbance - disturbed broadleaf (Forestry Department 2001). Just over 30% of the country is classified as Mixed use (areas of disturbed broadleaf forest mixed with another land use/forest cover), and the remaining 39% of the area of Jamaica is classified as Non-forest (Forestry Department 2001).

Nearly 35% of all forests, and over 73% of closed broadleaf forest are protected. However, despite being protected, more than a third of all forest reserves and other protected areas have been disturbed by human activity, and over 20 % of land within forest reserves has been disturbed by human activity. The Forestry department has stated that enforcement has been a problem during the period 2005 – 2009.

Assessments of forest cover and calculation of deforestation rates have not been conducted since 1998, but the rate is assumed to be 0.1% per annum (Forestry Department pers. comm. May 2010). However, the Forestry Department plans to conduct forest cover assessments in 2010.

The Cockpit Country is the largest remaining primary forest in Jamaica. The low, flat lands are dominated by agriculture, and invasive plant species, but the mountains are covered by forest (BirdLife International 2009; Mitchell *et al.* 2008).

Dolphin Head, a forest reserve, is an important area of biodiversity with unique flora which arose from its isolation, climate, and geology (limestone mountain). However, the area is under threat from timber extraction and illegal agriculture (BirdLife International 2009).

According to Koenig (2001) there are approximately 150 animal species present, representing 61 families in 10 classes of 4 phyla and a least 50 of these animal species are endemic to Jamaica and a minimum of four (1 freshwater crab *Sesarma dolphinium*, 2 Lampyridae fireflies, 1 species of Operculate snail) are endemic to Dolphin Head. Proctor (2001) found 328 plant species, of which 107 were endemic to Jamaica, and 20 were endemic to Dolphin Head.

Portland Bight supports the largest intact area of mangrove forest in Jamaica. The Blue and John Crow Mountains, and the Rio Grande valley are important biodiversity areas which support globally threatened, and critically endangered species .

#### **1.2.5.1 Forest Act (1996)**

The Forest Act (1996) provides for the formation of Local Forest Management Committees (LFMCs) whose specific functions are:

- monitoring the condition of natural resources in the Committee's area;
- advising the Conservator on matters relating to the development of local forest management plans;
- assistance in the design and execution of conservation projects in the area; and
- other functions as may be identified by the Committees themselves and are provided for under the Forest Act (1996)

The LFMCs have helped to raise the awareness of forestry in:

- Buff Bay, Portland;
- Pencar, St. Mary;
- Upper Rio Minho;
- Cockpit Country (North, South-east, South-west); and
- Dolphin Head, Hanover.

These LMFCs are currently sustainable, and have access to funds from the EFJ, the Forest Conservation Fund and USAID. Three LFMCs in the Cockpit Country have identified sustainable livelihoods, developed local capacity in forest management and resource monitoring, and established environmental education programmes.

The Forestry Act is under review. A revised Act would reflect new objectives and policies. In 2008 the Forestry Department was declared an Executive Agency in transition and the revised Act would also reflect changes resulting from the Forestry Department being constituted as an Executive Agency.

#### **1.2.5.2 Draft Strategic Forest Management Plan**

The National Forest Management and Conservation Plan (NFMCP) which was approved in 2001, was reviewed in 2004 and 2008 according to the requirements of the Forest Act by the Conservator of Forests. During the review of the NFMCP, the conclusion was made that while the fundamentals of the NFMCP were still applicable, amendments and a renewed focus were required for the implementation of the strategies. A strategic planning approach has been adopted (Forestry Department 2009). The strategic objectives for fiscal years 2009 – 2013 related to biodiversity conservation and sustainable use are:

- ***Increase participation of the private sector and non-government organizations***  
Much of the existing forest cover, land requiring restoration of forest cover to maintain environmental integrity, and land suitable for commercial forestry or agro forestry is

- privately owned or otherwise outside the direct control of the Forestry Department. Conservation of these areas plus the realization of economic benefits from forest products can be achieved only by substantially increased involvement of the private sector and NGOs;
- **Increase community participation and public awareness.** The participation of local communities living in or adjacent to forests is essential to forest conservation, as are the support and awareness of the broader public. Both groups will benefit from a properly managed national forest estate. Both are subject to the catastrophic environmental risks associated with forest destruction;
  - **Develop and implement forest management plans.** While local forest management plans developed with public input are recognized as necessary, previously used planning approaches have been excessively time consuming and have failed to meet legislated requirements or produce a consensus for action. New and different planning strategies will therefore be applied over the next five years, both to the conservation of natural forests and the development of forest plantations; and
  - **Maintain and restore forest cover.** Forests play a crucial role in protecting watersheds and conserving biodiversity. Watershed protection is inextricably linked to soil conservation and disaster risk reduction. Failure to maintain and restore forest cover, particularly on steep slopes and in critical watershed areas, will (and already does) have disastrous consequences. The Forestry Department must therefore implement measures and strategies to reduce and compensate for deforestation, and to restore degraded areas.

#### **1.2.5.3 Deforestation and Reforestation**

The Forestry Department has taken several initiatives to stem the trend which was identified in the 1989-98 assessment (See section 1.2.5). These include not only the creation of seven Local Forest Management Committees, but also the institution of a Private Tree Planting Programme and the provision of incentives to private land owners with a view to having them declare their forested lands Forest Reserves or Forest Management Areas. To date two persons have done so.

Based on the assumption that the trend identified in 1998 has continued, the Forestry Department has estimated that:

- Total forest cover for 2005 was 330,100 hectares and will be 328,600 hectares for 2010;
- 54 ha of Closed Broadleaf Forest is lost annually, therefore estimates of Closed Broadleaf Forest cover are 87,852 ha in 2005, and 87,582 ha in 2010; and
- Annual deforestation rate is 0.1%.

For the period 2005 – 2009, the Forestry Department reforested 563 ha including areas of Blue Mountain Forest Reserve, Cockpit country, with native species such as West Indian Cedar (*Cedrela odorata* L.), Jamaica Mahogany (*Swietenia mahagoni* (L.) Jacq.), Blue Mahoe (*Hibiscus elatus* Sw.), Spanish Elm (*Cordia gerascanthus* L.), Santa Maria (*Calophyllum calaba* L.), and Bitter Damson (*Simarouba glauca* DC). Most of the 563 ha planted were on degraded forest lands, using block planting, Agro-Forestry, and enrichment strategies. Private forest areas have been supplied with over 200,000 seedlings which using a planting density of 625 plants/ha, is equivalent to 320 ha of forest plantation.

#### **1.2.5.4 Sustainable Forestry**

The Forestry Department has undertaken the following actions for sustainable forestry:

- ongoing forest inventory to generate information/data;
- 4 draft local forest management plans developed, using inventory information

- interim annual allowable cut determined;
- improved forest governance structures through establishment of 7 Local Forest Management Committees (LFMCs) established in several watersheds, using participatory involvement of stakeholders;
- increased vigilance to reduce forest loss and infringements;
- research into restoration of forest cover on mined-out bauxite lands; and
- awareness building to protect forest values and benefits.

#### **1.2.5.5 Incentives**

Tax incentives are provided for landowners for maintaining existing forest and for establishing or restoring tree cover. In the period 2005 – 2009, there were three privately owned forest lands which were brought under protected management. In the Strategic Forest Management Plan 2009 - 2013, Agro-Forestry will be emphasized.

#### **1.2.5.6 The Forest Conservation Fund**

The Forest Conservation, Debt Swap and Swap Fee Contractual Agreements were signed on September 21, 2004 by the Governments of Jamaica and the United States of America, the Nature Conservancy and the Jamaica Protected Areas Trust resulting in the creation of the Forest Conservation Fund (FCF).

A number of projects have been funded under this Fund and include the Dolphin Head Forest Conservation and Appropriate Resource Utilization Project and Forest Conservation in the Blue Mountains.

#### **1.2.5.7 National Consultations**

At the national consultations stakeholders identified the following areas of concern with regard to enforcement in forest protected areas:

- Forest wardens do not work on weekends when most illegal logging operations take place; and
- Charcoal burning is increasing and trees, including mangroves, are being cut down to produce charcoal.

### ***1.2.6 Inland Waters***

#### **1.2.6.1 Freshwater Biodiversity**

There are two families of freshwater shrimp (Aytidae and Palaemonidae), one endemic freshwater turtle (*Trachemys terrapen*), and three endemic species of fresh water fish (*Cubanichthys pengelleyi*, *Gambusia melapleura* and *Gambusia wrayi*) in Jamaica. Other species of fish found in Jamaica's freshwater system include: Blackbelly Limia (*Limia melanogaster*) Mountain mullet (*Agonostomus monticola*), 'God-a-me' (*Dormitator maculatus*), 'Macaback' (*Gerres cinereus*) and Striped mullet (*Joturus pichardi*).

The freshwater turtle *T. terrapen* is listed as vulnerable on the IUCN red list, and its international trade regulated by the Endangered Species (Protection, Conservation and Regulation of Trade) Act 2000, Schedule 4, however this regulates trade and not possession. The freshwater turtle

has been extirpated from much of its historical range, and is subject to continuing harvest for food.

A GEF Small Grants Project, "Ramble Pond Turtle Assessment and Pond Restoration Project- A Strategy for creating a model inland pond ecology with environmental education and recreational potential", was started and concluded in 2008. Among the successes of the project was the restoration of the pond and an increase in the number of flora and faunal pond species, and enhanced community interest and participation.

In a draft report of the gaps in freshwater biodiversity within protected areas (PAs) for the National Ecological Gap Assessment Report (NEGAR), it was found that:

1. most freshwater (FW) habitats are under or unrepresented in Jamaica's protected area network; and
2. the current PA network fragments freshwater systems and does not preserve the longitudinal and lateral connectivity of freshwater ecosystems.;

### **1.2.6.2 Watersheds**

Jamaica is divided into 26 Watershed Management Units (WMUs) comprising all the land from the mountains to the coasts. The WMUs contain over 100 streams and rivers and are composites of river basins which fall within 10 hydrological basins regions (Figure 1).

Steep slopes usually in excess of 20 degrees characterize the land in the upper part of the WMUs which in addition to thin or erosive soils, makes the soils on non-limestone areas susceptible to landslides, and slope failures. Most of the soils in the watersheds are limestone-derived soils and the remaining areas are composed of soils derived from weathered igneous and metamorphic rocks.

Heavy and high intensity rains in the upper watershed areas, soil erosion, and susceptibility to earthquakes add to the problem of landslides and slope failures. Inappropriate land use of slopes further contributes to land slippage. It has long been recognized in Jamaica that farming activities on the slopes are the most important cause of the degradation of watersheds in Jamaica. Over 170,000 farmers cultivating just under 245,000 ha, and using unsuitable agricultural practices have contributed to massive soil loss through soil erosion, siltation of drains and rivers and destructive flooding downstream.



**Figure 1. The Ten Hydrological Basins of Jamaica**  
 Source: Water Resources Authority (WRA)

### Hydrologic basins and their associated Watershed Management Units

<b><u>Basin</u></b>	<b><u>WMU</u></b>	<b><u>Area, km<sup>2</sup></u></b>
I. Blue Mountains South	15 Plantain Garden River	186.7
	16 Morant River	375.7
	17 Yallahs River	200.4
II. Kingston	18 Hope River	241.3
III. Rio Cobre	19 Rio Cobre	1,254.8
IV. Rio Minho	20 Rio Minho	789.3
	21 Milk River	512.1
	22 Gut River - Alligator Hole	512.9
V. Black River	23 Black River	1,698.3
VI. Cabarita River	24 Dean's Valley River	96.1
	25 Cabarita River	284.6
	26 New Savannah	76.3
	1 South Negril – Orange River	139.9
VII. Great River	2 Lucea River	253.2
	3 Great River	264.6
	4 Montego River	346.5
VIII. Martha Brae River	5 Martha Brae River	622.2
IX. Dry Harbour Mountains	6 Rio Bueno - White River	1,563.1
X. Blue Mountains North	7 Rio Nuevo	111.1
	8 Oracabessa River	169.5
	9 Wagwater River	315.1
	10 Pencar – Buff Bay River	202.0
	11 Spanish River	121.5
	12 Swift River	97.2
	13 Rio Grande	302.5
14 Driver's River	<u>210.9</u>	
<b>TOTAL AREA</b>		<b>10,947.2 km<sup>2</sup></b>

### Hydrologic basins and their associated Watershed Management Units

#### **1.2.6.3 Watershed Rehabilitation**

Ten watersheds have been deemed in critical condition due to deforestation and soil erosion. These include, Hope, Swift, Rio Grande, Yallahs, Wag Water, Rio Cobre, Rio Minho, Oracabessa and Morant rivers (Mitchell *et al.* 2008).

Northern Caribbean University (NCU) and the College of Agriculture, Science and Education (CASE) with funding from the EFJ, have been working to rejuvenate the Swift River watershed through work in Fruitful Vale, Portland. This watershed ranks high among the priority watersheds defined by NEPA.

The Swift River watershed is characterized by very steep slopes, high rainfall, highly erodible soils, and deforested areas. The area was once a thriving agricultural area for banana, cocoa, coffee, citrus and livestock but it has experienced a significant reduction in agricultural output due to the effects of hurricanes, a declining international market, crop diseases, importation of cheaper milk and meat, and high production costs. As a result of the decline in income generating activities, farmers have started to cut down the lumber trees as a means of sustaining their livelihood. Slash and burn cultivation for subsistence farming, as well as the cutting down

of the lumber trees resulted in land slippage and flooding, and the disappearance of previously year-round streams (NCU pers. comm. May 2010). The project now has over 45 acres of orchard already established with the aim of producing seedlings for additional watershed projects island-wide (EFJ 2009).

### **1.2.7 Dry and Sub-humid Lands**

The only dry and sub-humid lands in Jamaica are the dry limestone forests. The most extensive dry limestone forests are in the Hellshire Hills in St. Catherine, and Portland Ridge in Clarendon in southern Jamaica. It was in the Hellshire Hills that the Jamaican Iguana (*Cyclura collei*) was re-discovered. Other endemic animals that are found in Hellshire Hills and Portland Ridge include the Blue-tailed Galliwasp (*Celestus duquesneyi*), the tree frog (*Eleutherodactylus cavernicola*), two thunder snakes (*Trophidophis stullae* and *T. jamaicensis*), the Jamaican boa (*Epicrates subflavus*), the common snake (*Typhlops jamaicensis*), the grass snake (*Arrhyton calillaemums*), the Jamaican Coney/Hutia (*Geocapromys brownii*) and 11 endemic subspecies of birds. The last Jamaican populations of the skink (*Mabuya mabouya*) are believed to be in the Hellshire Hills. The dry limestone forest of the Hellshire Hills also exhibits 19.6% plant endemism with some species found only in that location. However, the Hellshire Hills are under threat from anthropogenic activities such as loss of forest for fuelwood.

The Jamaica Iguana Recovery Group (JIRG) continues to be involved with conservation and monitoring of the Jamaica Iguana and has noted that the core iguana population continues to increase in size (Dr. Byron Wilson pers. comm.).

### **1.2.8 Islands**

#### **1.2.8.1 Cays**

Jamaica's coastline is dotted with both near-shore and offshore cays that are used for recreational purposes such as boating and watersports activities as well as for commercial purposes such as fishing. To date, no clear policy exists on the management of these cays or of their resources. Offshore cays include four small limestone islands off the south coast (Morant Cays) and four coralline islands on the southeastern edge of the Pedro Bank (Pedro Cays). The nearshore cays are found mainly off the south coast (and include Lime Cay Maiden Cay, Bushy Cay and Drunkenman's Cay) with the exception of Booby Cay off the coast of Negril. Lime Cay and Booby Cay are used extensively for recreational purposes (Towards Developing a National Policy On Ocean and Coastal Zone Management, 2000).

The Jamaican Iguana (*Cyclura collei*) once inhabited the Goat islands, but the last known specimens disappeared in the 1940s and the iguana was thought extinct until sightings were made in the 1970s and confirmed in the 1990s in the Hellshire Hills. Plans are being made to eradicate goats and mongoose from the Goat islands for re-introduction of the iguana in a GEF/UNEP/CABI Regional Invasive Species pilot project.

Some 600 or more residents, mostly fishermen, reside on Middle and Top Cays of the Pedro Bank. Sanitation on the cays is of serious concern especially on Middle Cay which is a primary nesting area for the Masked Booby (*Sula dactylatra*).

Presently the government is looking at the development of a Cays Policy which will look at the sustainable use and management of the cays.



### ***1.2.9 Communication, Education, and Public Awareness***

Government agencies/departments such as NEPA, Fisheries Division, Forestry Department, the IOJ, universities such as the UWI, and NGOs such as the JCDT, JET, Montego Bay Marine Park Trust (MBMPT), and TNC are involved in educating Jamaicans about biodiversity conservation and sustainable use. Some of the methods used are radio broadcasts, posters, pamphlets, brochures, cartoons, environmental related competitions, in-house presentations, extension services, training sessions, video documentaries, and a school environment programme, and websites. The MBMPT regularly hosts school groups, and visitors (through private tour operators) and gives presentations on the history of the Marine Park, flora/fauna, and environmental threats.

NEPA has indicated that no research has been conducted by the Agency on general levels of environmental awareness, however, a study was conducted in 2005 to address issues related to burning as a method of garbage disposal, and to inform an anti-burning campaign that is now being implemented.

Each year, NEPA commemorates approximately 10 environmental days. Biodiversity awareness is enshrined in non-formal environmental education initiatives conducted by the Public Education and Corporate Communication Branch and as such forms part of activities undertaken during calendar events such as International Day for Biological Diversity and World Wetlands Day. These short initiatives may include electronic media advertising as a strategy. Biodiversity awareness is also part of its annual outreach to schools and the National Youth Service.

The IOJ has ongoing environmental education programmes specific to biodiversity conservation and sustainable use that have been very successful. Funding for these education programmes comes from both internal and external sources. Both the IOJ and NEPA cite the need for increased human resources in the area of environmental education.

The Port Royal Marine Laboratory has started a public education campaign to alert users of the value of the mangroves and the need to conserve them. Funding provided by the Environmental Foundation of Jamaica (EFJ), has enabled the marine laboratory to produce illustrated pamphlets about the plants and animals found in the mangroves. A specially prepared CD-ROM with information about the value and sustainable use of the mangroves has also been produced and is being distributed to schools throughout Jamaica.

### ***1.2.10 Protected Areas***

As a party to the CBD, Jamaica is obligated to developing an ecologically-representative system of PAs which are designed to conserve at least 10% of the country's biodiversity. Jamaica's approach has been to increase the percentage due to the high levels of endemism (NEGAR 2009).

Beginning in 1874 with the Harbours Act, Jamaica has passed many acts which relate to various aspects of the environment. As a result there are 19 different categories of protected areas under the jurisdiction of four government agencies – NEPA, Forestry Department, Fisheries Division, and the Jamaica National Heritage Trust (JNHT), however, NEPA and the Forestry Department have control over most of the protected areas (NEGAR 2009).

NRCA/NEPA is responsible for protected areas declared under the NRCA, Wild Life Protection and Beach Control Acts (See [Appendix IV](#) Lists and Tables). No additional areas have been declared

since 2005 under the NRCA and Beach Control Acts. Terrestrial protected areas represent 200,000 ha or approximately 18% of Jamaica's total land area and marine protected areas account for 180,000 ha or 15% of the archipelagic waters.

- For the period 2005 – 2009, the Forestry Department has declared one Forest Management Area (private – Tulloch Estate, St. Andrew) and one Forest Reserve – Craydon, St. James..

#### **1.2.10.1 BJCMNP**

The BJCMNP is Jamaica's first terrestrial national park and was The JCDT manages the BJCMNP under a delegation agreement with the Natural Resources Conservation Authority (NRCA) through the NEPA and a co-management agreement with NEPA and the Forestry Department (JCDT 2009). Management of the park is through the implementation of six programmes:

- Conservation;
- Monitoring and Evaluation;
- Enforcement and Compliance;
- Education and Public Awareness;
- Recreation and Training; and
- Governance.

The number of rangers in the park has increased from 3 in 2004 to 7, and there has been an increase in the number of patrols. Enforcement techniques used are the adoption of conciliatory measures, and verbal warnings and education.

Some activities of the JCDT within the park include reforestation of degraded land with native tree species, control of invasive species, sustainable livelihood projects with buffer zone communities, and using eco-tourism principles to operate recreational areas.

The JCDT has developed and implemented an environmental education programme in 30 schools in the buffer zone around the park.

The JCDT stages the Green Expo annually, which features environmentally friendly products and services and the organizations that provide them; and Misty Bliss which is a cultural and environmental event held annually since 2002.

The BJCMNP has been nominated as a UNESCO World Heritage Site (JCDT 2009).

#### **1.2.10.2 Gaps: Protected Areas**

In keeping with the CBD's Programme of Work on Protected Areas (PoWPA), Jamaica is preparing a Protected Areas System Master Plan (PASMP). A component of the PASMP is the National Ecological Gap Assessment Report (NEGAR).

The NEGAR (2009) has identified representation, ecological and management gaps in Jamaica's PAs. It shows that the representation of critical marine conservation targets in the eastern coast of Jamaica is ecologically insufficient for functionality. The offshore banks are not included in any PA, and representation of cays is highly selective. Current legislation is not designed to accommodate seascape-scale connectivity.

For terrestrial gaps, very limited data is available for plants and there are four targets which fall below the 10% threshold – Wet, and Very Wet Forest on alluvium, Mesic Forest on shale, and the endemic frog, *Osteopilus marianae*.

Freshwater gaps are large rivers, wetlands, ponds and lakes, freshwater caves in eastern Jamaica, and high-altitude streams in western Jamaica.

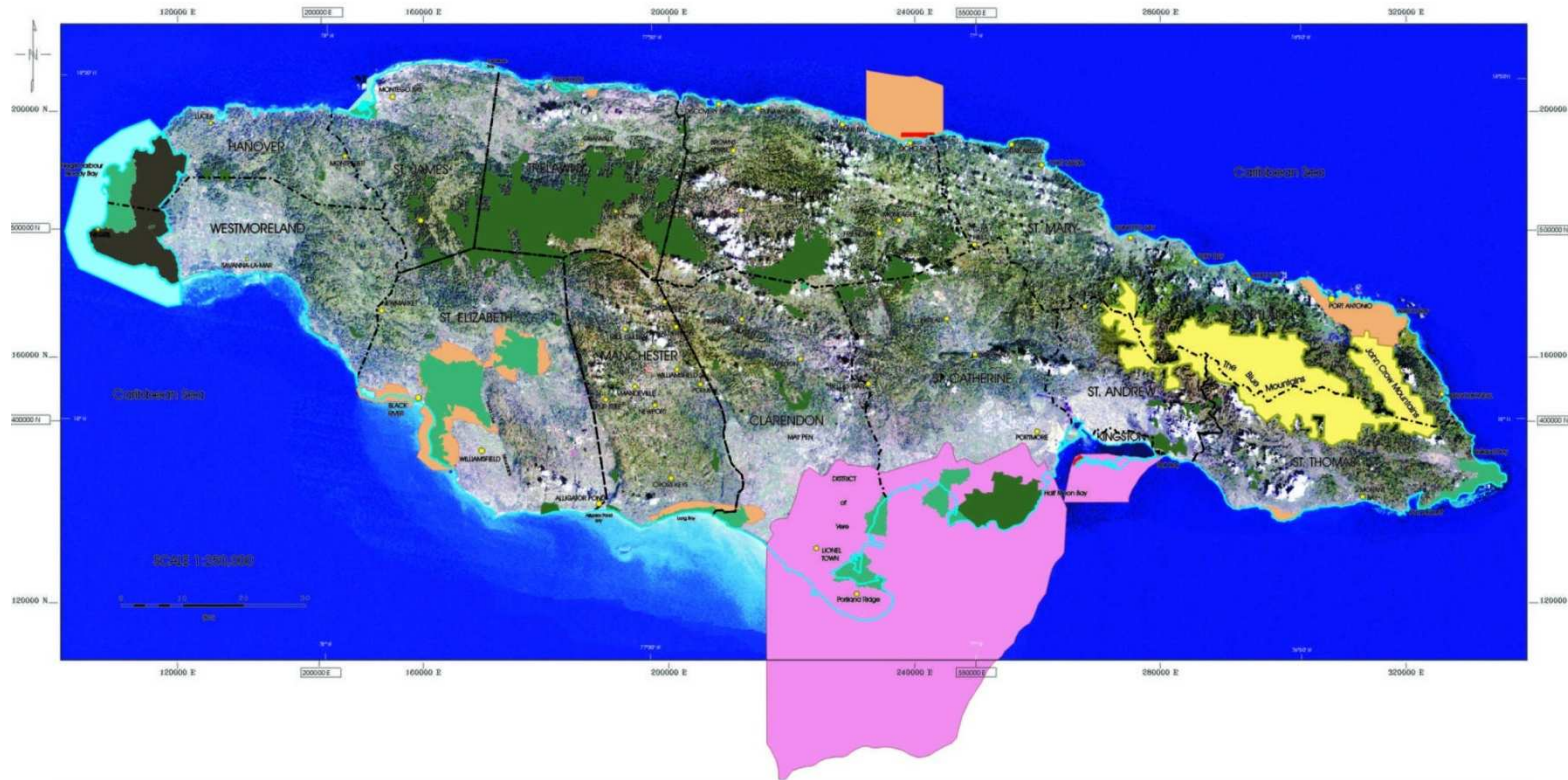
In terms of management of the current PAs, "major gaps exist relating to a lack of focus on conservation actions that directly impact biodiversity such as threat abatement and enforcement. These gaps are fuelled by overall inadequate investment of monetary and human resources in conservation. At the policy level, the complications of multiple-agency management combined with the lack of a harmonised system of classification to guide the management of protected areas are contributing to inefficiencies and shortcomings in overall performance."

Figures 2 and 3 show the current protected areas in Jamaica, and the proposed protected areas that meet biological conservation goals and the country's commitment to protect at least 10% of its biodiversity, respectively.

#### **1.2.10.3 Financial Support/Mechanism for Protected Areas**

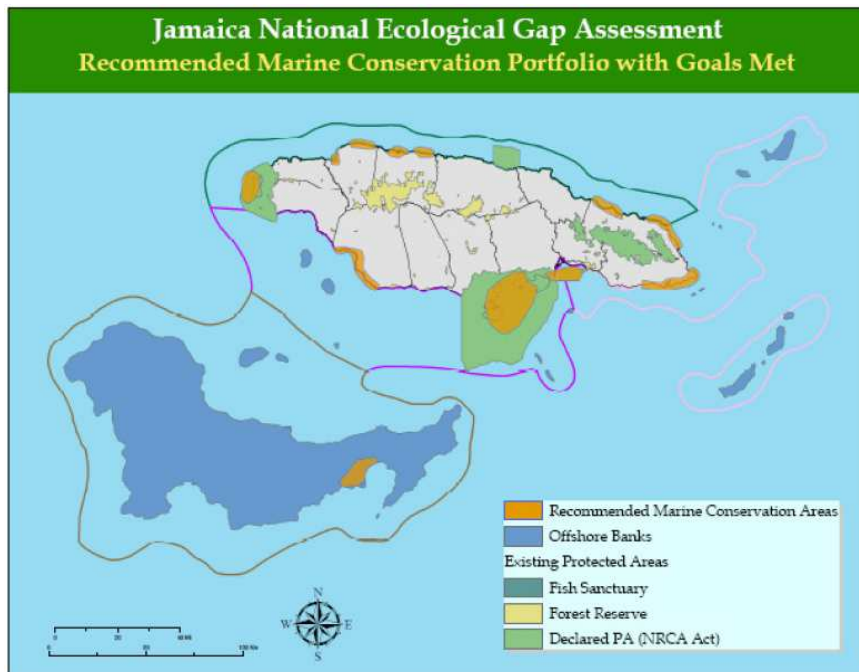
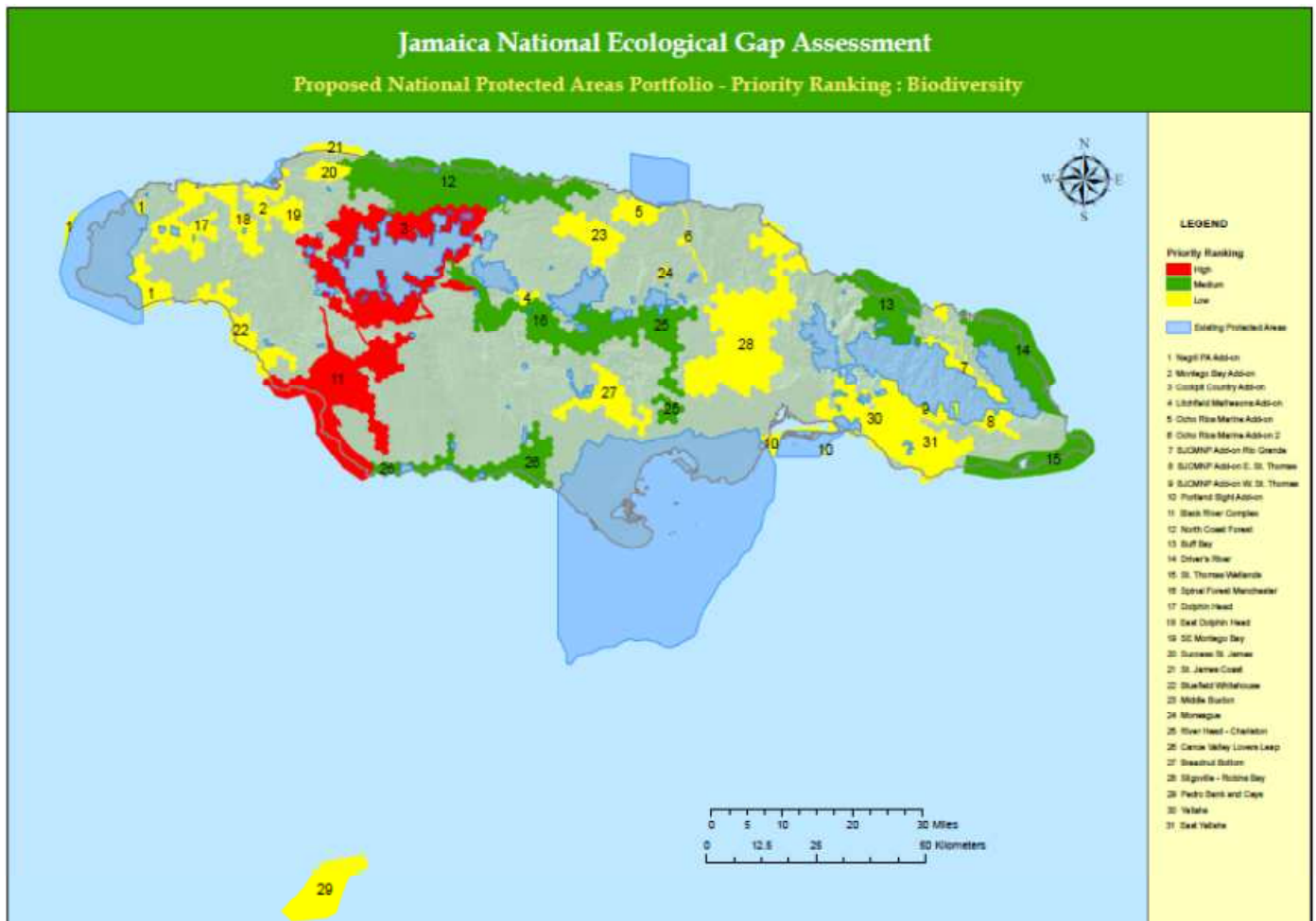
- Partial support is available from the GOJ and revenue is also generated through user fees. Additionally, entities seek additional funds from donor agencies. A Draft Financial Sustainability Plan for the Protected Areas System of Jamaica (2008) has been prepared. Protected area.

# PROTECTED AREAS SYSTEM



<p><b>National Parks</b> These are lands and/or sea managed mainly for the conservation of the ecological integrity of ecosystems. They are also managed for scientific research, education and recreation.</p>	<p>Marine Parks ————</p> <p>National Parks ————</p> <p>Protected Area ————</p> <p>Forest Reserves ————</p> <p>Proposed Protected Areas ————</p> <p>Negrit Protected ————</p>	<p>Parish Boundaries ————</p> <p>Town ————</p> <p>Game Sanctuaries/Reserves ————</p> <p>Protected Areas Under Beach Control Act ————</p>	<p>Coordinates in Jamaica Original System ———— 500000 E</p> <p>Coordinates in Jamaica Metric Grid (JAGS) System ———— 240000 E</p>
<p><b>Protected Areas</b> An area of land and/or sea dedicated to the protection and maintenance of natural and cultural values, and managed through legal or other effective means. These areas do not necessarily exclude industrial or any other type of economic activity.</p>	<p>Base map digitized by the Geographic Institute, St. John's, Barbados (1:50,000 scale). Topographic map data provided by the Geomatics Department, Government of Jamaica.</p> <p>Projection: Lambert Conformal Conic Central Meridian: 77° W    False Easting: 250 000 m One Parallel: 18° N    False Northing: 150 000 m Spheroid: CLARKE 1866</p>		 <p>1978-1998</p>  <p>TOGETHER WE PROTECT THE ECOSYSTEMS WE INHERIT</p> <p>33 Millers Road, Kingston 10, Jamaica. West Indies. Tel: 876-323-5121 Fax: 876-323-5125 e-mail: jnc@jnc.gov.jm</p>

Figure 2. Terrestrial and Marine Protected Areas of Jamaica



**Figure 3. Proposed Terrestrial and Marine Protected Areas of Jamaica**

*Source:* National Ecological Gap Assessment Report (2009)

#### **1.2.10.4 Ramsar Sites**

Jamaica has three Ramsar sites – the Black River Lower Morass (5,700 ha) which was declared in 1997, the Palisadoes-Port Royal Protected Area (7,523 ha) declared in 2005, and the Portland Bight Wetlands and Cays (24,542 ha) in 2006.

#### **1.2.10.5 National Consultations**

Areas of concern raised during national consultations include:

- inadequate funding for protected areas;
- lengthy process for delegation of the management of protected areas; and
- limited capacity of environmental NGOs and community groupings to effectively manage protected areas.

### **1.3 Tourism**

Jamaica is developing community-based nature and heritage tourism, and some examples of eco-tourism attractions are :

- Black River Safari;
- Blue Mountain Flora & Faunal Hike;
- Boone Hall Estate;
- Grand Valley Tours;
- Mavis Bank Community Tour;
- Mt. Charles Birding and Nature Walk;
- [Flagstaff Heritage Tour and Trail](#); and
- Buff Bay Valley – The Heritage Corridor of the Blue Mountains.

The Green Globe Certification Scheme was introduced through the USAID Environmental Audits for Sustainable Tourism (EAST) Programme. A Green Globe certification demonstrates a commitment to the environment, sustainable operations and management. (

Green Globe Certification Scheme began in 1997 as a demonstration of the benefits of improved environmental management in the hotel and manufacturing sectors. The first phase included the undertaking of environmental audits, training in environmental management systems (EMS), and supplying environmental equipment for 14 small hotels in Negril. This was soon extended to include Port Antonio, Montego Bay, Ocho Rios and the South Coast Region (Environmental Audits n.d).

Through the EAST programme, which ended in 2005, the first four hotels, the first attraction (Green Grotto) and the first hotel training institution in the world were Green Globe 21 certified. Jamaica was the first country to publicly endorse the Green Globe Certification as the official certification programme for the country (PIOJ 2005).

The Master Plan for Sustainable Tourism Development (Tourism Plan) (2001-2010) recommends that the Tourism Product Development Company (TPDCo) provides matching grants for hotels to undertake environmental audits and this has not been implemented. However TPDCo's inspectors have been trained to conduct environmental audits and assessments for hotels and attractions and continues to conduct operations audits for entities seeking incentives under the Hotel and Attraction Incentive Programme.

Jamaica is also involved in the Blue Flag Eco-Certification Scheme for Beaches and Marinas, a sustainable management programme that certifies beaches/marinas that adhere to strict criteria dealing with water quality, environmental education and information, environmental

management, and safety and other services. Jamaica was selected along with Puerto Rico, the Dominican Republic, Venezuela and the Bahamas to be part of a pilot project for the Caribbean Hotel Association/Caribbean Alliance for Sustainable Tourism (CHA/ CAST) Caribbean Blue Flag Scheme. The award, a Blue Flag, is given annually to beaches and marinas that satisfy 4 main criteria.

Four pilot sites received Blue Flag certification in 2004. Five certified facilities applied for re-certification for 2005-2006: one marina and four beach properties, including a public beach (PIOJ 2004; PIOJ 2005). Currently, there are five Blue Flag certified beaches (all in Negril – Coco la Palm, Couples Beach (Bloody Bay), Couples Swept Away, Merrills 1 and Merrills 2), and one marina (Errol Flynn Marina in Portland) in Jamaica.

### ***1.3.1 Carrying Capacity***

In 2004, the Ministry of Industry and Tourism and TPDCo awarded a contract for a study to determine the capacity and safety in selected marine recreational areas in Jamaica. This was done in collaboration with NEPA, the Port Authority and USAID. The first phase of the study included capacity assessment studies for the resort areas of Negril, Ocho Rios and Port Antonio while the second phase included similar studies for Montego Bay, Lime Cay/Port Royal and Black River (PIOJ 2004; PIOJ 2005). The study which was completed in 2005 is now being used to craft a policy which will address the capacity and safety in marine recreational areas in Jamaica. As recommended in the Tourism Master Plan, the Ministry of Tourism is working with marine parks to bring about more effective management to the parks. The Tourism Enhancement Fund (TEF) has provided financial support to the Montego Bay Marine Park to implement measures aimed at improving environmental management.

### ***1.3.2 National Consultations***

During national consultations stakeholders expressed the concern that while additional hotels have been built during the period, housing has not been provided for additional support staff, which has resulted in an increase in informal settlements. Also, sewage treatment plants have not been upgraded to adequately process increased sewage being generated.

## **1.4 Enforcement Statistics**

Under the Permit and Licence Regulations (1996) NEPA has the responsibility to issue environmental permits and licences for developments within the country. This gives NEPA the ability to regulate the impacts (environmental, physical) of developments by prescribing specific conditions under which the developments are to proceed. An Enforcement branch was established in NEPA to monitor pre and post permit activities.

During the period of review, the Enforcement Branch conducted many monitoring activities which included but was not limited to:

- NEPA Permits and Licences;
- Game Bird Shooting;
- monitoring of Fishing Beaches for violation of Close Seasons for Conch and Lobster; and
- North Coast and other Highway Improvement Projects.

Table 6 shows data for the period 2005 – 2009 obtained from NEPA's Enforcement Branch.

**Table 6. NEPA's Enforcement Statistics for 2005 – 2009**

Category	2005 - 2006	2006 - 2007	2007 - 2008	2008 - 2009
Routine monitoring/investigations	2,269	2,377	1,827	2,017
Post Permit/Licence Monitoring	2,594	2,121	1,381	2,007

During national consultations stakeholders identified the following areas requiring improvement:

- enforcement by NEPA;
- EIA requirements and post-permit monitoring; and
- the number of staff with expertise to review and monitor.

## 1.5 Trends

In Vision 2030 Jamaica (2009e), negative trends identified include:

- deteriorating air and water quality;
- poor waste management – solid, liquid, and hazardous;
- loss of biodiversity;
- watershed degradation;
- net loss of forest cover;
- increasing incidence of forest fires; and
- loss of wetlands.

It states that there were serious gaps and a lack of time-series data for quantitative indicators that could be used to, "spot emerging problems, and assess policy options and gauge the effectiveness of environmental programmes."

## 1.6 Main Threats/Constraints to Biodiversity Conservation and Sustainable Use

### 1.6.1 Natural Threats

The location, geography and geology of Jamaica make it prone to natural hazards such as hurricanes, storm surges, floods, landslides, earthquakes, and droughts.

#### 1.6.1.1 Invasive Species

There is a listing of invasive species occurring in Jamaica in the online database developed in 2006 through the IABIN Invasive Species Network and managed by the Ja CHM (see [www.jamaicachm.org](http://www.jamaicachm.org)). The invasive species list for Jamaica includes 40 plants and 46 animals. There are pilot projects planned for the Portland Bight Protected Area, and the Black River Lower Morass (Ramsar site) as part of a regional invasive species project which commenced in 2009. The project in the Portland Bight area aims to monitor and selectively eradicate vertebrate predators that may attack the critically endangered Jamaican Iguana (*Cyclura collei*), as well as protect the habitats of nesting sea birds and turtles that use the nearby cays. The second pilot project will be the rehabilitation of the Black River Lower Morass by the control of two invasive plants species (*Alpinia allughas*, and *Melaleuca quinquenervia*) and two fresh-water invasive animal species Australian Red Claw Crayfish, and the freshwater Suckermouth Catfish (*Cherax quadricarinatus*, and *Pterygoplichthys paradalis*, respectively) which have had negative effects on native species, as well as affecting the hydrology and structure of the wetlands.

Two marine invasive species are the Lion fish (*Pterois volitans*) and the Green mussel (*Perna viridis*). The Lion fish is currently the focus of a pilot control programme in Jamaica because of the potentially devastating effect it may have on the marine ecosystem, particularly on Jamaica's



fisheries industry which is vulnerable. The US Geological Survey Non-indigenous Alien Species (NAS) website shows a regional [map](#) of sites where the lion fish is established, and data shows that the lion fish has become established in waters around Jamaica, including the Pedro Banks. Some invasive species that are agricultural pests are the Pink Mealy Bug, Citrus Greening, Lime Swallowtail Butterfly, and Red Palm Mite.

Invasives which were mentioned in Jamaica's Third National Report include the native invasive vampire fern, *Dicranopteris sp.*, the Australian Red Claw Crayfish (*Cherax quadricarinatus*), and *Pittosporum undulatum*, and the white-tailed deer (*Odocoileus virginianus*). The JCDT in the period 2005 - 2009 has treated approximately 9 ha for *P. undulatum* at Cinchona, Holywell, and the Blue Mountain Peak Trail. The JCDT has not implemented an eradication exercise for the white-tailed deer which although it has become established in a small part of Portland, has not penetrated the forests of the Blue and John Crow mountains but is reported to be a nuisance to farmers in lower altitude areas outside of the BJCMNP (Chai 2007).

Jamaica is preparing an IAS Strategy and Action Plan which will:

1. work within existing international agreements to develop Jamaica's national IAS strategy that is compatible with these agreements;
2. develop a strategy that is scientifically-based and utilizes the best knowledge (science-based prioritization of invasive species problems);
3. adopt an adaptive management approach that incorporates and continually improves on policies and practices by learning from the outcomes of operational programmes;
4. cooperate at all levels of government, industry, and non-governmental organizations within Jamaica and globally (an improved system of accountability);
5. engage the public and encourage universal stewardship; and
6. respect the rights of the people and others and integrate traditional knowledge with other sources of knowledge to address the threat of IAS.

#### **1.6.1.2 Marine Diseases**

Coral diseases affecting populations of the most important reef building coral species are widespread throughout the Caribbean (Creary 2008). It is believed that the increased frequency of epizootic events and the emergence of new diseases can be correlated with the deterioration of the marine environment (Creary 2008). The five main diseases and syndromes affecting reef building corals in the Caribbean are White Plague, White Band Disease, Black Band Disease, Yellow Band Syndrome, and Dark Spot Syndrome (Creary 2008).

#### ***1.6.2 Anthropogenic Threats***

Anthropogenic threats to biodiversity conservation and sustainable use include deforestation and removal of riparian vegetation, mining, nutrient loading, watershed degradation, unsustainable harvesting of freshwater biodiversity, land run-off, coastal erosion, coastal development, squatting, over fishing, oil spills, poor physical planning, land clearing for housing, slash and burn cultivation, and pollution from chemicals, fertilizers, and solid waste (NEGAR 2009; PIOJ 2009e).

##### **1.6.2.1 Threats and Concerns Highlighted During National Consultations**

In national consultations, threats mentioned were:

- the construction of cell sites - leads to deforestation of the site, and the construction of access roads;

- large-scale tourism developments - particularly on the south coast were highlighted as a major threat to biodiversity loss. Mention was also made of land reclamation activities, particularly in mangrove areas;
- improperly treated sewage discharged from large coastal developments;
- solid waste generated by hotels is considered to be unsustainable;
- beach erosion;
- poor planning;
- fragmentation of ecosystems; and
- importation of potentially invasive plant species for landscaping.

Areas, which are considered under threat by stakeholders, are Rio Bueno (last remaining stand of relatively intact dry limestone forest on Jamaica's north coast), Font Hill (globally important bird habitat), Canoe Valley (wetlands), Braziletto Mountains, Black River Lower Morass, Palisadoes-Port Royal area, Pear Tree Bottom and Cockpit Country. These areas are considered to be areas of high biodiversity, and in the cases of Port Royal and Canoe Valley, historical sites as well, and should be preserved.

Another issue of concern was the lack of and poor coordination and communication between government agencies/ministries and Environmental NGOs.

Stakeholders believe that the use of agricultural lands for housing contributes to flooding, and that mined out areas are no longer suitable for agriculture, even with the use of chemical fertilizers, and that there was a need for more rehabilitation by the bauxite companies.

### ***1.6.3 Climate Change***

The report "Development of a National Water Sector Adaptation Strategy to address Climate Change in Jamaica"<sup>1</sup>, (Environmental Solutions Ltd.2009) on the development of a water sector adaptation strategy to climate change identified as likely impacts to the water sector by the end of the century:

- increasing length of the dry season but increased frequency of intense rains which is likely to result in high sediment loads;
- the likely increase in frequency of high intensity rainfall events will increase the frequency of the occurrence of landslides and floods;
- increased frequency of more intense rainfall events will accelerate sediment erosion, movement and transport within basin river systems;
- the likely increase in climatic variability will increase the vulnerability of the agricultural sector; and
- sea level rise is expected to increase by between 0.18 m and 0.59 m by the 2090's (IPCC 2007). Other projections have estimated up to 1.4 m over the same period.

It further states that it is likely that climate change will result in the following impacts and vulnerabilities in the four main flooding regions of Jamaica:

- Eastern Jamaica (Blue Mountains): projected increase in frequency of high intensity precipitation events will increase frequency of occurrence of landslides and floods;
- Central Jamaica: likely that severity of tropical storms and hurricanes will increase, therefore likely that threat from flooding due to these events will increase;
- Western Jamaica (Karst regions): projected increase in frequency of high intensity precipitation events will increase frequency of occurrence of floods; and

---

<sup>1</sup> Mainstreaming Adaptation to Climate Change Project

- Coastal Areas: projected sea level rises of 0.18 m – 0.59 m by 2090 will result in most coastal communities within the 0.6 m – 1.4 m above current sea level being inundated.

Other possible impacts of climate change are (PIOJ 2009f):

1. declines in agricultural yields due to sea-level rise, and seawater intrusion;
2. severe repercussions on the tourist industry – acceleration of erosion and flooding, causing loss of beach, infrastructural damage etc.; and
3. death of corals due to increased sea surface temperatures.

According to the PIOJ (2009f), approximately 82% of the Jamaican population lives along the coastline, and therefore coastal hazards, such as storm surges, will have a significant impact on the social and economic well being of the country. The impacts of climate change will be magnified by activities such as deforestation, over-fishing, and mining (PIOJ 2009f).

### **1.6.4 Constraints**

Jamaica's debt to GDP ratio is over 100%, in 2008, for example, it was 128%. Debt servicing in 2009 will account for 47% of the budget (JIS 2009c). This leaves very little money for infrastructure and social programs, and by extension, for biodiversity conservation. Most of Jamaica's foreign exchange is earned from tourism, remittances, and bauxite/alumina (mining).

Tourism has been one of the main contributors to the degradation of the island's wetlands and mangroves, destruction of marine habitats, and damage to reefs (PIOJ 2009e). The discharge of sewage into off-shore areas causes algal blooms which kill coral leading to loss of biodiversity, reduced sand production, and beach erosion (Goreau 1992a; Goreau 1992b; Goreau and Goreau 1996). Mining, particularly bauxite mining, has been a major contributor to deforestation, loss of biodiversity, dust and noise pollution, land and groundwater pollution, and beach erosion (; PIOJ 2009d). However, the two represent the majority of Jamaica's source of foreign exchange, this, along with the high debt to GDP ratio presents a dilemma – how to finance the budget, and pay the debt without further detrimental effects to the environment.

In addition, the global recession has resulted in increased unemployment in Jamaica, particularly in the mining sector which saw a decline of 50.2% in 2009 (PIOJ 2009c). The average unemployment rate in 2009 was 11.4%, an increase of 0.8% (PIOJ 2009c).

Government agencies involved in biodiversity conservation were asked what they saw as constraints to their work and Table 7 shows the responses received.

**Table 7. Constraints Identified by Government Agencies to Biodiversity Conservation and Sustainable Use**

<b>Government Agency</b>			
<b>Constraint</b>	<b>Fisheries</b>	<b>Forestry</b>	<b>IOJ - NHMJ</b>
Lack of/Limited Public Awareness of/Education on/Indifference to Importance of Conservation and Sustainable Use	X	X	X <sup>a</sup>
Lack of Coordination	X	---	---

<b>Government Agency</b>			
<b>Constraint</b>	<b>Fisheries</b>	<b>Forestry</b>	<b>IOJ - NHMJ</b>
Lack of/Inconsistent/Limited Inter-agency Cooperation	---	---	X
Lack of Comprehensive Legislation	X	---	---
Lack of/Inconsistent Enforcement	X	X	---
Lack of Human Resources/Training in Agencies	X	---	---
Squatting	X	X	---
Non-sustainable land use practices	---	X	---
Over-grazing by Livestock	---	X	---
Lack of Finances	X	X	X <sup>b</sup>
Conflicting/Overlapping Roles	---	X	---
Lack of Information	---	---	---
Improper waste disposal	X	---	---
Improper mineral exploitation	---	---	---
Improper Planning	---	---	---
Lack of/Inconsistent Monitoring	X	---	---
Lack of Human Resources for Long-term Conservation	---	---	X

<sup>a</sup>Improvement in last 6 years among environmental sector and NGOs but many of rural communities still not sensitized.

<sup>b</sup>Greatest constraint

From the responses obtained, lack of, or limited public awareness of the importance of biodiversity conservation and sustainable use, and a lack of finances are the constraints being experienced by the government agencies that responded. Some agencies rely on external funding in order to implement projects, for example, The Nature Conservancy/RARE has approved US\$20,000 for the Palisadoes-Port Royal Conservation Campaign; GEF provided US\$48,000 for capacity building of, and sensitization about the IOJ's JA CHM.

A constraint to biodiversity conservation is the paucity of baseline data on terrestrial and marine species in Jamaica and its waters. There is limited data on fungi and lower plants such as mosses.

Vision 2030 Jamaica (2009e) has identified that the current environmental legislation provides a basic framework for conservation and sustainable development. The focus of this framework is on mitigating the impact of activities and on establishing protected areas, which is only part of the need for conservation of biodiversity and ecosystems (PIOJ 2009e). As a result, biodiversity is still lost, and unsustainable use occurs (PIOJ 2009e).

## **1.7 Implications of Changes**

Air, water, and solid waste pollution are contributory factors to population health including; the development and spread of diseases, maintenance and proliferation of disease vectors, reduction in potable water, and loss of biodiversity.

Deforestation, particularly in upper watershed areas will lead to a reduction in water supply, increased soil erosion and land slippage particularly, on steep slopes, siltation of rivers, reservoirs, dams, harbours, and flooding.

Climate change may result in sea levels rising endangering coastal communities, warming temperatures, and decreasing summer rainfall, and the intensity of hurricanes may increase.

## Chapter 2. Current Status of Implementation of National Biodiversity Strategies and Action Plans

### 2.1 An Overview of the NBSAP

Jamaica's NBSAP, developed to fulfill Article 6 of the Convention, was completed in 2003. The NBSAP identified eight high priority project profiles, and nine medium priority project profiles (see Table 8 below). Since 2003, 13 of the project profiles either have been completed, or are at various stages of completion, and or implementation. Other activities that are not identified in the NBSAP Action Plan, but contribute to the listed NBSAP project areas have been included. For this purpose, the project title in the Action Plan will also be considered as a programme area.

**Table 8. Status of NBSAP Project Profiles**

Ranking	#	Project Profile/Programme Area	Status
High Priority	1	Establishment of National Biodiversity Secretariat	Established, but existed for only 1.5 years; due to lack of funding for staff.
	2	Preparation for the Declaration of Protected Areas: Black River, Mason River, Port Antonio, Dolphin Head, Cockpit Country, and Rozelle/Rozelle Falls	The Mason River Reserve was declared a protected area in the period 2005 - 2009.
	3	Rehabilitation of Coral Reef Ecosystems	<p><b>OTHER ACTIVITIES</b></p> <p>The Montego Bay Marine Park is involved in coral reef restoration by using "coral gardening" for outplanting.</p> <p>The CMS of UWI is conducting/has conducted projects on:</p> <ul style="list-style-type: none"> <li>• <b>Restoration of Coral Reefs in Jamaica, West Indies; Practicing Novel Measures for Reef Management.</b></li> <li>• <b>Enhancing Coral Reef and Fish Habitat Through Coral Restoration</b> – the Coral Reef Recovery Project seeks to facilitate reef recovery by deploying a new design of artificial reef module as the first component of a two-part strategy. The creation of suitable coral and fish settlement habitat combines with a second element – transplanting coral onto this artificial reef structure.</li> </ul>

Ranking	#	Project Profile/Programme Area	Status
			<p><b>Best Strategies for Determining Coastal Habitat Health Status and Priorities for Impact Mitigation and Ecosystem Restoration</b> - this project also monitors a relatively pristine coral reef area; a nearby hotel development site and a cruise ship port construction site that involves coral relocation as mitigation for the dredging needed to develop the port area.</p> <ul style="list-style-type: none"> <li>• <b>Rackham's Cay Cut Face Monitoring for Coral Recruit Recovery</b> – this project looks at the re-colonisation of the cut face for biological recovery.</li> </ul>
	4	Reduction of Pollutants in Freshwater and Marine Environments	<p><b>ONGOING ACTIVITIES</b></p> <p>The JCDT monitors the water quality of 6 major rivers at sites within and outside of the BJCMNP.</p> <p>NEPA continually monitors coastal water quality in specific sites around the island, e.g. Kingston Harbour, Hellshire and Hunt's Bay.</p>
	5	Preparation of an Alien Invasive Species Management Strategy	<p>Ongoing regional project in which Jamaica is one of the participating countries. Three pilot projects have been identified, see Chapter 1, <a href="#">Section 1.5.1.1</a> and below:</p> <ul style="list-style-type: none"> <li>▪ <b>Management and Control of the Lionfish <i>Pterois volitans</i> and <i>Pterois miles</i> in Jamaica</b> – The Discovery Bay Marine Lab is the lead agency for the Lionfish Project for Jamaica. The project will examine the islandwide distribution; prey preferences; development of a passive capture mechanism; development of a management plan; and public education.</li> </ul> <p><b>OTHER ACTIVITIES</b></p> <p>The CMS of UWI is conducting projects on:</p> <ol style="list-style-type: none"> <li>1 <b>Oceans Under Threat: A Study of Ballast Water Stowaways in Jamaican Harbours</b> – The main components of the project include sampling and analyses of ballast; identification of species in ballast water, particularly marine invasive species; a public education programme; increasing the</li> </ol>

Ranking	#	Project Profile/Programme Area	Status
			<p>level of capacity for ballast water sampling and analyses in Jamaica; providing technical guidance for ballast water legislation by the Maritime Authority of Jamaica.</p> <p>2 <b>The Use of Oceanography and GIS to Manage the Release and Uptake of Ballast Water in Major Bays in Jamaica</b> – the project aims to identify and map zones within and around Kingston Harbour and Montego Bay for release of ballast water taken up from international ports.</p>
	6	Implementation/Preparation of Recovery Strategies for Critically Endangered Species	<p>Being implemented by NEPA.</p> <p><b>OTHER ACTIVITIES</b></p> <ul style="list-style-type: none"> <li>▪ The JIGR is implementing recovery strategies for the Jamaica Iguana.</li> <li>▪ The Negril Area Environmental Protection Trust (NEPT) is implementing a project for the conservation and management of endemic and endangered species of the Negril Royal Palm Reserve through habitat improvement and interpretation.</li> </ul>
	7	Preparation of Policies and Legislation to Facilitate Access to Biological Resources and Equitable Benefit Sharing	An assessment of the policies and legislation is being conducted as part of a GEF/UNDP/NEPA/IOJ project.
	8	Sensitisation of the Judiciary and Training for Customs and Immigration Officers and the Constabulary	Implemented by NEPA and ongoing.
Medium Priority	9	Financial Sustainability of Protected Areas	Review of current strategies for funding protected areas and needs assessments has been done as part of the Protected Areas System Master Plan project.
	10	Rehabilitation of Degraded Forests	<p>Lack of funding has prevented implementation by the FD, however the FD continues to provide planting material to persons/institutions.</p> <p><b>OTHER ACTIVITIES</b></p> <p>The Portland Environment Protection Association is implementing a Mangrove Habitat Conservation and Endemic Species Protection Programme.</p>



Ranking	#	Project Profile/Programme Area	Status
	11	Development of Sustainable Fisheries: 'Development of a Policy Framework and Strategic Plan for Sustainable Fisheries in Jamaica',	<p>Development of a policy framework, aimed at achieving growth and sustainability in the local fishing sector. "in 2005-2007. The draft document titled: Policy Framework and Strategic Plan for Sustainable Fisheries in Jamaica", was presented in a series of public consultations in 2007-2008. Some refinement is being done by the relevant Ministry.</p> <p>The Draft Fisheries Bill is currently with the Chief Parliamentary Counsel. The Bill is expected to be tabled in parliament in the 2010/2011 Financial year.</p> <p><b>OTHER ACTIVITIES</b> The Department of Life Sciences, UWI, has completed a project which investigated the sustainability of the mangroves and seagrass beds of Kingston Harbour as nursery grounds for fishable organisms.</p>
	12	<p>Development of Sustainable Forestry</p> <p>a) Island-wide Orchid Survey</p> <p>b) Island-wide Lignum Vitae Survey</p>	<p>Some elements of this programme area have been incorporated into the regular work of the Forestry Department.</p> <p>a) NEPA and the UWI have begun work on this project.</p> <p>b) NEPA has conducted a paper-based survey.</p> <p><b>OTHER ACTIVITIES</b> Capacity building for three LFMCs in the Cockpit Country Forest Reserves.</p> <p>Through support from a GEF Small Grants Project, the Southern Trelawny Environmental Agency implemented a project on conserving Cockpit Country Biodiversity through sustainable development,(2006-2007).</p>
	13	Preparation of Ecological Zonation Plan and Land Use Plans for Declared Protected Areas	<p><b>Montego Bay Marine Park</b> In 2009, NEPA conducted an assessment of the natural resources in the marine park and recommendations for zoning were developed. During that year, user group questionnaires were prepared and user group surveys were conducted to inform the process of developing recommendations for zoning.</p> <p><b>Negril Marine Park</b> User group questionnaires were prepared and user group surveys were conducted to inform the process of developing recommendations for zoning the Negril Marine Park.</p>

Ranking	#	Project Profile/Programme Area	Status
			<p><b>Palisadoes-Port Royal Protected Area</b>            In 2009, NEPA conducted an assessment of the natural resources of the marine component of the protected area and recommendations for zoning were developed. The preparation of the first draft of the Preliminary Zoning Plan for the Palisadoes-Port Royal Protected Area commenced in 2009 incorporating <i>inter alia</i> the results of the assessment conducted.</p>
	14	Development of Natural Products Industry, Sustainable Use of Medicinal and Aromatic Plants and the Establishment of <i>In-situ</i> and <i>Ex-situ</i> Collections	<p>The Biotechnology Centre, UWI, has been conducting work on natural products and has established an <i>ex-situ</i> collection of medicinal plants. The Biotechnology Centre has produced and disseminated monographs of Medicinal Plants. There is also a Natural Products Institute at UWI.</p> <p>The Biology Division of the University of Technology, Jamaica, is implementing a project on DNA fingerprinting of Jamaica's Endemic Medicinal plants.</p>
	15	Development of Regulatory and Administrative Measures to Control the Safe Handling and Use of Living Modified Organisms (LMOs) – Biosafety Framework	<p>Initiated by NEPA. A Draft National Biosafety Policy has been developed along with preliminary drafting instructions.</p>
	16	Expansion of the National Clearing-House Mechanism	<p>Being implemented by the Natural History Division of the IOJ and is expected to be completed by June 2010. A National Clearing-House Mechanism Steering Committee has been established.</p> <p>Activities completed include:            Sensitization workshops have been held to identify data providers and data.            A system of data transfer to the JA CHM has been established. Data is submitted in the form of reports, information and articles.</p> <p>Creation of digital format for data gathered (e.g. purchase of GIS software - ArcGis 9.2 and 9.3). Computer systems hardware and training acquired.</p> <p>The Regional metadata project was not implemented by IABIN as the project direction changed to setting up 5 thematic networks. The invasive species network, in which Jamaica participates through the JA CHM, has developed a metadata set.</p> <p>An Invasive species in protected areas brochure has been developed.</p>

Ranking	#	Project Profile/Programme Area	Status
	17	Development of Increased Resource Management Capacity	NEPA has trained staff members in project monitoring and evaluation. A toolkit is being prepared on natural resource evaluation as part of a GOJ/ GEF/UNDP/UNOPS project on the valuation of natural resources in protected areas.
Low Priority	18	Involvement of Private Landowners in Protected Area Management	Forestry Department has involved private landowners in protected area management
	19	Declaration of Forest Reserves	Three have been declared for the period 2005 – 2009.
	20	Regulation of Collection and Harvesting of Wild Fauna and Flora	There are no existing regulations for domestic trade, or the emerging trade in species or by-products, but in the drafting instructions for the new Wildlife Act, there are regulations which will address these areas.
	21	Establishment of Three Plant Rescue Centres	No national plant rescue centres have been established.
	22	Implementation of the Ocho Rios Marine Park Management Plan	NEPA has conducted water quality monitoring in the Ocho Rios Marine Park as part of its Routine Water Quality Monitoring Programme and Coastal Water Quality Monitoring Programme since April 2008, however, there is yet no approved Management Plan..
	23	Development and implementation of Criteria for Sustainable Use of Resources	NEPA is implementing the GOJ/GEF/UNDP Project, "Incorporating natural resource valuation tools into environmental impact assessment procedures" The objective of the project is to develop a set of natural resource valuation tools, and incorporate these into the policies and procedures governing the preparation and use of EIAs.  <b>OTHER ACTIVITIES</b> The CMS of UWI is implementing a project on: <ul style="list-style-type: none"> <li>• <b>Development of Best Practice Strategies for the Use of Scuba Gear in Fisheries Exploitation,</b> a community based fisheries education programme to promote sustainable fishing practices in Jamaican waters</li> </ul>
	24	Sustainable Management of Game Bird Populations	Implemented by NEPA.

Ranking	#	Project Profile/Programme Area	Status
	25	Sustainable Management of Bat and Dolphin Species	<p><b>Dolphins</b> In February 2004 a preliminary survey of the Bottlenose Dolphin was conducted to assist in providing an estimate of their abundance in Jamaica's waters. This arose from reports by fishers in Whitehouse, Westmoreland, who complained that dolphins were interfering with their fish pots and requested permission to capture them. In addition to the survey conducted, one person was trained in the survey technique.</p> <p>A draft Dolphin Policy has also been developed which is presently going through the public consultation phase.</p> <p><b>Bats</b> NEPA has been conducting bat species and cave roost reconfirmation since 2006. The Jamaica Caves Organisation has assisted with reconfirming bat cave roosts. Distribution maps have been developed based on information from the literature and data collected up to 2006.</p>
	26	Promotion of Sustainable Tourism Practices	<p>The Ministry of Tourism continues to promote "Eco-Tourism Ventures".</p> <p><b>OTHER ACTIVITIES</b></p> <ul style="list-style-type: none"> <li>▪ Sambo Hill Trekking Tour project in the Charles Town, Buff Bay area of Portland – Charles Town Maroon Council, (2007-).</li> <li>▪ Spring Bank Conservation and Eco-tourism project – Port Morant Development Area Committee, (2007-).</li> </ul>
	27	Development of a Sustainable, Community Based Management Plan for the Yallahs Lagoon Ecosystem	A GOJ/GEF/IDB project for the Hope/Yallahs Watershed Management is being developed.
	28	Protection of Traditional Knowledge and Creation of a Traditional Knowledge Register/Library.	<p>Some elements of this profile have been addressed in the UNDP-GEF Enabling Activities Add-on Project "Assessment of Capacity Building Needs, Preparation of the Third National Report (CBD) and the Clearing House Mechanism aka the Biodiversity Add-On Project" executed by the IOJ and NEPA using data from the Memory Bank housed at the IOJ-African Caribbean Memory Bank.</p> <p>The project output will include, <i>inter alia</i>, preservation of indigenous knowledge; and intellectual property as it applies to genetic resources and indigenous knowledge, and a legal overview of biodiversity related laws.</p> <ul style="list-style-type: none"> <li>•</li> </ul>

Ranking	#	Project Profile/Programme Area	Status
	29	Public Education on the Safe Handling and Use of Living Modified Organisms (LMOs)	Sensitization workshops, training and a brochure on biosafety were developed under the biosafety capacity building project implemented through the JA CHM.
	30	Institutional Capacity Building for Risk Assessment and Management of Living Modified Organisms (LMOs)	Little progress.
	31	Human Resources Development in Identification, Conservation and Sustainable Use of Genetic Resources	<p>MoAF trains their plant protection officers in plant pests.</p> <p>Food Storage and Prevention of Infestation Division (FSPID) provides training to their staff members in pests in stored products.</p> <p>Training has been conducted on identifying organisms in ballast water.</p>
	32	Establishment of the Jamaica Protected Areas Biological Database	<p><b>OTHER ACTIVITIES</b></p> <p>The CMS has created a searchable database which contains a list of all the research projects on the coastal and marine environment conducted at UWI. The CMS hopes to expand the database to include published research and grey literature (EIAs, technical reports etc.).</p>
	33	Repatriation of Indigenous Biodiversity Information	The NHMJ has explored the possibility of Jamaica becoming a member of the Global Biodiversity Information Facility (GBIF) which is one means of facilitating data repatriation, however the cost has been prohibitive.
	34	Protected Areas Public Education/Information Programme	The JA CHM has protected areas information on its webpage and has produced a brochure with the JCDT on invasive species in protected areas. The JCDT has an ongoing schools programme which now includes basic schools. The Dolphin Head Trust has developed and implemented an area-specific environmental education and awareness programme.

Ranking	#	Project Profile/Programme Area	Status
	35	Develop and Expand Existing Environment Education Programmes and Exhibits in the Royal Botanical Gardens, including Hope Zoo	No information.
	36	Build on Existing Regional Data and Information Exchange Mechanism	<p><b><u>IOJ/NHMJ</u></b></p> <p>Procedures and agreements for data access and use have been developed through participation in IABIN thematic network projects. Guidelines for use of JA CHM online data and information are being developed.</p> <p>Data and information priorities and needs have been identified.</p> <p>The UWI Department of Life Sciences and the IOJ/NHMJ launched a Jamaica Virtual Herbarium project UWI/IOJ (2009).</p> <p>Metadata databases have been developed for a biodiversity literature catalogue and indicators of information technology priorities, needs and impacts have been identified.</p> <p>A directory of biodiversity research and management resource persons has been produced. Also, a list of invasive species has been developed .</p> <p><u>The Coastal and Marine Atlas of Jamaica</u></p> <p>A Coastal and Marine Atlas of Jamaica is being developed through The Caribbean Marine Atlas Pilot Project which is a joint initiative of 9 countries in the Caribbean (Barbados, Cuba, Dominica, Grenada, Guyana, St. Lucia, Trinidad &amp; Tobago, Turks and Caicos Islands and Jamaica). The purpose of the atlas is to identify, collect and organize geo-spatial datasets on the coastal and marine environment for the Caribbean region. This is to act as a support for sustainable development and integrated management of marine and coastal areas in the Caribbean region. This is a web-based database. NEPA has a "rudimentary" atlas which is based on information in the agency. The next step is to incorporate data from other organizations.</p>

Ranking	#	Project Profile/Programme Area	Status
			<p><u>CARIPESTNET</u> The electronic pest information network provides pest identification and free management recommendations through the expertise of numerous specialists globally.</p>
	37	Promotion of a Mechanism for Regional Technical and Scientific Co-operation	No information.

Implementation of the NBSAP began in March 2003 with the formation of a National Biodiversity Secretariat to implement and monitor the NBSAP. The Secretariat was established for 1 1/2 years and it developed and sought funding for fifteen project profiles, but only six were funded. A review of the gaps or challenges identified in the NBSAP was conducted, and the Secretariat determined that a number of organisations/ institutions were implementing activities to close these gaps. Some of the gaps and challenges are provided below with outcomes and obstacles identified, (Table 9).

**Table 9. Examples of Some of the Gaps/Challenges Identified in Jamaica's NBSAP and the Status of Implementation and Obstacles**

Element	Gaps/Challenges	Status of Implementation
Socio-economic	Developing effective mechanisms to actively engage communities in the decision-making process.	NEPA has established a process for public consultation with regards to Environmental Impact Assessments and Development Orders.
	Expanding the agricultural services provided to farmers particularly in the area of modern farming techniques.	<p>In addressing the provision of better information for farmers 60 new Rural Agricultural Development Authority extension officers have been added to the field staff complement, bringing the total complement to 98. This included the addition of Parish Marketing and Livestock officers.</p> <p>The number of farmer trainings in Integrated Pest Management (IPM) have been increased.</p> <p>Extension staff have been:</p> <ul style="list-style-type: none"> <li>▪ trained in use of modern technologies such as : green house, on-farm water management, GIS/GPS, apiculture, organic agriculture, and backyard garden.c; and</li> <li>▪ equipped with several tools/equipment for improved efficiencies.</li> </ul>

Element	Gaps/Challenges	Status of Implementation
		<p>Information Communication Technology (ICT) capabilities for staff have been improved such as Cell phones and laptops</p>
	National Agricultural Disaster Risk Management Programme	<p>Starting 2008, the project, TCP/JAM/3202 (D) – National Disaster Preparedness and Emergency Response Plan for the Agriculture Sector – has been working to help Jamaica develop an Agricultural Disaster Risk Management (ADRM) plan as a component of the island’s overall Disaster Risk Management Plan. This Technical cooperation project has also helped to identify a number of ‘best practices’ and mitigation measures that farmers can put in place to minimize the impact of hurricanes on their farming systems. The CSDI is looking at assisting with the production of a video tech pack to promote these best practices on-farm.</p> <p>Under this initiative, training has been provided to staff of the Rural Agricultural Development Authority (RADA), the Ministry of Agriculture (MOA) and related partner organizations in Livelihood Assessment (LA) methodologies. This training will help Agricultural Extension Officers (AEOs) and others to complete LA baseline assessments in advance of potential Climate Change disasters, and will also help them to more effectively do initial LA assessments and detailed assessments in the event that disasters occur.</p>
National Biosafety Policy and Legislation	Developing risk assessment and management capabilities.	The completion of the Biosafety Policy and Biosafety legislation will enable the closure of this gap.
Water Pollution Control	Licensing of existing facilities that discharge municipal and industrial effluents into rivers and other inland water bodies.	Draft Waste Water and Sludge Regulations have been prepared.
Conservation and Sustainable Use of Jamaica’s Wild Flora	Continuing to establish protected areas to conserve species and their habitat	A National Ecological Gap Assessment Report (NEGAR) was completed as part of the development of a Protected Areas System Master Plan. The report identified priority areas required to close the gaps in protected areas.



Element	Gaps/Challenges	Status of Implementation
and Fauna		
Forest Biodiversity	Securing financial resources to overcome gaps in knowledge of forest resource base and ensure the sound management of forest resources.	The Forest Conservation Fund was established in September 2004 by a debt-for-nature swap agreement between the Nature Conservancy and the governments of Jamaica and the United States of America. These resources fund projects to conserve and restore important tropical forest resources and supporting community livelihood throughout Jamaica. Funds are granted to environmental, forestry or conservation NGOs, local or regional entities active in Jamaica.

Fisher (2005) reviewed the implementation of the NBSAP for the NCSA report and found that there were capacity issues which included:

- lack of human and financial resources;
- insufficient biological information on flora and fauna;
- insufficient coordination among and within the relevant agencies;
- lack of appropriate skills in project writing;
- insufficient cooperation from partners in developing the projects; and
- lack of or insufficient skills in financial resource identification and negotiation.

### ***2.1.1 Sources of Funding for Biodiversity Related Activities***

The IOJ has received funding from the following organizations for biodiversity-related activities :

- IABIN/OAS (2006) – US\$10,000;
- UNEP/GEF (2008) – US\$48,000;
- UNDP/GEF (2009) – US\$48,000; and
- McArthur Foundation (2009).

[NEPA](#) has received funding from the following organizations for NBSAP-related activities:

- GEF/CABI/UNEP (2009 – 2013) – US\$1,738,978;
- GEF/UNDP (2008 – 2011) – US\$552,250;
- GEF/UNDP (2009 – 2010) – US\$218,620; and
- GEF/UNDP (2008 – 2010) – US\$240,000.

## **2.2 Successes in Biodiversity Conservation and Sustainable Use**

Thirteen of the NBSAP project profiles have been completed, or are at various stages of completion and or implementation. Of that number, 5 were high priority, 6 were medium, and 2 were low priority.

## **2.3 Lessons Learned**

The following were identified as some of the lessons learned in implementation of the NBSAP:

- the need for ongoing consultations with other agencies, particularly government Ministries and agencies regarding obligations under the CBD and responsibilities for the

- implementation of the strategies and actions identified in the NBSAP including incorporation into agency's annual plans; and
- the need for a mechanism for ongoing reporting by responsible agencies. This would also facilitate the preparation of national reports as required.

## **2.4 Analysis of the Effectiveness of the NBSAP**

Based on the areas of priority (high and medium) identified in the NBSAP to address the gaps in biodiversity conservation and its sustainable use, Jamaica has achieved a significant level of achievement in these areas, as of the 17 priority areas identified (Table 8 above) there has been action in 13 areas to date (Section 2.1 above). However, funding and capacity constraints continue to affect implementation. Despite these gains there are still significant gaps to be addressed in the area of policy and legislation.

To help alleviate the problem of funding and capacity constraints, community engagement will have to be increased; and better coordination across the various agencies responsible for different aspects of the environment will need to be improved.

Other activities related to CBD POWs that have been implemented or are being implemented include:

- a country-based taxonomic needs assessment is being conducted;
- the International Day for Biological Diversity has been implemented; and
- strengthen formal and informal education on Biodiversity – this is being done by the JCDT.

## **Chapter 3 Sectoral and Cross-Sectoral Integration or Mainstreaming of Biodiversity Considerations**

### **3.1 Introduction**

There are at least 52 pieces of legislation which address biodiversity issues and no one agency/entity has overall responsibility for biodiversity. While many policies relating to conservation and sustainable use of biodiversity exist, several are in draft form awaiting finalization. Additional resources, human and financial, are critical for their completion.

### **3.2 Existing Framework for International Biodiversity Related Conventions**

Jamaica is a party to a number of international agreements such as the CBD, UN Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol to the UNFCCC, the UN Convention to Combat Desertification (UNCCD), CITES, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, UN Convention on the Law of the Sea, International Convention for the Prevention of Pollution from Ships, Vienna Convention for the Protection of Ozone Layer, Montreal Protocol on Substances that Deplete the Ozone Layer, Protocol of 1978 Relating to the International Convention for the Prevention of Pollution From

Ships, and the Convention on the Protection of Wetlands of International Importance especially as Waterfowl Habitats, (Ramsar Convention).

Agencies/entities directly involved in biodiversity conservation and or management are:

- Environmental Management Division, (Ministry responsible for the environment);
- NEPA;
- Forestry Department;
- Department of Fisheries, Ministry of Agriculture and Fisheries; and
- IOJ/Jamaica National Heritage Trust.

Sectors involved in biodiversity management/conservation include health, education, tourism and planning.

### ***3.2.1 Environmental Management Division***

The Environmental Management Division (EMD) within the ministry with responsibility for environment has overall responsibility for the implementation of international development conventions in Jamaica and is the focal point for the CBD, responsible for representation at meetings of the Conference of the Parties. Its mission is the protection of Jamaica's natural resources, the reduction and prevention of pollution, the integration of environmental considerations into national development policies, in contribution to the achievement of sustainable national development. The mandate of the EMD includes the development of policies, legislation and programmes for effective environmental management, supported by well developed research and database systems in the area of environmental protection and conservation.

### ***3.2.2 NEPA***

NEPA, an Executive Agency, is mandated to promote sustainable development by ensuring protection of the environment and orderly development in Jamaica. It is the result of a merger of the Natural Resources Conservation Authority (NRCA), the Town Planning Department (TPD) and the Land Development and Utilization Commission (LDUC), the aim of which was to integrate environmental, planning and sustainable development policies and programmes and to improve customer service. It is actively involved in ensuring that the various decisions of the CBD are implemented and works closely with the various sectors involved in utilising the natural environment to ensure sustainable use of Jamaica's resources.

The Acts under which NEPA operates and the policies and plans by which it is guided can be found in Appendix IV (Additional Information).

### ***3.2.3 Forestry Department***

The Forestry Department's management and conservation activities are essential components to meeting the objectives of the Rio Conventions by:

- reducing the rate of biodiversity loss (CBD);
- maintaining and measuring the role of forests as carbon sinks (UNFCCC); and
- prevention of land degradation and drought (UNCCD).

Through funding provided by USAID, \$4.617 million has been set aside in the 2009/2010 budget to assist with the implementation of biodiversity conservation programmes in select Cockpit Country forest reserve sites that are being affected by expanding agricultural activities.

### **3.2.4 Fisheries Division**

The Fisheries Division has implemented cross-sectoral measures in the designation of new fish sanctuaries in 2009. The application of baseline studies is being done at the various sites to have an indication of the effectiveness of the designation. This data will be used to track conservation and protection patterns which contributes to overall application of biodiversity indicators (Fisheries Division pers. comm. May 2010). Cross-sectoral working relationships exist between Fisheries and CBOs/NGOs, and a Memorandum of Agreement is being developed with management entities who will co-manage the listed fish sanctuaries. They include the NGOs, MBMPT, Caribbean Coastal Area Management Foundation, Bluefields Bay Fishermen's Friendly Society, The Nature Conservancy and others (Fisheries Division pers. comm. May 2010).

### **3.3 Tourism**

The Master Plan for Sustainable Tourism Development (Tourism Master Plan), has as one of its objectives environmental sustainability, as Jamaica's tourism product depends mainly on the natural environment, and its continued degradation threatens the future of the industry and the lives of successive generations. The sector, through TPDCo is responsible for conducting operations audits for entities seeking incentives under the Hotel and Attraction Incentive Programme.

As stated previously, Jamaica is involved in the Blue Flag Eco-Certification Scheme for Beaches and Marinas). The award, a Blue Flag, is given annually to beaches and marinas that satisfy 4 main criteria which include: environmental education and information, water quality and environmental management.

In an effort to address the challenges faced in effectively monitoring the regulation of recreational river-based water sports which are operating on the same river, the Ministry of Industry and Tourism commissioned a technical study which was completed in August 2005. This study sought to classify the seven rivers under the purview of the River Rafting Authority for recreational use in terms of public health and safety, security and habitat conditions. Data from the study was to be used to develop an inter-sectoral policy governing the streamlining and integrated management of river-based water sports vessels (PIOJ 2005). The use of carrying capacity limits is also under consideration and associated operational guidelines.

### **3.4 Energy**

The vision of the National Energy Policy 2009-2030 is, "A modern, efficient, diversified and environmentally sustainable energy sector providing affordable and accessible energy supplies with long-term energy security and supported by informed public behaviour on energy issues and an appropriate policy, regulatory and institutional framework". Jamaica is vulnerable to the effects of climate change such as sea level rise, and damage by extreme weather events. A fundamental element of the Energy Policy is that the energy sector will be environmentally sustainable with significantly increased use of economically viable renewable energy sources such as solar, wind, hydropower, and biofuels (Ministry of Energy 2009). An increase in the use of renewable energy sources will contribute to the reduction in global emissions of greenhouse gases and global warming and the effects of climate change.

Two of the goals for the Minerals Policy are a Minerals Industry that contributes to sustainable national development and integrates the concept and principles of sustainable development in local and national decisions that affect the industry. This includes the effective management of

mineral resources and mineral-bearing lands from the pre-mining to post-mining stage; and a Minerals Industry that embraces and exemplifies environmental best practices, including the recovery of minerals and other products from mining waste (Ministry of Mining 2009). That is, a Minerals Industry that exemplifies environmental best practices and good corporate citizenship (Ministry of Mining 2009).

### **3.5 Mining and Quarrying**

Jamaica is developing a National Minerals Policy which seeks to establish the framework for the country's approach to managing its mineral resources and developing its Minerals Industry. Minerals Policy is the need to revise the land-use and land management framework to allow for sequential planning and so optimize the benefits of exploiting the country's mineral resources, while minimizing negative social and environmental impacts (Ministry of Mining 2009). The policy is still in the draft stage. One of the reasons for the Minerals Policy is the need to revise the land-use and land management framework to allow for sequential planning and so optimize the benefits of exploiting the country's mineral resources, while minimizing negative social and environmental impacts (Ministry of Mining 2009).

### **3.6 Vision 2030 Jamaica: National Development Plan**

In 2009, Jamaica completed its "Vision 2030 Jamaica: National Development Plan" which seeks to make Jamaica a developed country by 2030. Vision 2030 has four goals:

1. Jamaicans are empowered to achieve their fullest potential;
2. the Jamaican society is secure, cohesive and just;
3. Jamaica's economy is prosperous; and
4. Jamaica has a healthy natural environment through sustainable management and use of environmental and natural resources, hazard risk reduction and adaptation to climate change, and sustainable urban and rural development.

To achieve Goal 4, Jamaica will ensure that environmental considerations become integral factors in socio-economic decision-making in order to transition the country into a green economy. Attention will be given to increasing public awareness on environmental matters, and increasing participation in the management of natural resources; providing an effective regulatory framework for conservation of Jamaica's natural resources; incorporating environmental considerations into decision-making processes; determining the economic value of biodiversity and ecosystem services, as well as determining the long-term economic consequences of the continuing loss of biodiversity; and preserving and renewing ecological capital. Another outcome will be the greater emphasis that will be placed on hazard risk management activities and programmes for reducing Jamaica's existing and future vulnerability. Climate change scenarios will be incorporated in future economic and land use planning and provide a framework to ensure that risks associated with natural hazards will be reduced by integrating hazard considerations into Jamaica's development planning (PIOJ 2009e).

The plan states that Jamaica's planning efforts have had limited success due to weaknesses which include relatively short-term planning, "inadequate resources to support implementation, an ineffective monitoring and evaluation framework, limited involvement of non-state actors, weak synergies between targets, indicators and the budget." The plan will therefore focus on implementation and accountability and will depend on results-based management using targets and performance indicators at national and sectoral levels "to measure the effects of the actions being implemented in the medium and the long-term."

The Agriculture sector has the potential to make a contribution to Jamaica's GDP, employment, the enhancement of rural livelihoods, and food security.

The strategies that will be employed for environmental sustainability are:

- increased application of environmental best practices throughout the agricultural sector;
- promotion of zero waste in agriculture production and processing;
- development of organic farming as a major mode of production;
- development of a comprehensive agricultural insurance system; and
- strengthening of hazard mitigation for the agricultural sector.

### 3.7 National Spatial Plan

A National Spatial Plan is to be developed which will provide the strategic spatial framework to guide national development. The reasons for the development of a new spatial plan include:

- spatial planning needs to play a more effective role in the development process. Jamaica's vision and goal of achieving global competitiveness and developed country status by 2030, hinges heavily on its capacity to pursue planned and orderly development and **to sustainably manage its natural and environmental resources**; and
- the population is projected to reach 3.3 million by 2030 with the urban population growing at a much faster pace. Currently growth in this segment has coincided with an outward expansion of urban centres resulting in some instances in the conversion of agricultural lands – potentially impacting the country's food and water supply. Much of this growth has taken place in an uncontrolled manner and reflects inappropriate and unregulated land use.

### 3.8 Health Sector

One of the goals in Vision 2030 is for a healthy and stable population. There is an awareness of the importance of the state of the environment to the maintenance of a healthy population. There is also an acknowledgment that in much of Jamaica, there is improper disposal of all types of waste, and that there is increased atmospheric pollution from factories and motor vehicles.

The strategies to be employed are:

- create appropriate frameworks to strengthen health security;
- identify and assess the linkages between the health of Jamaicans and the state of the environment, and define appropriate long-term strategies to anticipate changing environmental conditions;
- generate and sustain action across sectors to modify environmental determinants of health; and
- include climate change issues into health policies.

### 3.9 Agro-Forestry

A strategically planned Forestry Department will contribute to the principles expounded by Vision 2030 by (Forest Department 2009):

- Increased participation of communities, placing those people most affected by, or dependent on, forests at the centre of forestry development;
- strong leadership and organizational management achieved by transformation of the Forestry Department as already initiated under the Public Sector Modernization Vision and Strategy;
- the practice of sustainable forest management, balancing economic, social and environmental values;
- fostering rural development whilst improving the quality of life for all Jamaicans;
- providing opportunities for equitable participation in the management, conservation and enjoyment of forests; and
- building partnerships between government, private sector and non-government organizations (NGOs) based on shared goals and values.

### **3.10 Fisheries**

The Fisheries Division implemented cross-sectoral measures in the designation of new fish sanctuaries in 2009. The application of baseline studies is being done at the various sites to have an indication of the effectiveness of the designation. This data will be used to track conservation and protection patterns which contributes to overall application of biodiversity indicators (Fisheries Division pers. comm. May 2010). Cross-sectoral working relationships exist between Fisheries and CBOs/NGOs, and a Memorandum of Agreement is being developed with management entities who will co-manage the listed fish sanctuaries. They include the NGOs, MBMPT, Caribbean Coastal Area Management Foundation, Bluefields Bay Fishermen's Friendly Society, The Nature Conservancy and others (Fisheries Division pers. comm. May 2010).

#### ***3.10.1 Draft Fisheries Policy***

The Fisheries Division has drafted a new Fisheries Policy which will be consistent with acceptable principles of sustainable development. The objectives of the draft policy are:

1. ensure sustainable development of the fisheries industry;
2. promote efficiency of the fishing industry;
3. promote economic and social development of fisheries industry;
4. improve systems and procedures for the management of the fishing industry;
5. promote partnerships with stakeholders in the management of fisheries and ensure transparency and accountability in the governance of fisheries resources; and
6. comply with international standards and best practices for fisheries development and management in keeping with Jamaica's commitments under various agreements and conventions.

### **3.11 Economic Infrastructure**

Vision 2030 Jamaica recognizes that there are environmental issues involved with the development of a strong economic infrastructure. These environmental issues are air pollution, noise, dust, modification of land use to accommodate new or expanded roadways, increased surface water run-off from roads, ship-borne waste, oil spills, dumping, aquatic invasive species, port and shipping facilities impacting on coastal ecosystems.

## Chapter 4 Conclusions: Progress Towards the 2010 Target and Implementation of the Strategic Plan

This chapter provides an overview of the progress made towards the CBD goals.

### 4.1 Progress Toward the 2010 Targets

#### ***Goal 1: Promote the Conservation of the Biological Diversity of Island Ecosystems, Habitats and Biomes***

##### **Targets**

1.1 At least 10% of each of the island ecological regions effectively conserved.

1.2 Areas of particular importance to island biodiversity are protected through comprehensive, effectively managed and ecologically representative national and regional protected area networks.

##### **Progress**

At present, approximately 18% of Jamaica's land area, and approximately 15% of archipelagic waters are protected areas (NEPA). However, although Jamaica's approach has been to increase the percentage due to the high levels of endemism, the current PAs are not sufficiently representative of Jamaica's ecological regions. Jamaica's NEGAR (2009) highlighted gaps in the coverage of the PA system (see Chapter 1, [1.2.9.1 Protected Area System Gaps](#)) and has recommended expansion of some existing areas, and addition of new PAs, to ensure that 10% of Jamaica's ecological regions are conserved. Under the PoWPA Jamaica is in the process of developing a PASMP which will seek to look at PA management in a holistic manner. The recommendations of the NEGAR have been taken into consideration in the development of the PASMP.

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

##### **Targets**

2.1. Populations of island species of selected taxonomic groups restored, maintained, or their decline substantially reduced.

2.2 Status of threatened island species significantly improved.

##### **Progress**

The head-start programme for the Jamaican Iguana has been successful in helping to maintain the Iguana population, however, the species is still under threat from habitat loss, and predators such as the mongoose, and dogs.



The Negril Area Environmental Protection Trust (NEPT) is implementing a project for the conservation and management of endemic and endangered species of the Negril Royal Palm Reserve through habitat improvement and interpretation.

There is a draft Orchid Policy which is to be taken for national consultations.

There is a recommendation in the NEGAR that some of the protected area boundaries be extended, and other target areas designated protected areas, due to their diverse biodiversity and ecological attributes. If this is implemented, the status of threatened species in these areas will be significantly improved.

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

#### **Targets**

3.1 Genetic diversity of crops, livestock, and other valuable island species conserved, and associated indigenous and local knowledge maintained.

#### **Progress**

Animal and Plant species conservation work is being done by the MoAF (see [AnGRFA](#) and [PGRFA](#) in chapter 1), and by the Maroons (medicinal and traditional herbs). The Maroons and the IOJ are involved in preservation of the associated indigenous and local knowledge.

The UWI Biotechnology centre has established *ex-situ* and *in-situ* gene banks of Jamaican medicinal plants.

The [SRC](#) continues to maintain a plant gene bank which contains plants such orchids, and pineapples.

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

#### **Targets**

4.1 Island biodiversity-based products are derived from sources that are sustainably managed, and production areas managed, consistent with the conservation of biological diversity.

4.2 Unsustainable consumption of island biological resources and its impact upon biodiversity is reduced.

4.3 No species of wild flora and fauna on islands is endangered by international trade.

#### **Progress**

Jamaica has a draft Orchid Policy which seeks to establish export quotas for native species of orchids taken from the wild. In 2009, the UWI and NEPA started population surveys of native orchid species to assist in determining export quotas.

Jamaica has established close seasons for both Queen Conch and Lobster in a bid to sustainably manage the harvesting of these important commercial species. There is also a quota system for conch which is informed by the results of surveys conducted during the close season.

A preliminary island-wide survey of Lignum Vitae (*Guaiacum officinale*) distribution has been conducted by NEPA.

There is a draft Dolphin Conservation Policy which addresses the issue of capture of dolphins from the wild. The NRCA has adopted the precautionary approach in relation to applications for capturing dolphins from the wild, and the goals of the policy are:

- conservation of Jamaica's dolphin species and their habitats; and
- development of a management plan for sustainable use of dolphins.

***Goal 6: Control threats to island biological diversity from invasive alien species.***

**Targets**

6.1 Pathways for major potential alien invasive species are identified and controlled on islands.

6.2 Management plans in place and implemented for major alien species that threaten ecosystems, habitats or species.

**Progress**

The IOJ has created an invasive alien species listing for Jamaica.

Jamaica has an invasive species task force, and is part of a four-year regional project on "[Mitigating the Threats of Invasive Alien Species \(IAS\) in the Insular Caribbean](#)" which started on September 1, 2009. The project goal is to conserve globally important ecosystems, the species and genetic diversity within the insular Caribbean and the project objective is to mitigate the threat to local biodiversity and economy from IAS in the insular Caribbean, including terrestrial, freshwater, and marine ecosystems.

Other work is being done by academia to address invasive species, see Chapter 2.

The JCDT currently works at controlling *Pittosporum undulatum*, and *Hedychium* spp. in the BJCMNP, and have successfully controlled over 13.8 ha.

***Goal 7: Address challenges to island biodiversity from climate change and pollution.***

**Targets**

7.1 Resilience of the components of biodiversity to adapt to climate change in islands maintained and enhanced.

7.2 Pollution and its impacts on island biological diversity significantly reduced.

**Progress**

Wastewater and Sewage regulations have been drafted and are to be implemented. The NRCA permit and licence system has categories that relate to sewage and industrial wastewater treatment facilities and industrial projects such as chemical plants so as to regulate the discharge

from the facilities and ensure that they meet standards which reduce any impact to the natural environment.

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

**Targets**

8.1 Capacity of island ecosystems to deliver goods and services maintained or improved.

8.2 Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people living on islands, maintained.

**Progress**

The Integrated Watershed and Coastal Area Management ([IWCAM](#)) project started in October 2006 and ended in October 2009. One of the outputs of the project is a Watersheds Area Management Model (WAMM). The aim of the model is to provide watershed practitioners, government agencies, non governmental organizations, funding agencies and the ordinary citizens a simple, practical and flexible method of working together to achieve sustainable watershed management.

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

**Targets**

9.1 Measures to protect traditional knowledge, innovations and practices associated with island biological diversity implemented, and the participation of indigenous and local communities in activities aimed at this promoted and facilitated.

9.2 Traditional knowledge, innovations and practices regarding island biodiversity respected, preserved and maintained, the wider application of such knowledge, innovations and practices promoted with the prior informed consent and involvement of the indigenous and local communities providing such traditional knowledge, innovations and practices, and the benefits arising from such knowledge, innovations and practices equitably shared.

**Progress**

The Maroons have established traditional medicine/herb gardens and museums in some of their communities. The Jamaican Memory Bank at the IOJ is a repository for: audio recordings, film recordings, and photographs, of indigenous and local communities which includes information on plants and their traditional uses.

There is no legislation for access and benefit sharing of genetic resources, or of traditional knowledge, innovations and practices, however through a GEF enabling activity assessments have been conducted on capacity needs in the areas of preservation of indigenous knowledge, access to genetic resources and benefit sharing.

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

**Targets**

10.1 All access to genetic resources from islands is in line with the CBD and its relevant provisions and, as appropriate and wherever possible, with the International Treaty on Plant Genetic Resources for Food and Agriculture and other applicable agreements.

10.2 Benefits arising from the commercial and other utilization of island biodiversity genetic resources are shared in a fair and equitable way with the island countries providing such resources in line with the CBD and its relevant provisions.

**Progress**

See paragraph 2 of the Progress for goal 9 above.

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

**Targets**

11.1 New and additional financial resources are allocated to all islands, in particular small islands developing States and for developing country Parties, to facilitate the effective implementation of this PoW and, in general, their commitments under the Convention in accordance with Article 20.

11.2 Technologies are transferred to developing country Parties, in particular Small Island Developing States, to allow for the effective implementation of this PoW and, in general, their commitments under the Convention, in accordance with Article 20, paragraph 4.

11.3 Capacity of islands to implement this PoW on island biological diversity and all its priority activities is significantly strengthened.

**Progress**

The Caribbean Challenge is a commitment by some Caribbean governments to support and manage new and existing national parks and protected areas throughout the region. The governments have agreed to protect at least 20 percent of their marine and coastal habitats by 2020. TNC has pledged US\$20 million towards these efforts.

***4.1.1 Indicators used for Measuring Progress***

Jamaica does not have indicators but is working on developing suitable ones. Some indicators being considered are faecal coliform in freshwater, BOD in water bodies, population estimates of key species (endemic flora and fauna), number of threatened/endangered species, annual catch of major species, annual rate of decrease in forest cover. Previously collected data sets, such as those of Reef Check and Caricomp, are being examined to determine if indicators can be developed from them.

### ***4.1.2 Obstacles Encountered***

Jamaica faces many obstacles in achieving the 2010 targets; major ones include, but are not limited to:

- limited resources (financial, technical etc)
- lack of harmonisation with respect to policies geared towards biodiversity conservation

Obstacles to the development of suitable indicators have been, insufficient data sets for most species as well as biased study areas which have not been island-wide.

## **4.2 Progress Towards the Goals and Objectives of the Strategic Plan of the CBD**

### ***4.2.1 National Goals***

The Strategic Plan is being implemented through the; execution of the NBSAP; and other biodiversity related Conventions such as UNCC, RAMSAR, and UNCCD.

### ***4.2.2 Progress Towards Goals and Objectives***

Since adopting the Convention, Jamaica has sought to adhere to its general provisions and, where possible, translate the provisions into practical actions. The process was initiated with the development of our NBSAP (2003) which identified our priorities and set strategies for achieving the goals and objectives of the Convention. The NBSAP identified 17 project profiles (8 high and 9 medium priority) of which there has been some action on 13 to date (see Chapter 2, [Table 8](#) above). There have also been other activities implemented or are at various stages of implementation, (outside of the NBSAP) that contribute positively to Jamaica achieving the goals and objectives under the CBD's Strategic Plan.

### ***4.2.3 Obstacles to the Implementation of the Convention on Biological Diversity***

#### **1. Political/societal obstacles**

- a. Lack of/insufficient political will and support to implement the Convention on Biological Diversity
- b. Limited public participation and stakeholder involvement
- c. Limited precautionary and proactive measures, resulting in reactive policies.

#### **2. Institutional, technical and capacity-related obstacles**

- a. Inadequate capacity to act, caused by institutional weaknesses
- b. Lack of/Inadequate human resources
- c. Lack of transfer of technology and expertise
- d. Lack of adequate scientific research capacities to support all the objectives.

#### **3. Lack of accessible knowledge/information**

- a. Loss of biodiversity and the corresponding goods and services it provides not properly understood and documented
- b. Existing scientific and traditional knowledge not fully utilized.
- c. Lack of public education and awareness at all levels.

#### **4. Economic policy and financial resources**

- a. Insufficient financial and human resources
- b. Insufficient economic incentive measures
- c. Insufficient benefit-sharing.

#### **5. Collaboration/cooperation**

- a. Inadequate synergies at the national and international levels
- b. Lack of horizontal cooperation among stakeholders
- c. Too few effective partnerships
- d. Insufficient engagement of scientific community.

#### **6. Legal/judicial impediments**

- a. Too few appropriate policies and laws

#### **7. Socio-economic factors**

- a. Poverty
- b. Population distribution and pressure
- c. Unsustainable consumption and production patterns
- d. Insufficient capacities at the local community level.

#### **8. Natural phenomena and environmental change**

- a. Climate change
- b. Natural hazards

### **4.3 Opinion on Progress Towards Goal 1 at the Convention Level**

#### ***Goal 1: The Convention is Fulfilling its Leadership Role in International Biodiversity***

##### **1.1 The Convention is setting the global biodiversity agenda**

The Convention on Biological Diversity is the most internationally recognised and supported instrument to conserve and sustainably use biological diversity. Presently with 193 parties, it has created a global forum where a wide cross section of sectors (governments, non-governmental organizations, academics, the private sector and other interested groups or individuals) can share ideas and develop as well as compare strategies with respect to the conservation and sustainable use of the earth's biodiversity.

##### **1.2 The Convention is promoting cooperation between all relevant international instruments and processes to enhance policy coherence**

Overall, the Convention on Biological Diversity is one of a number of treaties dealing with the management of species, habitats and ecosystems. While a number of these treaties predate the Biodiversity Convention (and continue to carry on their mandates as before), the CBD does supplement other treaties, as it provides the missing general framework for the conservation and use of all biological and genetic resources.

##### **1.3 Other international processes are actively supporting implementation of the Convention, in a manner consistent with their respective frameworks**

This statement is supported and is noticeable in the implementation of many local activities related to various environment and biodiversity-related agreements (eg. UNFCCC, the Ramsar Convention, CITES and others).

## **4.4 Cartagena Protocol on Biosafety**

### ***4.4.1 The Cartagena Protocol on Biosafety is widely implemented***

Jamaica having signed the Protocol, still remains a non-party. None the less it has made significant strides in the preparation of a Draft Biosafety Policy (to be submitted to Cabinet for approval). As part of implementing that policy, legislation has been drafted.

### ***4.4.2 Biodiversity concerns are being integrated into relevant sectoral or cross-sectoral plans, programmes and policies at the regional and global levels***

There has been some success with respect to this but much remains to be done.

## **4.5 Conclusions**

### ***4.5.1 Overview***

Implementation of the Convention has had some impact in terms of greater public awareness, and stakeholder involvement in Biodiversity Conservation and Protected Area Management. A range of government policies has been developed and legislation has been prepared to implement aspects of the Convention. However, many of the policies and plans have not been finalized. Government's fiscal difficulties over the last five years have impacted significantly on resource availability, and prior to Vision 2030 Jamaica, Jamaica's focus was on medium-term goals, and economic development. A greater level of effort is needed to identify and secure international funding to implement biodiversity related activities since a lack of funding has been a limiting factor to implementation. There is also a greater need for intra – and inter- government agency cohesion, coordination, and cooperation.

Human resource and institutional capacities have been additional constraints which affect assessments of species status, monitoring, and enforcement.

### ***4.5.2 Lessons Learned***

LFMCs and the JCDT have been effective in managing forest resources, and in terms of PA management.

Vision 2030 Jamaica presents a new strategic plan for Jamaica, and environmental issues have been incorporated into most objectives and strategies. It is hoped that this new focus will result in better sectoral, and cross-sectoral co-ordination and cohesion. The focus of Vision 2030 Jamaica will be on implementation and accountability with results-based management using targets and performance indicators.

### ***4.5.3 Future Priorities and Capacity-Building Needs***

Based on the gaps identified in the NCSA (Fisher 2005), areas of future priority are to:

- increase human and financial resources;
- develop an efficient system of dissemination of information at the national level;
- determine the value of biodiversity and the corresponding goods and services it provides;
- utilize existing scientific and traditional knowledge;
- increase public awareness and education at all levels;

- conduct studies/surveys to increase biological information on flora and fauna;
- improve co-ordination among and within the relevant agencies;
- 
- increase cooperation from partners in developing projects;
- increase skills in financial resource identification and negotiation; and
- review and revise the NBSAP where necessary.

#### ***4.5.4 Suggestions for Actions that Need to be Taken at the Regional and Global Level to Enhance Implementation of the Convention at the National Level***

**a) Refining existing programmes of work or developing new ones to address emerging issues;**

There are several programmes of work that can be revised to further enhance proper utilization of our resources especially for islands.

**ii) Suggesting goals and objectives that may be included in the future Strategic Plan of the Convention;**

A revision of the Strategic Plan could be done to incorporate goals beyond 2010; and

**iii) identifying mechanisms that need to be established at various levels.**

There are some mechanisms presently in place. It is recommended that these be fully synchronised and utilized before new ones developed.



## Appendix I – Information Concerning Reporting Party and Preparation of National Report

### A. REPORTING PARTY

Contracting Party	Jamaica
<b>NATIONAL FOCAL POINT</b>	
Full name of the institution	Environmental Management Division/Office of the Prime Minister, Jamaica
Name and title of contact officer	Mr. Jerome Smith
Mailing address	16 A Half-Way-Tree Road Kingston 5, Jamaica
Telephone	929-2792
Fax	920-7267
E-mail	<a href="mailto:jsmithemdmohe@yahoo.com">jsmithemdmohe@yahoo.com</a>
<b>CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)</b>	
Full name of the institution	(See above)
Name and title of contact officer	
Mailing address	
Telephone	
Fax	
E-mail	
<b>SUBMISSION</b>	
Signature of officer responsible for submitting national report	
Date of submission	

### B. Process of Preparation of National Report

The preparation of the Jamaican Fourth National Report was carried out by consultation with the relevant Ministries responsible for land, the environment, agriculture, forestry, and fisheries, academia and NGOs . A draft report was prepared based on literature reviews, and information received. The draft report was reviewed not only by the government agencies, but also by relevant stakeholders through national consultations. Comments received from reviewers and through national consultations were incorporated.

The GOJ acknowledges the technical and financial support of the GEF/UNDP and the CBD Secretariat in the preparation and submission of the Fourth National Report.

## IDENTIFICATION OF GAPS

In compliance with the Convention on Biological Diversity (CBD), protected area gaps were analysed according to the three prescribed types:

1) **Representation Gaps** – *How much of critical biodiversity is protected?* Representation gaps are species, ecosystems or habitats that are not included within present protected areas, or they do not occur in sufficient quantities to ensure long-term viability.

2) **Ecological Gaps** – *Is that which is protected ecologically healthy?* Ecological gaps refer to biodiversity representation within protected areas that are of insufficient quality to ensure their functionality and, therefore, their long-term survival.

3) **Management Gaps** – *Is that which is protected under effective management?* Management gaps refer to ineffective management regimes governing protected areas that perpetuate their vulnerability to further degradation.

The following section summarizes the representation, ecological and management gaps described in the marine, terrestrial and freshwater ecoregional plans, but management gaps in the current protected areas were not addressed within the Jamaica Ecoregional Plan (JERP). It should be noted also that there was very limited, current islandwide data on any of the three realms, including current identification and distribution of plants, and the associations within ecosystems.

## Appendix II – Progress Towards Targets of the Global Strategy for Plant Conservation and the Programme of Work on Protected Areas

### A. Progress towards Targets of the Global Strategy for Plant Conservation

The GSPC contains 16 targets grouped under five major goals and the initial aim was for these targets to be achieved by 2010.

Jamaica has not set national targets for any of the goals and does not have a national strategy for plant conservation but through the work of several agencies and individuals some targets are being addressed.

#### **Goal 1: Understanding and documenting plant diversity**

**Target 1: A widely accessible working list of known plant species, as a step towards a complete world flora.**

**Progress:** The Institute of Jamaica through the Natural History Museum of Jamaica houses Jamaica's national herbarium. Researchers of the IOJ have been working for many years to document the plant species of Jamaica with the aim to list all the known

plant species. This is the national inventory and the work continues today. However more training is needed in the area of plant taxonomy to increase the number of persons locally with expertise in this area.

**Target 2: A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels.**

**Progress:** This needs to be addressed as the data listed in Adams and even on the IUCN Red List needs to be updated by fieldwork. There is no national Red List for Jamaica.

**Target 3: Development of models with protocols for plant conservation and sustainable use, based on research and practical experience.**

**Progress:** No national target.

### **Goal 2: Conserving plant diversity**

**Target 4: At least 10 per cent of each of the world's ecological regions effectively conserved.**

**Progress:** The current terrestrial PAs represent approximately 200,000 ha or approximately 18% of Jamaica's land area. Marine protected areas account for 180,000 ha or 15% of the archipelagic waters. However, these PAs do not conserve 10% of Jamaica's ecological regions, and the NEGAR has recommended expanding boundaries of some existing PAs and declaring new PAs.

**Target 5: Protection of 50 per cent of the most important areas for plant diversity assured.**

**Progress:** The [NEGAR](#) has identified 31 areas which need to be included in the protected areas system.

**Target 6: At least 30 per cent of production lands managed consistent with the conservation of plant diversity**

**Progress:** No information

**Target 7: 60 per cent of the world's threatened species conserved *in situ***

**Progress:** Jamaica has partially addressed this by having protected areas including forest reserves.

**Target 8: 60 per cent of threatened plant species in accessible *ex situ* collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes.**

**Progress:** The Plant Conservation Centre (PCC) of the NAF, established in 1997 at Hope Gardens, was closed in 2007 by new management after the Gardens had been divested. In 2005, the PCC housed 170 taxa (65 Jamaican natives of which 40 were Jamaican endemics) field gene and germplasm banks. Attempts to re-establish the PCC at the UWI, Department of Life Sciences, failed.

**Target 9: 70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained**

**Progress:** The MoAF has submitted reports on AnGRFA and PGRFA to the FAO.

**Target 10: Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems**

**Progress:** The JCDT currently works at controlling *Pittosporum undulatum*, and *Hedychium* spp. in the BJCMNP, and have successfully controlled over 13.8 ha.

The IOJ has created an invasive alien species listing for Jamaica. Also Jamaica has an invasive species task force, and is part of a four-year regional project on "[Mitigating the Threats of Invasive Alien Species \(IAS\) in the Insular Caribbean](#)" which started on September 1, 2009.

### **Goal 3: Using plant diversity sustainably**

**Target 11: No species of wild flora endangered by international trade**

**Progress:** No information available.

**Target 12: 30 per cent of plant-based products derived from sources that are sustainably managed.**

**Progress:** No information available.

**Target 13: The decline of plant resources, and associated indigenous and local knowledge, innovations and practices that support sustainable livelihoods, local food security and health care, halted.**

**Progress:** No information available.

### **Goal 4: Promoting education and awareness about plant diversity**

**Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, educational and public-awareness programmes.**

**Progress:** The IOJ through the NHMJ, NEPA and the Forestry Department incorporate this target in their educational programmes, presentations, exhibits, etc.

### **Goal 5: Building capacity for the conservation of plant diversity**

**Target 15: The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy**

**Progress:** The Botanist at the IOJ attended a training course in Miami in 2006.

**Target 16: Networks for plant conservation activities established or strengthened at national, regional and international levels**

**Progress:** More work needs to be done in this area.

**Gaps:** Jamaica needs to nominate a national focal point for the GSPC and develop a national strategy for plant conservation, also the Wildlife Protection Act needs to be updated.

## **B. Progress towards Targets of the Programme of Work on Protected Areas**

### **Goal 1.1 To Establish and Strengthen National and Regional Systems of Protected Areas Integrated into a Global Network as a Contribution to Globally Agreed Goals**

**Target:** By 2010, terrestrially <sup>1/</sup> and 2012 in the marine area, a global network of comprehensive, representative and effectively managed national and regional protected area system is established as a contribution to (i) the goal of the Strategic Plan of the Convention and the World Summit on Sustainable Development of achieving a significant reduction in the rate of biodiversity loss by 2010; (ii) the Millennium Development Goals – particularly goal 7 on ensuring environmental sustainability; and (iii) the Global Strategy for Plant Conservation

**Progress:**

The implementation of a Protected Areas System Master Plan (PASMP) which is expected to be finalized by January 2010 will assist in meeting this target. A Global Environmental Facility (GEF)/ United Nations Development Programme (UNDP) full sized project is to be developed to strengthen the operational and financial sustainability of Jamaica's protected areas system.

### **Goal 1.2 To Integrate Protected Areas into Broader Land- and Seascapes and Sectors so as to Maintain Ecological Structure and Function**

**Target:** By 2015, all protected areas and protected area systems are integrated into the wider land- and seascape, and relevant sectors, by applying the ecosystem approach and taking into account ecological connectivity <sup>25/</sup> and the concept, where appropriate, of ecological networks.

**Progress:**

One of the outcomes (#13) of the Vision 2030 Jamaica National Development Plan (2009) is the sustainable management and use of environmental and natural resources. Strategies include the integration of "environmental issues in economic and social decision-making policies and processes". Another strategy identified includes the adoption of an ecosystems management approach taking into consideration *inter alia* the establishment of protected areas.

Efforts are underway to incorporate aspects of Jamaica's National Ecological Gap Assessment Report (2009) in Development Orders (Town and Country Planning Act) currently being prepared

---

<sup>2/</sup> Terrestrial includes inland water ecosystems.

<sup>5/</sup> The concept of connectivity may not be applicable to all Parties.

for specific areas. These form a key component of the country's broader planning framework and serve to guide development activities.

See status regarding goal 3.1

**Goal 1.3 To Establish and Strengthen Regional Networks, Transboundary Protected Areas (TBPAs) and Collaboration Between Neighbouring Protected Areas Across National Boundaries.**

**Target:** Establish and strengthen by 2010/2012 <sup>6/</sup> transboundary protected areas, other forms of collaboration between neighbouring protected areas across national boundaries and regional networks, to enhance the conservation and sustainable use of biological diversity, implementing the ecosystem approach, and improving international cooperation.

**Progress:**

Consideration is being given to participating in the Caribbean Biological Corridor Project. This project seeks to *inter alia* reduce biodiversity loss.

**Goal 1.4 To Substantially improve Site-Based Protected Area Planning and Management**

**Target:** All protected areas to have effective management in existence by 2012, using participatory and science-based site planning processes that incorporate clear biodiversity objectives, targets, management strategies and monitoring programmes, drawing upon existing methodologies and a long-term management plan with active stakeholder involvement.

**Progress:**

There are management plans for some categories of protected areas including forest reserves. The GEF/UNDP Project proposes to address *inter alia* the development of management, operations and business plans in approximately 35% of existing protected areas.

**Goal 1.5 To Prevent and Mitigate the Negative Impacts of Key Threats to Protected Areas**

**Target:** By 2008, effective mechanisms for identifying and preventing, and/or mitigating the negative impacts of key threats to protected areas are in place.

**Progress:**

Assessments have been conducted which *inter alia* identify threats to biodiversity within and outside of protected area boundaries. This includes Eco-regional Assessments conducted for marine, freshwater and terrestrial ecosystems as well as Jamaica's National Ecological Gap Assessment Report (2009) which incorporated the findings of the eco-regional assessments.

**Goal 2.1 To Promote Equity and Benefit-Sharing**

**Target:** Establish by 2008 mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of protected areas

**Progress:**

No mechanisms currently exist.

---

<sup>6/</sup> References to marine protected area networks to be consistent with the target in the WSSD plan of implementation.

### **Goal 2.2 To Enhance and Secure Involvement of Indigenous and Local Communities and Relevant Stakeholders.**

**Target:** Full and effective participation by 2008, of indigenous and local communities, in full respect of their rights and recognition of their responsibilities, consistent with national law and applicable international obligations, and the participation of relevant stakeholders, in the management of existing, and the establishment and management of new, protected areas.

**Progress:**

The Forestry Department, a government agency, has Memoranda of Understanding with LFMCS which involve local communities and non-governmental organizations (NGOs). A co-management agreement is currently under review with two government agencies and one NGO for the management of a forest reserve which is also a national park.

### **Goal 3.1 To Provide an Enabling Policy, Institutional and Socio-economic Environment for Protected Areas**

**Target:** By 2008 review and revise policies as appropriate, including use of social and economic valuation and incentives, to provide a supportive enabling environment for more effective establishment and management of protected areas and protected areas systems.

**Progress:**

Projects have commenced relating to valuations of natural resources and protected areas. A project *Piloting Natural Resource Valuation Within Environmental Impact Assessments* is currently underway, This project seeks to develop natural resource valuation tools, and incorporate them into policies and procedures relating to the development and use of Environmental Impact Assessments Additionally, an *Economic Valuation of 3 Protected Areas* project in Jamaica has commenced which seeks to assess the value of protected areas to Jamaica's economy, begin incorporating natural resource valuation into policy as well as build capacity to apply this information to the decision-making process. These two projects are slated to end in 2011 and 2010, respectively.

### **Goal 3.2 To build capacity for the planning, establishment and management of protected areas**

**Target:** By 2010, comprehensive capacity-building programmes and initiatives are implemented to develop knowledge and skills at individual, community and institutional levels, and raise professional standards

**Progress:**

A *National Report on Management Effectiveness Assessment and Capacity Development Plan for Jamaica's System of Protected Areas* was prepared in 2007. A five year action plan was developed regarding strategic directions relating to sustainable financing, collaboration, enabling environment, human resources management, research, monitoring and evaluation, boundary and zoning setting, public education and awareness and infrastructural development. Components of the plan will be incorporated in the PASMP. The GEF/ UNDP project will seek to *inter alia* implement priority actions to strengthen management effectiveness and capacity development for agencies with responsibility for protected areas.

LFMCs have been implemented by the Forestry Department, and the JCDT works with communities around the BJCMNP, see Chapter 1, 1.2.9.2 [BJCMNP](#).

### **Goal 3.3 To Develop, Apply and Transfer Appropriate Technologies for Protected Areas**

**Target:** By 2010 the development, validation, and transfer of appropriate technologies and innovative approaches for the effective management of protected areas is substantially improved, taking into account decisions of the Conference of the Parties on technology transfer and cooperation.

**Progress:**

No information available.

### **Goal 3.4 To Ensure Financial Sustainability of Protected Areas and National and Regional Systems of Protected Areas**

**Target:** By 2008, sufficient financial, technical and other resources to meet the costs to effectively implement and manage national and regional systems of protected areas are secured, including both from national and international sources, particularly to support the needs of developing countries and countries with economies in transition and small island developing States.

**Progress:**

A *Financial Sustainability Plan for the Protected Areas System of Jamaica* was developed in 2008 and is expected to be finalized in 2009. It includes a financial needs assessment and identifies potential sources of funds (public, private, international and self-generated). Also, a Forest Conservation Fund has been established to support Jamaica's forest conservation activities, and a Tourism Enhancement Fund has been established to implement activities relating to the implementation of the *Master Plan for Sustainable Tourism Development* (2002).

### **Goal 3.5 To Strengthen Communication, Education and Public Awareness**

**Target:** By 2008 public awareness, understanding and appreciation of the importance and benefits of protected areas is significantly increased.

**Progress:**

A *Final Report on Recommendations for National Public Awareness and Consultations Strategy in support of Protected Area System Plan for Jamaica* was prepared in 2004. Elements of the strategy relate to *inter alia* advertising (print, television and radio), public service announcements, community meetings, media appearances, flyers, billboards and events.

Government agencies responsible for protected areas continue to prepare public education material, host events and make presentations relating to protected areas and their natural resources. There are also NGOs involved in the development of public education material, presentations, hosting events e.g. World Wetlands Day, Earth Day and Coastal Clean-up. A protected area strategy will be developed (2009-10) for protected areas for which the National Environment and Planning Agency is responsible.

See also Chapter 1, 1.2.8 [Communication, Education, and Public Awareness](#).



#### **Goal 4.1 To Develop and Adopt Minimum Standards and Best Practices for National and Regional Protected Area Systems**

**Target:** By 2008, standards, criteria, and best practices for planning, selecting, establishing, managing and governance of national and regional systems of protected areas are developed and adopted.

**Progress:**

The GEF/UNDP project will also prepare guidelines on minimum standards of information requirements for PA planning and management

#### **Goal 4.2 To Evaluate and Improve the Effectiveness of Protected Areas Management**

**Target:** By 2010, frameworks for monitoring, evaluating and reporting protected areas management effectiveness at sites, national and regional systems, and transboundary protected area levels adopted and implemented by Parties

**Progress:**

The proposed GEF/UNDP project outputs relate to improving management effectiveness including but not limited to performance-based reporting and monitoring procedures, training materials and programmes for protected area staff, revised management guidelines, public communication and awareness raising strategy for decision makers tools.

#### **Goal 4.3 To assess and monitor protected area status and trends**

**Target:** By 2010, national and regional systems are established to enable effective monitoring of protected-area coverage, status and trends at national, regional and global scales, and to assist in evaluating progress in meeting global biodiversity targets.

**Progress:**

One of the proposed GEF/UNDP project outputs is a programmatic monitoring and evaluation system and associated indicators.

Jamaica has an islandwide programme to conduct baseline assessments and regular monitoring at specific coral reef sites within and outside of protected areas. The purpose is to determine the current status of coral reefs in terms of health, impact and ecological functions.

#### **Goal 4.4 To Ensure that Scientific Knowledge Contributes to the Establishment and Effectiveness of Protected Areas and Protected Area Systems**

**Target:** Scientific knowledge relevant to protected areas is further developed as a contribution to their establishment, effectiveness, and management.

**Progress:**

*Jamaica's National Ecological Gap Assessment Report* (2009) identifies national priority research areas.

## Appendix III– References

- Abdo, Melissa; 2009. "Rediscovery of the century for Jamaica's Cockpit Country!" Exploring for Plants. <http://exploreplants.org/2009/06/19/rediscovery-of-the-century-for-jamaicas-cockpit-country/> (accessed May 20, 2010).
- Adams, C. D. 1972. *Flowering plants of Jamaica, 848 pp.* Mona, Jamaica: University of the West Indies.
- ADCP Study Group; 1983*A policy for development of aquaculture in Jamaica. Report of a Government of Jamaica/ADCP study group.* Report. Rome: UNDP/FAO.<http://www.fao.org/docrep/006/Q5739E/Q5739E13.htm> (accessed May 27, 2010).
- Armstrong, Sean.; 2001. "Terrestrial Ecoregions -- Jamaican dry forests (NT0218)." World Wildlife Fund - Wildlife Conservation, Endangered Species Conservation. [http://www.worldwildlife.org/wildworld/profiles/terrestrial/nt/nt0218\\_full.html](http://www.worldwildlife.org/wildworld/profiles/terrestrial/nt/nt0218_full.html) (accessed April 16, 2010).
- BirdLife International; 2009. "Caribbean Islands Biodiversity Hotspots." Critical Ecosystem Partnership Fund. [http://www.cepf.net/Documents/Finaldraft\\_Caribbean\\_EP.pdf](http://www.cepf.net/Documents/Finaldraft_Caribbean_EP.pdf) (accessed April 28, 2010).
- Blue Flag Programme; 2010. <http://www.blueflag.org/> (accessed April 29, 2010).
- Buddo, Dayne; 2005. "Space Shuttles for Aliens." Jamaica Clearing-House Mechanism: Home. <http://www.jamaicachm.org.jm/Article/August2005.asp> (accessed April 27, 2010).
- Chai, Shauna-Lee.; 2007. "Establishment of the Invasive White-tailed Deer in Portland, Jamaica." Jamaica Clearing-House Mechanism:<http://www.jamaicachm.org.jm/Article/August2007.asp> (accessed May 18, 2010).
- Conservation International; 2007a. "Biodiversity Hotspots - Caribbean - Human Impacts." Conservation International Biodiversity Hotspots - <http://www.biodiversityhotspots.org/xp/hotspots/caribbean/Pages/impacts.aspx> (accessed April 20, 2010).
- Conservation International;2007b. "Biodiversity Hotspots - Caribbean - Overview." Conservation International Biodiversity Hotspots - <http://www.biodiversityhotspots.org/xp/hotspots/caribbean/Pages/default.aspx> (accessed April 23, 2010).
- Creary, Marcia M; 2010. *Coastal and Marine Environment: UWI Thesis Inventory.*
- ; 2008. *Marine and Coastal Zone Assessment.* Report no. FA 118/199.
- Donaldson, Andrea; 2008. *Preliminary Report on the Implementation of the National Strategy and Action Plan on Biological Diversity in Jamaica.* National Environment and Planning

- Agency.
- Environmental Management Solutions Ltd; 2009. *Development of a National Water Sector Adaptation Strategy to Address Climate Change in Jamaica*. Mainstreaming Adaptation to Climate Change Project.
- Espeut, Peter; 1999. "CSI Activities (Portland Bight, Jamaica). 27 April 1999." United Nations Educational, Scientific and Cultural Organization. <http://www.unesco.org/csi/act/jamaica/jamai1.htm> (accessed May 09, 2010).
- Espeut, Peter; 2000. "CSI Activities (Portland Bight, Jamaica)." United Nations Educational, Scientific and Cultural Organization. <http://www.unesco.org/csi/act/jamaica/hellshire.htm> (accessed April 29, 2010).
- FAO; 2005. "Information on Fisheries Management in Jamaica." FAO. <http://www.fao.org/fi/oldsite/FCP/en/JAM/body.htm> (accessed April 26, 2010).
- Fisher, Elaine; 2005. *Final Report Thematic Assessment Convention on Biological Diversity and the Cartagena Protocol on Biosafety*; National Capacity Self-Assessment Project (NCSA).
- Forestry Department; 2001. *National Forest Management and Conservation Plan*. [http://www.forestry.gov.jm/PDF\\_files/ForestPlan.pdf](http://www.forestry.gov.jm/PDF_files/ForestPlan.pdf) (accessed April 29, 2010).
- . 2009; "Strategic Forest Management Plan 2009 - 2013." Forestry Department. [http://www.forestry.gov.jm/PDF\\_files/SFMP\\_FinalFeb23.pdf](http://www.forestry.gov.jm/PDF_files/SFMP_FinalFeb23.pdf) (accessed April 16, 2010).
- GEF; "Establishing the Shortwood Teachers' College as a Green Learning Community." GEF Small Grants Programme. [http://sgp.undp.org/web/projects/12837/establishing\\_the\\_shortwood\\_teachers\\_college\\_as\\_a\\_green\\_learning\\_community.html](http://sgp.undp.org/web/projects/12837/establishing_the_shortwood_teachers_college_as_a_green_learning_community.html) (accessed May 20, 2010).
- ; "Ramble Pond Turtle Assessment and Pond Restoration Project- A Strategy for creating a model inland pond ecology with environmental education and recreational potential." GEF Small Grants Programme. [http://sgp.undp.org/web/projects/12011/ramble\\_pond\\_turtle\\_assessment\\_and\\_pond\\_restoration\\_project\\_a\\_strategy\\_for\\_creating\\_a\\_model\\_inland\\_po.html](http://sgp.undp.org/web/projects/12011/ramble_pond_turtle_assessment_and_pond_restoration_project_a_strategy_for_creating_a_model_inland_po.html) (accessed May 20, 2010).
- Genoways, Hugh H., Robert J. Baker, John W. Bickham, and Carleton J. Phillips; 2005. *Bats of Jamaica*. Special Publications of the Museum, Texas Tech University, 48:1-156. <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1105&context=museummammalogy> (accessed July 16, 2010).
- GOJ; 2008. Cabinet. *Government of Jamaica Policy Register*.
- Goodbody, Ivan; 2004a. *Marine Biodiversity in the Palisadoes Port Royal Protected Area, (PPRPA) Jamaica. Supplemental Information*.
- ; 2006. "Jamaica's Marine Biodiversity (July 2006)." Jamaica Clearing-House Mechanism: Home. <http://www.jamaicachm.org.jm/Article/July2006.asp> (accessed April 25, 2010).
- ; 2004. "Port Royal as a Focal Point of Marine Biodiversity in Jamaica." *Jamaica Journal of Science and Technology* 15 (December 15, 2004): 27-53.

- Goreau, Maya, and Thomas J. Goreau; 1996. "Water Quality in the Negril Area Watershed, Jamaica: Environmental Management Implications." The Global Coral Reef Alliance GCRA. [http://globalcoral.org/water\\_quality\\_in\\_the\\_negril\\_area.htm](http://globalcoral.org/water_quality_in_the_negril_area.htm) (accessed April 26, 2010).
- Institute of Jamaica; 2010. "I3N Jamaica." IABIN. [http://jamaica.inbiar.org.ar/list\\_especies.asp](http://jamaica.inbiar.org.ar/list_especies.asp) (accessed April 16, 2010).
- Jackson, Celia P.J., Wallie H. De Weerd, and Mona K. Webber; 2006. "Haliclona (Reniera) portroyalensis n. sp., a new chalinid sponge (Porifera, Demospongiae, Haplosclerida) from the southeast coast of Jamaica." *Zootaxa* 1319 (August 28, 2006): 59-68. <http://www.mapress.com/zootaxa/2006f/z01319p068f.pdf> (accessed April 06, 2010).
- Jamaica Clearing-House Mechanism; 2010a. "Endemic Bird Database." Jamaica Clearing-House Mechanism. <http://www.jamaicachm.org.jm/EndemicBirds.asp> (accessed May 20, 2010).
- ; 2010b. "Endemic Butterflies Database." Jamaica Clearing-House Mechanism. <http://www.jamaicachm.org.jm/EndemicButterflies.asp> (accessed May 20, 2010).
- ; 2010c. "Endemic Orchids Database." Jamaica Clearing-House Mechanism: Home. <http://www.jamaicachm.org.jm/EndemicOrchids.asp> (accessed May 20, 2010).
- ; 2010d. "Jamaican Biological Diversity." Jamaica Clearing-House Mechanism I. <http://www.jamaicachm.org.jm/Biodiversity/intro.asp> (accessed April 16, 2010).
- John, Kimberly; 2006. *Jamaica Protected Area Gap Assessment: Freshwater*. <http://www.protectedareas.info/upload/document/jamaicafreshwatergapanalysis.pdf> (accessed April 27, 2010).
- Jones, Loureene; 2005. "The Jamaica Coral Reef Monitoring Network (December 2005)." Jamaica Clearing-House Mechanism. <http://www.jamaicachm.org.jm/Article/December2005.asp> (accessed May 18, 2010).
- Koenig, Susan; 2001. *THE FAUNA OF DOLPHIN HEAD, JAMAICA. A Report on the Status of Wildlife Diversity and the Effects of Habitat Modifications on Ecological Communities, Dolphin Head Environs*. Report. [http://www.forestry.gov.jm/dolphinweb/pdf\\_docs/Faunal\\_Report.pdf](http://www.forestry.gov.jm/dolphinweb/pdf_docs/Faunal_Report.pdf) (accessed May 18, 2010).
- Ministry of Energy and Mining; 2009. *Jamaica's National Energy Policy 2009 – 2030*.
- Ministry of Land and Environment; 2003. *Jamaica National Assessment Report*. [http://www.sidsnet.org/docshare/other/20041102123106\\_JAMAICA\\_NAR\\_2004.pdf](http://www.sidsnet.org/docshare/other/20041102123106_JAMAICA_NAR_2004.pdf) (accessed April 26, 2010).
- Ministry of Mining and Telecommunications; 2009. *The National Minerals Policy: Sustainable Development of the Minerals Industry*.
- Mitchell, S., and M. H. Ahmad; 2005/2006. "Protecting Our Medicinal Plant Heritage the Making of a New National Treasure." In *Jamaica Journal* 29, no. 3 (2005/2006): 28-33.
- Mitchell, Sylvia, Adrian Burke, Claudette McKenzie, Shaunakay Stirling, Josette Ryan, Winston Simpson, and Don McGlashan; 2008. *Jamaica: Country Report to the FAO International Technical Conference on Plant Genetic Resources for Food and Agriculture*. Kingston,

2008. <http://www.fao.org/ag/AGP/AGPS/Pgrfa/pdf/jamaica.pdf> (accessed April 5, 2010).
- MoAF; 2008. "Fish Sanctuaries." Ministry Of Agriculture and Fisheries.  
<http://www.moa.gov.jm/Fisheries/Fish%20Sanctuary.php> (accessed April 21, 2010).
- National Commission on Science and Technology; 2006. *Biotechnology for Socio-Economic Development: A Policy for Jamaica. Draft 5.*
- NEPA; 2003. *National Strategy and Action Plan on Biological Diversity in Jamaica.* Kingston: National Environment and Planning Agency, 2003.
- ; 2004. *National Environment and Planning Policy and Strategy (NEPPS) Draft 1.*
- ; 2006. *Jamaica's National Environmental Action Plan (JaNEAP) 2006 to 2009.*  
<http://www.nepa.gov.jm/adverts/JANEAP-2006.pdf> (accessed April 6, 2010).
- ; "Watershed Policy." [http://www.nrca.org/policies/watershed/policy\\_information.htm](http://www.nrca.org/policies/watershed/policy_information.htm)  
(accessed May 17, 2010).
- Neufville, Zadie. 2001 -- Environment-Jamaica: Bauxite Mining Blamed for Deforestation." Forest Protection Portal. <http://forests.org/archive/samerica/bauxmini.htm> (accessed May 21, 2010).
- O'Sullivan, Christine; 2006. "Marine Mammals Strandings in Jamaica." Jamaica Clearing-House Mechanism: Home. <http://www.jamaicachm.org.jm/Article/PDF/html/June2006.html>  
(accessed May 19, 2010).
- PIOJ; 2004. *Economic and Social Survey Jamaica.*
- ; 2005. *Economic and Social Survey Jamaica.*
- ; 2009. *Economic and Social Survey Jamaica.*  
[http://www.pioj.gov.jm/Portals/0/Sustainable\\_Development/OVERVIEW%202009.pdf](http://www.pioj.gov.jm/Portals/0/Sustainable_Development/OVERVIEW%202009.pdf)  
(accessed April 22, 2010).
- ; 2009a. *Final Draft Agriculture Sector Plan.* By Agriculture Task Force.  
[http://www.vision2030.gov.jm/Portals/0/Sector\\_Plan/Microsoft%20Word%20-%20Vision%202030%20Jamaica%20-%20Final%20Draft%20Agriculture%20Sector%20Plan%20?.pdf](http://www.vision2030.gov.jm/Portals/0/Sector_Plan/Microsoft%20Word%20-%20Vision%202030%20Jamaica%20-%20Final%20Draft%20Agriculture%20Sector%20Plan%20?.pdf) (accessed April 7, 2010).
- ; 2009b. *National Report of Jamaica on Millennium Development Goals for the UN Economic and Social Council Annual Ministerial Review.* By Planning Institute of Jamaica and Ministry of Foreign Affairs and Foreign Trade. 2009. <http://www.jm.undp.org/node/184>  
(accessed April 10, 2010).
- ; 2009c. "Overview." In *Economic and Social Survey Jamaica.*  
[http://www.pioj.gov.jm/Portals/0/Sustainable\\_Development/OVERVIEW%202009.pdf](http://www.pioj.gov.jm/Portals/0/Sustainable_Development/OVERVIEW%202009.pdf)  
(accessed April 22, 2010).
- ; 2009d. *Vision 2030 Jamaica: Mining and Quarrying Sector Plan 2009 - 2030.* By Mining and Quarrying Task Force.
- ; 2009e. *Vision 2030 Jamaica: National Development Plan.* Kingston: Planning Institute of

- Jamaica.
- ; 2009f. *Vision 2030 Jamaica: National Development Plan. Combined Sector Plan Natural Resources and Environmental Management & Hazard Risk Reduction and Climate Change*. By Natural Resources and Environmental Management & the Hazard Risk Reduction and Climate Change Task Forces. NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT & HAZARD RISK REDUCTION AND CLIMATE CHANGE (accessed May 29, 2010).
- Proctor, George; 2001. *Interim Checklist of Plants Found in Dolphin Head Project Area*. [http://www.forestry.gov.jm/dolphinweb/pdf\\_docs/Plant\\_Taxonomy.pdf](http://www.forestry.gov.jm/dolphinweb/pdf_docs/Plant_Taxonomy.pdf) (accessed April 14, 2010).
- Rosenberg, Gary; 2005. "Biotic Survey of Jamaican Mollusks and other Terrestrial Invertebrates." Academy of Natural Sciences. <http://clade.ansp.org/malacology/collections/jamaica/#newspecies> (accessed April 20, 2010).
- Special Advisory Services Division Commonwealth Secretariat; 2002. "Master Plan for Sustainable Tourism Development." Ministry of Industry and Tourism. [http://tourism.gov.jm/master\\_plan/](http://tourism.gov.jm/master_plan/) (accessed April 29, 2010).
- Statistical Institute of Jamaica; 2007. *Census of Agriculture 2007. Preliminary Report*. 2007.
- The Nature Conservancy; 2008. "Jamaica Blue and John Crow Mountains Protected Area." The Nature Conservancy Parks in Peril. <http://www.parksinperil.org/wherewework/caribbean/jamaica/protectedarea/bluejohn.html> (accessed April 20, 2010).
- Townsend, Sean; 2009a. *Draft Invasive Alien Species Strategy and Action Plan*.
- UNDP; 2008. "Integrating Watershed and Coastal Area Management (IWCAM) in the Small Island Developing States of the Caribbean." UNDP. [http://www.undp.org/gef/documents/writeups\\_doc/iw/IWCAM.doc](http://www.undp.org/gef/documents/writeups_doc/iw/IWCAM.doc) (accessed May 19, 2010).
- USAID; 2009. "USAID FrontLines: Jamaica Conserves Its Forests, One Community at a Time." U.S. Agency for International Development. [http://www.usaid.gov/press/frontlines/fl\\_decjan10/p03\\_jamaica100106.html](http://www.usaid.gov/press/frontlines/fl_decjan10/p03_jamaica100106.html) (accessed May 17, 2010).
- Warner, George R., and Ivan Goodbody; 2005. "Jamaica." In *Caribbean Marine Diversity: The Known and the Unknown*, 57-70. Lancaster: DEStech Publications, 2005. [http://cbm.usb.ve/CoMLCaribbean/pdf/Jamaica\\_reprint\\_3.pdf](http://cbm.usb.ve/CoMLCaribbean/pdf/Jamaica_reprint_3.pdf) (accessed April 15, 2010).
- WRA; 2005. *Water Resources Authority Annual Report 2004 - 2005*. [http://www.wra.gov.jm/dynaweb.dti?dynamodule=document\\_library&dynapage=download&no\\_template=1&id=8](http://www.wra.gov.jm/dynaweb.dti?dynamodule=document_library&dynapage=download&no_template=1&id=8) (accessed April 27, 2010).

## Appendix IV – Additional Information

### **Some Endemic Bird Species and Conservation Status**

Some endemic bird species are (Jamaica Clearing-House 2010a):

- Jamaican Petrel (*Pterodroma caribbaea*) - believed extinct
- Jamaican Poorwill or Jamaican Parauque (*Siphonorhis americanus*) - critically endangered, suspected extinct
- Crested Quail Dove (*Geotrygon versicolor*) – protected
- Yellow-billed Parrot (*Amazona collaria*) - threatened; CITES: Appendix II. Protected under the Endangered Species Act 2000
- Black-billed Parrot (*Amazona agilis*) - threatened; CITES: Appendix II. Protected under the Endangered Species Act 2000
- Red-billed Streamertail Hummingbird (*Trochilus polytmus polytmus*) – protected
- Jamaican Blackbird (*Nesopsar nigerrimus*) – protected

The Jamaica Conservation and Development Trust (JCDD) monitors birds within the BJCMNP and have found that bird composition is good.

### **Some Endemic Butterflies**

Some endemic butterfly species are (Jamaica Clearing-House 2010b):

- Jamaican Satyr (*Calisto zangis*)
- Jamaican Hairstreak (*Calophrys crethona*)
- Panton's Hairstreak (*Electrostrymon pan*)
- Jamaican Blue (*Hemiargus dominica*)
- Giant Swallowtail (*Papilio homerus* or *Pterourus homerus*) - endangered; Protected under the Endangered Species Act 2000
- Butler's Jamaican Skipper (*Astraptes jaira*)

### **Some Endemic Plants**

Some endemic plant species are (Abdo 2009; Adams 1972; Jamaica Clearing-House 2010c; Windsor Research n.d.):

- *Arpophyllum jamaicense* – rare
- *Blakea trinerva* – Cup and Saucer/Jamaican Rose, common
- *Broughtonia negrilensis* – locally common in western Jamaica
- *Broughtonia sanguinea* – common in eastern and central parishes in Jamaica
- *Buxus arborea* – native to Cockpit Country and found in a confined area in St. James and Trelawny, listed as vulnerable in the IUCN red list, but it was last collected in the mid-1970s
- *Cinnamodendron corticosum* – Mountain Cinnamon/Red Canella, protected under the Endangered Species Act 2000, rare and is listed as vulnerable in the IUCN red list.
- *Euphorbia alata* - rare
- *Lepanthes divaricata* - all but one of the 32 species of *Lepanthes* is endemic. This genus is important biologically and phylogenically. Locally common.
- *Lepanthes proctorii* – rare
- *Maxillaria swartziana* - rare
- *Tolumnia pulchella* (*Oncidium pulchellum*) – widespread and locally common
- *Phyllanthus axillaris* – protected under the Endangered Species Act 2000, and is listed as endangered on the IUCN red list. Restricted to Trelawny.
- *Pleurothallis hirsutula* – rare in central parishes
- *Podocarpus purdianus* – this is a living relic which is part of the gymnosperm lineage

- *Schoepfia harrisii* – listed as vulnerable on the IUCN red list of endangered species.
- *Tetrazygia fadyenii* – frequent on wooded limestone hills and rocky escarpments
- *Weinmannia portlandiana* – protected under the Endangered Species Act 2000, and is listed as vulnerable on the IUCN red list.

### Some Rivers of Jamaica

North Coast	South Coast
South Negril River	New Savannah River
Middle River	Cabarita River
North Negril River	Thicket River
Orange River	Morgans River
New Found River	Mayfield River
Cave River	Roaring River
Fish River	Sweet River
Green Island River	Black River
Lucea West River	Broad River
Lucea East River	Y.S. River
Flint River	Smith River
Great River	One Eye River (underground connection)
Montego River	Hectors River (underground connection)
Martha Brae River	Alligator Hole River
Rio Bueno	Gut River
Cave River (underground connection)	Milk River
Roaring River	Rio Minho
Laughland Great River	Salt River
Dunn's River	Coleburns Gully
White River	Rio Cobre
Rio Nuevo	Rio Pedro
Oracabessa River	Rio Doro
Port Maria River	Rio Magno
Wag Water River (Agua Alta)	Ferry River
Flint River	Hope River
Annotto River	Cane River
Dry River	Yallahs River
Buff Bay River	Morant River
Spanish River	Negro River
Swift River	Plantain Garden River
Rio Grande	
Back River	
Stony River	
Guava River	
Pencar River	
Crawle River	
Swift River	
Ugly River	
Brays River	
Georges River	
Bucket River	
Simons River	
Stony River	

Rivers that are indented are tributaries.



**List of Islands, Cays, and Rocks in Jamaica's Territorial Waters**

1. Anvil Rock - Bowden, St. Thomas
2. Bare Bush Cay - Portland Bight
3. Big Half-Moon Cay - Portland Bight
4. Big Pelican Cay - Portland Bight
5. Big Portland Cay - Portland Bight
6. Blower Rock - Pedro Bank
7. Bogue Islands - Montego Bay, St. James
8. Booby Cay - Negril
9. Booby Cay - Pedro Cays
10. Booby Cay - Morant Cays
11. Bush Cay - Falmouth, Trelawny
12. Bushy Cay - Port Royal Cays
13. Cabarita Island - Port Maria, St. Mary
14. Careening Cay - Portland Bight
15. Christmas Island - Kensington, Portland
16. Dolphin Island - Portland Bight
17. Drunken Man's Cay - Port Royal Cays
18. East Crall - Wreck Bay, St. Catherine
19. Emerald Island - Bowden, St. Thomas
20. Fort Cay - Blue Mahoe, St. Thomas
21. Gordon Cay - Kingston Harbour (now joined to the mainland)
22. Great Goat Island\* - Portland Bight
23. Green Cay - North Bloody Bay, Hanover
24. Green Island - Green Island, Hanover
25. Gun Cay - Port Royal Cays
26. Hogsty Cay - Pera, St. Thomas
27. Lilyroot Cay - Bowden, St. Thomas
28. Lime Cay - Port Royal Cays
29. Little Goat Island - Portland Bight
30. Little Half-Moon Cay - Portland Bight
31. Little Pelican Cay - Portland Bight
32. Little Portland Cay - Portland Bight
33. Long Island - Salt River, Clarendon
34. Maiden Cay - Port Royal Cays
35. Man O' War Cays - West Harbour, Portland Bight
36. Mango Cay - Palm Point, St. Thomas
37. Mid Crall - Wreck Bay, St. Catherine
38. Middle Cay - Pedro Cays
39. Monkey Island - San San, Portland (also called Pellew Island)
40. Morant Cays
41. Navy Island - Port Antonio, Portland
42. Needles - Portland Bight
43. Northeast Cay - Morant Cays
44. Northeast Cay - Pedro Cays
45. One Tree Island - Green Island, Hanover
46. Pedro Cays
47. Pelican Cay - SE of North Negril Point
48. Pellew Island - San San, Portland (or Monkey Island)
49. Pigeon Island - Portland Bight
50. Portland Rock
51. Rackham's Cay - Port Royal Cays
52. Refuge Cay - Port Royal

53. Rocky Cay - Portland Bight
54. Salt Island - Salt River, Clarendon
55. Sandbank Cay - Portland Bight
56. Santamaria Island - Oracabessa, St. Mary
57. Sapphire Island - Tower Isle, St. Mary
58. Short Island - Salt River, Clarendon
59. South Cay - Port Royal Cays
60. Southeast Cay - Port Royal Cays
61. Southeast Cay - Morant Cays
62. Southwest Cay - Pedro Cays
63. Southwest Rock
64. Tern Cay - Portland Bight
65. West Crall - Wreck Bay, St. Catherine
66. Woods Island - Folly, Portland

**Protected Areas, Declaration Date, and Acts under which the areas were Declared.**

<b>PROTECTED AREA</b>	<b>DECLARATION DATE</b>	<b>ACT</b>
Montego Bay Marine Park	June 5, 1992	NRCA
Blue and John Crow Mountains National Park	February 26, 1993	NRCA
Negril Environmental Protection Area	November 28, 1997	NRCA
Negril Marine Park	March 4, 1998	NRCA
Palisadoes/Port Royal Protected Area	September 18, 1998	NRCA
Coral Spring – Mountain Spring Protected Area	September 18, 1998	NRCA
Portland Bight Protected Area	April 22, 1999	NRCA
Ocho Rios Marine Park	August 16, 1999	NRCA
Mason River Protected Area	November 14, 2002	NRCA
Ocho Rios Protected Area	April 7, 1966	BCA
Port Royal Protected Area	May 8, 1967	BCA
Bogue Lagoon Creek Game Reserve, Montego Bay, St. James	December 12, 1963	WLPA
Kingston and St. Andrew Game Reserve	April 15, 1971	WLPA
Knapdale Game Reserve, St. Ann	January 1963	WLPA
Reigate Game Reserve, Manchester	June 6, 1968	WLPA
Stanmore Hill Game Reserve, St. Elizabeth	July 19, 1988	WLPA
Alligator Pond, Guts River and Canoe Valley Game Reserve, Manchester/Clarendon	August 22, 1997	WLPA
Amity Hall Game Reserve, St. Catherine	August 22, 1997, amended July 28, 2004	WLPA
Bogue Lagoon Creek Game Reserve, Montego Bay, St. James	August 22, 1997	WLPA
Glistening Waters Game Reserve, Falmouth, Trelawny	August 22, 1997	WLPA
The Great Morass Game Reserve, Holland Bay, St. Thomas	August 22, 1997, amended July 28, 2004	WLPA
The Lower Morass, Black River Game Reserve, St. Elizabeth	August 22, 1997, amended in 1998	WLPA
The Great Morass Game Reserve, Negril, Westmoreland/Hanover	August 22, 1997	WLPA
The Great Morass Game Reserve, Parottee, St. Elizabeth	August 22, 1997	WLPA

Upper Morass, Black River Game Reserve, St. Elizabeth	August 22, 1997	WLPA
Cabaritta Point Game Reserve, St. Catherine	August 21, 1998	WLPA
Long Island Game Reserve, Clarendon	August 21, 1998	WLPA
Mason River Savanna Game Reserve, Clarendon	August 21, 1998	WLPA
West Harbour, Game Reserve, Clarendon	August 21, 1998, amended in 1999 and July 28, 2004	WLPA
Portmore and Greater Portmore Game Reserve, St. Catherine	July 28, 2004	WLPA
Fairy Hill-Port Antonio Game Reserve, Portland	July 28, 2004	WLPA

### **Acts under which NEPA operates**

- The Natural Resources Conservation Authority Act;
- The Town and Country Planning Act;
- The Land Development and Utilization Act;
- The Beach Control Act;
- The Watersheds Protection Act;
- The Wild Life Protection Act; and
- Endangered Species (Protection, Conservation and Regulation of Trade) Act

### **Policies and plans which guide the work of NEPA**

- Jamaica National Environmental Action Plan (JaNEAP) 1999-2002;
- National Physical Plan;
- Policy for Jamaica's System of Protected Areas – 1997;
- Biodiversity Strategy and Action Plan;
- Watershed Management Policy (Draft);
- Beach Policy for Jamaica (Draft) ; and
- Environmental Management Systems Policy and Strategy (Draft).

