



MINISTRY OF ECONOMIC GROWTH  
AND JOB CREATION

# National Strategy and Action Plan on Biological Diversity in Jamaica 2016-2021



# **National Strategy and Action Plan on Biological Diversity in Jamaica 2016-2021**

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National Strategy and Action Plan on Biological Diversity in Jamaica 2016-2021

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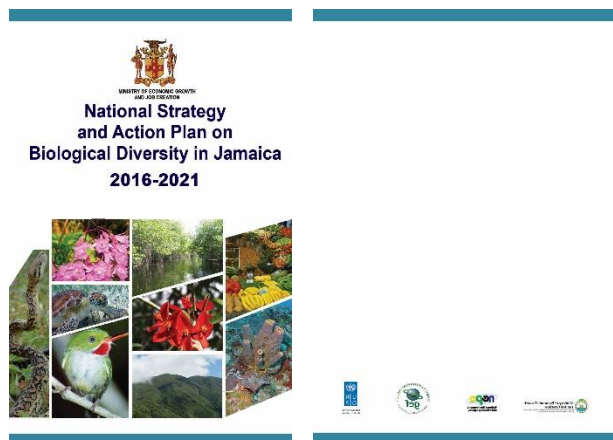
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Cover Photos (clockwise) are: Jamaican Boa (*Epicrates subflavus*); *Broughtonia negrilensis*; a section of the Black River Morass, St. Elizabeth; a Jamaican market scene; Branching Tube Sponge in Jamaican waters; a view of the Blue and John Crow Mountains; *Euphorbia punicea*; Jamaican Tody (*Todus todus*)

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## Foreword

In preparing our second National Strategy and Action Plan for Biodiversity, we have had an opportunity to take stock of the challenges and achievements based on the Plan created thirteen years ago. As we move forward in our nation's development, it is more important than ever to ensure that biodiversity considerations are an intrinsic part of decision-making processes, plans and programmes. There is clear evidence that our natural resources must be conserved and sustainably used for the well-being of Jamaicans now and in the future. Jamaica has made commitments at the international level to conserve and sustainably use our natural resources and to ensure that benefits are equitably shared. In our National Development Plan Vision 2030 Jamaica, these commitments are also reflected in the goal that Jamaica has a Healthy Natural Environment and the associated national and sector outcomes.

In this new Strategy and Action Plan, developed through consultation with stakeholders from the public and private sectors and civil society, practical actions are set out for mainstreaming biodiversity, along with plans for monitoring and communication and for including gender considerations, I am particularly pleased that the linkages with climate change adaptation and mitigation and ecosystem-based management are clearly set out.

Many of us are not aware of, or take for granted, the contribution of healthy natural resources. The diversity of the biological environment is important for the various services it provides such as: the production of food and water; the control of climate and disease; nutrient cycles and crop pollination; and spiritual and recreational benefits. These services are provided by critical ecosystems in Jamaica, such as the Cockpit Country, the Black River Morass, the Great Morass Negril and the Blue John Crow Mountains forest ecosystem.

This updated NBSAP 2016-2021 reinforces the need to have adequate tools and personnel to improve planning and management and it highlights several key issues concerning biodiversity management and conservation. However, successful realization of targets will depend on the level of commitment, prioritization and resource allocation, and the engagement of the society. Should the Action Plans within this NBSAP be implemented as suggested, the country can expect significant enhancement of the effectiveness of biodiversity protection in Jamaica.

Andrew Holness, ON, MP  
Prime Minister and  
Minister of Economic Growth and Job Creation

## Acknowledgements

The development of the National Strategy and Action Plan for Biological Diversity in Jamaica 2016-2021 (NBSAP) would not have been possible without the hard work of many stakeholders. The funds to support the update of the NBSAP document were provided by the Global Environment Facility (GEF) through the executing entity the United Nations Development Programme (UNDP).

Many thanks to the individuals and organizations/stakeholders who took the time and effort to meet with the consulting team, not only to share their knowledge and experience, but also to assist in providing insight on the various topics and sectors. Without their invaluable input, compilation of this report would not have been possible.

Special thanks to the technical team at the National Environment and Planning Agency (NEPA), Environmental Solutions Limited, the International Advisor, the UN NBSAP Peer Review Group, the project Technical Working Group, the NRCA Biodiversity & Game Birds Committee of the Natural Resources Conservation Authority, Jamaica's CBD Focal Point (within the Ministry of Economic Growth and Job Creation) and the Government Partners for their hard work and dedication to the review process for the NBSAP.

To those who assisted with the logistics of the workshops and consultations, and the gathering of data, we also wish to express our appreciation for their kindness and willingness to work with the Consulting team in completing worksheets and providing feedback. Appendix II presents a list of the names of all the stakeholders consulted, the members of the Consultancy team from Environmental Solutions Limited, the Technical Working Group, and the Biodiversity Committee.

We hope that this document will provide the strategic direction needed to help Jamaicans understand the need to conserve and protect the country's rich biodiversity and resources; and we trust that the timely publication of this document will facilitate and encourage the consideration and comprehensive integration of biodiversity into the national planning and decision-making process across all sectors.

## List of Acronyms

ABS	Access and Benefit Sharing
AMANDA	Application Management and Data Automation
APCAR	Action Plan for Corals and Reefs
BCH	Biosafety Clearing-House
BGA	Bureau of Gender Affairs
CBD	Convention on Biological Diversity
CBO	Community-Based Organizations
CCA	Climate Change Adaptation
C-CAM	Caribbean Coastal Area Management Foundation
CCD	Climate Change Division
CH <sub>4</sub>	Methane Gas
JA-CHM	Jamaica-Clearing-House Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Conference of the Parties
CRHI	Coral Reef Health Index
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ERMD	Environment and Risk Management Division
ESL	Environmental Solutions Limited
ESV	Ecosystem Service Valuation
EU	European Union
FAO	Food and Agriculture Organization
FD	Forestry Department
GDP	Gross Domestic Product
GEF	Global Environment Facility
GOJ	Government of Jamaica
Ha	Hectare(s)
IAS	Invasive Alien Species
IOJ	Institute of Jamaica
IUCN	International Union for Conservation of Nature
JCDT	Jamaica Conservation and Development Trust
JCF	Jamaica Constabulary Force
JCRMN	Jamaica Coral Reef Monitoring Network
JDF	Jamaica Defence Force
JET	Jamaica Environment Trust
JHTA	Jamaica Hotel and Tourist Association

JIPO	Jamaica Intellectual Property Office
JIS	Jamaica Information Service
JNHT	Jamaica National Heritage Trust
JSIF	Jamaica Social Investment Fund
JDVRP	Jamaica Disaster Vulnerability Reduction Project
KAP	Knowledge, Attitudes and Practices
KHEMP	Kingston Harbour Environmental Management Programme
KMA	Kingston Metropolitan Area
LFMC	Local Forest Management Committee
LMO	Living Modified Organisms
LSDP	Local Sustainable Development Plans
MEGJC	Ministry of Economic Growth and Job Creation
MFPS	Ministry of Finance and Public Service
MGD	Mines and Geology Division
MICAF	Ministry of Industry, Commerce, Agriculture and Fisheries
MOAF	Ministry of Agriculture and Fisheries
MOE	Ministry of Education
MOJ	Ministry of Justice
MOT	Ministry of Tourism
MRE	Ministry responsible for the Environment
MOU	Memorandum of Understanding
MSET	Ministry of Science, Energy and Technology
MTF	Medium Term Socio-Economic Policy Framework
MTIASIC	Mitigating the Threat of Invasive Alien Species within the Insular Caribbean
NBC	National Biosafety Committee
NBSAP	National Biodiversity Strategy and Action Plan
NCTFJ	National Conservation Trust Fund of Jamaica
NCS	National Conservation Strategy
NCST	National Commission on Science and Technology
NCU	Northern Caribbean University
NEEC	National Environmental Education Committee
NEPA	National Environment and Planning Agency
NFMCP	National Forest Management and Conservation Plan
NGO	Non-Governmental Organization
NHMJ	Natural History Museum of Jamaica
NIA	Nutrient Indicating Algae
NIASSAP	National Invasive Alien Species Strategy and Action Plan
NPAS	National Protected Areas System
NRCA	Natural Resources Conservation Authority
NRV	Natural Resource Valuation

ODPEM	Office of Disaster Preparedness and Emergency Management
PAS	Protected Areas System
PASMP	Protected Areas System Master Plan
PES	Payments for Environmental Services
PIOJ	Planning Institute of Jamaica
PPA	Permanent Protection/Preservation Area
PSOJ	Private Sector Organization of Jamaica
RADA	Rural Agricultural Development Authority
RAMSAR	Convention on Wetlands of International Importance especially as Waterfowl Habitats
SDC	Social Development Commission
SDG	Sustainable Development Goals
SEEA	System of Environmental-Economic Accounting
SFCA	Special Fishery Conservation Area
SFMP	Strategic Forestry Management Plan
SRC	Scientific Research Council
SPAW	Specially Protected Areas and Wildlife
STATIN	Statistical Institute of Jamaica
TEEB	The Economics of Ecosystems and Biodiversity
TEF	Tourism Enhancement Fund
TPDCo.	Tourism Product Development Company
UDC	Urban Development Corporation
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UTECH	University of Technology
UWI	University of the West Indies
WAMM	Watershed Area Management Mechanism
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WMU	Watershed Management Unit
WRA	Water Resources Authority
WROC	Women's Resource and Outreach Centre

## Executive Summary

Jamaica is the third largest of the group of islands known as the West Indies. It is located in the western Caribbean Sea approximately 145km south of the island of Cuba and 161km west of Haiti, with a land area of 10,981km<sup>2</sup>. Jamaica is an archipelagic state consisting of the main island and several rocks, cays and other islands. It has stewardship over a marine space twenty-four (24) times its land space, with an exclusive economic zone of approximately 235,000 km<sup>2</sup>.

Jamaica was known as the Land of Wood and Water by its original inhabitants the Tainos who arrived from around 600AD. The island was colonized by various countries from the arrival of the Spanish in 1494 to 1670 when it was agreed, after various battles, between Britain and Spain that the British would govern Jamaica. Today, the people of Jamaica are descendants of several migrant cultures including African, Chinese, Indian, European, Jewish, and Middle Eastern. The majority of Jamaicans however are of African descent. Cultural attitudes to natural resources reflect the influence of the various migrant populations and the differences associated with rural and urban lifestyles. Religious beliefs also influence the island's diverse cultures, and its numerous traditions and rituals involving the use of plants, animals, land, and water.

The Maroons, who have been designated indigenous people by UNESCO, possess, along with other Jamaicans, traditional knowledge on the use of herbal medicines and utilize plants in ceremonial events. Some Maroons own land in the Cockpit Country, which is rich in biodiversity. Many rural communities continue to use their traditional knowledge and cultural practices which have helped to promote soil fertility and conservation over the years.

The various settlers introduced a variety of crops, such as citrus, bananas, cocoa which resulted in many changes to the physical landscape. They also brought animals such as goats, chickens, and cattle.

At the end of 1998, the population of Jamaica was estimated at 2,576,300; by the end of 2014, the estimated number was 2,723,246 (1,375,203 female

and 1,348,043 male). (Statistical Institute of Jamaica). An increasing percentage of the population lives in urban areas. Kingston, the capital, is situated on the seventh largest natural harbour in the world, and is the country's major trade centre.

### Jamaica's Biodiversity

Biodiversity contributes positively to the social, environmental and economic growth of Jamaica. The main industries include agriculture, tourism, mining and quarrying and all based on natural resources.

The country has a rich biodiversity, marked by high endemism of species. Jamaica has been ranked fifth among islands of the world in terms of endemic plants. There is also a high level of endemism for many species of animals including snails, terrestrial grapsid crabs, amphibians, reptiles, and land birds. There is a diverse range of ecosystems:

- Terrestrial – wetlands, mangrove forests and inland forests (highland, lowland);
- Marine/coastal – coral reefs, beaches, seagrass beds, coastal waters, fisheries; and
- Freshwater – coastal and inland wetlands, ponds, rivers.

Jamaica's forests are the main repositories of terrestrial biodiversity, especially of endemic flora and fauna.

Reports on the state of species and ecosystems are available in Jamaica's five National Reports to the Convention on Biological Diversity, the Stocktaking Report on Implementation of the National Biodiversity Strategy and Action Plan, and the State of the Environment Reports for 2010 and 2013, among others.

The Second NBSAP addresses information up to 2013 on species diversity, the status of threatened and endangered species and Jamaica's actions and plans to develop a protected areas system including the preparation of the Protected Areas System Master Plan.

Among the many factors that contribute to the loss of biodiversity in Jamaica are poverty, population growth, lack of public awareness about the importance of conserving biodiversity,

The 2015 Stocktaking Report identified the main threats to biodiversity in Jamaica as habitat loss, climate change, resource over-exploitation, invasive alien species and pollution.

Conservation constraints included:

- a lack of political will;
- limited public awareness;
- conflicting policy/limited inter-Agency collaboration;
- unwillingness to share data/information;
- limited scientific information;
- limited information on biological resources and natural heritage;
- low revenue/funding;
- limited expertise in areas such as taxonomy;
- poor socio-economic planning; and
- weak law enforcement.

Other factors noted in the State of the Environment Report, 2010 were population growth, coupled with agricultural, industrial and commercial expansion, which resulted in intense competition for land, leading to encroachment and fragmentation of natural habitat; natural processes and events such as erosion and hurricanes, the effects of which were often exacerbated by human activities and practices and climate change considered as being likely to further increase the negative impacts of these natural events.

## Policy and Legislation

Jamaica has an extensive policy and legal framework for the management of biodiversity. While some policies and laws have remained in draft, recent initiatives include the development of the Forest Policy for Jamaica as a Green Paper, the Climate Change Policy Framework, 2015, a draft National Fisheries and Aquaculture Policy, a draft Cays Management Policy, and a draft of comprehensive policy and legislation on a protected areas system. There are also plans for the development of other policies and legislation.

One of the most important developments since the first NBSAP in 2003 was the preparation of Jamaica's first long term sustainable development plan – Vision 2030 Jamaica – National Development Plan 2009-2013. One of the four goals of the Plan is that Jamaica has a healthy natural environment. Within this goal are three National Outcomes, including National Outcome 13 on the *Sustainable Management and Use of Environmental and Natural Resources*.

## The Updated National Strategy and Action Plan, 2016-2021

Since 2003, several global and national policies and or initiatives have enhanced the approaches recommended for development of national biodiversity protection and these have helped to underpin Jamaica's updated Strategy. These include the global Sustainable Development Goals (SDGs) for 2015-2030, Vision 2030 Jamaica - National Development Plan, and the supporting Medium Term Framework which has been recently updated to cover the period 2015–2018.

The National Strategy and Action Plan for Biological Diversity in Jamaica 2016-2021 (NBSAP) was prepared as an update to the strategy and action plan prepared in 2003. This document has provided an update of Jamaica's conservation efforts since the 2003 strategy and action plan and now includes biodiversity conservation which are aligned to the Convention on Biological Diversity Aichi Targets. The matter of mainstreaming of biodiversity is one of the main elements of the NBSAP.

The vision and guiding principles developed in 2003 are still the same:

**Vision-** Mindful of the importance of our natural heritage to the well-being of present and future generations, recognising that sustainable use of biodiversity is the only way to secure its availability for future generations, and being conscious of the intrinsic value of biological diversity we accept our responsibility to conserve and protect Jamaica's biodiversity through mainstreaming in key sectors, sustainable use, and fair and equitable sharing of the benefits derived from this biodiversity.

## Guiding Principles:

- **Principle I - Transparency**  
Affirm their commitment to open and transparent decision-making processes and provide opportunities for the participation of all citizens in the development of strategies, plans and programmes aimed at addressing biodiversity issues.
- **Principle II - Acknowledge the need for behavioural change**  
Address the underlying causes of the loss and decline of biodiversity by promoting the necessary societal changes through policies, laws, public education and awareness.
- **Principle III - Local and traditional knowledge**  
Respect local and traditional knowledge when developing and implementing policies, programmes and plans related to biodiversity.
- **Principle IV - Protect habitats, ecosystems, species and genetic resources**  
Adopt comprehensive biodiversity strategies and plans as part of efforts to conserve Jamaica's habitats, ecosystems, species and genetic resources.
- **Principle V - Local management**  
Encourage NGOs and community groups to manage protected areas; operate rescue centres; captive breeding and other artificial propagation facilities; and to implement species management and recovery plans.
- **Principle VI - Precautionary approach**  
Ensure that the precautionary approach (Principle 15, Rio Declaration 1992) is applied as widely as possible to avoid or minimise environmental degradation and the loss of biodiversity.
- **Principle VII - Environmental economic tools and technology**  
Invest adequate financial capital in resource management tools, including biophysical inventories, monitoring, research, enforcement, environmental education and other activities to ensure the conservation of biodiversity and the sustainable use of biological resources.

- **Principle VIII - Sectoral integration**

Ensure that economic, social and environmental objectives are integrated, and policies, strategies, plans and programmes are co-ordinated to effectively use scarce human and financial resources to ensure their greatest positive impacts.

The updated NBSAP presents several activities to achieve the Aichi Targets which have been prioritized based on consultations with the main national stakeholders. The understanding of biodiversity as a critical asset for the Jamaican people and ensuring long term and sustainable economic activities are key to promoting the importance of biodiversity conservation across all economic sectors through public, private and civil sectors. The updated NBSAP seeks to provide activities which not only target the awareness and sensitization among groups but also foster engagement and buy-in to the strategic goals. It also has recognized the increasing challenge posed by climate change to biodiversity conservation and the need for the recovery of degraded ecosystems for environmental health and to building climate change resilience. . With regard to the Aichi Targets, there is no goal that explicitly targets strengthening legislation to support biodiversity conservation. However, improving legislation along with the enforcement and implementation of same directly impacts all of the key areas discussed in this document.

The updated NBSAP consists of five parts:

- Part I provides background information on Jamaica and on the development of the NBSAP and progress in implementing the NBSAP of 2003;
- Part II addresses the state of biodiversity in Jamaica;
- Part III sets out the policy and legislative framework related to biodiversity, including international treaties concerning biodiversity to which Jamaica is a Party;
- Part IV addresses pressures, gaps and challenges related to loss of biodiversity; and
- Part V presents the Strategy and Action Plan which includes the National Biodiversity Targets and Indicators and the supporting



Monitoring Plan for achieving the national targets.

An extensive stakeholder consultative process guided the preparation of the updated NBSAP. A National Targets Workshop was held on July 7, 2016 and a Mainstreaming and Action Planning Workshop was held on September 17, 2016. Group and individual interviews were also conducted separately with a number of Ministries and government agencies, Non-Governmental Organisation (NGOs), Academia and the private sector. A Gap Analysis and Organisational Capacity Assessment were conducted. This revealed several areas where biodiversity management needed to be strengthened such as organizational and institutional capacity, public awareness and education, socioeconomic and gender issues, as well as in the mining, tourism and agriculture sectors.

Extensive literature review was also conducted during the update of the NBSAP. This review indicated that Jamaica has made significant progress towards the Aichi Targets though improvement is needed.

Mainstreaming biodiversity is the most effective approach to achieving the conservation and preservation of biodiversity in Jamaica. The national targets thus developed sought to ensure this mainstreaming to enable achievements of the Aichi Targets. Biodiversity conservation and management will be mainstreamed into all development plans during preparation, updating and revisions of the Medium Term Framework documents of Vision 2030 Jamaica. Mainstreaming of biodiversity at the national level will be done through national poverty reduction strategies and other cross-cutting plans and policies such as those related to gender, climate change and disaster risk reduction. In addition, biodiversity conservation will be mainstreamed into the plans of key production sectors such as forestry, fisheries, mining, tourism and agriculture. Five strategic goals and 20 Aichi Targets that were considered relevant and applicable to Jamaica were identified and adopted through stakeholder consultation. The Strategic Goals and national targets for the relevant Aichi Targets are listed below:

<b>National Targets</b>
<b>STRATEGIC GOAL A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society</b>
1. By 2021, Jamaicans are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.
2. By 2021, at the latest, biodiversity values have been integrated into national and local development and poverty reduction and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.
3. By 2021, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant obligations, taking into account national socioeconomic conditions.
4. By 2021, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits
<b>STRATEGIC GOAL B – Reduce direct pressures on biodiversity loss and promote sustainable use</b>
5. By 2021, at the latest, the rate of loss of natural habitats, including forests, is at least halved and where feasible, brought close to zero, and degradation and fragmentation is significantly reduced.

<b>National Targets</b>	
6.	By 2021, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.
7.	By 2021, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
8.	By 2021, pollution, including from excess nutrients and solid waste, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
9.	By 2021, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.
10.	By 2021, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.
<b>STRATEGIC GOAL C – Improve the status of ecosystems by safeguarding ecosystems, species and genetic diversity</b>	
11.	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective based conservation measures, and integrated into the wider landscapes and seascapes.
12.	By 2021, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.
13.	By 2021, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.
<b>STRATEGIC GOAL D – Enhance the benefits to all from biodiversity and ecosystem services</b>	
14.	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, and local communities and the poor and vulnerable.
15.	By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, hereby contributing to climate change mitigation and adaptation and to combating desertification.
16.	By 2020, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational consistent with national legislation.
<b>STRATEGIC GOAL E – Enhance the implementation through participatory planning, knowledge management and capacity building</b>	
17.	By 2019, each party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.
18.	By 2021, the traditional knowledge, innovations and practices of local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations,

## National Targets

and fully integrated and reflected in the implementation of the Convention with the full and effective participation of local communities, at all relevant levels.

19. By 2020, the knowledge, the science base and technologies relating to biodiversity, its values, functioning, status, and trends, the consequences of its loss, are improved, widely shared and transferred and applied.

20. By 2019, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2016–2021 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

# PART I – INTRODUCTION

©[http://www.jamaicanpost.com/jamaica\\_national\\_flower\\_lignum\\_vitae.htm](http://www.jamaicanpost.com/jamaica_national_flower_lignum_vitae.htm)



Jamaican Lignum Vitae (*Guaiacum officinale*)



Jamaican Doctorbird (*Trochilus polytmus*)

© <http://kiwanisstandrew.org/indigenous-animals-of-jamaica/>

© Institute of Jamaica



Hot Lips (*Cephaelis elata*) (SW) = *Phsychothnia elata* (SW)



Orion Cecropian Butterfly/Orion (*Historis odius*)

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# 1 Introduction

Biological diversity, also referred to as biodiversity, is defined as the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems. (Convention on Biological Diversity (CBD)).

The objectives of the Convention on Biological Diversity, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the Convention at the national level. The Convention requires countries to prepare a national biodiversity strategy and to ensure that it is mainstreamed into the plans of the sectors that have activities which can impact biodiversity. As a party to the CBD and in keeping with its commitments, Jamaica prepared its National Strategy and Action Plan on Biological Diversity (NBSAP) in 2003. Five national reports have been made to the CBD to date.

## 1.1 Lessons learned from the 2003 NBSAP

Jamaica's first NBSAP included seven goals and strategic directions, aligned with the articles of the CBD, to:

- a. Conserve Jamaica's Biodiversity;
- b. Promote sustainable use of biological resources;
- c. Facilitate access to biological resources to promote developments in biotechnology and to ensure benefit sharing;
- d. Ensure safe transfer, handling and use of Living Modified Organisms (LMOs);
- e. Enhance resource management capacity;
- f. Promote public awareness and education and community empowerment; and

- g. Promote regional and international cooperation and collaboration in support of the implementation of the CBD.

Preliminary to the preparation of the second NBSAP, a stocktaking of the implementation of the first NBSAP for the period 2010 to 2013, including stakeholder consultations, was carried out and a report produced in November, 2015. The third and fourth national reports to the CBD which covered the period 2003 to 2009 had provided updates on the status of the NBSAP, its implementation, and the extent to which biodiversity concerns had been effectively mainstreamed in accordance with Articles 6 (b) of the Convention.

The Stocktaking Report noted that the NBSAP had served to guide national efforts for conservation and sustainable use of the island's resources.

Several sector strategies in the Medium Term Socio-Economic Policy Framework for Vision 2030 Jamaica–National Development Plan on biodiversity conservation were aligned with the strategies of the NBSAP, thereby strengthening the commitment of entities to implement projects. Several gaps and challenges listed in the NBSAP were reiterated in the Vision 2030 combined sector plan on Natural Resources and Environmental Management and Hazard Risk Reduction and Climate Change for the period 2009-2030.

Assessment of the implementation of the NBSAP since 2010 revealed that 22 of the 37 project profiles had either been completed, were on-going, or had commenced. Additional national projects implemented among agencies across various sectors allowed for several of the NBSAP strategies and related activities to be realized. The projects include the Global Environment Facility (GEF) Project on Strengthening the Operational and Financial Sustainability of the National Protected Areas System (NPAS) (2010-2016), the European Union (EU) funded Climate Change Adaptation and Disaster Risk Reduction Project (2001-2013), and the GEF funded pilot projects under the regional Invasive Alien Species project (2009-2014).

The implementation of many of the projects in the 2003 NBSAP beyond the seven year timeline resulted from insufficient funds to undertake activities as well as delays due to insufficient human resources.

The Report noted that, notwithstanding successes in amending and developing policies and legislation, there was a critical need to strengthen the legislative framework.

Consultations with stakeholders revealed the current threats to biodiversity to be invasive alien species (IAS), air and water pollution, over-exploitation, poor agricultural practices and informal settlements. Additional threats include habitat loss from mining and quarrying activities, developments, and increased incidents of natural disasters and droughts due to climate change.

Weak law enforcement, inadequate public awareness, limited inter-agency collaboration and conflicting policies were some of the constraints highlighted among stakeholders.

It was recommended that strengthening of capacities within agencies must be considered in the revised NBSAP to address recurrent threats and constraints. Other recommendations were that there should be more coordinated systems of data sharing and information exchange at a national level, increased sensitization activities among stakeholders and greater coordination in the preparation of the new NBSAP. One notable gap was that gender issues had not been included.

## 1.2 Development of Jamaica's Second NBSAP

The update of the 2003 NBSAP addresses changes in national policies, programmes and plans and the constitutional, legal, policy and institutional framework as well as gaps in implementation of the CBD. There have also been changes at the global level such as the agreement on the Post 2030 Development Agenda and the Sustainable Development Goals (SDGs) to be taken into account.

Jamaica's second NBSAP assesses the value of the country's biodiversity and ecosystem services and their current state and outlines the priority areas and

strategies to be implemented over the five-year period 2016 to 2021. The NBSAP takes into account the CBD's Strategic Plan 2011 – 2020 and the Aichi Targets, and is in keeping with Vision 2030 Jamaica – National Development Plan, 2009.

The primary considerations in this strategy and action plan are to integrate biodiversity conservation and sustainable use into sectoral and cross-sectoral processes and guidelines and also to increase the awareness of the general public of the importance of conserving biodiversity. Recommendations are made on policies, plans, legislation, budgets, indicators and monitoring systems identified for the following sectors:

- a) Agriculture;
- b) Forestry;
- c) Fisheries;
- d) Mining and Quarrying;
- e) Tourism;
- f) Education;
- g) Energy; and
- h) Transportation, Housing and Construction

Cross-sectoral strategies were developed for mainstreaming biodiversity into plans related to sustainable development, gender, poverty reduction, climate change, and disaster risk reduction.

The strategies and activities have been prioritized for implementation within the 5-year timeframe.

A resource mobilisation strategy has also been developed to support the completion of the activities set out in this NBSAP, and a monitoring and evaluation plan prepared to determine how Jamaica is meeting the National Targets.

Fundamental provisions in the first NBSAP, on the vision and the guiding principles, are retained.

The NBSAP comprises five sections:

- i. Part I provides background information on Jamaica and on the development of the NBSAP and progress in implementing the NBSAP of 2003;
- ii. Part II addresses the state of biodiversity in Jamaica;
- iii. Part III sets out the policy and legislative framework related to biodiversity, including

international treaties concerning biodiversity to which Jamaica is a Party;

- iv. Part IV addresses pressures, gaps and challenges related to loss of biodiversity; and
- v. Part V presents the Strategy and Action Plan which includes the National Biodiversity Targets and Indicators and the supporting Monitoring Plan for achieving the national targets.

Two consultations were carried out in preparing the NBSAP, namely, a National Targets Workshop which was held on July 7, 2016 and a Mainstreaming and Action Planning Workshop, held on September 17, 2016. Group and individual interviews were also conducted with Ministries and government agencies, Non-Governmental Organizations (NGOs), representatives of academia and the private sector. A list of the stakeholders consulted is shown at Appendix II.

The main reports which informed this document are a Gap Analysis and an Organizational Capacity Assessment; the National Biodiversity Strategy and Action Plan (2003) Stocktaking Report, 2015; Jamaica's Fifth National Report to the CBD (December 2015) covering the period 2010-2013 and its report on *Progress towards the 2015 and 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 targets of the Millennium Development Goals*; and Jamaica's State of the Environment Reports for 2010 and 2013.

The Communication Strategy that was developed for the NBSAP also speaks to building the awareness of all stakeholders including vulnerable groups through direct activities with local Community Based Organizations (CBOs). Appendix IV shows the Stakeholder Map from the Communication Strategy that guided the development of this NBSAP and that will guide the implementation of this NBSAP.

The CBD's Training Packages for updating the NBSAP also provided significant guidance.

## 1.3 Background

### 1.3.1 Jamaica - Land of Wood and Water

Jamaica is the third largest of the group of islands known as the West Indies. It is located in the western Caribbean Sea approximately 145 kilometres south of the island of Cuba and 161 kilometres west of Haiti, with a land area of 10,981 square kilometres. As an archipelagic state, Jamaica has stewardship over a marine space 24 times its land space, with an exclusive economic zone of approximately 235,000 square kilometres.

### 1.3.2 People and Culture

The original inhabitants of Jamaica, the Tainos, arrived on the island around 600 AD. The Taino population was greatly decimated within 50 years of the arrival of Columbus in 1494, and by the beginning of the 17<sup>th</sup> Century, fewer than 100 were left. Today, the people of Jamaica are descendants of several migrant cultures including African, Chinese, Indian, European, Jewish, and Middle Eastern. This diversity gave rise to the island's motto, "*Out of Many, One People*", which is inscribed on Jamaica's Coat of Arms.

Cultural attitudes to natural resources reflect the influence of the various migrant populations and the differences associated with rural and urban lifestyles. Religious beliefs also influence the island's diverse cultures, and its numerous traditions and rituals involving the use of plants, animals, land, and water. These religious beliefs include Christianity, Judaism, Rastafarianism, Islam and Hinduism.

The majority of Jamaica's population is of African descent. Most Jamaicans practice their African traditions in one form or another, for example, in speech, foods eaten, folklore, customs, music and dance, as well as in family and community life. The Maroons, who have been designated indigenous people by UNESCO, possess, along with other Jamaicans, traditional knowledge on the use of herbal medicines and utilize plants in ceremonial events. The Maroons of Accompong in St. Elizabeth are

owners of land in the Cockpit Country, which is rich in biodiversity.

Many rural communities continue to use their traditional knowledge and cultural practices, for example, using phases of the moon to aid in determining the optimal timing for planting of crops; implementing traditional agriculture practices including pest control, crop rotation, mulching, mixed cropping; and using economic plants as live contour barriers. These practices have helped to promote soil fertility and conservation over the years.

### 1.3.3 History of Jamaica

Prior to 1494, Jamaica was occupied exclusively by Tainos who favoured living in coastal villages. The Tainos called the island "Xaymaca" - Land of Wood and Water. They enjoyed a varied diet including fish and shellfish, cassava, maize, fruits, birds, hutia (coney), iguanas, snakes and manatees.

The arrival of Christopher Columbus and his ships in 1494 marked the first recorded visit of Europeans to the island. Spanish settlers followed, introducing a variety of crops, which resulted in many changes to the physical landscape. They established plantations of exotic crops such as citrus, bananas, sugar cane, cotton, cocoa and tobacco and brought horses, goats, chickens, pigs and cattle, which, like the plantation crops, were selected for their ability to adapt to the local climate.

The British arrived in 1655 and fought Spain for control of Jamaica until the treaty of Madrid, which gave governance to the British in 1670.

The British introduced other fruits including breadfruit (*Artocarpus altilis*) and otaheite apple (*Jambosa malaccensis*). Ackee (*Blighia sapida*) was introduced by slaves and mangoes (*Mangifera indica*) were probably initially introduced from fruits taken off a captured French ship.

The majority of Jamaica's population still lives on the coastal plains and consequently this is where most economic activities occur. This concentration of people and the resulting developments have had

significant impacts on marine and coastal resources.

At the end of 1998, the population of Jamaica was estimated at 2,576,300; by the end of 2014, the estimated number was 2,723,246 (1,375,203 female and 1,348,043 male) (Statistical Institute of Jamaica data). An increasing percentage of the population lives in urban areas. Kingston, the capital, is situated on the seventh largest natural harbour in the world, and is the country's major trade centre.

The island is divided into three counties, and further sub-divided into fourteen parishes. Eleven of the parish capitals are located along the coast and represent the main population centres.

## 1.4 Jamaica's Physical Features

Jamaica's biodiversity is influenced by a variety of physical factors such as topography, geology, terrain and climate.

### 1.4.1 Topography

The country's topography consists of a highland interior, formed by a backbone of peaks, hills and plateaux running the length of the island, which is surrounded by flat coastal plains. The highest peaks are to the east, with the Blue Mountain peak reaching a height of 2,256 m. The central and western parts of the island are mainly limestone hills and plateaux dissected by faults and karstified to varying degrees. The most developed karst topography is in the Cockpit Country which is an important ecological area of the country and is still relatively undisturbed. Elsewhere, the karst is less developed and the terrain generally comprises rolling hills, sinkholes, ridges and caves.

The coastal plains are narrow on the north coast and tend to be wider along the south coast. These include alluvial areas such as the plains of Clarendon, St. Catherine and St. Andrew. There are some extensive wetlands on the coastal plains such as the Black River Upper and Lower Morasses, the St. Thomas Great Morass, West Harbour and the Negril Morass. In addition to coastal lowlands, there are three interior valleys. The coastal plains and the interior valleys are the prime agricultural areas.



Jamaica's irregular coastline is 795 km long and has diverse ecosystems including sandy beaches, rocky shores, estuaries, wetlands, seagrass beds and coral reefs. Most of the living marine resources are found on the island shelf and nine oceanic banks which cover an area of 4,170 sq. km. The island shelf is much wider on the south coast with a maximum width of approximately 24 km. On the north coast the island shelf averages only 1.6 km in width.

### 1.4.2 Geology

Jamaica has an igneous and metamorphic core, covered to a great extent by limestone deposited during periods of marine submergence. Approximately 70% of the island's surface area is covered by limestone. The remaining 30% is covered by igneous and metamorphic rocks, shale, and alluvium. The soils of the country are a reflection of the geology. In the upland plateau for example, soils are formed from weathered limestone and constitute approximately 64% of the island's soil, while the alluvial soils of the flood plains, river terraces, inland valleys and coastal plains, constitute approximately fourteen percent (14%).

### 1.4.3 Climate

Jamaica has a tropical maritime climate which is influenced by northeast trade winds and land and sea breezes. In the cooler months of January and February, the average temperature is approximately 25° Celsius (C). Temperatures in the warmest months, July and August, range from 28°C to 30°C. Temperature is significantly affected by altitude. In the higher elevations of the Blue Mountains and some plateaux, temperatures may be as much as 15 degrees cooler.

The mean annual temperature for Jamaica is projected to increase between 1.1 °C and 3.2 °C by the 2090s, based on existing climate models. The range of increase is 0.7°C to 1.8°C by the 2050s and 1.0°C to 3.0°C by the 2080s. There will be continuing increases in sea-surface temperatures for Jamaican waters with projected increases ranging between +0.9°C and +2.7°C by the 2080s (Meteorological Office, 2015).

Rainfall is marked by monthly, annual and spatial variability, with the average annual rainfall for the country being approximately 200cm. The northeast portion of Jamaica receives the highest annual rainfall, which is in excess of 330cm. Areas in the southern coastal plains receive less than 127 cm annually and water shortages are common occurrences, especially along the southern coastal plains. The rainfall pattern is bimodal with peaks in May and October. Heavy rainfall associated with passing storm systems may also occur during the annual hurricane season (June to November). Other natural phenomena, which affect the island's biodiversity, include hurricanes, earthquakes, floods and droughts.

Projected rainfall changes range from -44% to +18% by the 2050s and -55% to +18% by the 2080s. (Meteorological Office, 2015).



*Trimezia martinicensis*,

©Institute of Jamaica

# PART II – SITUATIONAL ANALYSIS OF JAMAICA’S BIODIVERSITY

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©Dayne Burdho

Brown Pelican (*Pelecanus occidentalis*)



© [https://twitter.com/jamaicanmanatee]

West Indian Manatee (*Trichechus manatus*)



©Florida Tropical Botanical Gardens

*Euphorbia punicea*

## 2 Situational Analysis of Jamaica's Biodiversity

### 2.1 The Value of Biodiversity to Jamaica

Jamaica has a diverse range of ecosystems and related habitats:

- Terrestrial – wetlands, mangrove forests and inland forests (highland, lowland)
- Marine/coastal – coral reefs, beaches, seagrass beds, coastal waters, fisheries
- Freshwater – coastal and inland wetlands, ponds, rivers

Estuarine and wetland environments exist in low-lying areas that extend into the nearshore and give rise to an abundance of biodiversity. Typical tropical marine ecosystems dominate, including deep ocean basins.

In its Environmental Profile of the Caribbean, the Critical Ecosystems Partnership Fund described the region's 30 nations and territories, including Jamaica, as 'one of the world's greatest centres of endemic biodiversity'. (The Caribbean Islands Biodiversity Hotspot – Birdlife International, 2010). In Latin America and the Caribbean, biodiversity and ecosystems are among the region's most valuable assets and of strategic importance for attaining long-term sustainable development.

Biodiversity contributes positively to the social, environmental and economic growth of Jamaica. For example, increasing the variety of agricultural plant species can benefit the agricultural sector; and healthy biodiversity can increase the capacity of Jamaica to withstand and recover from natural disasters, such as drought and flooding.

There is a direct relationship between diverse ecosystems and the opportunities available for: new medical discoveries, economic development, and adaptive responses to challenges, such as climate change and global warming. On the other hand, while extraction of natural resources such as minerals, for example, has been profitable, it has, in

some cases, led to overexploitation and losses of biodiversity.

The value of biodiversity can be separated into two categories namely economic and social. Direct economic benefits of biodiversity are either consumptive or productive and include sustenance of livelihood, i.e. obtaining services for survival from the environment such as land and firewood; and the use of goods and services harvested from the environment that are bought and sold locally and internationally. Examples (productive) include timber, fuelwood, fish and shellfish, fruits and vegetables and seaweed. (Parchman *et al*, n.d.). Indirect anthropocentric benefits include water resource protection, soil formation and protection, pollution breakdown and absorption, recreation and ecotourism, to name a few. (Parchman *et al*, n.d.)

In recognition that the value of ecosystem services are essential to human well-being, Jamaica has declared several marine and terrestrial protected areas and prepared the Protected Areas System Master Plan (PASMP), (2013 to 2017) to develop a comprehensive and representative system of protected areas. The ecosystems in these sites have or support extractive direct use values (e.g. forestry); non-extractive direct use values (tourism and recreation); indirect use values (control of soil erosion and coastal protection); and non-use values (biodiversity). Forests, for example, play a vital role in protecting and conserving water, soils and biological diversity. The forested areas that protect upper watersheds reduce run-off and allow percolation thereby ensuring a more regular flow of water to reservoirs (PASMP, 2013).

Coastal and marine ecosystems in marine protected areas support fisheries as well as recreational activity and tourism. Studies of the country's marine protected areas show that they have had some effectiveness. In 2008, there were two to three times more commercially important fish species and increased density of spiny lobsters inside marine protected areas than in unprotected areas (PASMP, 2013).

Marine protected areas are not just useful fisheries management tools; they can be important assets to Jamaica's tourism product, particularly for dive tourism. Terrestrial protected areas, such as forest reserves and heritage sites, are also important tourist attractions and they too are worth being looked after in order to support this economically important industry (PASMP, 2013).

Jamaica's natural environment, including the beaches and reefs, is a primary attraction for its visitors; this means the quality of the environment is important for the tourism industry, which generated 278,500 jobs or 24 per cent of total employment in 2011 and contributed J\$335.1bn to GDP (accounting for 25.6 per cent of GDP) in that same year. (World Travel and Tourism Council, 2012) (PASMP, 2013)

As the cost of replacing biodiversity (if possible) becomes increasingly expensive and risky, it makes economic and development sense to strengthen sustainable use and conservation of what already exists.

## 2.2 Species Diversity

Species diversity refers to the number and variety of species found within the marine, terrestrial and freshwater ecosystems of Jamaica, such as coral reefs, dry and wet limestone forests, mangrove forests and wetlands. There are two broad categories of classification of species according to the status of their existence on the island, namely, native species and introduced species (NEPA, n.d.).

Jamaica has been ranked fifth among islands of the world in terms of endemic plants. There is also a high level of endemism for many species of animals including snails, terrestrial grapsid crabs, amphibians, reptiles, and land birds.

The status of species of fungi, bacteria, viruses and some invertebrates is not yet well known. According to Jamaica's Conservation Data Centre's database, at least 221 endemic species are classified as 'critically imperilled' and 'especially vulnerable to extinction'. However, this database is incomplete.

## 2.3 Terrestrial Biodiversity

Jamaica's terrestrial biodiversity is characterized by over 3,304 vascular plant species, 600 species of ferns, 136 species of butterflies, and 106 known bird species (31 of which are indigenous to Jamaica and are migratory).

Information on Jamaica's richness in terrestrial biodiversity continues to grow, as on-going research activities on various taxa revealed new records, taxonomic reclassifications and changes in species status since 2010. Table 2.1 shows native (indigenous and endemic) terrestrial plant and animal species in Jamaica along with revised data on some species.



*Heppiella corymbossa* found in Cane River, St. Thomas

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Table 2.1 - Species Diversity in Jamaica

Fauna/Flora	2009		2013	
	Total estimated number of Species	Number of Endemic Species	Total estimated number of Species <sup>1</sup>	Number of Endemic species
<b>Fauna</b>				
<b>Arthropods and other invertebrates</b>				
Rotifers	211	21	211	21
Land Snails	561	505	<b>514</b>	<b>499</b>
Grapsid Crabs	9	9	9	9
Jumping Spiders	26	20	26	20
Fireflies	48	45	48	45
Butterflies	133	20	<b>136</b>	<b>38</b>
Moths	-	-	<b>730</b>	<b>&gt;292</b>
Ants			59	6
Carabid beetles			No data	No data
Scolytid & Platypodid beetles			69	31
<b>Amphibians</b>				
Frogs	22	22	<b>21</b>	<b>21</b>
<b>Reptiles</b>	43	33	43	33
Crocodiles	-	-	1	0
Lizards	-	-	29	28
Snakes	-	-	9	9
Freshwater turtles	-	-	1	1
Marine turtles	-	-	4	0
<b>Birds</b>				
Shore and Sea Birds	39	1	39	1
Land Birds	67	30	67	30
<b>Mammals</b>				
Bats	21	2	21	<b>5</b>
Other mammals (rodents)	2	2	2	2
<b>Fish</b>				
Freshwater fish			29	4
<b>Flora</b>				
Bromeliads	60	22	60	<b>26</b>
Orchids	230	60	<b>219</b>	<b>62</b>
Ferns	579	67	579	67
Cacti	20	10	20	<b>4</b>
Palms	12	7	12	7
Grasses	200	1	200	1
Trees			No data	316

Note: Figures in bold indicate an increase in number; those italicized and in red indicate a reduction

(Source: Fifth National Report, 2015; State of the Environment Report, 2013)

The changes in species numbers include a revision in the number of indigenous seed plants, where recent studies revealed that there are approximately 3,175 species in Jamaica (of which 32.4% are

endemic, compared to a 27.9% level of endemism reported in 2009). Increases in the number of endemic Bromeliads (from 22 to 26) and Orchid species (from 60-62) are also indicated.

<sup>1</sup> Estimated total number of species includes both introduced and indigenous species

The total number of indigenous butterfly species rose to 136 (with 38% endemism), including the discovery of a species and genus new to science. Turner's Gold Striped Skipper (*Troyus turneri*) was discovered in 2012 by researchers from the McGuire Centre for Lepidoptera Biodiversity at the Florida Museum of Natural History, University of Florida in the United States, along with a local field naturalist. The reclassification of bat species also resulted in a change in the number of endemic species, which rose from two (2) in 2010 to five (5) in 2013 (Fifth National Report (NEPA, 2015).

At least six species<sup>2</sup> of Jamaica's terrestrial vertebrates are thought to have become extinct in the last 160 years, and many more species are considered endangered, threatened or rare. The list of species protected under the Wild Life Protection Act was updated in the Wild Life Protection (Amendment of Second and Third Schedules) Regulations, 2016 which covers mammals, reptiles, amphibians, insects, fish, corals, sponges and birds.

## 2.4 Forests

Jamaica's forests are the main repositories of terrestrial biodiversity, especially of endemic flora and fauna. Many of Jamaica's rare and threatened animals depend on the forest for their survival, and therefore the conservation and sustainable use of forest resources are a critical component of Jamaica's overall biodiversity conservation strategy.

Forests also play an important function in air purification, conservation of water supplies, soil formation, climate modification and protection of the coastal lowlands and marine ecosystems from the effects of flash flooding and sedimentation.

Jamaica's forests provide diverse economic employment opportunities. Products extracted from the forest include: fuel wood; medicinal plants; yam sticks; lumber for construction and furniture; fence-

posts; wood for fish pots; and wicker and other materials for craft items.

Wood and charcoal provide the energy used in the popular jerk food industry as well as being used for domestic purposes.

The wide range in microclimates, soils and physical features gives rise to a variety of forest types, classified as follows:

- a) Closed Broadleaf (closed primary forest with broadleaf trees at least 5m tall and crowns interlocking, with minimal human disturbance). An example include the upper parts of the Blue and John Crow Mountains.
- b) Disturbed Broadleaf<sup>3</sup> (with broadleaf trees at least 5 m tall and species indicators of disturbance such as Trumpet Tree (*Cecropia peltata*) and Broke Axe (*Miconia* spp). The majority of forest land in Jamaica, over 178,000ha, is classified as disturbed broadleaf forest.
- c) Tall Open Dry (open natural woodland or forest with trees at least 5m tall and crowns not in contact; in the drier part of Jamaica with species-indicators such as *Bursera simaruba* (Red birch).
- d) Short Open Dry (open scrub, shrub, bush or brushland with trees or shrubs 1-5m tall and crowns not in contact; in the drier parts of Jamaica with species-indicators such as *Prosopis juliflora* (cashaw) or *Stenocereus hystrix* (Columnar cactus).
- e) Bamboo (*Bambusa vulgaris*), an invasive species which can be found in more disturbed or cleared areas, lowlands and hills.
- f) Swamp (edaphic forest - soil waterlogged), with species indicators such as *Symphonia*

<sup>2</sup> The species thought to have become extinct includes the Monk Seal (*Monachus schauinslandi*), Black Race (*Coluber constrictor Priapus*), Giant Galliwasp (*Cellestus occiduus*), Jamaican Rice Rat (*Oryzomys antillarum*), Jamaican Parauque (*Siphonorhis Americana*) and the Black-Capped Petrel (*Pterodroma hasitat*)

<sup>3</sup> *Disturbed Broadleaf* refers to disturbance of ales than 15% of the total broadleaf area. More pronounced disturbances in this forest class (i.e. between 15 and 25% of broadleaf cover) are classified as secondary forest.

*globulifera* (hewstick) and *Roystonea princeps* (Royal Palm).

- g) Mangrove forests (edaphic forests (areas with saline or brackish water) composed of trees with stilt roots or pneumatophores, species-indicators such as *Rhizophora mangle* – Red Mangrove)<sup>4</sup>.

According to the Forestry Department’s National Land Use/Cover Assessment, 2013, Jamaica’s forests cover approximately four hundred and forty-one thousand, three hundred hectares (441,300ha) of land<sup>5</sup> which represent roughly 40% of the entire island<sup>5</sup> (Forestry Department, 2015).

Almost 19% of the country is classified as having mixed land use (a combination of any of the forest broad classification with that of non-forest) and the remaining 41% of the mainland is classified as non-forest inclusive of bamboo (which in 1998 was considered as contributing to forest cover), crop plantations, quarries, water bodies, infrastructure etc. (State of the Environment Report, 2013).

Broadleaf forest (closed and disturbed), noted for its high levels of biodiversity, accounts for almost 59% (263,000 ha) of the total forest cover.

Jamaica experienced a net gain of approximately 0.41% per annum in forest cover between 1998 and 2013. This increase in cover can be attributed primarily to the regeneration of secondary forest cover (ruinate forest) on land previously impacted by

bauxite mining operations and abandoned agricultural areas. Despite the gain in overall forest cover, however, the island experienced a decrease in the amount of closed broadleaf forest, the better quality forest – from 8% to 7.7% (Table 2.2).

While approximately 35% of the remaining area of forests and 73% of closed broadleaf forests are protected, more than 65% are under private ownership with no comprehensive legislative framework to govern their protection.

The Forestry Department (FD) has embarked on several reforestation activities since 2010 and reported in 2014 that on average, approximately one hundred and twenty (120) hectares of land, were being planted per annum. Through the Government of Jamaica (GOJ)/European Union/United Nations Environment Programme Climate Change Adaptation and Disaster Risk Reduction Project (GOJ/EU/UNEP CCADRP) 2010–2013, the FD was supported in the rehabilitation of 50ha of land in 2013; the completion of a Forest Fire Management Plan to guide the FD and other key stakeholders in planning for, preventing and managing forest fires; and the implementation of an agroforestry programme through which seedlings (fruit and timber trees) were issued to the public. Between 2010 and 2013, the JCDT conducted the reforestation of 36 hectares of land in the Blue Mountains with native trees.

**Table 2.2 - Change in forest cover in Jamaica between 1998 and 2013 (in ‘000 hectares)**

National Classes of Forest (in 2013)	1998	Land use (%)	2013	Land use (%)	LU Change in 2013	Loss (-)/ Gain %
<b>Forest Land Use</b>						
Closed Broadleaf	88.2	8.0	84.6	7.7	- 3.6	- 4.1
Disturbed Broadleaf	174.8	15.9	175.3	16.0	0.5	0.3
Short Open Dry	12.1	1.1	2.6	0.2	- 9.5	- 78.5
Tall Open Dry	42.0	3.8	37.6	3.4	- 4.4	- 10.5
Bamboo*	3.0	0.3	-	-	-	-

<sup>4</sup> Draft Forest Policy for Jamaica, 2015

<sup>5</sup> Just over 30% of the country is classified as mixed use. These are areas of disturbed broadleaf forest mixed with another land use/forest cover,

e.g. pine plantation, agricultural field bauxite extraction site or bamboo. The remaining 39% of the area of Jamaica is classified as non-forest and consist of wholly cultivated areas, water bodies, bare rock, bauxite mines and buildings/other infrastructure.

National Classes of Forest (in 2013)	1998	Land use (%)	2013	Land use (%)	LU Change in 2013	Loss (-)/ Gain %
<b>Forest Land Use</b>						
Mangrove forest	9.7	0.9	9.8	0.9	-0.1	1.0
Swamp/Riparian forest	2.2	0.2	0.1	0.0	- 2.1	- 95.5
Forest Plantation**	8.2	0.7	8.3	0.8	0.1	1.2
Secondary Forest***	-	-	123.0	11.2	123.0	-
<b>Total (change in forest cover)</b>	<b>332.0</b>	<b>30.3</b>	<b>441.3</b>	<b>40.2</b>	<b>109.3</b>	<b>32.9</b>

Source: Forestry Department, 2013; \* Bamboo included in Non-Forest Land use; \*\*previously classified as Fields/Disbursed broadleaf and pine plantation; \*\*\*New classification for 2013; State of the Environment Report 2013

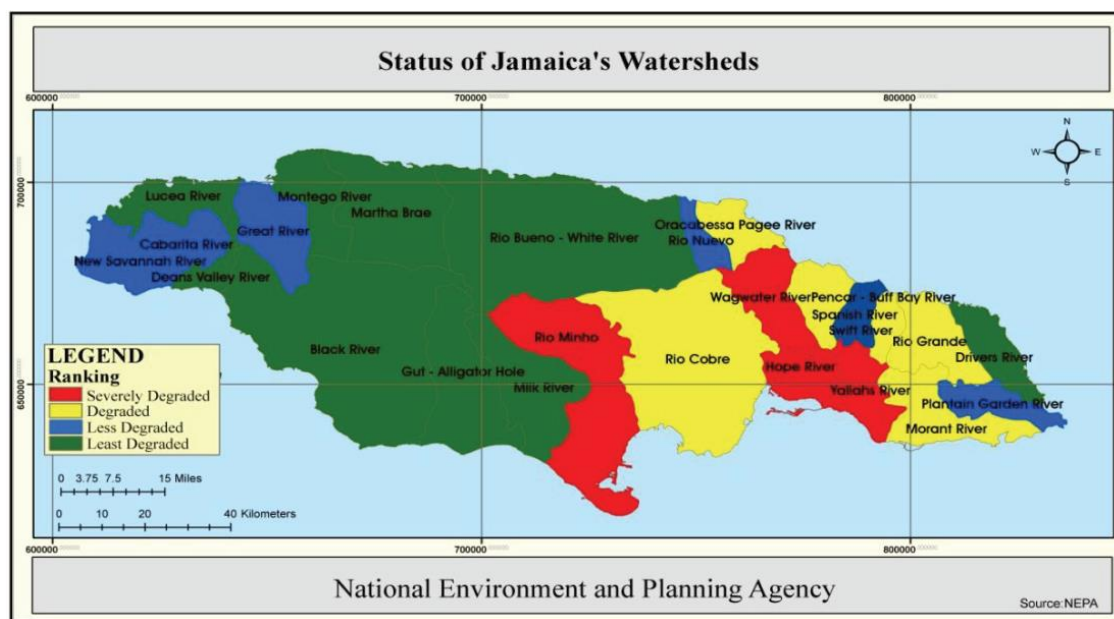
## 2.5 Watersheds

Limestone aquifers provide the main source (84%) of Jamaica's freshwater resources, while the remaining 16% is provided by surface water.

The island is divided into 26 Watershed Management Units (WMUs) containing over 100 streams and rivers. These WMUs are essentially composites of watersheds that fall within 10 hydrological basins (regions). The results of routine monitoring of WMUs conducted by NEPA in 2008 and 2009 classified 10 watershed units as being in critical condition, namely, the Pencar/Buff Bay Rivers, Morant River,

Oracabessa/Pagee Rivers, Swift River, the Rio Cobre and the Rio Grande, with the Hope River, Wagwater River, Yallahs River and the Rio Minho as the most severely degraded (State of the Environment Report, 2010 and 2013). The remaining 16 watershed units were listed as either less degraded or least degraded (Figure 2.1). The critical watershed units were assigned high priority for rehabilitation by the Government.

Several ecosystem rehabilitation programmes are being undertaken to increase the quality and quantity of water for human consumption and assist in the conservation of Jamaica's biodiversity.



**Figure 2.1: Status of Jamaican Watersheds**

(Source: State of the Environment Report, 2010)



## 2.6 Freshwater Biodiversity

Jamaica's freshwater resources are quite extensive. There are ten hydrological basins throughout the island containing over 100 streams and rivers, in addition to a multitude of subterranean waterways, ponds, springs and blue holes.

Past assessments have recognised Jamaica's freshwater biodiversity as regionally important and characterised by moderate to very high rates of endemism (John, 2006). These ecosystems not only safeguard the survival of aquatic and semi-aquatic species, but also provide much of the country's clean water (John, 2006). Freshwater ecosystems therefore play an important role in sustaining Jamaica's diversity, economy and culture.

Jamaicans depend on water from these freshwater sources for domestic purposes, as well as for agricultural irrigation and industrial processes. In addition, the natural fauna and flora supported by these lotic and lentic habitats are a major food source for rural, inland communities and also support commercial activities such as shrimp, fish and snail harvesting for sale as food or ornamental items.

Information on biodiversity status and trends in Jamaica's freshwater ecosystems remains limited as they have not been as well studied or protected as terrestrial and marine systems. Research on freshwater species nonetheless continues at the University of the West Indies, in addition to periodic assessments conducted by NEPA in regard to the preparation of the ecosystem assessment papers for the Development Orders for selected parishes.

There has also been increased monitoring and assessment of freshwater systems and watershed by NEPA's Pollution Monitoring and Assessment branch (NBSAP 2015 Stocktaking Report). The expansion of water quality monitoring in special focus areas since 2013, based on the 1990 ranking of areas that were severely degraded, and the implementation of a community-based water quality first responder programme to pollution incidents, have yielded significant improvements in the water quality and biodiversity in freshwater ecosystems.

Freshwater conservation areas that have been considered a priority in Jamaica based on their vulnerability to various impacts (mainly anthropogenic) are the Black River (including the main stem, the Upper and Lower Morasses, wetlands, coastal springs, and the freshwater lake in South-central St. Elizabeth); Cockpit/Martha Brae (including the Cockpit Country karstic systems, upper Martha Brae watershed and river main-stem and the Falmouth wetlands); and Northeast Portland (including the upper Rio Grande and Drivers River Watersheds, Rio Grande main-stem and coastal springs and wetlands in Drivers River) (John, 2006).

Jamaica's component of the regional project Mitigating the Threat of Invasive Alien Species within the Insular Caribbean (MTIASIC) included a freshwater pilot project that looked at the impacts of the invasive alien plant species Wild Ginger (*Alpinia allughas*) on the biodiversity of the Lower Black River Morass, and on the regeneration of the swamp forest, as well as the determination of the most effective management treatment for the Paperbark Tree (*Melaleuca quinquenervia*) (NEPA 2015). There are gaps in our knowledge of freshwater ecosystems. There is therefore a need for a more integrated approach to gathering data on freshwater species to include species diversity, and continuous monitoring of the impacts of pollution and other threats to biodiversity in rivers and other freshwater systems.

### **Freshwater Plant Species**

Freshwater plants consist of rooted emergent vegetation such as Reed (*Phragmites* spp.) and the Bullrush (*Typha* sp.); rooted, floating vegetation such as the Water Lily (*Nymphaea* spp.); and invasive floating plants such as the Water Hyacinth (*Eichhornia crassipes*) and Salvinia (*Salvinia* spp.).

### **Freshwater Animal Species**

There are three endemic freshwater fish species, namely, *Cubanichthys pengellyi*, *Gambusia wrayi* and *Limia melanogaster*. Little information is available on the ecology of these endemic species or on the freshwater ecosystems that sustain them. (John, 2006).

Two families of freshwater shrimp are native to Jamaica: *Atyidae*, which includes eight species, and *Palaemonidae* which has six species. The early life cycle stages of these shrimps require a saline environment. Their survival within their freshwater ecosystems is threatened by alien invasive species, pollution and over-fishing. Artisanal and subsistence fisheries utilise these freshwater shrimps which are of considerable economic importance to communities. Of significance, is the inclusion of provisions on inland fisheries in the revised Fisheries Bill in 2016.

There is one endemic freshwater Jamaican Slider Turtle (*Trachemys terrapen*) in Jamaica. The status of its population is unknown.

## 2.7 Coastal and Marine Biodiversity

### 2.7.1 Marine resources

The current estimate is that there are three thousand, five hundred and two (3,502) species of marine plants and animals (not including bacteria, viruses and fungi) in the shallow, shore or shelf waters of the Jamaican marine environment (Warner and Goodbody, 2005). Few deep-sea studies have been conducted, but it is likely that the greatest proportion of new species may be discovered in this environment (Fifth National Report, 2015).

Jamaica's marine species include species of fish, sea anemones, black corals, stony corals, sea fans, molluscs, sea turtles, sponges, crocodiles and marine mammals such as whales, manatees and dolphins.

Table 5 below shows the estimates of marine species in Jamaican shallow, shelf, or shore waters. The highest numbers of marine species present are from the taxon Mollusca and the lowest species count is from *Cephalochordata* (Table 2.3).

The main fisheries resources include coral reef fish, Spiny Lobsters, Queen Conch, small coastal pelagic finfish and large offshore pelagic finfish.

The reef fish of major economic importance in Jamaica include representatives from the families: Mullidae (goatfish), *Haemulidae* (grunt), Serranidae (grouper), Acanthuridae (doctorfish), Lutjanidae (snapper), Carangidae (jack), Holocentridae (squirrelfish), Holacanthidae (angelfish), Balistidae (triggerfish), and Scaridae (parrotfish).

Several finfish species provide recreation for individuals and groups that engage in various types of sporting activities. The annual Marlin (*Istiophoridae*) Tournament for example, has continued to be extremely popular for over 50 years.

The status of the American Crocodile (*Crocodylus acutus*) population in Jamaica is not fully understood, however, six (6) localities on the south coast of the island have been identified as having the largest crocodile populations.

The appearance of invasive alien species, including the lionfish and Green Mussel into Jamaica's marine waters in about 2005, has changed the overall landscape of species diversity over the years and continues to threaten the biodiversity of marine ecosystems. (Fifth National Report, 2015)

**Table 2.3 - Estimates of Marine Species in Jamaican Shallow, Shelf, or Shore Waters**

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

Sources: G. R. Warner and I. Goodbody, "Jamaica", *Caribbean Marine Diversity: The known and unknown*, Lancaster DES Stech Publications, 200 (State of the Environment Report, 2010, 2013)

### 2.7.2 Seagrass/Marine Plants

Seagrasses are very important to Jamaica's marine biodiversity and can be found throughout the Jamaican coastal areas, but are more abundant on the south coast where the island shelf is broader (State of the Environment Report, 2010). They provide protection, nesting and nursing grounds for many aquatic species. Three species are predominantly found in Jamaican waters, namely: Shoal Grass (*Halodule wrightii*), Turtle Grass (*Thalassia testudinum*) and Manatee Grass (*Syringodium filiforme*). There are no complete records of Jamaica's seagrasses in terms of abundance, distribution, and health, but the State of the Environment Report (2010) states that during the period 2007 to 2010, 121,326.34 m<sup>2</sup> of seagrass were removed or relocated for approved coastal development.

### 2.7.3 Coral Reefs

Jamaica is home to 65 species of corals and 38 species of gorgonians (NEPA, 2015). Coral reefs in Jamaica contribute significantly to the rich biodiversity and economic productivity of the island. Reefs act not only as a habitat and nursery for marine organisms, but they also serve as barriers, protecting the coastline from erosion and high energy waves. Reefs also support tourism and recreational activities of the island, thus playing a critical role in Jamaica's socio-economic development.

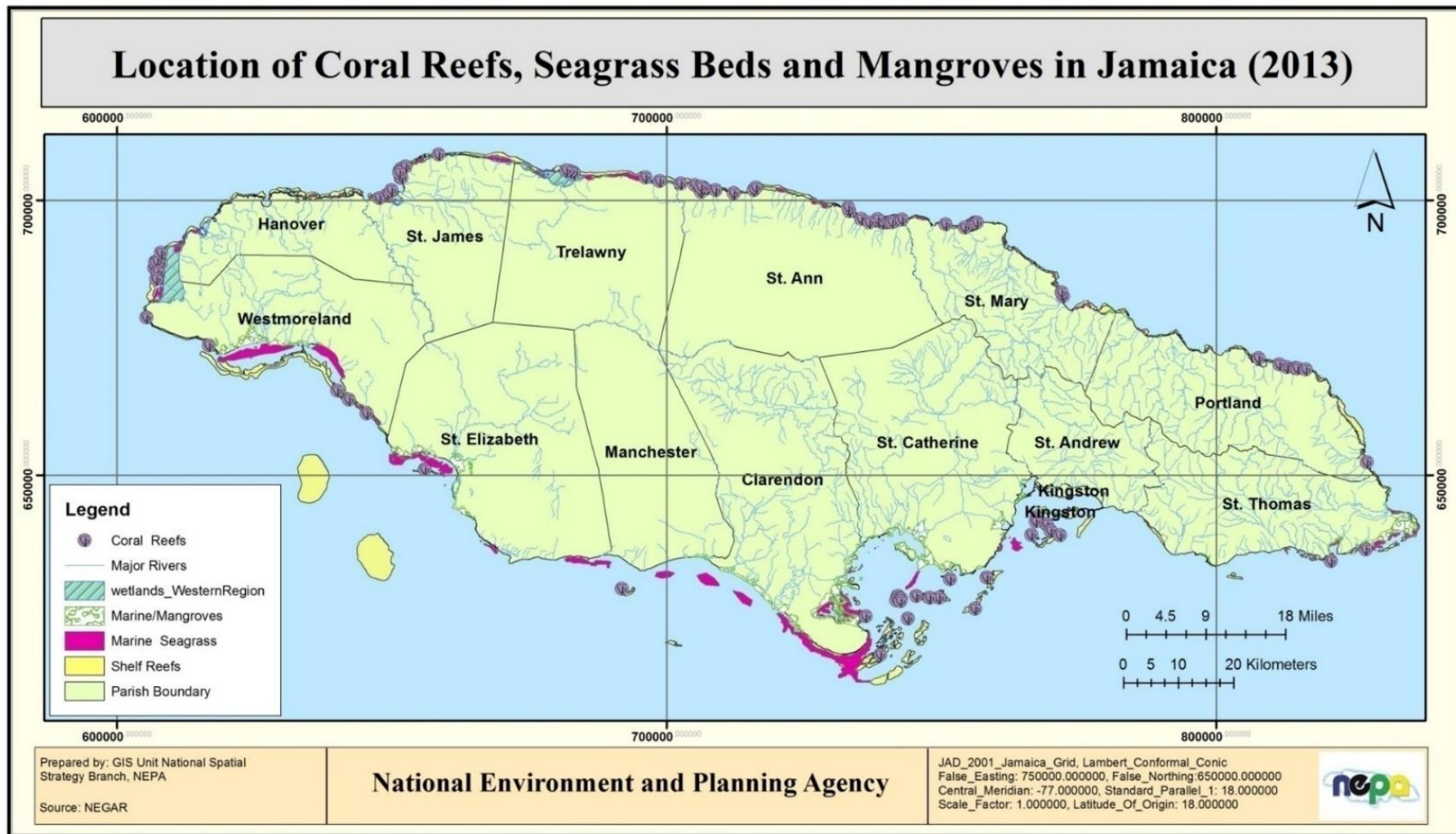
Fringing reefs and patchy fringing reefs occur mostly along the north and east coasts and on the broader shelf of the south coast respectively (Coral Reefs of Jamaica, 2007). Apart from the reefs immediately surrounding Jamaica's mainland, reefs and corals are present on the banks and shoals within Jamaica's Exclusive Economic Zone – inclusive of Brune Bank and the Pedro Cays to the south, the Morant Cays to the southeast, and the Formigas Banks to the northeast (Coral Reefs of Jamaica, 2007).

Over twenty (20) coral reef sites are monitored annually and the respective reports generated. Between 2010 and 2013, the average coral cover per site was approximately 18.1% and 32.2% for macroalgae (NEPA, 2015) (Figure 2.2). Jamaica's Coral Reef Health Index (CRHI) report card was first prepared in 2012 based on 2011 data and represents a holistic approach to tracking and improving coral reef ecosystem health. During 2013, the coral index (hard coral cover and recruits) was monitored at twenty three (23) sites in nine (9) locations and the reef biota index at twenty (20) sites in seven (7) locations (NEPA, 2015). The latter involved monitoring of Nutrient Indicating Algae (NIA), herbivorous and commercial fish, and the presence of the black sea urchin *Diadema antillarum*. Sixteen (16) or seventy percent (70%) of the sites were ranked as poor, six (6) as critical (26%), and one or four percent (4%) as fair (NEPA, 2015). The overall coral index showed that hard coral cover was good, but the recruits were at a critical level. Herbivorous and commercial fish quantities were also at a critically low level, while those for NIA and the black sea urchin were fair. An overall CRHI score of 2.1 across all sites signals that the country's coral reefs were in poor condition for 2013 (NEPA, 2015).

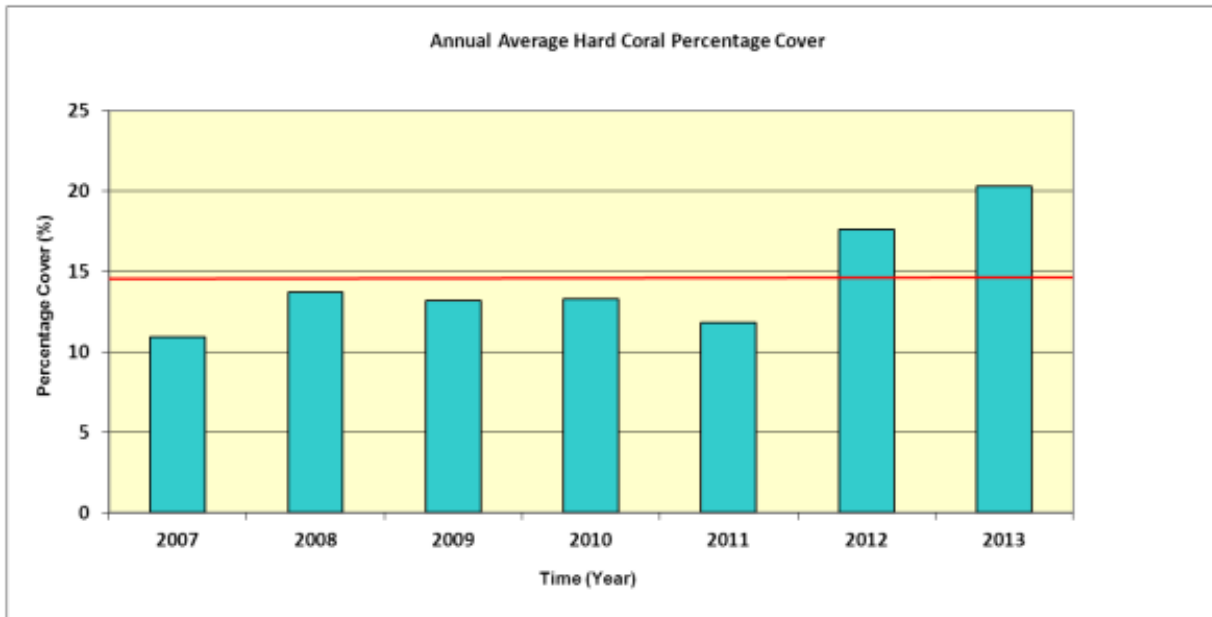


Banded Coral Shrimp (*Stenopus hispidus*)

©Krishna Desai



**Figure 2.2: Location of Coral Reefs, Seagrass Beds and Mangroves in Jamaica**  
(Source: NEPA, 2015)



**Figure 2.3: Average Coral Cover for 2007 – 2013**  
 (Source, Fifth National Report, 2015)

### 2.7.4 Wetlands

Wetlands represent 2% of Jamaica’s total surface area, and occur for the most part in the coastal zone (State of the Environment Report, 2010, 2013). Wetlands support various species of birds, crabs, fish, shrimps, and the American crocodile. Commercially important species including snapper, snook, tarpon, jack, and several species of fresh and brackish water shrimps use the wetlands as breeding grounds. Vast areas of wetlands in Jamaica are characterized by mangrove forests found along 290km of the coastline, with red and black mangroves being the predominant species (State of the Environment Report, 2010).

The largest areas of wetlands are found in the Black River Lower Morass (approximately 6,000 ha) and the Negril Great Morass (approximately 2,300 ha). These wetlands together represent 70% of wetland cover in Jamaica and contain not only large areas of mangrove forest, but also swamp forests and marshlands. (SOE 2013).

Four wetlands have been designated under the Ramsar Convention on Wetlands of International Importance: the Black River Lower Morass, the Palisadoes-Port Royal Wetlands, the Portland Bight Wetlands and Cays and the Mason River Protected Area in Clarendon. These areas support a high abundance of diversity as they provide food, shelter and protection for many terrestrial and marine organisms.

There is no authoritative catalogue of Jamaica’s mangrove and coastal wetlands although its aerial extent was estimated at 17,700 hectares in 1997. Since 2007, 40.68 hectares have been removed or relocated for approved development (State of the Environment Report, 2010). Wetlands were reported to have declined over the years due to reclamation for activities, such as, road construction, port and harbour development and housing. Table 2.4 below shows changes in wetland areas for 6 parishes, with four parishes showing a decline in wetland cover.

**Table 2.4 - Change in Wetland Areas in Six Parishes**

Parish	TNC (2005) (ha)	Digital Globe (2010) (ha)	Change (ha)
St. James	207.947	240.367	32.42
St. Ann	139.53	85.98	(53.55)
Portland	81.848	71.845	(10.003)
Trelawny	1098.29	937.975	(160.315)
Hanover	397.673	749.40	351.727
St. Mary	73.511	11.581	(61.93)

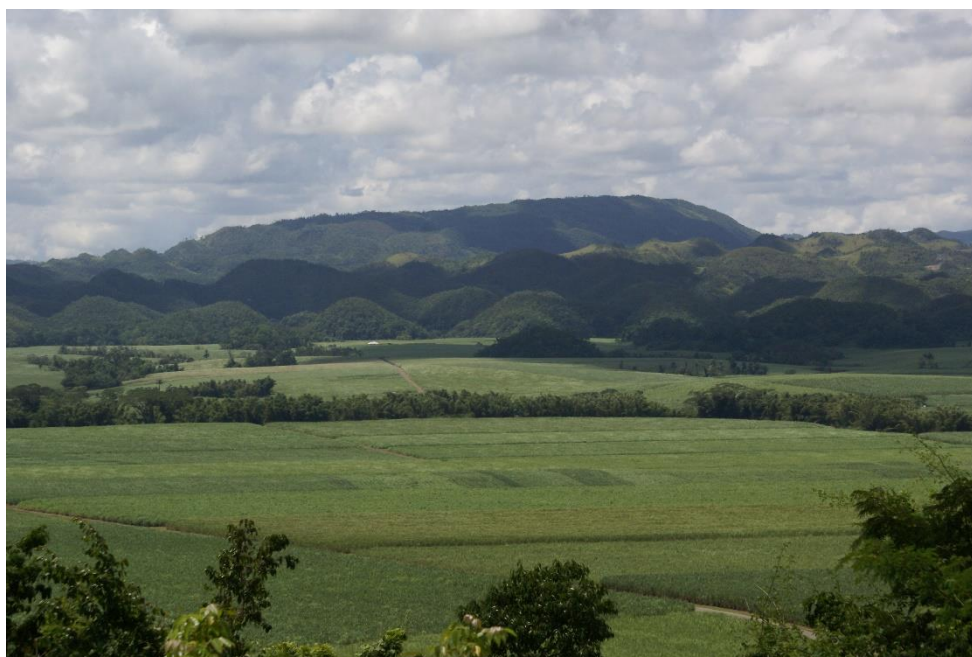
**Note: Bracketed figures indicate a reduction in wetland cover**

(Source: State of the Environment Report, 2010)

## 2.8 Agro-Biodiversity

Wild species of flora and fauna make a significant contribution to Jamaica's economy. In agriculture, animals act as pollinators, seed dispersers and recycle reducers of dead organic material. Major pollinators include bees, butterflies, moths, hummingbirds and nectarivorous bats. Fruit-eating birds and bats and seed-eating birds are important seed dispersers.

Genetic resources from both wild animals and plants may be used to improve domestic breeds and varieties respectively. An inventory of genetic resources is a potential area of study that needs to be addressed if Jamaica is to take advantage of the agricultural benefits of high biodiversity (terrestrial and marine) ecosystems.



©National Environment and Planning Agency

Luidas Vale, St. Catherine showing sugar cane fields in the foreground

# PART III CONSTITUTIONAL, LEGAL AND POLICY FRAMEWORK RELATED TO BIODIVERSITY



©Richard Nelson

*Anolis lineatopus* (Jamaican Gray anole)



©Institute of Jamaica

*Bletia purpurea* (an orchid)



©National Environment and Planning Agency

One of the five hundred species of snails in Jamaica



©National Environment and Planning Agency

Dune vegetation in the Palisadoes-Port Royal Protected Area

## 3 Constitutional, Legal and Policy Framework related to Biodiversity

### 3.1 The Constitution of Jamaica

The 1962 Constitution protects property rights and establishes principles on the ownership of property in Jamaica. The legal status of owned property applies to the ownership of flora and fauna in Jamaica. The proprietor owns all flora on his/her property and if he/she catches wildlife on his/her property (subject to the Wild Life Protection Act) then he/she owns these wild animals, subject to the Wild Life Protection Act. The Constitution prohibits the taking of property by compulsory acquisition. However, it provides exceptions, including taking possession of property to prevent activities injurious to the health of animals and plants and, where necessary, for carrying out an investigation for the conservation of natural resources.

In 2011, the Constitution of Jamaica was amended to provide for a Charter of Fundamental Rights and Freedoms. Section 13(3) (l) of the Constitution now recognizes, *inter alia*, “the right to enjoy a healthy and productive environment free from the threat of injury or damage from environmental abuse and degradation of the ecological heritage.”

### 3.2 Overview of Legislation Governing Biodiversity

Jamaica’s current environmental legislation provides a basic framework for the conservation and sustainable use of biodiversity, but does not comprehensively protect ecosystem diversity, species diversity or genetic diversity, as several statutes are primarily sectoral in nature. There are at least 52 pieces of legislation which have aspects that directly relate to the management of the environment

The main legislation for the protection of the environment is the Natural Resources Conservation Authority (NRCA) Act and its regulations. The Wild Life Protection Act, the Beach Control Act, the Watersheds Protection Act and the Endangered Species (Protection, Conservation and Regulation of Trade) Act are also under the purview of the Natural Resources Conservation Authority, with implementation through the National Environment

and Planning Agency. There are also laws relating to the forestry, fisheries and natural heritage sectors, namely the Forestry Act, the Fishing Industry Act and the Jamaica National Heritage Trust Act. Several other pieces of legislation include provisions relevant to natural resource conservation, such as those related to planning, plant resources, mining and quarrying.

Jamaica is in the process of reviewing or developing several pieces of legislation that are relevant to the conservation of biodiversity and its sustainable use. These include the revision of the Forest Act, 1996 in keeping with the provisions of the draft Forest Policy for Jamaica, 2015; amendment of the Plants (Quarantine) Act, 1994; enactment of the Fisheries Bill; the enactment of a new Watersheds Act to replace the Watersheds Protection Act, 1963; promulgation of the required regulations under the Endangered Species (Protection, Conservation and Regulation of Trade) Act 2000.

As regards, genetic resources, the Protection of Plant Genetic Resources for Food and Agriculture Act, was enacted in 2013.

New legislation proposed includes an overarching law on the protected areas system and regulations on a new category of protected area. Legal agreements related to the establishment of the National Conservation Trust Fund of Jamaica to support the Protected Areas System are also under preparation. There are also proposals to update the NRCA Act and amend the Town and Country Planning Act.

The following section outlines the main elements of relevant legislation as well as proposed new legislation



### **3.2.1 Provisions of the Main Laws and Regulations related to Biodiversity**

#### **3.2.1.1 The Natural Resources Conservation Authority Act, 1991 and its Regulations**

Under the Act, the NRCA may ‘take such steps as are necessary for the effective management of the physical environment of Jamaica so as to ensure the conservation, protection and proper use of its natural resources.’ The Authority may also ‘promote public awareness of the ecological systems of Jamaica and their importance to the social and economic life of the Island; and advise the Minister on general policies relevant to the management, development, conservation and care of the environment.’

Among the subsidiary legislation under the NRCA Act are the Natural Resources (Marine Parks) Regulations, 1992 and the Natural Resources (National Parks) Regulations, 1993, as well as several orders declaring protected areas.

The Natural Resources Conservation (Prescribed Areas) (Prohibition of Categories of Enterprise, Construction and Development) Order, 1996, prescribes the island of Jamaica and the territorial sea of Jamaica as the area in which specified activities- e.g. reclamation of wetlands, construction of roads - are prohibited without a permit. The Natural Resources Conservation (Permits and Licences) Regulations, 1996 set out the requirements for application for a permit or licence.

The Natural Resources Conservation (Wastewater and Sludge) Regulations, 2013 replaced provisions in the Permits and Licences Regulations related to the construction or reconstruction or alteration of works for the discharge of sewage or trade effluent or both or to discharge such effluent. The Wastewater and Sludge Regulations also included provisions related to the Protocol concerning Pollution from Land-based Sources and Activities, 1999 to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, 1983. Jamaica ratified the Protocol in 2015.

Guidelines for environmental impact assessments (EIAs) were issued in 1997 and revised in 2007 in relation to Section 10 of the NRCA Act which provides that the Authority may require an EIA. Regulations on EIAs were drafted in 2016. There is still no legal requirement for Strategic Environmental Assessments.

#### **3.2.1.2 The Wild Life Protection Act, 1945, (amended 1998)**

The Wild Life Protection Act specifically protects designated species of animals and regulates hunting in Jamaica. Section 6 of the Act makes it a criminal offence for any person to be in possession of any protected animal, or part thereof. Protected animals include those listed in the Third Schedule to the Act as well as all birds except those listed in the second part of the Second Schedule.

#### **3.2.1.3 The Watersheds Protection Act, 1965**

The Watersheds Protection Act provides a framework for the management of watersheds in Jamaica. There are 26 watershed management units declared under the Act. Provision is made for the intervention of the Government in regulating uses of private land including the clearing of land and implementing appropriate agricultural practices. There are also provisions for intervention through assisted improvement agreements whereby improvement works can be carried out on land to protect watersheds.

No regulations have been prepared under this Act and therefore, voluntary compliance and training have been the main measures available to ensure appropriate management practices in watersheds in Jamaica under the Act. Proposals for amendment of the Watersheds Protection Act have been completed to remedy the deficiencies in the Act, including as it regards soil conservation and land use management measures.

#### **3.2.1.4 The Beach Control Act, 1956 (amended 2004)**

The Beach Control Act regulates rights to the foreshore and the floor of the sea in Jamaican waters. Provisions contained in the Act govern

commercial and recreational activities; the control and management of development on the beach through licensing provisions; and the protection of the marine ecosystem. Marine protected areas may be declared under the Act.

The Act provides for the NRCA to apply to the Court for an order, if so warranted, for a person who has caused any damage to the foreshore or the floor of the sea, to rehabilitate the area or in the case of damage to a natural resource pay damages to the Authority. In determining the amount for damages, the Court may take into account:

- any reasonably fore-seeable loss in the economic value of the natural resource to the public;
- income from sales of goods and services provided by marine resources;
- the value of marine resources used for subsistence;
- the value of ecological functions and services provided by marine resources;
- the value of potential uses of marine resources and biological assets; and
- the value to the public derived from the existence of the resource, independent of the value of any existing or potential use of the resource.

#### **3.2.1.5 The Endangered Species (Protection, Conservation and Regulation of Trade) Act, 2000**

The Endangered Species Act provides for the conservation, protection and regulation of trade in endangered species. The Act was prepared to allow the Government of Jamaica to fulfil its obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

There are four Schedules as follows:

- the First Schedule concerns endangered species that are threatened with extinction and which may be affected by trade;
- the Second Schedule addresses species which could become extinct if trade is not regulated;

- the Third Schedule deals with species which any contracting party wishes to regulate within its own jurisdiction; and
- the Fourth Schedule is particular to Jamaica and lists Jamaican indigenous species. Domestic trade in these endangered species is controlled under Regulations.

#### **3.2.1.6 The Forest Act, 1996**

The Forest Act is the only piece of legislation in Jamaica that uses the word 'biodiversity'. This Act sets out the role and functions of the Forestry Department and the Conservator of Forests.

The Act vests responsibility in the Conservator of Forests for developing and maintaining an inventory of forests and lands suitable for the development of forests.

The Forestry Department is required to make an assessment of forestry lands to determine their potential for maintaining and enhancing biodiversity. The Act provides for the controlled utilization of forest resources in a rational manner.

Jamaica has over 100 gazetted forest reserves. Under the Act, private lands may be declared as forest reserves. One of the purposes of forest reserves is to protect and conserve endemic flora and fauna.

The Act calls for the creation of forest management plans, which stipulate the allowable annual cut where appropriate; addresses conservation and protection measures; and outlines the roles of other Government departments. The purpose of forest management plans is to ensure the protection and conservation of forests, soil, water, wildlife, and forest products.

It is an offence to destroy trees, cause damage, light fires, carry axes, or kill or injure wild birds or animals in a forest reserve or forest management area.

#### **3.2.1.7 The Fishing Industry Act, 1975**

The taking and catching of fish are regulated by the Fishing Industry Act. A licence is required to catch fish utilizing one of the prescribed methods under the Act.

Provision is made for the protection of fish stocks through the designation of fish sanctuaries and the

declaration of open and closed fishing seasons (for conch and lobster). In 2012, the Fishing Industry (Special Fishery Conservation Area) Regulations were promulgated for the management, control and conservation of fish in the areas declared, including to allow for the taking of lionfish in fish sanctuaries.

Regulations are being created for the management of the conch fishery. For the lobster fishery, the Act stipulates the size of lobsters to be caught and the mesh size for nets. The fines under this Act are extremely low ranging from one hundred to one thousand Jamaican dollars.

A Fisheries Bill has been drafted to repeal the Fishing Industry Act (1975) and sections of the Wild Life Protection which deal with fish; to provide for more efficient and effective provisions for the management and sustainable development of fisheries, aquaculture and other related activities in accordance with internationally recognized norms, standards and best practices.

The Fisheries Bill addresses fishery management plans, the declaration of fishery management areas around the island and the establishment and operation of aquaculture facilities. It will also include provisions for conservation and management measures and the licensing of all fishing activities to ensure enforcement of the controls.

#### ***3.2.1.8 The Protection of Plant Genetic Resources for Food and Agriculture Act, 2013***

The objectives of the Protection of Plant Genetic Resources for Food and Agriculture Act are to facilitate Jamaica's compliance with its obligations under the International Treaty on Plant Genetic Resources for Food and Agriculture and (a) to further the conservation and sustainable use of plant genetic resources; and (b) facilitate access to, and use of, plant genetic resources, and to promote the equitable sharing of benefits arising out of their use, in harmony with the provisions of the convention.

The Treaty was approved by the United Nations Food and Agriculture Organization (FAO) in November 2001, and came into effect in June, 2004. The main areas of the Treaty are the protection and realization of farmers' rights on plant genetic

resources for food and agriculture; and the fair and equitable sharing of benefits accruing from facilitated access under the multilateral system.

#### ***3.2.1.9 Water Resources Authority Act, 1995***

The Water Resources Authority Act was promulgated to regulate and manage the abstraction and allocation of water resources through the establishment of the Water Resources Authority. The Act also governs the preservation of water quality and the conservation of such resources. The Authority is required to gather data on the quantity and quality of water in above ground and underground resources. A Master Plan, as required under the Act, has been developed to allow for the proper management of such resources. It evaluates and recommends how Jamaica should use its water resources. A licensing system is in place to govern the allocation of water resources.

#### ***3.2.1.10 The Jamaica National Heritage Trust Act, 1985***

This Act establishes the Trust as a statutory body to protect Jamaica's national heritage, including any place, animal or plant species or object/building.

### **3.2.2 Other Legislation Relating to Biodiversity**

#### ***3.2.2.1 The Town and Country Planning Act, 1948 (amended in 1999)***

Substantial amendments were made to the Town and Country Planning Act in 1999 to provide for effective enforcement. The Act is currently being revised to provide more comprehensive control over planning in Jamaica.

The objective of this Act is to ensure the orderly development of land. Presently, the entire island is not covered by Development Orders nor are existing orders updated regularly. In areas covered by a Development Order, planning permission is required from the local authority or from the Town and Country Planning Authority if the area is "called in" or if the development does not conform to the zoning in the Development Order. In considering development applications, the planning authorities take into account

the Development Order and other material considerations.

The Act also provides for the making of Tree Preservation Orders (Section 25) whereby a local authority may seek to preserve trees or woodlands in their area and prohibit willful damage or destruction of trees, or require the replanting of trees. The Act provides for notification of, designation, and the right to submit objections to the declaration of such an Order including provisions for compensation. These Orders are not widely used.

#### 3.2.2.2 *The Mining Act of 1947, (amended in 1988)*

The Mining Act regulates mining activities in Jamaica and establishes that the rights to minerals belong to the Crown. Licences to extract minerals are granted by the Mines and Geology Division. Under the Act and its associated Regulations, the holder of a mining lease is required to restore all mined lands to at least the level of agricultural or pastoral productivity or of suitability for afforestation, which existed before mining. The Mining Regulations 2004 accommodated the amendment of penalties for non-compliant licensees. The Mining Act covers mineral resources defined as minerals under the Mineral Vesting Act such as bauxite, gold and high purity limestone.

Under Section 9 of the Mining Act, the Minister by Gazette may declare an area, for which there is no existing licence or mining lease, to be closed to prospecting and mining. Such areas or sections of the area may be re-opened by Gazette, with terms and conditions related to prospecting or mining.

#### 3.2.2.3 *The Quarries Control Act, 1984 (amended 2015)*

This Act concerns the requirements to quarry rock, stone, sand (including sea sand), marl, gravel, clay, fill and limestone where such material does not contain any minerals in economically workable quantities and quarry minerals (gypsum and any other substance that the Minister may declare to be a quarry mineral, by notice published in the Gazette). The Act provides for the establishment of a Quarries Advisory Committee (Section 6) to designate quarrying zones, and requires that applications for a

licence to carry out quarrying operations be made to the Minister responsible for mining and quarrying. Written notices may be served on a quarry operator if the operation is detrimental to the fauna and flora of the neighbourhood (Section 29). Where illegal quarrying activities exist, the Court may order that any fine imposed under the Act may be directed towards the rehabilitation of the illegally operated quarry.

The Quarries Control (Amendment) Act, 2015 introduced new provisions regarding, *inter alia*, fines and offences, buffer zone, quality control and fitness for purpose, and quarry management.

### 3.3 National Policies, Plans and Strategies

#### 3.3.1 Vision 2030 Jamaica - National Development Plan, 2009

The aim of Vision 2030 Jamaica - National Development Plan is to enable Jamaica to achieve developed country status by 2030. The Plan has four national goals and fifteen national outcomes.

Goal 4, which relates to biodiversity – that ***Jamaica has a Healthy Environment***, is supported by the following national outcomes:

- 13-Sustainable Management and Use of Environmental and Natural Resources
- 14-Hazard Risk Reduction and Adaptation to Climate Change
- 15-Sustainable Urban and Rural Development.

Outcome 13 states that Vision 2030 Jamaica “will ensure that environmental considerations become integral factors in socio-economic decision-making, thereby moving us into the realm of a green economy. To achieve this outcome, Vision 2030 Jamaica will give priority attention to: increasing environmental awareness of the general population and their participation in the management of natural resources; providing an effective regulatory framework for the conservation of our natural resources; incorporating environmental considerations into decision-making processes; determining the economic value of our biodiversity

and ecosystem services, as well as the long-term economic consequences of the continuing loss of biodiversity; and preserving and renewing ecological capital. Our Plan articulates a mix of national strategies that focus on the effective management of our country's environmental and natural resources. This will ensure the continued provision of essential environmental goods and services as we recognize that proactive environmental management is increasingly becoming the basis for the success of economies and social systems.”

The Medium Term Socio-Economic Policy Framework (MTF) is the main mechanism for translating Vision 2030 Jamaica's long-term national goals and outcomes into action. The most recent of the three-yearly MTFs covers the period 2015-2018. As a fundamental component of the national planning framework, the MTF 2015-2018 outlines a prioritized package of policies, strategies and programmes aligned to the budget at the macro level that will be implemented primarily by Ministries, Departments and Agencies (MDAs) over the period. (Vision 2030 Jamaica)

### **3.3.2 The main policies and plans relating to biodiversity**

There are a number of policies and plans related to biodiversity, some of which are in draft, but others of which have been finalized as noted in the State of the Environment Reports for 2010 and 2013, the Stocktaking Report (2015), and Jamaica's national reports to the CBD. Several new policies are being developed which support and make reference to the establishment of the protected areas system in Jamaica.

#### **3.3.2.1 Policy for Jamaica's System of Protected Areas, 1997**

In 2016, a draft overarching policy for Jamaica's protected area system was completed to update and revise the Draft 1997 Policy for Jamaica's System of Protected Areas. The aim of the 2016 policy was to harmonizing the administrative and management processes for the system of natural and cultural protected areas within the country. This final draft of the 2016 updated Policy was finalized after extensive consultations. The Policy is important for the

implementation of the CBD, since the establishment of protected areas is one of the most effective mechanisms to support the conservation of Jamaica's biodiversity.

The goals of the Protected Areas Policy include economic development, environmental conservation, sustainable resource use, recreation, public education, public participation, local responsibility and financial sustainability. .

The policy states that successful implementation of the Protected Areas Policy would depend on the coordination of policy, and the planning and implementation among the agencies with responsibility for the different types of protected areas.

#### **3.3.2.2 The Protected Area System Master Plan (PASMP), 2013**

The PASMP covers the five-year period 2013–2017 and presents guidelines to establish and manage a comprehensive network of Protected Areas. The PASMP seeks to enable Jamaica to:

- a) Relate protected areas to national priorities;
- b) Move away from a case-by-case approach to resource management;
- c) Make additions to the Protected Areas System in a more rational and integrated manner;
- d) Facilitate integration with other development plans such as those for tourism, biodiversity conservation and sustainable development;
- e) Implement an improved process for the management of protected areas, by sharing resources and responsibilities among government agencies, communities, NGOs and the private sector;
- f) Improve the meeting of obligations under international treaties.

The PASMP aims to develop a comprehensive and representative system of protected areas and a framework for management that supports national development. The Plan sets out to ensure long-term viability by maintaining ecological processes and systems and protecting the country's natural and cultural heritage. There are 13 goals which were derived from the goals and activities of the CBD's Programme of Work on Protected Areas. Each goal

has an action plan that outlines the targets to be achieved and identifies the organization responsible for lead implementation of the associated activities. The PASMP's goals respond to the gaps and challenges that currently exist in protected areas management. In order to support the implementation of the master plan, the government prepared drafting instructions for an overarching protected areas system act, *inter alia*, to harmonize common management aspects for protected areas. The PASMP outlines the roles of the main institutions responsible for management of natural and cultural heritage in Jamaica, namely, the Fisheries Division, the Forestry Department, the Jamaica National Heritage Trust and the Natural Resources Conservation Authority/National Environment and Planning Agency.

### **3.3.2.3 Forest Policy for Jamaica (Green Paper No. 2 of 2015)**

The Forest Policy is consistent with the Charter of Rights and outlines eight principles critical to the sustainable management of Jamaica's forests including transparency and accountability; the utilization of sustainable development and inter-generational considerations, best science and participatory and collaborative approaches in forest management planning and implementation processes. The Policy also establishes three overarching Goals related to Governance, Forest Ecological System Conservation and Socio-Economic Considerations and ten objectives. The Forest Policy addresses national priorities as well as international obligations and commitments relating to climate change, biodiversity conservation, and the sustainable use of wetlands.

The Policy proposes the expansion of the mandate of the Forestry Department to facilitate the regulation of privately held lands with forest cover, which account for two-thirds of forested land in Jamaica. The Department will also hold in trust, for the people of Jamaica, the remaining 7.7 percent of remaining closed broadleaf forest on crown land.

The required changes to the legislative and management framework for the provisions in the Policy are indicated in the document.

The policy will address crucial gaps and needs for the sector, namely,

- The development of forest management plans,
- The introduction of mechanisms to govern forest management data collection,
- The demarcation of jurisdictional boundaries and the regulation of
  - activities on Crown and privately-owned lands
  - the forest sector and
  - forest-based industries
- Documenting the importance of a wide stakeholder involvement in the management of the island's forests to include the public and private sectors, non-government organizations, community-based organizations, Local Forest Management Committees (LFMCs) and special interest groups.

### **3.3.2.4 Draft National Fisheries and Aquaculture Policy, 2015**

Jamaica's fisheries sector has experienced a severe crisis as a result of overfishing of coral reef and reef-associated finfish resources, loss of and degradation of critical marine habitats and biodiversity, illegal and unsustainable fishing practices. Depletion of fish stocks has been seen as a major issue for the local capture fisheries industry for many years, particularly in relation to near-shore or reef fisheries. Management of the environment and activities of the fisheries industry are two inter-related dimensions of the protection of the sustainability of the ecosystem.

The development of the Policy was guided by, *inter alia*, the FAO Code of Conduct for Responsible Fisheries which provides principles and standards applicable to the conservation, management and development of fisheries and aquaculture.

The vision of the policy is to:

"Ensure the optimal contribution of the fisheries and aquaculture sector to Jamaica's economy, food and nutrition security, poverty alleviation and sustainable livelihoods through the sustainable management and development of capture fisheries and aquaculture."

The goals of the policy include:

- ensure sustainable development and management of capture fisheries and aquaculture;
- promote greater efficiency and improved competitiveness of national capture fisheries and aquaculture enterprises; and
- improve the contribution of the fisheries and aquaculture sector to the socio-economic development of Jamaica.

Among the guiding principles of this policy are:

- ◆ Sustainability- Fisheries resources shall be managed as a renewable asset to ensure utilization of these resources at the optimum sustainable yield. The ecosystem as the genetic biodiversity and the aquatic environment shall be protected in order to minimize adverse ecological changes and related economic and social impacts, if any, which may result from the development of fisheries and aquaculture.
- ◆ Ecosystems approach to fisheries and aquaculture- This approach strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries
- ◆ Precautionary Approach to Conservation, Management and Exploitation of Fisheries Resources- This approach seeks to protect fishery resources from fishing practices which might put their long-term viability in jeopardy.

#### **3.3.2.5 National Policy on Ocean and Coastal Zone Management, 2000**

This Policy addresses the role of the National Council on Ocean and Coastal Zone Management and identifies five policy goals:

- i. Promotion of Sustainable Development
- ii. Conservation of Ocean and Coastal Resources and Ecosystems
- iii. Baseline Data Collection and Research
- iv. Utilizing the Role of Science and Traditional Ecological Knowledge for Integrated Coastal Area Management
- v. Providing the Conditions of Governance Required for Effective Integrated Coastal Area Management.

The goal of integrated coastal zone management, as noted in the Policy, is to improve the quality of life of human communities who depend on coastal resources, while maintaining the biological diversity and productivity of coastal ecosystems.

Profiles of each parish in Jamaica were included in the Policy, with Environmentally Sensitive Areas, Protected Marine & Coastal Areas, Predominant Use, Critical Issues/Problems and Opportunities identified.

The Policy is being updated to take into account developments since its approval, such as the pressing need to mainstream climate change considerations.

#### **3.3.2.6 The Orchid Policy**

This policy which was agreed in 2014 aims to conserve Jamaica's orchid species and their habitats, ensure sustainable use of orchids, promote and facilitate research and training and ensure public education and awareness.

#### **3.3.2.7 The Draft Watersheds Policy, 2015**

The Draft Watersheds Policy for Jamaica was updated in 2015 following the commencement of a review process in 2012. The policy, which includes proposals to amend the Watersheds Protection Act (1965), is intended to guide all watershed management related activities, strategies and programmes. It outlines the legislative and institutional reforms to be undertaken by Government ministries, departments and agencies, the role of private land owners and the involvement of funding partners.

### 3.3.2.8 Draft Biosafety Policy

The draft Biosafety Policy has been revised and reviewed by the NRCA and NEPA for submission to the Ministry responsible for the environment.

The National Biosafety Committee (NBC) was formed in 1996 with a mandate to develop clear procedural guidelines for the importation of transgenic plants for experimental use. In 1997, through the efforts of the National Commission on Science Technology (NCST) and the NBC, regulations were gazetted under the Plant Quarantine Act to permit entry of transgenic plant material for contained experimentation.

### 3.3.2.9 Jamaica National Land Policy (1996)

The comprehensive National Land Policy was developed after an assessment of the physical resource and socio-economic needs of the country. This assessment underscored the need for a more complete understanding and appreciation of the finite nature of land resources and advocacy for its sustainable use.

The goals and objectives of this Policy are to ensure the sustainable, productive and equitable development, use and management of the country's natural resources. The Policy establishes the framework for the planning, management and development of Jamaica's resources. It takes into consideration that Jamaica, including the foreshore, territorial waters and exclusive economic zone, is a finite resource and a national asset.

The Policy is being revised through the Ministry responsible for Land Management (the Ministry of Economic Growth and Job Creation). The Agricultural Land Use Policy, 2012 was the first updated section of the Land Use Policy to be prepared.

### 3.3.2.10 Climate Change Policy Framework for Jamaica, 2015

This Policy Framework was approved by Parliament in 2015. Among its goals is to create a sustainable institutional mechanism to facilitate the development, coordination and implementation of policies, sectoral

plans, programmes, strategies, and legislation to mitigate as well as adapt to climate change.

Among the objectives is to 'mainstream climate change considerations into national policies and all types and levels of development planning and to build the country's capacity to develop and implement climate change adaptation and mitigation activities';

The principles of the policy framework include:

*"Sustainable use of natural resources*

*"Recognizing that the resilience of the natural environment is key to adapting to climate change, the response to the climate change challenge must be linked to the sustainable use of natural resources, the maintenance and restoration of ecosystems and an ecosystem based approach to disaster risk management."*

### 3.3.2.11 Management and Recovery Plans for Endangered Species

Management and recovery plans for several endangered species have been completed over the last few years. These include the Crocodile Management Plan; the Giant Swallowtail Butterfly Recovery Action Plan; the Jamaican Iguana Conservation Strategy; Jamaica's Sea Turtle Recovery Action Plan; the Jamaica Coral and Reef Action Plan; the Game Birds Management Plan; Bat Management Plan; the Queen Conch Management Plan; and the Plan for Managing the Marine Fisheries of Jamaica. In addition, management plans have been developed for other, non-threatened species such as the Sooty Tern and the Brown Noddy. These policies and action plans:

- identify projects and programmes to protect species which are endangered or threatened;
- seek to mitigate adverse impacts of the destruction of habitats across the country;
- aim at changing behaviour and educating the public on aspects of biodiversity; and
- recommend increased means of protection under the law for our natural resources and the environment.



### **3.3.2.12 National Forest Management and Conservation Plan, 2001 and the Strategic Forest Management Plan**

The National Forest Management and Conservation Plan (NFMCP) outlines the manner in which the Government will conduct activities to protect and manage the forests in Jamaica. The NFMCP was prepared to promote and improve the conservation and sustainable use of the forest resources of the country, to meet local and national needs by protecting, managing and restoring the resource for the benefit of present and future generations. The NFMCP was updated in 2006 and is currently being reviewed in accordance with the stipulations of the Forest Act, 1996.

The Strategic Forest Management Plan 2010 – 2015 (SFMP) sets targets by which the Forestry Department's performance in relation to its management of Jamaica's state-owned forests is measured. The SFMP seeks to ensure implementation of Vision 2030 and includes a number of objectives and indicators including:

- building the Forestry Department as an efficient and effective service delivery organization;
- increasing participation of the private sector, community based organizations, and non-government organizations in the sustainable management and conservation of Jamaica's forests;
- increasing the level of public awareness regarding all issues related to forestry;
- developing and implementing forest management plans; and
- maintaining and restoring forest cover.

### **3.3.2.13 The National Physical Plan (1978) and the Proposed Spatial Plan**

The National Physical Plan was developed to foster orderly development in the country. It focuses on physical planning, settlement, conservation, income generators (i.e., agriculture, forestry and fisheries,

mineral industries, tourism and manufacturing) and public utilities through the use of Development Orders.

There are six Confirmed Parish Development Orders, six Confirmed Coastal Orders, thirteen Petroleum Filling Station Orders and four Confirmed Development Orders. The remaining parish development orders are currently in draft. It is anticipated that by 2017 the entire island will be covered by updated development orders.

The Planning Division of NEPA has been integrally involved with implementing activities to prepare a National Spatial Plan which would provide a modern framework for integrated spatial planning and a basis for prioritizing and rationalizing land dependent decisions - "Spatial planning gives geographical expression to the economic, social, cultural and ecological policies of society<sup>6</sup>."

## **3.3.3 Future Initiatives**

### **3.3.3.1 Traditional knowledge**

Much traditional knowledge exists in Jamaica for the different uses and properties of local genetic resources. If this knowledge is not preserved and the access regulated, it might be lost or be entered into the public domain, which could diminish its value.

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. (Fourth National Report).

The objects of the Protection of Plant Genetic Resources for Food and Agriculture Act, include the conservation and sustainable use of plant genetic resources and facilitation of access to, and use of, plant genetic resources, and to promote the equitable sharing of benefits arising out of their use.

Through a GEF enabling activity, assessments were conducted on capacity needs in the areas of

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<sup>6</sup> Presentation by NEPA – Towards Strategic Spatial Planning in Jamaica- The National Spatial Plan, 2011

preservation of indigenous knowledge, access to genetic resources and benefit sharing.

The Jamaica Intellectual Property Office (JIPO) was established in 2001 and is responsible inter alia for administering intellectual property systems in Jamaica on traditional knowledge and cultural expressions.

### 3.3.3.2 Other Policies, Strategies, Guidelines and Plans

There are various policies that have been prepared, some in draft, concerning the conservation and sustainable use of Jamaica's biodiversity. These are primarily sectoral in nature and include:

- The Water Sector Policy and Implementation Plan (2016) (Draft)
- The Pollutant Release and Transfer Register
- A Plant Conservation Strategy for Jamaica (2013) (Draft)
- National Invasive Alien Species Strategy and Action Plan, 2014-2020 (2013)
- The National Policy and Strategy on Environmental Management Systems
- Wildlife Trade Policy, 2016 (Draft)
- Cays Policy, 2015 (Draft)
- Updated Oceans and Coastal Zone Management Policy (2014) (draft)

Several draft guidelines are also being considered by NEPA including:

- Delegation and Compliance
- Integrated Pest Management
- Protection of Private Lands
- Disaster Preparedness and Natural Disasters
- Human Resources Management
- Fire Management
- Financing and Land Acquisition
- Resource Users and Special Users

## 3.4 International Agreements

Environmental management in Jamaica is guided not only by national policies and legislation, but also by several international and regional agreements. Jamaica is committed to implementing a number of

international agreements relating to biodiversity as indicated below.

### 3.4.1 Jamaica and the Convention on Biological Diversity (CBD)

The Convention on Biological Diversity creates the framework for Parties to implement national legislative, policy and administrative measures. The Government of Jamaica intends to fully implement the provisions of this Convention by carrying out the necessary legislative changes required to fulfil our obligations

Jamaica became a party to the CBD in 1995, and in 1999, officially established its National Clearing House Mechanism (CHM), which directly responds to Article 18.3 of the Convention, to promote and facilitate technical and scientific cooperation.

In 2012, Jamaica became a Party to the Cartagena Protocol on Biosafety, having been a signatory since 2001. Jamaica's Biosafety Clearing House (BCH) was established in accordance with Article 20 of this Protocol. The BCH serves to facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, living modified organisms.

Jamaica is a signatory to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity, 2010.

### 3.4.2 Other Biodiversity-related treaties

Jamaica is also a party to five of the six biodiversity-related treaties in addition to the CBD, namely the:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975),
- International Treaty on Plant Genetic Resources for Food and Agriculture (2004),
- Ramsar Convention on Wetlands of International Importance, 1971
- World Heritage Convention (1972) and
- International Plant Protection Convention (1952).

Jamaica is a party to the Rio Conventions and to other international and regional treaties related to marine and coastal zone management. (Appendix II).



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Cow Bay beach, St. Thomas with the Blue Mountain in the background

## PART IV – PRESSURES, GAPS AND CHALLENGES

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©National Environment and Planning Agency

Dunns River Falls in Ocho Rios, St. Ann



© Krishna Desai

Stoplight-Parrot fish (*Sparisoma viride*)



© The Cleaner Company Limited

Bauxite mining

## 4 Pressures, Gaps and Challenges Affecting the Conservation and Sustainable Use of Jamaica's Biodiversity

### A. PRESSURES

#### 4.1 Pressures on Biodiversity

Among the many factors that contribute to the loss of biodiversity in Jamaica are poverty, population growth, lack of public awareness about the importance of conserving biodiversity,

The 2015 Stocktaking Report identified the main threats to biodiversity in Jamaica as habitat loss, climate change, resource over-exploitation, invasive alien species and pollution.

Conservation constraints included:

- a lack of political will
- limited public awareness
- conflicting policy/limited inter-Agency collaboration
- unwillingness to share data/information
- limited scientific information
- limited information on biological resources and natural heritage
- low revenue/funding
- limited expertise in areas such as taxonomy
- poor socio-economic planning
- weak law enforcement.

Other factors noted in the State of the Environment Report, 2010 were population growth, coupled with agricultural, industrial and commercial expansion, which resulted in intense competition for land, leading to encroachment and fragmentation of natural habitat; natural processes and events such as erosion and hurricanes, the effects of which were often exacerbated by human activities and practices; and climate change, considered as likely

to further increase the negative impacts of these natural events.

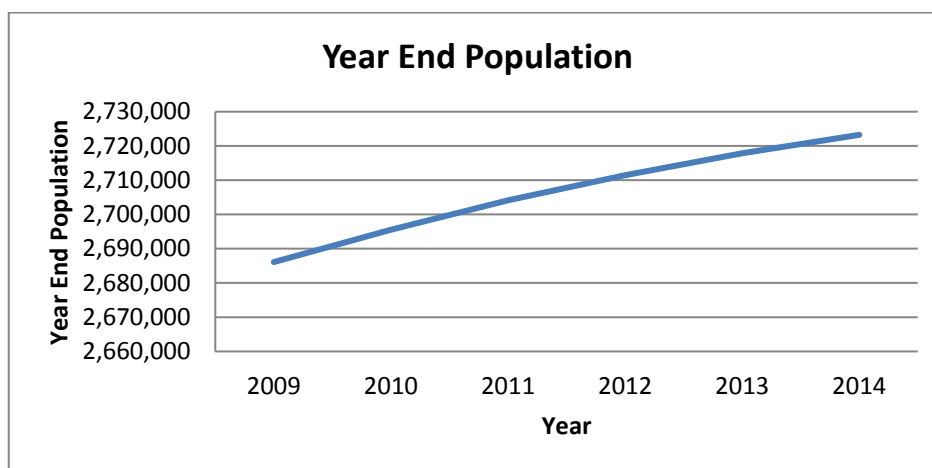
#### 4.2 Socio-economic Factors

##### 4.2.1 Population Pressure

Jamaica's population has been on a steady increase over recent years, see figure 4.1. Population increase has also led to an increasing demand for housing, particularly in urban areas, such as the corporate area of Kingston and St. Andrew, Spanish Town, Portmore and Montego Bay.

There has also been an increase in informal settlements. Such settlements are usually associated with improper garbage disposal mechanisms as garbage trucks do not traverse some of these areas. Unfavourable methods such as burning and dumping are practised by some households, which heighten the environmental, health and sanitary risks. These concerns relate to inadequacies in garbage collection in areas where these practices are prevalent (STATIN & PIOJ, 2014).

A summary of the drivers and economic sectors impacted by overexploitation is outlined in the Fifth National Report, 2015.



**Figure 4.1: End of Year Population for Jamaica**  
(Source: STATIN, 2016)

#### 4.2.2 Poverty

The national prevalence of poverty in 2012 was 19.9 percent, indicating that approximately one-fifth of Jamaicans were living in poverty (PIOJ & STATIN, 2014). The poverty rate increase was most noticeable in rural towns which registered a fourfold increase between 2007 and 2012, while the increase in the Kingston Metropolitan Area (KMA) was more than threefold.

The relationship between poverty and environmental degradation requires an integrated planning approach in order to achieve economic development and environmental sustainability. The poor and vulnerable in society are typically highly dependent on subsistence products. Overuse or misuse of these resources can result in biodiversity loss. In order to address growing pressures on Jamaica's biodiversity resources, one approach is to address poverty in a way that can lead to reduction in the dependency on natural resources.

The unregulated production of charcoal fuel for cooking can lead to deforestation. Providing cheap alternatives for cooking fuels from animal and sugar cane waste with the assistance of agencies such as the Scientific Research Council should continue to be promoted.

Reducing the pressure on near-shore marine fisheries by providing alternative livelihood strategies is an imperative. Underemployed Jamaicans are currently engaged in spear fishing, often targeting

juvenile herbivorous species. The high rate of capture for sale or for subsistence needs is responsible for over fishing in Jamaica. Social development agencies may benefit from assistance that allows them to recognize the link between poverty and its impacts to biodiversity. Agencies with responsibility for managing biodiversity should work with these social development agencies (such as, the Social Development Commission, etc.) and their key stakeholders to develop social support and income opportunities that are sustainable and lead to conservation. Through collaborative efforts, strategies may be discussed and implemented and can include building the capacity of vulnerable communities to work as stewards and beneficiaries (including monetary benefits) of biodiversity resources including genetic resources, tourism and the sustainable harvest of forest products.

#### 4.2.3 Habitat Degradation

Poor agricultural practices such as slash and burn, hillside farming, improper and overuse of fertilizers and pesticides lead to the degradation and loss of forests. Hillside that once were dominated with structurally complex and biodiverse primary forests that would have included endemic species (plants and animals), are now primarily secondary structurally simplified regrowth. These changes in structure have likely resulted in a loss of biodiversity including the potential for proliferation of harmful invasive alien species such as the White Ginger Lily (*Hedychium coronarium*) and the Vampire Fern

(*Dicranopteris pectinata*) (Fifth National Report, 2015).

The increasing demand for housing and the growth of formal and informal settlements have also threatened wetland areas along the coast as these lands are being reclaimed and riparian vegetation has been replaced as persons now live along drainage paths.

Coastal developments, to support tourism and other activities, have also threatened forest and wetland ecosystems, through reclamation of the lands for construction. This loss in habitats and biodiversity has led to increasing threats from natural hazards such as storm surge, flooding and coastal erosion.

Anecdotal evidence has suggested that habitat loss from coastal and inland mining and quarrying activities has increased the risk of erosion and flooding in some areas of Jamaica.

#### 4.2.4 Overexploitation

The unregulated harvesting of plants and animals by Jamaicans, particularly for food, is another significant pressure on the island's biodiversity (NEPA, 2015). There are several instances of exploitation in aquatic ecosystems, namely, the American Crocodile and Sea Turtles, both of which are still illegally exploited in Jamaican waters (as they are protected by law). Overfishing is another challenge. Over 20,000 Jamaicans depend on artisanal fishing for their livelihood leading to significant pressure on fish stocks and a tendency for many species to be overfished. Trends in the value of fish landings indicate that there is a gradual decline in the value of fish landed. For example, the value of total fish catch in 2009 was higher than in 2013 even though fish landings were higher in 2013. One possible explanation is that as fish stocks dwindle, many fishermen may be catching less economically valuable fish varieties, such as Wenchman (*Pristipomoidis aquilonaris*), and Grunt (*Haemulon album*) which fetch lower prices<sup>7</sup>.

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<sup>7</sup> A Reefs at Risk assessment conducted by the WRI and The Nature Conservancy (TNC) as part of the Coastal Capital project (2010-13) confirmed the pressure from over-fishing affects approximately two-thirds of reefs, and watershed-based sources threatened over 60%.

The Fisheries Division has declared fourteen areas as Special Fishery Conservation Areas (SCFA) /Fish Sanctuaries<sup>8</sup>. This has allowed for the protection and rehabilitation of remaining fish stocks and the protection of large fish with the notion that they produce and fertilize more eggs than do smaller fish. This activity to protect and enhance the fish stock appears to be effective. One NGO group reported that fish biomass increased by over 500% from 2011-2013 (NEPA, 2015).

There is a high level of unemployment and inadequate enforcement which contributes significantly to the pressures on the fisheries sector and impact extraction. As such, communication with fishers in a language that they know and understand is critical. The Fisheries Division has a deliberate strategy with the fishers to consult with them especially on management issues as well as on the new fines.

Finalization of the new Fisheries Policy and the Fisheries Bill was identified as a priority during stakeholder consultations. The proposals in the Fisheries Bill include an increase in fines from a maximum of JA\$5,000 to JA\$3million, and also provisions for the Fisheries Division to take cases to the Supreme Court where there is no limit on fines.

Extraction of wood for timber and charcoal is also a threat to biodiversity loss and habitat loss. The Forestry Department has undergone a number of initiatives to address this challenge. Extraction of orchid species for local sale and habitat alteration is thought to be the second largest threat to orchid species in Jamaica (although the latter is currently regulated). This has led to the development and passing of the Orchid Conservation Policy to preserve the over 220 species of orchids, 60 of which are endemic.

Some of the needs that have been identified during the NBSAP stocktaking exercise are outlined below:

<sup>8</sup>Draft 2013 State of the Environment Report. National Environment and Planning Agency.

- Increased funding to support public awareness campaigns on biodiversity conservation.
- Examination of the institutional capacity building of resource management agencies and the appropriate staffing and compensation packages.
- Greater interagency collaboration towards biodiversity conservation
- Improved collaboration and formal linkages with Academia for Master's and PhD studies to help fill some of the research gaps.
- Improved direct consultations with the private sector and special interest groups when making decisions related to conservation of biodiversity.

#### 4.2.5 Invasive Alien Species

Invasive alien species have important ecological impacts, including extinction of native species through both competition and predation, changes of ecological community structure, and impacts on human activity including economical activities and other impacts. Increasing regional integration and commerce among countries lead to an increasing risk of exchanges that can prove damaging to biodiversity. Invasive species can be either directly introduced by humans, or transported involuntarily. Shipping is a major vector for alien species, which are transported either with cargo shipped or as biofouling communities or in ballast water.

In Jamaica there are over 120 recorded invasive alien species. The Jamaica Invasive Species Database, managed through the Jamaica Clearing-House Mechanism, details some of the species invasive to Jamaica, including their management strategy, invasive and habitat types and occurrence. Even though there are over 120 recorded invasive alien species, data on only 60 have been entered in the JA-CHM invasive species database.

According to the Stocktaking Report (2015), several invasive alien species listed in the NBSAP have significantly impacted Jamaica's local biodiversity and livelihoods. These include the White-tailed Deer, (*Odocoileus virginianus*) which has severely affected farming communities in the hills of Portland; and the Indian mongoose (*Herpestes javanicus*) which is

believed to be responsible for the decline and possible extinction of five endemic vertebrate species such as the Jamaican Petrel and is also a major threat to several indigenous and endemic species including the critically endangered, Jamaican Iguana (*Cyclura collei*). Increasing numbers of invasive plant species were also listed as being of particular concern, including the Wild Ginger (*Alpinia allughas*) and the Australian Paper bark (*Melaleuca quinquenervia*) which have the potential to destroy the ecology of the Black River Morass, and the Mock Orange (*Pittosporum undulatum*) and Wynne Grass (*Melinis minutiflora*) which have taken over large areas on the disturbed periphery of the Blue and John Crow Mountains National Park. In the marine environment the Lionfish (*Pterois* spp.) is also causing ecological imbalance.

#### 4.2.6 Pollution

Water pollution has direct impacts on biodiversity, ranging from eradication of life in heavily polluted areas to more subtle, but relevant effects such as changes in freshwater and marine community structure and diversity, which can affect the maintenance of a sustainable freshwater fishery. In addition, bioaccumulation of contaminants up the food chain, such as heavy metals and persistent organic pollutants, may impact the long-term survival of both freshwater and marine fauna. People who consume contaminated fish with these bio-accumulated toxins can also be affected. An additional problem triggered by organic pollution is the onset of the eutrophication process, which changes aquatic community structure and affects water quality.

According to the NBSAP Stocktaking Report (2015), the major contributors to water pollution in Jamaica include continued deforestation and the contamination of aquifers. The pollution is as a result of commercial and domestic activities, including improper disposal of waste, saline intrusion, contamination from agricultural activities, grazing and watering of livestock, untreated domestic discharges, and industrial effluents. Constraints outlined include the lack of a policy to guide the utilization, management and protection of rivers.



Some steps have been taken to prevent contamination of natural ecosystems. One of the priorities in the Medium Term Socio-Economic Policy Framework (MTF) 2015–2018 is a sector strategy entitled "Develop a Framework for Non-Regulated Sources of Pollution". The related actions were to undertake regulatory impact assessments of selected non-regulated sources of pollution and develop best practice guidelines for at least two non-regulated source categories.

The Natural Resources (Wastewater and Sludge) Regulations (2013) set out standards for disposal of sewage and trade effluent and sludge and provide for a permit and licensing system for the discharge of effluent. The permit and licensing system under the NRCA Act also allows for Environmental Impact Assessments to be required for development applications. There are also standards for ambient water quality (covering both freshwater and marine water). Monitoring activities by NEPA need to be increased, however.

Another significant source of both groundwater and surface water pollution is solid waste dumps. The

accumulation of waste produces highly contaminated liquid effluent that flows down through the drainage system or leaches into the ground and groundwater aquifers, thereby posing a serious threat to water quality. The environmentally acceptable alternative would entail replacing unmanaged dumping areas for appropriately installed and managed landfills, designed to prevent the infiltration and run-off of waste effluent or built with waste effluent treatment facilities to render the effluent harmless. The gas generated by organic waste is mostly methane (CH<sub>4</sub>) which could be used to generate energy and avoid emission of a greenhouse gas into the atmosphere. At present, there are no regulations for the construction of landfills.

If the recommendations outlined in the Vision 2030 Jamaica MTF are adequately implemented, the proposed measures would promote a significant reduction in water pollution in Jamaica and would also aid the conservation of biodiversity. It would also help in meeting some of the Aichi targets.

## B. GAPS AND CHALLENGES

### 4.3 Climate Change

Jamaica, as a small island developing state, has been experiencing the impacts and is projected to continue to be negatively impacted by climate change. The projected changes in the climate of the Caribbean include: shorter rainy seasons, longer dry seasons, increased and more intense flooding events and more intense hurricanes. Specifically, in the Caribbean basin, temperature is projected to rise between 0.7°C and 2.4°C by the end of the 21st century (IPCC Fifth Assessment Report, 2013). Similarly, climate models project changes in annual precipitation varying from –29% to +14% with a median value of -5%. There has been a moderate decline in precipitation across the northern Caribbean basin coupled with evidence of greater rainfall variability and increasingly more and prolonged dry spells especially during the summer period (Gamble and Curtis 2008; Gamble 2009). The latter trend is particularly important given the fact that

the Caribbean's climate regime has traditionally been characterized by dry winters and wet summers (Chen and Taylor 2002; Taylor et al. 2011). In addition to these trends, there has been a marked increase in tropical cyclone activity in the region which some believe may be linked to climate change (Pulwarty et al. 2010; Trotz and Lindo, 2013).

Table 4.1 below outlines some of the impacts of climate change on Jamaica's biodiversity. Climate change is an additional stress with expected profound impacts on the island's natural ecosystems and their species (Webber. ppt, n.d.). For example, coral bleaching, due to increased sea surface temperatures coupled with poor sewage disposal practices, threatens the loss of biologically diverse coral reef ecosystems. Coastal erosion due to sea level rise has been eroding beaches and damaging the species they house and other coastal vegetation, leading to losses in biodiversity.

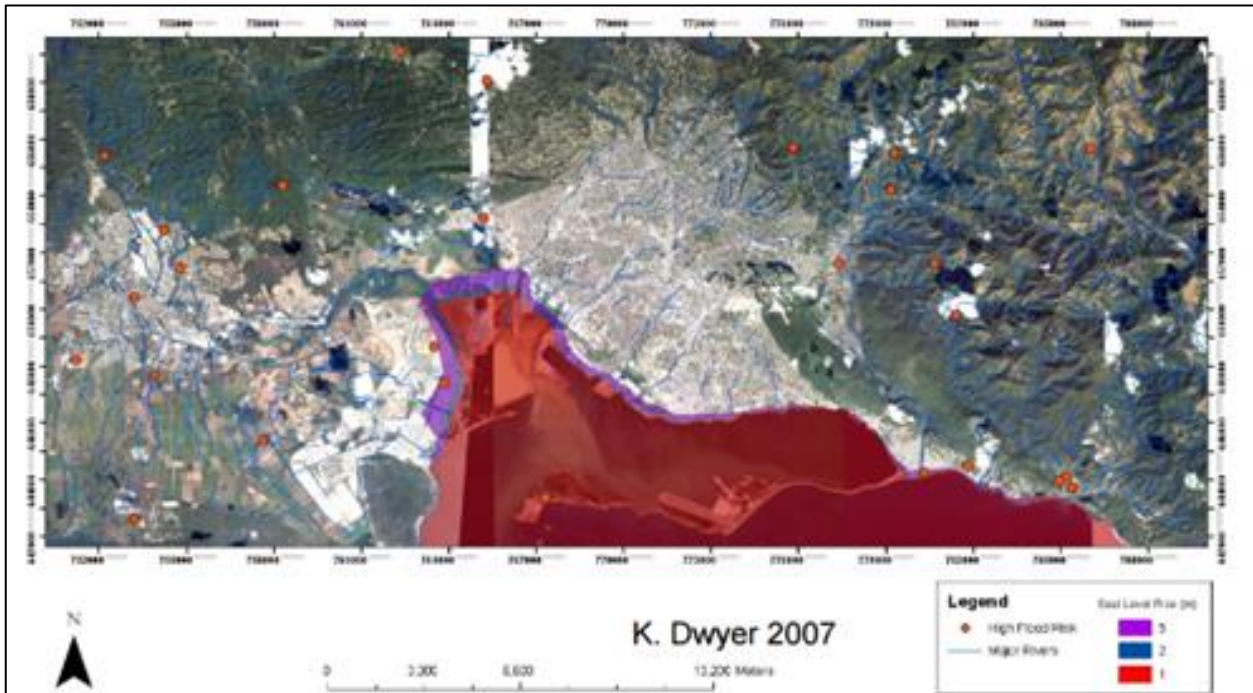
Based on the Fifth National Report, 2015, coral reefs, highland forests and mangroves are the most vulnerable to climate change. The following species have also been identified as being most at risk to climate change within Jamaica:

- Portland Ridge Frog (*Eleutherodactylus cavernicola*);
- Cricket Lizard (*Sphaerodactylus parkeri*);
- White Ibis (*Eudocimus albus*);
- Clapper Rail (*Rallus crepitans*);
- Loggerhead turtle (*Caretta caretta*);
- Jamaican Iguana (*Cyclura collei*);
- Glossy Ibis (*Plegadis falcinellus*);
- Caribbean Coot (*Fulica caribaea*);
- Hawksbill Turtle (*Eretmochelys imbricata*);
- Blue-tailed Galliwasp (*Celestus duquesneyi*);
- West Indian Whistling Duck Bridled Tern (*Dendrocygna arborea*);
- Green Turtle (*Chelonia mydas*);
- Jamaican Boa (*Epicrates subflavus*);
- Masked Duck (*Nomonyx dominica*);
- Fish-eating Bat (*Noctilio leporinus mastivus*);
- Jamaican Slider Turtle (*Trachemys terrapen*);
- Jamaican Thunder Snake (*Trophidophis stullae*);
- Black Rail (*Laterallus jamaicensis*); and
- Jamaican Hutia (Coney) (*Geocapromys brownii*).
- Jamaican Blackbird (*Nesopsar nigerrimus*)

**Table 4.1 - Impacts of Climate Change on Biodiversity**

Impact	Threats to Biodiversity
Higher Temperatures	<ul style="list-style-type: none"> <li>• Change in species abundance &amp; distribution</li> <li>• Migration to higher altitudes</li> <li>• Genetic changes in species to new climatic conditions</li> <li>• Change in reproduction timings (life cycle)</li> <li>• Increased sand temperatures, can lead to changes in sex ratios (reducing male turtle production)</li> <li>• Change in length of growing seasons for plants</li> <li>• Increase in extinction rate</li> </ul>
Altered rainfall and run-off patterns	<ul style="list-style-type: none"> <li>• Drying of ecosystems leading to loss of species and changes in community composition.</li> <li>• Changes in species distribution and ecosystem composition.</li> <li>• Changes in the geographical extent of habitats and ecosystems.</li> <li>• Flooding of nests of various species and death of young individuals.</li> </ul>
Sea level rise	<ul style="list-style-type: none"> <li>• Changes in structure of coral reefs and shallow water marine communities.</li> <li>• Increased inundation of coastal wetlands and lowlands.</li> <li>• Loss of estuarine, coastal species and communities.</li> <li>• Increased intrusion of salt water vegetation into freshwater ecosystems in coastal areas.</li> <li>• Loss of nesting and feeding habitats particularly for endangered turtle species and crocodiles</li> </ul>
Increase in sea surface temperature	<ul style="list-style-type: none"> <li>• Mild warming (+2°C), tropical near-shore communities will change from coral-dominance to algal-dominance.</li> <li>• Creates conditions that may be suitable for some invasive species to become established in new areas</li> <li>• High temperatures lead to coral bleaching and even coral death</li> </ul>
Altered intensity of hurricanes	<ul style="list-style-type: none"> <li>• Loss of vulnerable island species.</li> <li>• Changes in species competitive interactions and species and community composition.</li> <li>• Changes in range of invasive species.</li> <li>• Increased damage to nests &amp; nesting sites</li> </ul>

(Source: Webber, PPT, n.d.)



**Figure 4.2: Sea Level Rise Impacts on the Kingston Harbour**

(Source: Webber, n.d.)

One of the key challenges for Jamaica is that the linkages between climate change and biodiversity have not been studied in depth to determine detailed impacts that can be highlighted and adaptation measures specified. There is limited information on this and so detailed research should be commissioned to understand the impacts of climate change on biodiversity in Jamaica. In addition, it is also recommended that a rapid assessment be conducted to gain more insight on the likely impacts of climate change on biodiversity so that it can be used as a guide for targeted research.

Figure 4.2 above illustrates predictions for sea level rise for Kingston, Jamaica. Various areas of healthy and diverse mangrove stands around the island are likely to be lost/inundated. These mangrove stands have ecological value such as: sediment trapping, purification (sewage, fertilizers), shoreline and infrastructure protection, nutrient release, nursery ground, habitat for other species and refuge during hurricanes and severe storms (Webber, PPT, n.d). Currently, the *Planning for Adaptation to Climate Change Project, NRCA & CMS/UWI* is monitoring the impacts of climate change on coral reefs in Discovery Bay, Port Royal Cays, and the Pedro Bank. Apart from this work, one of the key challenges for Jamaica

is that the linkages between climate change and biodiversity have not been studied in depth to determine detailed impacts that can be highlighted and adaptation measures specified for various locations.

As such, the timing of proposed actions for considering climate change should be based around a staged approach that considers both the size and urgency of the problems.

In the first stage, there should be concurrent assessments of the size and urgency of the impacts of climate change and the institutional systems and human capital to deal with climate change. This would be followed by a two-staged process where urgent threats are dealt with using best available knowledge, whilst we improve our understanding of longer term (and possibly more intractable) threats before developing and implementing an action plan.

The potential impacts of climate change on biodiversity are likely to be significant and there is existing evidence of early ecological response to these changes. Nevertheless, many of the significant changes in species distribution and ecosystem function will happen over longer timeframes.

Therefore, before committing to actions aimed at dealing with the impacts of climate change on biodiversity it is important to consider not only the question of “adaptation to what” but also how much time the country has before action needs to be taken. This second part is critical as given the existing limited knowledge and resources, the challenge is to determine which actions should be prioritized, where in the landscape and seascape should they be undertaken and how urgently do those actions need to be undertaken. Of equal importance is to ensure that Jamaica has the institutional frameworks and intellectual capital to adequately assess and implement climate change actions for biodiversity.

Addressing climate change has been a priority for the Government and is included in the MTF 2015-2018.

#### 4.4 Biosafety

In Jamaica’s preparation to ratify the Cartagena Protocol on Biosafety, the development of a National Biosafety Framework, a National Biosafety Policy and a National Biosafety Act was initiated. Jamaica’s biosafety framework includes a National Policy on Biosafety; draft elements for a regulatory regime for biosafety, risk assessment and risk management procedures; and mechanisms for public information and participation (JIS, 2004).

Jamaica became a Party to the Protocol in 2012. The draft policy document has been revised and the proposals for a biosafety act will be developed.

Threats to biodiversity from biotechnology in the Caribbean including Jamaica vary. However, those directly relating to biodiversity include threats to ecosystems and to wildlife and agriculture. Concerns include the limited capacity in biosafety management and the inadequacy of immediate technical skills required to implement and operate biosafety regimes.

Biosafety in agriculture, chemistry, medicine, etc. requires application of the precautionary principle and a new definition focused on the biological nature of the threatened organism rather than the nature of the threat. Based on this narrower view of this issue, the NBSAP, in turn, highlighted the need for development of a domestic biosafety policy and

provided suggestions for a strategic direction for implementation. The following strategic directions were considered to be necessary:

- Finalize the national biosafety and biotechnology policies, and develop domestic legislation for the safe handling, use and transboundary movement of Living Modified Organisms (LMOs), taking into account risks to human health and to biodiversity;
- Strengthen institutional capacity in organizations involved in biotechnology to develop appropriate procedures and measures for conducting risk assessment and management concerning the use and release of LMOs;
- Provide public education on the uses of LMOs, especially in the area of agriculture, thereby increasing public understanding of potential benefits and adverse effects of LMOs.

With respect to the proposed strategic direction, significant gaps remain as none of the major strategic directions appear to have been undertaken. Additionally, the primary focus on LMOs is another gap that will need to be addressed. The development of a national biosafety policy should consider some of the other elements (medicine, chemistry, synthetic biology as well as introduced virus mutations from invasive species). The Biosafety Committee is needed to follow through the address of biosafety issues. It is critical that this committee be reformed and a mandate established.

#### 4.5 Endangered or Threatened Species

The Fifth National Report (2015) provides data comparing the status of Jamaican species on the Red List of endangered species of the International Union for Conservation of Nature (IUCN) between 2010 and 2013. The results show that 4 species (the West Indian Manatee, the Yellow- and Black-billed Parrots, and the Jamaican Iguana) were listed as critically endangered in 2013, while 4 species (1 bird, 2 amphibians and 1 plant) were categorized as endangered. Overall, there was an increase in the number of endangered species for groups including

birds and plants, while the total number of endangered species for mammals, reptiles and amphibians decreased as compared to 2010. Alliance for Zero Extinction (AZE) launched in 2005, engages over 88 non-governmental biodiversity conservation organizations working to prevent species extinctions by identifying and safeguarding the places, where species evaluated to be Endangered or Critically Endangered under IUCN criteria are restricted to single remaining sites (known as Alliance for Zero Extinction Sites). It is now increasingly adopted by governments to help protect against species extinction.

Jamaica has been working to recover the critically-endangered Jamaican Iguana, which has been considered an AZE species. The habitats of the endemic Jamaican Iguana in the dry limestone Hellshire Hills are protected and managed. In their native habitat, the resident population is monitored and an eradication programme for the predatory

invasive Indian Mongoose (*Herpestes auropunctatus*), in addition to feral dogs and cats, is conducted.

There appears to be population recovery underway for this endemic species which was once thought to be extinct. Numerous efforts have been put in place to identify and protect AZE species and monitor them within confined sites.

Similar gains need be made that mirror the success of the Jamaican Iguana, recognizing that for that effort, the activities spanned several decades.

In total, Jamaica has seven Alliance for Zero Extinction species in five Alliance for Zero Extinction sites as shown in **Table 4.2** below. There still exist some data gaps surrounding the location of some of the AZE species.

**Table 4.2 - Alliance for Zero Extinction Species and Sites**

Site Name	Species (Scientific Name)	Common Name
Blue and John Crow Mountains	<i>Eleutherodactylus alticola</i>	
Cockpit Country and Catadupa	<i>Eleutherodactylus griffus</i>	
	<i>Eleutherodactylus sisypodemus</i>	
Hellshire Hills	<i>Cyclura collei</i>	Jamaica Ground Iguana
	<i>Siphonorhis americana</i>	Jamaican Puraque
John Crow Mountain	<i>Pterodroma caribbaea</i>	Jamaica Petrel
Portland Bight and Ridge and surrounding areas	<i>Eleutherodactylus cavernicola</i>	Portland Ridge Frog

Source: Alliance for Zero Extinction, 2013

## 4.6 Protected Areas

Protected Areas are defined as “a clearly defined geographical area of land and or water that is dedicated to and managed for the long term conservation and sustainable use of its ecological systems, biodiversity and/or specific natural, cultural or aesthetic resources” (PASMP, 2013). PA’s are therefore necessary, and serve as important tool for the conservation of biodiversity and other services. Some benefits of protected areas include but not limited to:

- i. Conserves and or protects ecological and biological resources - provides breeding grounds and habitats for wildlife including fish which are critical to maintaining the island’s biodiversity and ecosystems;
- ii. Provides genetic resources - for food and agriculture;
- iii. Provides water - filter and supply fresh water for both rural and urban populations;
- iv. Protects against natural hazards - mitigate the effects of natural hazards (for example, hurricanes, storms) by acting as barriers and buffer zones; and

- v. Regulates climate – acts as natural carbon sinks and play a key role in global climate regulation

Jamaica has prepared the Protected Areas System Master Plan (2013-2017) as a requirement under the CBD's Programme of Work on Protected Areas. It is expected to provide a structured framework within which protected areas will be managed as part of a system. Thematic areas such as public awareness, legislation, culture and heritage, institutional arrangements, financial sustainability, and biodiversity conservation, including prioritization of areas proposed for inclusion in the protected areas

system, are included and discussed in the PASMP. The agencies responsible for these PAs include NRCA/NEPA, the Forestry Department, Fisheries Division and the Jamaica National Heritage Trust.

There are many different types of PA's in Jamaica. These include Marine Parks, Fish Sanctuaries, Forest Reserves, National Parks etc. that are protected to not only preserve the biodiversity of the area but protect other valuable aspects such as culture. **Table 4.3** below highlights the types of protected areas in Jamaica with their respective number (2006 vs. 2010) and their enabling legislation.

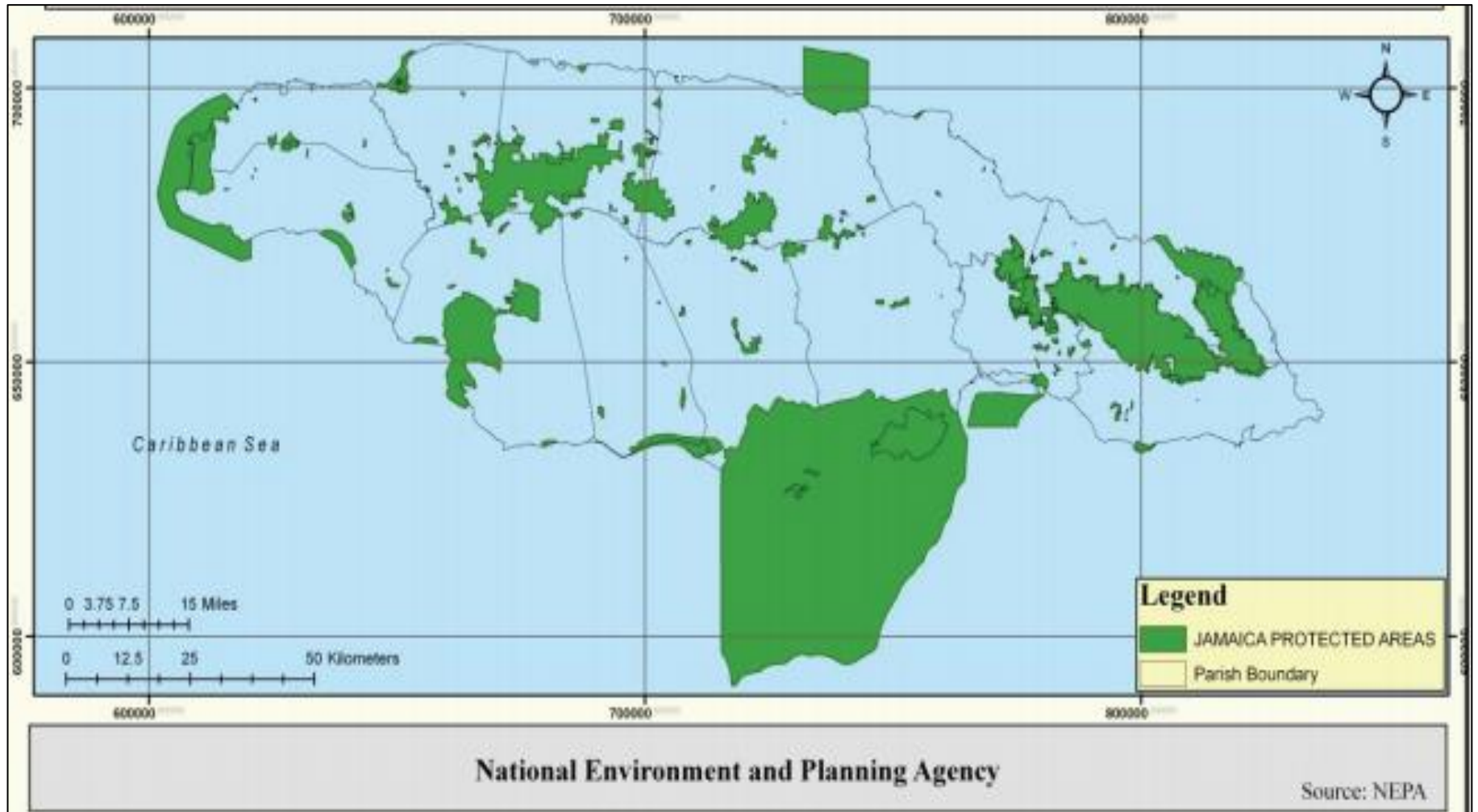
**Table 4.3 - Types of Protected Areas in Jamaica and their respective numbers as of 2010**

Type	Enabling Legislation	Number	
		2006	2010
National Parks	NRCA Act	1	1
Marine Parks	NRCA Act	2	2
Protected Areas*	NRCA Act	5	5
Protected Areas	Beach Control Act	2	2
Fish Sanctuaries	Fishing Industry Act	2	12
Forest Reserves	Forest Act	96	102
Game Reserves**	Wild Life Protection Act	13	13
Forest Management Area		...	2
Game Sanctuaries	Wild Life Protection Act	5	5
National Monuments	Jamaica National Heritage Trust Act	92	92
Protected National Heritage Sites	Jamaica National Heritage Trust Act	7	7
Environmental Protection Area	NRCA Act	1	1
<b>Total</b>		<b>226</b>	<b>244</b>

Source: NEPA and Forestry Department; \*The NRCA Protected Areas also include four Ramsar Sites and one World Heritage Site. Ramsar is an international designation-Convention on Wetlands of International Importance especially as waterfowl habitat. \*\*Note that all 102 Forest Reserves are also Game Reserves

**Figure 4.3: Legally Declared Protected Areas in Jamaica**

(source: State of the Environment Report, 2010)



These protected areas are distributed throughout Jamaica and indicate areas of great sensitivity. Terrestrial protected areas represent approximately 18% of Jamaica's total land area (200,000 ha) while marine protected area account for approximately 15% (180,000 ha) of the country's archipelagic waters (1.2% of Jamaica's total marine area (State of the Environment Report, 2010). **Figure 4.1** above highlights the legally protected areas in Jamaica. There are overlapping areas that may fall within more than one of the protected area category listed above.

As it relates to fish sanctuaries, the first two fish sanctuaries were declared in 1979 and 1986 at Bogue Island Lagoon, Montego Bay, and Bowen Inner Harbour, St Thomas respectively (State of the Environment Report, 2010). The Ministry of Agriculture and Fisheries has declared ten additional sanctuaries. These include, Three Bays Fish Sanctuary, Galleon, Galleon Harbour, Salt Harbour, Bluefields Bay, Orange Bay, Montego Bay Point Special Fishery Conservation Area, Discovery Bay, Sandals Boscobel and Oracabessa Bay Fish Sanctuary (Ministry of Agriculture and Fisheries, 2010). The fish sanctuaries are being managed through collaborative arrangements between the GOJ, non-governmental organizations (NGOs) and local community based organizations (CBOs). The GOJ through the Fisheries Division has signed MOUs with various local community based organizations or NGOs, for the management of these fish sanctuaries.

Unfortunately, protected areas are under pressure from various land uses. As most of these areas are surrounded by housing, mining and agriculture, activities such as "slash and burn" cultivation, squatting, deforestation for fuelwood, pollution from agricultural run-off, mining activities etc. exert significant pressures on the area greatly compromising biodiversity.

According to the Protected Areas System Master Plan: Jamaica 2013-2017, even though there is a relatively large coverage of PA's in Jamaica the existing protected sites do not include all the critical natural processes necessary to maintain Jamaica's significant biological features for the long term. Additionally, a number of biodiversity elements and ecological processes are not part of the current

conservation portfolio (Ecological Working Group, 2009).

The NBSAP (2003) stated that successful implementation of the Protected Areas Policy would depend on the coordination of policy, and planning and implementation among the agencies responsible for different types of protected areas. Protected area policies and plans have since been developed for a number of areas including Mason River, Palisadoes/Port Royal, and the Blue and John Crow Mountains to name a few. One highlight was the 2015 Declaration at the United Nations of the Blue and John Crow Mountains as a World Heritage Site of significant importance (UNESCO, 2015).

The major gap as it relates to conservation of biodiversity in various protected areas is the failure to source the funding needed to carry out the mandates of the National Protected Areas System (Master Plan). The development of a sustainable financial mechanism to support the management of all types protected areas is underway with the establishment and operationalization of the National Conservation Trust Fund of Jamaica (NCTFJ).

The situation with respect to biodiversity conservation is not unique to Jamaica. The major challenges to biodiversity conservation are poverty and unsustainable approaches to economic development. While there has been a plethora of agency-led initiatives towards biodiversity conservation and management, including the preparation of Protected Area management strategies, several key pieces of legislation or policies remain in various stages of implementation (draft, amended, etc.). Anthropogenic pressures continue to impact sensitive habitats, leading to overall declines in biodiversity. In addition, government agencies and other institutions charged with biodiversity conservation have difficulty sourcing sustainable funding to support their activities. There is also inadequate public awareness and political will to effect change. The development and implementation of Special Fisheries Conservation Areas (SFCA) counters this trend and is a welcomed success.

There are many factors that contribute to the loss of biodiversity in Jamaica. These include poverty, lack



of public awareness about the importance of conserving biodiversity, habitat/ecosystem destruction and degradation, unsustainable harvesting, pollution, and the spread of invasive alien species. This is important for key sectors discussed in Section 4.1 to 4.11 below.

#### 4.7 Economic Assessment of the Value of Biodiversity

Jamaica's marine and terrestrial biodiversity continues to be impacted by increasing pressures from a variety of human impacts. These human impacts can cause decreased quality and quantity of biodiversity thereby resulting in a reduction in the ability to provide valuable ecosystem services such as climate regulation, water purification, flood control, and recreational opportunities. Coastal and terrestrial ecosystems including seagrass beds, mangrove forests, and coastal and montane forests provide essential ecosystem services like water filtration, carbon storage, wildlife habitat, recreational opportunities and scenic beauty. However, because no market exists in which to trade many of these services, it is difficult to quantify the benefits they provide. Ecosystem services are those things that nature provides that are of direct benefit to humans.

When ecosystems are valued as assets and brought into the light of economic decision-making, these cost-effective services are more likely to be retained, thus leading to monetary savings by citizens and private entities. Economic value considers benefits to the resource users and the wider society. For instance, the economic value of coral reef habitats resides in the ecosystem functions that they contribute to human well-being. In economic terms "well-being" is also known as consumer or public welfare. The end goal of ecosystem service valuation is to be able to demonstrate the trade-offs in ecosystem services resulting from policy decisions.

Evidence of the incorporation of results and data produced from natural resource or ecosystem service valuation (NRV/ESV) into formal decision-making processes is very limited. The 2015

Stocktaking Report cited the Edwards (2011) Cockpit Country Ecosystem valuation study. However, there is little evidence that the results from this NGO-commissioned study were incorporated into the formal decision-making process. Similarly, a related rapid NRV study of the cost and benefits of constructing breakwater in Negril was commissioned by the responsible government agency. It is unclear if the findings from that study were able to be included as part of the decision-making process. To date, decisions for that project have not yet been finalized.

Another gap is the limited local capacity of individuals with formal environmental or natural resource economics training; this means that the production of high quality analyses used in international standard cost-benefit analyses is limited. A key recommendation for improving Jamaican capacity is the incorporation of environmental and natural resource economics into the curriculum of tertiary level academic institutions. This is both at the undergraduate and more importantly, the postgraduate level.

The use of **payment for ecosystem services (PES)** approaches may be considered as part of the suggestions for alternative options. PES is a market-based mechanism, similar to subsidies and taxes, to encourage the conservation of natural resources (IEED 2015)<sup>9</sup>.

Using of the results from natural resource valuation studies has direct relevance to the development of sustainable financing mechanisms for conserving biodiversity. An example of the potential use of this approach was demonstrated in Edwards (2009) study where the feasibility of implementing a sustainable funding mechanism for ocean and coastal management in Jamaica was explored. The Edwards' study also showed that an "environmental surcharge" of US\$2 per person could generate US\$3.4M per year that could be directed towards conservation and management. The mechanism for collecting this surcharge was essentially the tourism head tax that currently is used to maintain the

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<sup>9</sup>International Institute for Environment and Development (2015) Markets and payments for ecosystem services <http://www.iied.org/markets-payments-for-environmental-services>

Tourism Enhancement Fund. The study's key finding was that people are willing to pay more if they are assured that the funds will go directly towards environmental conservation and not into a general consolidated fund. This has implications for appropriate use of the TEF given the reliance of the tourism industry on a healthy natural environment.

#### 4.7.1 Carbon Pricing and Climate Mitigation

Another identified gap regarding the incorporation of the natural resource values into biodiversity conservation is the application of carbon prices. Carbon pricing can be used to mitigate climate change while promoting forest (including mangroves) biodiversity. Market-based mechanisms (such as the carbon registry or nutrient trading programmes) can be developed and designed in order to provide key stakeholders with greater incentives to leave land in forest production. This is another example of payment for ecosystem services. The Clean Development Mechanism out of the Kyoto Protocol was designed to support these types of efforts. Key to setting appropriate prices including taxes (for emitters) and payments for carbon sequestration services is the use of natural resource valuation approaches. Carbon sequestration is an added by-product of maintaining high diversity of flora associated with various ecosystems (terrestrial and coastal forests, seagrass beds, salt marshes) and the fauna that interacts with these systems as part of a functioning carbon cycle.

#### 4.7.2 National Environmental Accounting

The World Bank has signalled that environmental management is critical for sustainable human and economic development. The Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES) initiative<sup>10</sup> is one such initiative. WAVES is a World Bank-led global partnership that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. Jamaica, through its relevant ministries (finance and planning),

should seek advice regarding the national implementation of this approach. The Bank also manages the Climate Investment Fund through which current biodiversity and climate change-related projects are being conducted<sup>11</sup>.

In addition, the International Monetary Fund is incorporating environmental management into its lending portfolio. The IMF has recently produced publications including titles such as *Fiscal, Macroeconomic and Financial Implications for Global Climate Change*, *Getting Energy Prices Right: From Principle to Practice* and *Fiscal Policy to Mitigate Climate Change* among others<sup>12</sup>.

Environmental accounting should be part of an integrated framework involving multiple agencies. The application of environmental and natural resource economics to the valuation and accounting for natural capital is a fundamental requirement if sustainable development and biodiversity conservation are to occur. This approach cuts across most of the categories dealt with in this gap analysis document. For example, its use in setting appropriate fines for biodiversity losses (pollution, degradation, environmental offenses) is applicable to the justice system and the agencies charged with the responsibility for managing these resources.

The incorporation of natural resource valuation into biodiversity and environmental conservation requires mainstreaming across several agencies.

#### 4.8 Gender

Gender was not previously considered as a part of biodiversity conservation in Jamaica and was clearly absent in the 2003 NBSAP. The process of gender mainstreaming is an objective of the project and it serves to ensure that both men and women benefit from development interventions related to biodiversity conservation to be prepared under the NBSAP 2016-2021. Since 2003, Jamaica has developed a National Policy for Gender Equality (2011) and has ratified the Elimination of All Forms of Discrimination against Women (CEDAW), but

<sup>10</sup> <http://www.wavespartnership.org>

<sup>11</sup> <http://www.-cif.climateinvestmentfunds.org>

<sup>12</sup> <http://www.imf.org/external/np/fad/environ/>

gender mainstreaming throughout the sectors have been generally weak.

Within the Jamaican scenario, some consultations suggested that women have equal access to the goods and services provided by biodiversity. However, other consultations indicated that although there are no societal barriers to accessing biodiversity resources, circumstantial barriers may exist. The disparities that exist along gender lines are not fully understood in Jamaica, including the roles and needs of men and women with regards to biodiversity resources. Gender considerations are important to yield greater benefits to whole communities that benefit both genders, in protecting and conserving biodiversity, as well as, in allowing sustainable access to resources.

In examining the gender issues, its interlinkages with poverty are evident. PIOJ (2012) indicates that female-headed households are highly predominant in Jamaica and hold the highest percentage share compared to male-headed households. It was further noted that female-headed households bore a greater burden of dependents than male-headed households. Woven in this issue of gender equality, is the issue of poverty. Most of the female-headed households were identified within the poorest quintile (PIOJ, 2012). Additionally, female-headed households (46.5 per cent) were more likely to have applied to the PATH programme at some point in time than male-headed ones (27.3 per cent).

Gender mainstreaming at the institutional level is the best entry point for gender mainstreaming. If an institution mainstreams gender, then all policies, programs and products emanating from that institution will be gender-aware. Mainstreaming can also take place at the policy level, as well as, at the project/programme level. Data to inform a gender analysis is critical in order to properly mainstream gender equality. Recognizing that gender mainstreaming efforts are lacking in most sectors, with the exception of agriculture, the first step in mainstreaming is the conduct of sector based gender analyses to produce important answers to questions regarding the inequalities that exist and how these can be addressed. This is further elaborated in Section 6.3.

#### 4.9 Public Awareness, Education, and Community Responsibility and Empowerment

It has been recognized that there is a great need to improve the awareness among Jamaicans of the need to conserve biodiversity. This is stated in the 2003 NBSAP Report and reiterated in the Stocktaking Report (2015).

The financial resources to sustain all the above-listed activities have been inadequate. The National Environmental Education Committee (NEEC) was a multi-agency network established to coordinate and integrate environmental education activities across the island, but the committee is currently inactive. The committee addressed the need for networking and coordination to avoid duplication of efforts and sought to promote greater efficiency in the delivery of public education programmes.

Recognising that many environmental education programmes exist either through projects or organizational mandates, stakeholders reiterated the need for more activities on the role of communities in biodiversity conservation and the importance of ensuring that the language and content are suited to the audience being targeted, that is, using less technical jargon.

The need for public education and change management to counter poor behavioural practices and watershed management has been consistently underscored because the gap remains. One example of work being done is the Watershed Area Management Mechanism (WAMM) which is currently being implemented by the Ecosystems Management Branch at NEPA. The WAMM focuses on public awareness and capacity building within Watershed Management Units (WMUs). NEPA is currently implementing the WAMM in six (6) WMUs including the Hope River, the Montego River, Rio Cobre, Rio Minho, the Yallahs River and the Black River.

NEPA has also recently started another 5-year project (2015 to 2020) focusing on the Integrated Management of the Yallahs and Hope River Watershed Management Areas. This goal of this project is to work with farmers and communities to

influence behavioural change with respect to the environment.

There are some gaps in studies needed for effective watershed management, for example:

1. Population studies for animals and plants that are being harvested so that a sustainable yield can be set to avoid depletion;
2. Mapping of wetland areas including coral reefs;
3. Greater partnership needed between NEPA and academia to get students at the post-graduate level to conduct studies that would be useful in helping to fill some of the gaps identified by NEPA;
4. Greater public awareness activities are needed on the importance of biodiversity and how our bad habits and practices negatively impact biodiversity. Farmers, fishers, tourism groups need to be involved;
- 5.

The JA-CHM needs to be better publicised so that greater benefits can be garnered from the use of this website; and

6. The National Environment Education Committee needs to be reactivated.

#### 4.10 Enhancing the Legislative Framework for Biodiversity

The NBSAP (2003) outlined a number of policy and legislative gaps and challenges and articulated the need for more comprehensive legislation to protect ecosystems, species and genetic diversity. NEPA's (2015) NBSAP stocktaking report provided an updated account of the current actions that had been taken to address these gaps and status of implementation. **Table 4.4** below presents the gaps and needs identified based on the assessment conducted.



Branching Tube Sponge (*Pseudoceratina crassa*)

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**Table 4.4 - Policy and Legislative Gaps and Needs**

Policy and Legislative Gaps and Challenges	Needs
<p>Determine mechanism to modify constitution to support biodiversity conservation, sustainable use of biological resources, and ownership of genetic resources</p> <p>Amendment has been made to include certain environmental rights. Section 13(3) (l) of the Constitution now recognizes . . . “the right to enjoy a healthy and productive environment free from the threat of injury or damage from environmental abuse and degradation of the ecological heritage”.</p>	<p>An information campaign is needed. Partner with civil society groups to highlight environmental element of Section 13(3) (i) when discussing constitutional reform.</p>
<p>Determine the need to incorporate into legislation alternative regulatory instruments, such as economic incentives to promote sustainable use of biodiversity and ways and means to empower and support NGOs involved in environmental projects</p>	<p>Conduct legislative analysis of relevant or potentially relevant laws and regulations</p> <p>Collaborate with relevant ministries (Justice, Finance, Security) to develop economic instruments (fines, green fees, polluter pays), mechanisms, to generate dedicated biodiversity conservation funding for sustainable financing</p>
<p>Develop legislation concerning scientific research and collection</p> <p>A permit is required to do research in a National Park (National Park Regulations 16) or a Marine Park (Marine Park Regulations 9)</p>	<p>Examine existing regulations for biological sampling and export of endemics. Link to Ministry of Industry, Commerce, Agriculture and Fisheries, Veterinary Services Division. Cross-cutting with Biosafety</p>
<p>Develop legislation to address the commercial use of Living Modified Organisms (LMOs)</p>	<p>Re-establish National Biosafety Committee. Follow CBD guidelines for developing legislation. Cross-cutting with Sustainable Agriculture</p>
<p>Fines and other punitive measures particularly associated with improper handling and disposal of hazardous waste are not high enough to act as deterrent or represent seriousness of offence.</p>	<p>The NRCA Act needs to be revised to increase fines etc. especially for hazardous waste.</p>
<p>The NRCA Act does not have any provisions relating to buffer zones, however, the JCDT, in conjunction with the surrounding communities, have created a buffer zone for the Blue and John Crow Mountains National Park.</p>	<p>The NRCA Act needs to be revised to include provisions relating to buffer zones. The example of Blue and John Crow Mountains National Park can be used to inform revision.</p>
<p>Inadequate monitoring and enforcement of: Natural Resources Conservation Wastewater and Sludge Regulations passed in 2013: Wastewater and sludge entering, but not limited to coral reefs, seagrass beds, mangroves, nursery or forage areas for aquatic and terrestrial life, habitats for species protected under the SPAW Protocol, waters for recreational use</p>	<p>Enforcement and funding to conduct baseline monitoring and as such enforcement and monitoring efforts should be improved.</p>

Policy and Legislative Gaps and Challenges	Needs
Section 19 of the Beach Controls Act (1956) addresses coastal resources and the ability to sue for damage to these resources.	
Establish mechanisms to ensure awareness by the judiciary of the status of Jamaica's biodiversity especially threatened species	Repeat Judicial symposia, but with clear outputs beyond sensitization. Suggest output - draft recommendations for updating laws, increased fines for breaches etc.
There is currently no policy governing the protection of rivers and caves.	Policy should be developed on the protection of rivers and caves.

The main gap continues to be the sectoral nature of legislation and policy. This is not unique to environmental conservation and biodiversity issues or Jamaica. Harmonization of complementary pieces of legislation across various key agencies is one way to make some progress. A key entry point seems to be the enforcement and strengthening of existing laws as well as the creation and the promulgation of new laws that are able to keep pace with emerging needs and technology.

With respect to the harmonization of legislation, a key opportunity exists for conducting a thorough legislative analysis of relevant or potentially relevant laws and regulations. This will require collaboration with relevant ministries (Finance, Security, Agriculture, Mining, etc.) and Attorney General to assess if there are any conflicts or overlaps with respect to enforcing and updating penalties for breaches that may negatively impact biodiversity. In addition, there is a need to develop economic instruments (fines, green fees, polluter pays) and other mechanisms to generate dedicated biodiversity conservation funding for sustainable financing.

This should be done in collaboration with the Ministry of Finance and government agencies responsible for conserving biodiversity. This cuts across the incorporation of Natural Capital and Environmental Benefits into National Accounts.

With regard to the Aichi Targets, there is no goal that explicitly targets strengthening legislation to support biodiversity conservation. However, improving legislation along with the enforcement and

implementation of same directly impacts all of the key areas discussed in this document.

#### 4.11 Land Use Planning and Environmental Impact Assessments

Land use planning is an essential tool to control development and protect sensitive areas. This is particularly relevant to protect areas highly threatened by human encroachment, such as forests and wetlands, among others. In Jamaica, this has been recognized and the National Spatial Plan is under preparation. During the preparation of the Gaps Report (ESL, 2016) many opportunities for improving land use control and management were identified. However, the completion of the National Spatial Plan is one of the most important gaps to be fulfilled to enhance effective land use management in Jamaica.

Most of the above activities fall into the jurisdiction of the Land Administration Division, National Land Agency and the Spatial Planning Division at NEPA. Stakeholder consultations indicated a series of needs, such as:

- Improved financial resource availability;
- Increased availability of qualified staff;
- Increased availability of environmental data and information coverage;
- Increased availability of technology and equipment; and
- Enhanced training to all staff involved in biodiversity management.

Land use planning is essential to protect sensitive environments and is in line with Aichi's Strategic Goal B, which demands that the pressures on biodiversity and habitat loss are controlled and also the need to promote sustainable use of natural resources.

The improvement of land use planning capability is largely dependent upon the completion of Jamaica's National Spatial Plan. This requires funds of approximately 2.5 - 2.9 US\$ million. This plan should enable the identification of areas that contain high biodiversity and must be protected from any use (for instance, lands within conservation units and protected areas). Moreover, the Spatial Planning Division (of NEPA) has identified shortage of human resources and technology to perform the duties.

Environmental Impact Assessments (EIAs) are an essential part of mainstreaming of biodiversity conservation and the sustainable use of natural resources. Many specific development types deserve specific guidelines for EIAs. As far as biodiversity conservation and sustainable use are concerned, EIAs must contain adequate assessment of biodiversity baseline conditions, providing for the identification of sensitive habitats, protected areas and information on the composition of both flora and fauna assemblages. Environmental Impact Assessments (EIAs) are an essential part of mainstreaming of biodiversity conservation and the sustainable use of natural resources. Many specific development types deserve specific guidelines for EIAs. As far as biodiversity conservation and sustainable use are concerned, EIAs must contain adequate assessment of biodiversity baseline conditions, providing for the identification of sensitive habitats, protected areas and information on the composition of both flora and fauna assemblages. In addition, baseline assessments must target specific endangered and endemic species of fauna and flora.

Adequate EIAs must consider appropriate impact assessment of biodiversity impacts, identification of feasible mitigation techniques, and appropriate biodiversity management and monitoring plans. Biodiversity management plans must be a mandatory element of any environmental management plan, particularly in cases where developments are proposed in sensitive areas. The

main gaps identified as far as Land Use Planning and EIAs are concerned include:

- Preventing uncontrolled or poorly planned human settlement in areas not conducive to such development, like steep hillsides and in watersheds;
- Preventing development and expansion of farming on steep slopes and on low productivity lands;
- Preventing further deforestation and destruction of watersheds and wetlands;
- Establishing incentives for private landowners to conserve biodiversity;
- Strengthening and enforcing existing laws against trespassing and illegal developments;
- Addressing land tenure issues;
- Preventing uncontrolled, illegal and inadequate development on environmentally sensitive areas;
- Lack of Strategic Environmental Assessments (SEAs) to address cumulative impacts of developments; and
- Weak processes for community feedback.

#### 4.12 Agricultural Sustainability

Agriculture is a highly relevant economic activity that provides for relevant needs of Jamaican society. However, the use of steep slopes for crop planting, soil exposure and the use of fertilizers and pesticides pose relevant threats to biodiversity. Mismanaged agriculture generates erosion, soil impoverishment, increased sedimentation in rivers, pollution (from pesticides and fertilizers) and reduction of soil biodiversity (meiofauna). As the activity covers large extensions of land, adequate management and impact mitigation are essential to protect biodiversity.

New regulations may be required to prevent agricultural development on steep slopes and also protection of river margins, in order to stem erosion and protect watersheds from impacts. These may include, for instance, the creation of the concept of Permanent Preservation Areas (PPAs) leading to prohibition of vegetation removal from steep slopes and river margins. The PPAs would then receive status akin to protected areas, where all native

vegetation would need to be left untouched (unless under very specific circumstances that would grant its removal).

Another relevant need identified is capacity building of farmers. They should be qualified to adopt more sustainable agricultural practices, while obtaining better results from their efforts. Continued efforts with the Farmers Field Schools are required. Wider coverage of this initiative is required to promote sustainable agricultural practices.

The main gaps identified for the sound management of biodiversity within the agriculture sector were:

- Developing and implementing improved agricultural policies and planning systems to provide a basis for the sustainable use of resources and to integrate agriculture policies and programmes with conservation policies and programmes;
- Obtaining financial resources to support training and extension services in order to provide farmers with the support they need;
- Increasing technical and scientific capacity within the agricultural sector;
- Developing land use zoning and control and enforcement measures to protect sensitive landscapes and species from inappropriate agricultural use and development;
- Increasing use and development of locally adapted genetic resources; and
- Increasing control over the importation of agricultural plants and animals to prevent the introduction of harmful alien species.

#### 4.13 Mining and Quarrying

The mining/minerals industry is a significant contributor to the country's GDP and foreign exchange earnings. The full scope of the sector, includes: metallic minerals (including bauxite and gold), non-metallic minerals (clay, dolomite, gypsum, limestone, marble, sand and gravel, silica sand, volcanic rocks and shale), and semi-precious minerals. The industry's contribution to overall GDP was 2.3 per cent in 2013 relative to 2.2 per cent in 2012, and remained flat at 2.3 per cent in 2014.

Mining, such as that for bauxite, requires the removal of forest before the ore can be extracted. When this removal occurs in areas of native limestone forests (such as in the Cockpit Country) the impact can be highly detrimental to biodiversity and to the quality of groundwater. Furthermore, following mine closure, the area may only be grassed or restored with non-native trees (NEPA, 2015)

Mining and quarrying activities continue to pose negative environmental impacts to people and sensitive ecosystems. The main gaps identified for the sound management of biodiversity within the Mining and Quarrying industry were:

- Preventing or reducing loss of habitat for endemic and threatened species;
- Obtaining adequate detailed descriptions of geophysical, climatic, vegetative and ecological characteristics as part of planning mine site developments;
- Overcoming gaps in understanding the regenerative capacity of the various flora and fauna communities affected by mining activities; and
- Increasing the understanding of the long-term impact of pollution on species and ecosystems.

In order to improve the environmental management of mining and quarrying activities, the conclusion of the National Spatial Plan of Jamaica, the preparation of Guidelines and Research to address impacts, mitigation and recovery from mining are required.

As government funds are often limited, one possibility of enhancing financial capacity for impact management, mitigation and compensation would entail promoting regulations to establish environmental compensation funds, whereby the developers would provide funds to compensate for their impacts. The use of the "polluter pays" principle can be used to develop regulations to promote payment for mitigation and recovery of degraded environments by project proponents. In addition, adequate ecosystem services valuation should be used to calculate the amount of funds to be made available by developers within compensation funds. We suggest some additional mechanisms (including



new levies) for financing biodiversity management in later sections of this report.

#### 4.14 Tourism

The tourism industry represents an important component of national development. Jamaica enjoys significant competitive advantages in Tourism and Travel Services, based primarily on its strong brand image, an appealing natural environment and human and cultural assets, and as such has been identified as one of the key industrial clusters deemed capable of driving sustainable economic growth for Jamaica in the long term. Tourism continues to play a central role by contributing to income generation, job creation and foreign exchange earnings. The progress made by the tourist sector in recent years included facilitating and sustaining the natural environment upon which the sector depends.

Usually the economic feasibility of any tourism development is directly dependent on large numbers of visitors at least during the high season, which in turn raises issues regarding:

- Sewage generation and treatment capability;
- Solid waste generation, disposal and treatment capability;
- Energy demand and consumption;
- Water consumption and water resources availability;
- Deforestation to build the new development as well as access roads and other installations;
- Potential erosion of exposed soils during construction;
- Potential contamination of both surface and ground water linked to sewage disposal;
- Potential erosion of beaches and dune systems linked to coastal resorts infrastructure;
- Loss of fauna and flora habitat associated to deforestation;
- Littering of natural environments around the proposed development;
- Potential social changes around the proposed development;

- Potential impacts on fishing activity;
- Increased road traffic along the access roads and conflicts with other users;
- Increased boat traffic in coastal areas and conflicts with bathers;
- Impacts of increased boat traffic on coral reefs, marine mammals and marine turtles;
- Other issues.

All issues above can be addressed by appropriate land use planning and policies, adequate EIA assessments, effective enforcement and the existing environmental licensing/permitting system that should bind everything together and must consider existing environmental laws and regulations as well as land use policies. The major gaps identified for the sound management of biodiversity in Jamaica were:

- Developing a comprehensive "Green Tourism and Ecotourism Policy";
- Developing guidelines, standards and codes of conduct to prevent negative impacts to biodiversity such as incentive measures for remedial activities and the adoption of eco-friendly standards by tourism operations;
- Improving collaboration among all sectors to reduce conflicts;
- Improving disposal and management of sewage and solid waste in watersheds, marine and coastal areas;
- Increasing the capacity for monitoring, compliance and enforcement;
- Conducting biodiversity risk assessments and determining carrying capacity for protected and sensitive areas;
- Improving awareness among operators and tourists of potential negative impacts of their activities on biodiversity; and
- Adequate assessment of biodiversity and other impacts.

#### 4.15 Enforcement

Existing enforcement of biodiversity relevant laws are primarily through the government's environmental management agencies, namely, the Forestry Department, NEPA and the Fisheries Division. There is no evidence of a formal or

consistent approach to increasing the level of awareness of the judiciary and law enforcement agencies of the importance of biodiversity. There have been *ad hoc* sensitization and training efforts conducted by some agencies responsible for biodiversity conservation. The Fisheries Division is one such example. NEPA has a public education and awareness department but it is not clear if regularly scheduled training with the judiciary and law enforcement occurs.

There is a paucity of examples of legal cases brought to the courts on environmental offences. However, there have been a few cases brought by NGOs and other civil society groups in the areas of solid waste, sewage and industrial pollution, as well as, tourism and infrastructure development breaches.

The Beach Control Act was amended in 2004 to allow the Natural Resources Conservation Authority to file a claim for damages to “any natural resources situated on the floor of the sea,” which encompasses a variety of habitats that may be injured by a vessel grounding event. The court can require rehabilitation to remedy the damage caused or it can require payment of monetary damages for “any reasonably foreseeable loss in the economic value of the natural resource to the public.” Despite this strong statutory authority, vessel grounding incidents in Jamaica are still often prosecuted through common law solutions, such as, negligence and nuisance

In 2001, a Cambodian fishing vessel, M/V Neola #7, ran aground on a reef at Rackham’s Cay, Jamaica in Kingston Harbour. The grounding damaged 192.4 square meters of coral reef. The court awarded US\$346,300 for damages. The Supreme Court of Judicature of Jamaica held that the Neolla #7 breached its duty of competent navigation within Kingston Harbour. Case studies from the United States, Maldives, Australia, and Tanzania were used to determine natural resource damage assessment. The court accepted the “cost of restoration” approach for assessing damages in order to rehabilitate the area to its pre-grounding state. This case was the first of its kind and demonstrated that there was a need for the development of Jamaican case law that not only applied common law principles.

Institutionalized training of key legal and enforcement agency personnel is required. This will mean regular training offered by natural resource management agencies, as well as, formal inclusion in training curricula.

Sustainable financing to support these activities can be generated in part from the enforcement of laws leading to collection of fines for various environmental breaches.

Updating the civil laws to reflect environmental damages include loss to biodiversity. These laws should be based on the polluter pays principle. Updated laws and relevant fines should be supported results and data from drawn from research, such as, environmental economics, natural resource valuation and other quantitative and qualitative methods that are used to quantify loss of biodiversity services.

#### **4.16 Access to Genetic Resources and Fair and Equitable Sharing of Benefits and Traditional Knowledge**

One of the pillars of sustainable conservation of biodiversity is the recognition that vulnerable populations have rights to benefits from products and services. These benefits include direct access to resources (forest and ocean products) as well as financial benefits that may accrue from by-products derived from genetic resources including biomedical and other commercial extracts. Specifically, Aichi Targets numbers 16 and 18 call for inclusion of these elements in national strategies and plans. This issue is related to an ethical and general concept in international environmental law known as the common heritage of mankind. It establishes that some localities belong to all humanity and that their resources are available for everyone’s use and benefit, taking into account future generations and the needs of developing countries. It formed the basis for the amendments to the 1982 Law of the Sea Treaty with specific reference to equitable sharing of seabed mining resources from areas beyond national jurisdiction (UNCLOS III). It has, however, faced some objections in modern day environmental

treaties including the CBD that clearly articulates the concept of benefit sharing as part of its objectives.

However, there is evidence that elements of this concept can be applied in national contexts. It is based on the principle of cooperative management of resources for the benefit of all groups including those most vulnerable and in need. The development of national policies and strategies that address access to genetic resources with fair and equitable sharing is examined below.

On examination of the current legislation and recent activities, it appears that one of the significant gaps in the implementation of the first NBSAP is the absence of any parliamentary legislation or policy that addresses access to genetic resources or fair and equitable sharing of the benefits. It was cited as a recommendation in the NBSAP 2003 (section 4.5.3.1) but has not yet been implemented. As a result, there continues to be the need to take tangible steps towards addressing Aichi Targets 16 and 18.

Access to genetic resources and equitable sharing of the benefits is an area that requires more attention as part of the NBSAP. There is a clear intersection with intellectual property, copyright and patent issues. The possible benefits to be gained from pharmaceutical and other products derived from Jamaica's flora and fauna should accrue to all citizens. One possible recommendation is to develop legislation that requires private entities to provide a percentage of their profits (licences, fees etc.) to a centralized fund for biodiversity conservation, establishment of the JA-CHM and access ant transfer instruments. The fledgling medical marijuana (ganja) industry could be a test case for this approach. Key stakeholders and communities that have cultural and economic dependence on biodiversity must be included in the process.

The main gaps and challenges concerning access to genetic resources and equitable sharing of their benefits in Jamaica are:

- Establishing a process to identify and build consensus on national objectives and priorities in the form of a policy on access and benefit sharing;

- Establishing a sound legal framework for governing access to Jamaica's genetic resources;
- Consultations with key stakeholder groups with prescriptive rights to biodiversity groups;
- Preserving traditional knowledge and innovations.

With respect to traditional knowledge, CBD has determined that traditional knowledge from indigenous and local communities should be respected, preserved and knowledge, innovations and practices should be maintained that embody traditional lifestyles relevant for the conservation and sustainable use of biological diversity. CBD also requires that the wider application of this traditional knowledge should be promoted with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of benefits arising from the utilization of such knowledge, innovation and practices (Article 8(j) CBD).

'Indigenous peoples' have most often been used to refer to the original people on the land before colonization or displacement. Within the Jamaican setting, there are no indigenous groups. However, the CBD has treated the terms 'indigenous peoples' and 'tribal peoples' synonymously. The Maroons of Jamaica have received statehood status within Jamaica and consequently have independent status. They are a discrete tribe and would therefore be considered as both tribal people and indigenous people as defined by the CBD. The Maroons have also been designated as indigenous people by UNESCO. They, along with other Jamaicans, possess traditional knowledge on the use of herbal medicines and utilize plants in ceremonial events. In addition, the Maroon communities qualify for the rights of indigenous peoples based on recent jurisprudence from the Inter-American Court of Human Rights (IACHR). In this document, Aichi Target 18 has been modified for Jamaica to remove the term indigenous but the Maroons would be classified as part of the local communities requiring the protection of relevant practices and knowledge related to biodiversity conservation.

Jamaica established the Jamaica Intellectual Property Office (JIPO) in January 2001, and then it acquired its status as a statutory body on February 1, 2002 through the JIPO ACT. JIPO currently operates under the Ministry of Industry, Commerce, Agriculture and Fisheries and are responsible for the protection of traditional knowledge.

One of the main challenges is that traditional knowledge is used to develop commercial products, such as, plant-based medicines, health products and cosmetics, as well as other products made from or incorporating genetic material, such as handicraft and clothes. Traditional knowledge has increasingly been used to develop new products and techniques without the involvement and consent of the holders of such knowledge, who have also received none of the resulting benefits. JIPO has been developed to address this challenge by offering patent and trade mark rights to originators.

There is need for greater public awareness and promotion on the use of traditional knowledge and the protection of intellectual property. The proper legislative framework to support the protection of traditional knowledge needs to be further developed in Jamaica.

#### 4.17 Summary of Progress towards Achieving the Aichi Targets

As part of the 5<sup>th</sup> National Report, NEPA completed the report on: *Progress towards the 2015 and 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 targets of the Millennium Development Goals*. The progress to date was reviewed as part of the gap analysis conducted, which has been used to assist in the development of the national targets and indicators presented in Section 5 as part of Jamaica's overall Strategy to conserve and preserve biodiversity.

In summary, Jamaica has made **partial progress** in seventeen targets and is **on track** to accomplish or exceed two targets, namely

- Target 11. By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for

biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes; and

- Target 17. By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

It was considered that there had been **no real progress** in terms of Target 2:

- By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

In this area, Jamaica has trained government officers in natural resources valuation techniques; incorporated environmental sciences in schools curricula at various levels; integrated biodiversity conservation in the country's national development plan – Vision 2030 Jamaica - National Development Plan, to which various Strategic Business Plans of the Government (2014-2017) have been aligned; incorporated the SDGs in the Medium Term Socio-economic Policy Framework 2015-2018.

# PART V STRATEGY AND ACTION PLAN



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Negril Royal Palm Reserve, Negril, Westmoreland



© Aquaculture Branch, Fisheries Division, Ministry of Industry, Commerce, Agriculture and Fisheries

Harvesting of a fish pond



© National Environment and Planning Agency

Fishing boats

## 5 VISION, GOALS AND GUIDING PRINCIPLES

### Vision

Mindful of the importance of our natural heritage to the well-being of present and future generations, recognising that sustainable use of biodiversity is the only way to secure its availability for future generations, and being conscious of the intrinsic value of biological diversity, we accept our responsibility to conserve and protect Jamaica's biodiversity through sustainable use, and fair and equitable sharing of the benefits derived from this biodiversity.

### Goals

The goals and targets of this National Strategy and Action Plan are based on the five strategic goals of the CBD's Strategic Plan 2011-2020 and its Aichi Targets. The Strategic Goals are as follows:

- i. **Strategic Goal A** – Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
- ii. **Strategic Goal B** – Reduce the direct pressures on biodiversity and promote sustainable use;
- iii. **Strategic Goal C** – Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;
- iv. **Strategic Goal D** – Enhance the benefits to all from biodiversity and ecosystem services;
- v. **Strategic Goal E** – Enhance implementation through participatory planning, knowledge management and capacity building.

### Guiding Principles

The principles are intended to provide guidance to decision-makers, developers, and citizens in support of efforts to achieve the stated vision for biodiversity in Jamaica. To fulfil the requirements of the CBD and to ensure that current and future generations of Jamaicans have biological and other resources available to meet their needs and aspirations, the Government of Jamaica, NGOs, business interests, private sector companies, communities and individual citizens will uphold the following principles

#### **Principle I - Transparency**

Affirm their commitment to open and transparent decision-making processes and provide opportunities for the participation of all citizens in the development of strategies, plans and programmes aimed at addressing biodiversity issues.

#### **Principle II - Acknowledge the need for behavioural change**

Address the underlying causes of the loss and decline of biodiversity by promoting the necessary societal changes through policies, laws, public education and awareness.

#### **Principle III - Local and traditional knowledge**

Respect local and traditional knowledge when developing and implementing policies, programmes and plans related to biodiversity.

#### **Principle IV - Protect habitats, ecosystems, species and genetic resources**

Adopt comprehensive biodiversity strategies and plans as part of efforts to conserve Jamaica's habitats, ecosystems, species and genetic resources.

### **Principle V - Local management**

Encourage NGOs and community groups to manage protected areas; operate rescue centres; captive breeding and other artificial propagation facilities; and to implement species management and recovery plans.

### **Principle VI - Precautionary approach**

Ensure that the precautionary approach (Principle 15, Rio Declaration 1992) is applied as widely as possible to avoid or minimise environmental degradation and the loss of biodiversity.

### **Principle VII - Environmental economic tools and technology**

Invest adequate financial capital in resource management tools, including biophysical inventories, monitoring, research, enforcement, environmental education and other activities to ensure the conservation of biodiversity and the sustainable use of biological resources.

### **Principle VIII - Sectoral integration**

Ensure that economic, social and environmental objectives are integrated, and policies, strategies,

plans and programmes are co-ordinated to effectively use scarce human and financial resources to ensure their greatest positive impacts.

## **5.1 National Targets and Indicators**

The National Biodiversity Targets as modified for Jamaica and the supporting indicators and timelines for achieving each, based on the Aichi Targets. It was recognized in stakeholder consultations that all twenty targets were applicable to Jamaica and with a few modifications, including to the timeline, the Aichi targets were accepted with minor modifications for relevance to Jamaica. Table 5.1 presents the modified targets and indicators that were developed through stakeholder consultations. It is recommended that the Environmental Management and Conservation Division of NEPA take ownership of the NBSAP as the Focal Point. NEPA in general will ensure that biodiversity conservation is mainstreamed within the Vision 2030 MTF process. The Agency will be responsible for following-up with the various Ministries and Agencies to produce the data to inform the targets and indicators set out in the table 5.1. It is recommended that NRCA's Biodiversity and Game Birds Committee oversee the implementation of the NBSAP.

Table 5.1- National Biodiversity Targets and Indicators

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
<b>STRATEGIC GOAL A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society</b>													
T1-a	By 2021, at the latest, Jamaicans are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	Increase in knowledge of Jamaicans understanding of biodiversity	Extent to which baseline KAP <sup>13</sup> survey completed (Categories: Not done, to some extent, great extent, Completed) <sup>14</sup>	0	1	Conduct baseline - KAP survey including gender to facilitate gender sensitive data		Q4				GOAL A Target 1	NEPA
T1-b		Comprehensive national strategies that promote awareness of the values of biodiversity in various sectors	Extent to which comprehensive national strategies completed (Categories: Not done, to some extent, great extent, Completed)	0	1	Implement comprehensive national strategies into various sectors to promote awareness of the values of biodiversity (industry/sector-specific information and guidelines)		Q4				GOAL A Target 1	NEPA
T1-c		Biodiversity educational curricula for schools	Extent to which the educational curricula relating to biodiversity developed (Categories: Not done, to some extent, great extent, Completed)	1 <sup>15</sup>	3	Develop the relevant educational curricula relating to aspects of biodiversity to be implemented in schools			Q4			GOAL A Target 1	NEPA, Min. of Education, Youth & Information (Education)
T1-d		Increased awareness	Number of public awareness campaigns on biodiversity	0	2	Conduct public awareness campaigns on biodiversity and identify steps people can take to protect it.					Q3	GOAL A Target 1	NEPA
T2-a		By 2021, at the latest, biodiversity values have	National projects using TEEB and SEEA <sup>16</sup> approaches implemented	Extent to which TEEB and SEEA approaches developed.	0	1	Implementation of national projects using TEEB and SEEA approaches.				Q4		GOAL A Target 2

<sup>13</sup> KAP means Knowledge, Attitudes and Practices

<sup>14</sup> To some extent- 50%; Great extent- 80%; Completed- 100%

<sup>15</sup> Primary school curricula revised in 2015 to include National Environmental Accounting

<sup>16</sup> The Economics of Ecosystems and Biodiversity; System of Environmental-Economic Accounting



Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	been integrated into national and local development and poverty reduction and planning processes are being incorporated into national accounting as appropriate, and reporting systems.		(Categories: Not done, to some extent, great extent, Completed)										
T2-b		Policies using TEEB and SEEA approaches	Number of policies that used TEEB and SEEA approaches.	0	1	Environmental Management Policies using Environmental Accounting by 2020					Q4	GOAL A Target 2	NEPA
T2-c		Legislation and policies relating to conservation and protection of biodiversity updated.	Number of legislation and policies relating to conservation and protection of biodiversity updated.	0	2	Update current legislations and policies relating to conservation and protection of biodiversity				Q4		GOAL A Target 2	NEPA, Forestry Dept., Fisheries Div., MICAFA (Agriculture)
T2-d		At least two fines revised relating to conservation and protection of biodiversity	Number of fines revised and developed to incorporate biodiversity conservation strategies.	0	2	Revise and/or develop fines for extractive industries; (renewable) marine fisheries (conch, lobster etc.), forestry and (non-renewable) mining (bauxite, limestone, sand, aggregate)				Q4		GOAL A Target 2	NEPA, Forestry Dept., Fisheries Div., MICAFA (Agriculture), MGD
T2-e		Inclusion of natural capital into national budgets and priorities	% of natural capital reflected in the national budget	0%	20%	Include of natural capital into national budgets and priorities		Q4				GOAL A Target 2	Ministry of Finance & the Public Service, MEGJC (ERMD) <sup>17</sup> , NEPA
T3-a	By 2021, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in	Introduction of incentive programmes to private and public sector companies such as the Green Business Certification	Number of pilot incentive programmes introduced	0	2	Introduce incentive programmes to private and public sector companies such as the Green Business Certification			Q2			GOAL A Target 3	NEPA, MEGJC (ERMD)
T3-b		Ecological limits/footprint and carrying capacity assessments for key	Number of Ecological Carrying Capacity studies completed	1	3	Use baseline information to conduct additional ecological limits/footprint and				Q4		GOAL A Target 3	NEPA

<sup>17</sup> Environment and Risk Management Division

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant obligations, taking into account national socioeconomic conditions.	economic sectors completed				carrying capacity assessments for key economic sectors (such as tourism, bauxite, fisheries, sand mining and forestry) in terms of sustainable production and consumption							
T3-c		Conservation easements mechanisms or programs Increase by 10% island-wide	Number of conservation easement programmes offered to landowners	0	1	Incentives implemented to harmonize with The CBD and other relevant international obligations			Q4			GOAL A Target 3	NEPA
T4-a	By 2021, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	Tools developed that allow key stakeholders to implement plans leading to sustainable production levels and use of natural resources	Number of tools developed to conduct rapid ecological footprint assessments	0	1	Develop new tools (manuals and/or smartphone apps), models and applications for various ecological assessments (Modelled after carbon footprint calculator)'		Q3				GOAL A Target 4	NEPA
T4-b		Updated State Of The Environment (SOE) Report by 2019 to include annual trends for production and consumption of key natural resources of at least two key sectors	Number of sectors included in the State of the Environment Report presenting annual trends for production and consumption of key natural resources.	0 (Some sector data in SOE but gaps exist)	2 (At least two sectors with full consumption & production data)	Update the SOE Report by 2019 to include annual trends for production and consumption of key natural resources related to mining, construction (transport, housing, works) forestry, fishing, energy, and water quality and availability. Some			Q4			GOAL A Target 4	NEPA

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
						data reflected in the SOE but many gaps exist.							
<b>STRATEGIC GOAL B - Reduce direct pressures on biodiversity loss and promote sustainable use</b>													
T5-a	By 2021, at the latest, the rate of loss of natural habitats, including forests, is at least halved and where feasible, brought close to zero, and degradation and fragmentation is significantly reduced.	Updated report at three year intervals	Trend in the population of endangered terrestrial organisms by species reported	1	5	Monitor and report population trends of five key endangered terrestrial species living within major habitats [Key species: Jamaican Iguana ( <i>Cyclura collei</i> ), the Jamaican Giant (GS) Swallowtail ( <i>Papilio homerus</i> ), the Yellow-billed Parrot ( <i>Amazonia collaria</i> ), the Jamaican Boa ( <i>Epicrates subflavus</i> ) and the Jamaican Hutia ( <i>Geocrapomis brownii</i> )]					Q2	GOAL B Target 5	NEPA, Forestry Dept. (for the GS butterflies via Water Mahoe)
T5-b		Updated report at three-year intervals	Area coverage (hectares) of at least 5 types of forests and wetlands	2	5	Measure and report extent of all types of forests and wetlands (wet, mesic, dry limestone forest, riverine forest, shale forest, alluvial forest, montane cloud forest and swamp forest) by 2021					Q3	GOAL B Target 5	Forestry Dept.
T5-c		Updated report at three-year intervals	Trend in area coverage (hectares) and number of fragments per habitat type	Baseline to be collected	Less fragments and larger total areas over time	Assess and report habitat extent and fragmentation of each key habitat type (as listed in T5-b above)					Q3	GOAL B Target 5	Forestry Dept.
T6-a	By 2021, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying	Annual monitoring Report on fishing production	Trends in population of the 5 most important fish species disaggregated by fish species	0 (data not disaggregated as required)	5 (reports on 5 fish species)	Monitor and report fishing production (tonnage produced/target species)				Q4		GOAL B Target 6	Fisheries Div.
T6-b		Annual monitoring Report on fishing production	Trends in population of the 3 most important invertebrate species disaggregated by fish species	0 (data not disaggregated as required)	3 (reports on 3 fish species)	Monitor and report fishing production (tonnage produced/target species)				Q4		GOAL B Target 6	Fisheries Div.

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T6-c	ecosystem-based approaches, so that overfishing is avoided,	Fish Sanctuaries declared	Number of new fish sanctuaries or Special Fishery Conservation Areas declared	14 (already declared)	17 (3 more sanctuaries declared)	Declare new fish sanctuaries for critical areas					Q4	GOAL B Target 6	Fisheries Div.
T6-d	recovery plans and measures are in place for all depleted species, fisheries have no significant	10 Year Plan for reducing destructive fishing practices  Increased number of fishing areas monitored	Number of destructive fishing cases prosecuted and recorded by Marine Police	0 reported	3 reported	Establish plan for reducing destructive fishing practices over a 10-year timeframe  Increase the number of fishing areas monitored					Q4	GOAL B Target 6	Fisheries Div., Marine Police
T6-e	adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	Management Plan for Commercial Fishery Species	Extent to which the Commercial Fisheries Species Management Plan has been developed. (Categories: Not done, to some extent, great extent, Completed)	1 <sup>18</sup>	2	Prepare and implement a Management Plan for Commercial Fishery species by 2018 (List of target species to be developed and should include Irish moss, seagrass and Spirulina) (Sustainable extraction levels to be defined and recovery strategies for depleted species).		Q4				GOAL B Target 6	Fisheries Div., NEPA
T6-f		Monitoring Report Produced on extraction rates commercial fisheries species	Number of target fishery species caught, disaggregated by species outlined in management plan	0 (Data currently not disaggregated)	3 (At least three species reported)	Monitor and report on extraction rates commercial fisheries species					Q3	GOAL B Target 6	Fisheries Div., NEPA
		Management Plan implemented	Number of species for which Sustainability level defined	0 (Data currently not disaggregated)	3 (At least 3 species reported)	Implement sustainable extraction practices as outlined in management plan.					Q3		
T7-a	By 2021, areas under agriculture, aquaculture and	List of existing agriculture-dependent species <sup>19</sup> in production systems	Extent to which the list of agriculture-dependent species completed.	1	2	Assess and report the list of existing agriculture-dependent species <sup>20</sup> in production systems and	Q4					GOAL B Target 7	MICAF (Agriculture)

<sup>18</sup> For Queen Conch Fisheries

<sup>19</sup> Agriculture-dependent species refers to those plant and animal species that Jamaica relies on for food.

<sup>20</sup> Agriculture-dependent species refers to those plant and animal species that Jamaica relies on for food

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	forestry are managed sustainably, ensuring conservation of biodiversity.	highlighting the 10 most relevant species.	(Categories: Not done, to some extent, great extent, Completed)	0		highlight the 10 most relevant species.							
		Report on the location and population status of at least 10 agriculture-dependent species	Number of locations reported for most relevant agriculture-dependent species	0	10	Assess and report on the location and population status of at least 10 agriculture-dependent species			Q4				
			Number of relevant agriculture-dependent species disaggregated in which abundance is determined	0	Abundance determined for the 10 most relevant			Q4					
T7-b		Maintenance and sustainability strategy defined and adopted	Extent to which Maintenance and Sustainability strategy developed (Categories: Not done, to some extent, great extent, Completed)	0	1	Define and adopt Maintenance and Sustainability Strategy for identify and assessing agriculture-dependent species <sup>21</sup> in production systems			Q4			GOAL B Target 7	MICAF (Agriculture)
T7-c		Increasing areas where the sustainable agricultural practices are used.	Area coverage (hectares) of sustainable agricultural areas	Baseline area to be determined	Increase sustainable areas by 2%. Increase in number of farmers	Assess, map and report the areas where the agricultural practices are sustainable.				Q4		GOAL B Target 7	MICAF (Agriculture)
			Number of farmers utilising sustainable practices	Baseline area to be determined						Q4			
T7-d		Increasing area where sustainable forestry practices are utilized.  Updated report at three-year intervals	Area coverage (hectares) under sustainable forestry practices	Baseline area to be determined	Increase area by 2%.	Assess, map and report areas where forestry practices are sustainable			Q4			GOAL B Target 7	MICAF (Agriculture)

<sup>21</sup> Agriculture-dependent species refers to those plant and animal species that Jamaica relies on for food

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T7-e		Regulations to incentivise sustainable agricultural and forestry practices	Extent to which regulations drafted with incentives to promote sustainable agriculture and forestry practices (Categories: Not done, to some extent, great extent, Completed)	0	1	Promote and implement regulations to incentivise sustainable agricultural and forestry practices through the development of regulations and a supporting strategy				Q4		GOAL B Target 7	MICAFA (Agriculture), Forestry Dept.
		Enforcement Strategy for incentives	Extent to which enforcement Strategy developed. (Categories: Not done, to some extent, great extent, Completed)	0	1						Q4		
T8-a	By 2021, pollution, including from excess nutrients and solid waste, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	Annual Monitoring Report on water quality in coastal waters and key freshwater resources.	Number of sampling stations showing “in spec” water quality disaggregated by locatio	Baseline to be determined	Increase in numbers by at least 2 “in spec” location.	Monitor and report water quality in coastal waters and key freshwater resources based on National Water Quality Standards monitored.				Q4		GOAL B Target 8	NEPA
			Number of land based sources of pollution identified.	Baseline to be determined	At least 2 additional identified		Updated assessment yearly and make connections to land based sources of pollution.						
T8-b		Monitoring Report on the quality of industrial effluents from industries.	Number of industries where effluents are discharged in the environment	Baseline to be determined	At least 2 additional monitored	Monitor and report the quality of industrial effluents from industries.	Q4					GOAL B Target 8	NEPA
			Number of ambient sampling stations monitored for water quality					Q4					
			Number of “in spec” ambient sampling stations						Q4				
			Number of “in spec” industry effluent being discharged in the environment						Q4				

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T8-c		Annual Monitoring Report on the quality of domestic effluents from existing wastewater treatment plants	Number and location of wastewater treatment plants sampled for effluent quality	Baseline to be determined	At least 2 additional monitored	Yearly monitoring and report the quality of domestic effluents from existing wastewater treatment plants		Q4				GOAL B Target 8	NEPA
			Number and location of "in spec" wastewater treatment plants sampled for effluent quality		At least 2 additional "in spec"			Q4					
T9-a	By 2021, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	Draft legislation for discharge, treatment and management of ballast water	Extent to which Legislation drafted for the discharge, treatment and management of ballast water in Jamaica (Categories: Not done, to some extent, great extent, Completed)	0	1	Draft legislation for discharge, treatment and management of ballast water		Q4				GOAL B Target 9	NEPA, MAJ
T9-b		Annual Monitoring report on existing invasive alien species.	Number of invasive alien species control programmes developed and implemented	Baseline to be determined	Number of control programmes increased by at least 2	Monitor and report on annual control mechanisms implemented at existing invasive alien species potential hotspots (ports, marinas and harbours) using internationally recognized protocols.		Q4				GOAL B Target 9	NEPA IAS Working Group
			Population numbers for at least 3 known invasive alien species	0	3				Q4				
T9-c		Strategy and action plan for control and management of known invasive alien species.	Extent to which the strategy and action plan developed. (Categories: Not done, to some extent, great extent, Completed)	1	1 (revised)	Update the strategy and action plan for control and management of known invasive alien species.					Q3	GOAL B Target 9	NEPA
T9-d		Draft regulations to improve management of invasive alien species	Extent to which legislation and regulations have been drafted. (Categories: Not done, to some extent, great extent, Completed)	0	1	Draft regulations to improve management of invasive alien species				Q4		GOAL B Target 9	NEPA
T10-a	By 2021, the multiple anthropogenic	Monitoring Report on coral coverage and condition on key coral reefs.	Coverage area (hectares) of key coral reefs surveyed	Baseline to be determined	No net loss or increased coral coverage, coral	Monitor and report on coral coverage and					Q3	GOAL B Target 10	NEPA

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.		<p>Percentage of coral recruitment in monitored areas</p> <p>Percentage in macro-algal cover</p> <p>Number of herbivorous fish in monitored areas</p> <p>Number of commercial fish in monitored areas</p> <p>Number of <i>Diadema</i> sp. in monitored areas</p>		recruitment, macro-algal cover, herbivorous and commercial fish, and <i>Diadema</i> sp. by 2%.	<p>condition on key coral reefs.</p> <p>Link reef condition to specific management activities such as number of marine protected areas or implemented nutrient abatement projects.</p>							
<b>STRATEGIC GOAL C - Improve the status of ecosystems by safeguarding ecosystems, species and genetic diversity</b>													
T11-a	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and	Management effectiveness of existing network of protected areas improved over 2016 levels.	Percentage increase in Management Effectiveness Tracking Tool (METT) Scores for all protected areas (Categories: Not done, to some extent, great extent, Completed)	2016 METT scores <sup>22</sup>	2-5% increase over 2016 figures for all sites	Assess and report on management effectiveness of existing network of protected areas		Q4				GOAL C Target 11	NEPA, Forestry Dept., Fisheries Div., JNHT
T11-b		Final Policy and legislation on Protected Area System (PAS)	Extent to which Policy and legislation on Protected Area System (PAS) has been developed. (Categories: Not done, to some extent, great extent, Completed)	Great extent <sup>23</sup>	Completed	Policy and legislation on Protected Area System (PAS) finalized		Q4				GOAL C Target 11	MEGJC (ERMD), NEPA,

<sup>22</sup> Prepared under the NPAS project. Baseline METT scores prepared in 2010; Mid-term report prepared in 2013; final report prepared in 2016

<sup>23</sup> Prepared under the NPAS project. Baseline METT scores prepared in 2010; Mid-term report prepared in 2013; final report prepared in 2016



Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T11-c	equitably managed, ecologically representative and well connected systems of protected areas and other effective based conservation measures, and integrated into the wider landscapes and seascapes.	Coverage of both terrestrial and marine protected areas in relation to Jamaica's territory.	% Coverage of (hectares) of protected areas across Jamaica.	Baseline to be identified	Increase by 3%	Measure coverage of both terrestrial and marine protected areas in relation to Jamaica's territory.		Q4				GOAL C Target 11	MEGJC (ERMD, Forestry) MICAFA (Agriculture), Ministry of Culture, Gender Entertainment & Sports (Culture)
T11-d		Two New Protected Areas Declared	Number of new protected areas declared for the marine environment.	Baseline to be identified	At least 2	Propose additional protected areas particularly for the marine environment since Jamaica has already exceeded the 17 % target for terrestrial ecosystems				Q4		GOAL C Target 11	NEPA
T12-a	By 2021, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	Annual Population Assessments	Number of population assessments conducted on AZE species.	0	At least 3 re-evaluated	Conduct population assessments of selected key endangered and vulnerable species. Update yearly.				Q4		GOAL C Target 12	NEPA IOJ UWI (Life Sciences Dept.)
		Red listing re-evaluation of 3 groups of species.	Trend in population of AZE species assessed	Baseline to be identified	At least 1 species increases in population	Red listing process in place and evaluation of at least three groups of species conducted				Q4			
T12-b		At least two more species added to the head-start projects and rare and endemic plant propagation project.	Number of head-start and propagation Projects developed.	0	2	Conduct and report on distribution assessments of selected key endangered and vulnerable species annually.		Q4				GOAL C Target 12	NEPA
						Continuation and expansion of head start projects (Iguana and crocodile) as well as the rare and endemic plant propagation project		Q4					
T12-c		Distribution assessment of selected key endangered	Number of opportunities for optimizing protected	0	2	Assess and correlate the distribution of selected		Q4				GOAL C Target 12	NEPA

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
		and vulnerable species with the existing and proposed network of protected areas	area boundaries for endangered species			key endangered and vulnerable species with the existing and proposed network of protected areas  Update report every three years							
T13-a	By 2021, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	Assessment Report on genetic diversity of cultivated plants and farmed animals and their wild relatives completed	Extent to which genetic diversity of cultivated plants and farmed animals and their wild relatives have been identified. (Categories: Not done, to some extent, great extent, Completed)	50%	100%	Assess and report genetic diversity of cultivated plants and farmed animals and their wild relatives  Update assessment at three-year intervals		Q2				GOAL C Target 13	MICAF (Agriculture)
T13-b		Comparison of genetic diversity of cultivated plants and farmed animals to their relatives over time	Extent to which the comparison of genetic diversity of cultivated plants and farmed animals to their wild relatives is documented. (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Compare genetic diversity of cultivated plants and farmed animals to their wild relatives over time  Update at three-year intervals				Q4		GOAL C Target 13	MICAF (Agriculture)
T13-c		Management Plan to prevent genetic erosion of key agricultural species and farmed animals and their wild relatives	Extent to which the plan for genetic erosion of key agricultural species and farmed animals to their wild relatives have been developed. (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Develop plan to prevent genetic erosion of key agricultural species and farmed animals and their wild relatives				Q4		GOAL C Target 13	MICAF (Agriculture)
<b>STRATEGIC GOAL D - Enhance the benefits to all from biodiversity and ecosystem services</b>													

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T14-a	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health,	Conservation measures implemented and reflected in vulnerable/sensitive ecosystem areas restored National environmental management strategies	Coverage (hectares) of vulnerable ecosystems restored and safeguarded/protected based on previous baseline data	Baseline to be defined	Increase in hectares restored by 5%	Implement conservation measures in vulnerable/sensitive ecosystem areas to restore 5% of those vulnerable  Develop national environmental management strategies				Q4		GOAL D Target 14	NEPA
T14-b	livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, and local communities and the poor and vulnerable.	National strategies or policies for enhanced and equitable provision of and access to essential ecosystem services	Extent to which the national strategies or policies have been developed. (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Develop national strategies or policies for enhanced and equitable provision of and access to essential ecosystem services		Q2				GOAL D Target 14	NEPA, Forestry Dept., Fisheries Div.
		Standard assessment tool utilized by different groups for reporting on the conservation status of the ecosystems they utilize and/or are charged with protecting	Number of communities groups sensitized on reporting the services utilized in the ecosystem (including selected farmers, fisher folk or other local community groups)	0	5	Develop a standard assessment tool and sensitise to different groups to report on the conservation status of the ecosystems they utilize and/or are charged with protecting				Q4			
T15-a	By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including	Development and implementation of a National Plan for Ecosystem Restoration	Extent to which the national plan for ecosystem restoration has been developed (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Develop and implement a National Plan for Ecosystem Restoration		Q1				GOAL D Target 15	NEPA
		restoration of at least 15 per cent of degraded ecosystems,	Number of Workshop/seminar of the National Plan for Ecosystem Restoration held	0	At least 1				Q4				
T15-b		Workshops hosted on importance of biodiversity to national development	Number of workshops held on importance of biodiversity to national development	0	At least 1	Host workshops on importance of biodiversity to national development		Q4				GOAL D Target 15	NEPA

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T15-c	hereby contributing to climate change mitigation and adaptation and to combating desertification.	Information on the potential contribution of biodiversity and the maintenance of ecosystem services to resilience and adaptive capacity in the face of impacts from climate change, is compiled, generated, and reviewed.	Number of projects that address climate change adaption and mitigation measures relating to biodiversity	0	At least 1	Compile, generate and review information on the potential contribution of biodiversity and the maintenance of ecosystem services to resilience and adaptive capacity in the face of impacts from climate change. This information is used to address climate change policies that impact biodiversity including to people				Q4			
		Ecosystem-based adaptation (EBA) methods and tools for biodiversity restoration developed	Extent to which tools and methods for supporting ecosystem-based adaptation have been developed (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Develop appropriate EBA tools for ecosystem restoration		Q3				GOAL D Target 15	NEPA
		Training workshops on proper use and utilization of tools and resources relevant to sectors arranged and disseminated	Number of training workshop held on proper use and utilization of EBA tools and resources	0	At least 1	Host training workshop on proper use and utilization of tools and resources relevant to sectors arranged and disseminated			Q3				
		Integration of ecosystem restoration into national adaptation strategies (including REDD-plus)	Number of national adaptation strategy integrating ecosystem restoration	0	At least 1	Integrate ecosystem restoration into national adaptation strategies (including REDD-plus)				Q3			
T16-a	By 2020, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising	Reviewed ABS agreements to examine ecological, social and economic impacts of different products (ganja, marine products etc.) and the national access and benefit sharing plan (ABS)	Number of products for which the ecological, social and economic impacts have been identified	0	At least 3	Ongoing review of ABS agreements to examine ecological, social and economic impacts of different products (ganja, marine products etc.) and the national access and benefit sharing plan (ABS)			Q4			GOAL D Target 16	NEPA

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T16-b	from their Utilization is in force and operational consistent with national legislation.		The extent to which the national access and benefit sharing plan has been developed (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed				Q4				
		Study of ecological, social and economic impacts of ABS agreements for different products (ganja, marine products etc.)	Number of academic institutions consulted for this study	0	At least 3	Collaborate with academic institutions and produce study of ecological, social and economic impacts of ABS agreements for different products (ganja, marine products etc.)			Q4				
		Annual workshops	Number of workshops held on the status of the legal frameworks for governing access to, and sharing the benefits of Jamaica's genetic resources	0	At least 2	Host Annual workshops			Q4				GOAL D Target 16
		Legal framework for governing access to, and sharing the benefits of Jamaica's genetic resources	The extent to which the legal framework for governing access to, and sharing the benefits of Jamaica's genetic resources developed. (Categories: Not done, to some extent, great extent, Completed)	Not done	Great extent	Establish a legal framework for governing access to, and sharing the benefits of Jamaica's genetic resources			Q4				
<b>STRATEGIC GOAL E - Enhance the implementation through participatory planning, knowledge management and capacity building</b>													
T17-a	By 2019, Jamaica has developed, adopted as a policy	Gather and collate stakeholder input into JA-CHM website	Proportion of stakeholders sensitized on national activities under the updated NBSAP	Baseline to be identified	At least all 80% <sup>24</sup>			Q1				GOAL E Target 17	NEPA, IOJ (JA-CHM)

<sup>24</sup> At least 80% of those listed in the Communication Strategy

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T17-b	instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	Update of JA-CHM website (2016-2017) with information on revised NBSAP	Extent to which the JA-CHM website has been updated. (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed		Q4						
		JA-CHM Relaunched.	Relaunch of the JA-CHM website	0	1 Launch held	Relaunch JA-CHM website with updated functionality and links to social media platforms.		Q2				GOAL E Target 17	NEPA, IOJ (JA-CHM)
		Increased traffic on website.	Numbers of hits on JA-CHM website	206 per annum	Increase traffic by 10%	Track the numbers of hits on JA-CHM website		Q4					Forestry Dept., Fisheries Div., NEPA, Ministry of Tourism, MSET, MICAF (Agriculture), MEGJC, Ministry of Finance & the Public Service
T18-a	By 2021, the traditional knowledge, innovations and practices of local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national	Inventory or status report on traditional knowledge cultural practices linked to biodiversity	Extent to which guidelines that protect/govern traditional knowledge and cultural practices linked to biodiversity have been developed (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Develop an inventory or status report that documents traditional knowledge cultural practices linked to biodiversity				Q4		GOAL E Target 18	NEPA, IOJ JIPO
T18-b		Legislation and Regulations that protect/govern traditional knowledge and cultural practices linked to biodiversity	Extent to which legislation and regulations that protect/govern traditional knowledge and cultural practices linked to biodiversity have been developed	Not done	Completed	Develop legislation and regulations that protect/govern traditional knowledge and cultural practices linked to biodiversity				Q4		GOAL E Target 18	NEPA, IOJ JIPO

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of local communities, at all relevant levels.		(Categories: Not done, to some extent, great extent, Completed)										
T18-c		Report on the status of and trends of the practice of traditional occupations that depend on or impact biodiversity resources (e.g., wild honey harvesting, bussu/ganga harvesting)	Percentage of practices that traditional occupations that depend on or impact biodiversity resources reported	0%	At least 5%	Generate report on the status of and trends of the practice of traditional occupations that depend on or impact biodiversity resources (e.g., wild honey harvesting, bussu/ganga harvesting)				Q4		GOAL E Target 18	NEPA
T18-d		Inclusion in the State of the Environment Report (SOE)	Extent to which the status and practices of traditional occupations that depend on or impact biodiversity resources are included in the SOE report (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Include the status and practices of traditional occupations that depend on or impact biodiversity resources in the State of the Environment Report (SOE)				Q4		GOAL E Target 18	NEPA
T18-e		Signed agreement between local communities and government for access, benefit sharing and traditional knowledge on biodiversity	Percentage of stakeholders that have signed the agreement with the government for access, benefit sharing and traditional knowledge on biodiversity	0%	50%	Drafting and preparation of document for signed agreement between local communities and government for access, benefit sharing and traditional knowledge on biodiversity				Q4		GOAL E Target 18	NEPA
T19-a	By 2020, the knowledge, the science base and technologies relating to biodiversity, its values, functioning, status, and trends, the consequences of	Online Catalogue on Jamaica-CHM website of publicly available databases and information resources supporting biodiversity conservation	Number of membership on JA-CHM	Baseline to be identified	Increase by 5%	Increase the use of the JA-CHM to disseminate information about the value of biodiversity including providing summarized abstracts to relevant studies by soliciting membership and conducting public awareness activities		Q4				GOAL E Target 19	IOJ (JA-CHM), NEPA
		Number of entities listed on the Data and Conservation webpage of the JA-CHM website	20	Increase by 10%				Q4					
		Number of user sessions on the Data and	19	Increase by 10%				Q4					

Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
T19-b	its loss, are improved, widely shared and transferred and applied.		Conservation webpage of the JA-CHM website										
			Number of Public Awareness and Education Programmes on Science base and technologies relating to biodiversity executed.	Baseline to be identified	At least 2 more			Q4					
T19-b		Workshops hosted and campaigns developed to build stakeholder awareness and buy-in to biodiversity conservation/protection	Number of awareness campaigns held	0	At least 2	Plan and host workshops and campaigns developed to build stakeholder awareness and buy-in to biodiversity conservation/protection			Q4			GOAL E Target 19	NEPA
T20-a	By 2019, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2016-2021 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to	National Strategy for Resource Mobilization is developed and implemented.	Extent to which the National Strategy for Resource Mobilization is implemented. (Categories: Not done, to some extent, great extent, Completed	0%	Completed	Develop a National Strategy for Resource Mobilization		Q4				GOAL E Target 20	NEPA, Ministry of Finance & the Public Service, Planning, IOJ
			Total National Budget available for Biodiversity Conservation	Baseline to be identified	Increase total budget by at least 20%	Draft should include combined international domestic mobilization (funding, human resources and capacity building)			Q4				
T20-b		National external funding strategy for biodiversity conservation drawing from related funding sources and international agreements (UNFCCC, CBD, etc.) with the aim to increase the number of funding sources.	Number of funding sources	2	4	Develop a national external funding strategy for biodiversity conservation drawing from related funding sources and international agreements (UNFCCC, CBD, etc.) with the aim to increase the number of funding sources.			Q4			GOAL E Target 20	NEPA, PIOJ
			Number of international agreements with potential funding being utilised	1	4								



Reference /Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	resource needs assessments to be developed and reported by Parties.												

## 6 Strategy for Mainstreaming Biodiversity into National Development Plans

This Section discusses the strategies available to mainstream biodiversity in Jamaica at the national level in terms of Jamaica's overall sustainable development plans as well as through national poverty reduction strategies and other cross-cutting plans and policies such as those related to gender, climate change and disaster risk reduction.

### 6.1 Incorporating Biodiversity into Jamaica's Sustainable Development Plans

Jamaica's main long-term sustainable development plan is Vision 2030 Jamaica – National Development Plan (Planning Institute of Jamaica, 2009)<sup>25</sup>.

The Plan is built on four strategic goals which are mutually reinforcing and synergistic in design. The National Goals are further mapped into 15 National Outcomes and a range of national and sector strategies and actions. Vision 2030 Jamaica is implemented through a series of Medium Term Socio-Economic Policy Frameworks (MTFs) which identify the priority outcomes, strategies and actions for each three-year period from 2009 to 2030. The third and most recent MTF covers the period 2015-2018 and outlines the package of priorities aligned to the budget at the macro level that will be implemented primarily by Ministries, Departments and Agencies (MDAs) over the period<sup>26</sup>. The MTF also addresses alignment of the national outcomes to the 2030 Agenda for Sustainable Development and the Sustainable Development Goals.

The national goals of Vision 2030 are:

- a) Jamaicans are empowered to reach their fullest potential;
- b) The Jamaican society is safe, cohesive and just;
- c) Jamaica's economy is prosperous; and
- d) Jamaica has a healthy natural environment.

In terms of mainstreaming biodiversity conservation and the sustainable use of biodiversity, Goal 4, the related national outcomes, strategies and actions are of particular importance, as may be seen in Appendix

#### 1. (National Strategies and Priority Sector Strategies for National Outcomes).

A number of strategies are then related to each National Outcome as shown in Table 6.1.

Each of the National Strategies unfolds into Priority Sector Strategies, which, in turn, are translated into key actions and allocation of responsibilities. National Outcomes 13 and 15 are of particular importance to the subject of mainstreaming biodiversity conservation as well as the sustainable use of biodiversity resources.

Within National Outcome 13, National Strategies 13.1 and 13.2 (Integrate environmental issues into economic and social decision making policies and develop and implement mechanisms for biodiversity and ecosystem management, respectively) are of particular importance to mainstreaming biodiversity conservation and sustainable use. The Mid Term Report 2015-2018 presents a series of updated sector strategies and actions to achieve National Outcome 13.

**Table 6.1 - National Outcomes 13 to 15 and related National Strategies**

NATIONAL OUTCOME	NATIONAL STRATEGY
National Outcome 13	Integrate environmental issues into economic and social decision-making policies and processes
	Develop and implement mechanisms for biodiversity and ecosystem management
	Develop efficient and effective governance structures for environmental management
	Manage all forms of waste effectively
National Outcome 14	Improve resilience against all forms of hazards
	Develop measures to adapt to climate change
	Develop mechanisms to influence the global rate of climate change

<sup>25</sup>Planning Institute of Jamaica. Vision 2030 Jamaica: National Development Plan. 2009.

<sup>26</sup> Planning Institute of Jamaica. Vision 2030 Jamaica: National Development Plan. 2009.

NATIONAL OUTCOME	NATIONAL STRATEGY
National Outcome 15	Create a comprehensive and efficient planning system
	Create an appropriate framework for sustainability planning
	Ensure safe sanitary and affordable shelter for all

(Source: PIOJ, 2009)

During the preparation of MTF 2015 – 2018, stakeholders identified the following outstanding key issues that still need to be addressed in regard to National Outcome 15:

- Outdated legislation;
- Lack of local sustainable development plans (LSDP) for most parishes;
- Lack of a national spatial plan;
- Inefficient and ineffective development approvals process;
- Increasing urban sprawl;
- Insufficient access to safe and adequate low-income housing; and
- Increase in the prevalence of squatter settlements.

Therefore, MTF 2015 – 2018 outlines a package of priorities focused on:

- Advancing local sustainable development planning;
- Completing the national spatial plan;
- Implementing and using Application Management and Data Automation (AMANDA) in all relevant agencies to improve the efficiency and effectiveness of the development applications process;
- Updating and promulgating a national rural development policy and strategy;
- Approving and implementing the national agricultural land use policy;
- Finalizing and promulgating the national housing policy;
- Commencing implementation of the Low-Income Housing Programme; and
- Finalizing and updating Parish Development Orders.

NEPA will work with the Vision 2030 Jamaica secretariat at the PIOJ to ensure that biodiversity conservation and management is mainstreamed into

all development plans during preparation, updating and revisions.

Within National Outcome 15, the National Strategies 15.1 and 15.2 (*Creating a Comprehensive and Efficient Planning System* and *Create an Appropriate Framework for Sustainability Planning*, respectively) are particularly relevant to the issue of biodiversity mainstreaming. The Mid Term Report 2015–2018 presents a series of **updated** sector strategies and actions to achieve National Outcome 15. Curiously, the Mid Term Report 2015–2018 does not present a Sector Strategy and Actions to achieve National Strategy 15.2 (*Create an Appropriate Framework for Sustainability Planning*), which is a relevant gap in the plan.

## 6.2 Incorporating Biodiversity into Jamaica's Poverty Reduction Plans

As was highlighted on in the Gap Analysis Report, poverty and environmental degradation are often inextricably linked. Poverty reduction strategies will require sustainable approaches in order to meet national targets for alleviating poverty while conserving biodiversity. Mainstreaming of biodiversity within existing agencies responsible for social development, and economic growth and development is critical to achieving related Aichi Targets. Poverty alleviation is tied to key economic sectors including tourism, agriculture, mining and infrastructure development. These sectors all have potential negative impacts on biodiversity, but, at the same time, can benefit from careful consideration of biodiversity conservation and environmental management.

Within the context of improved coordination and governance of the social protection system, the Poverty Reduction Coordinating Unit was established within the Planning Institute of Jamaica (PIOJ) in December 2013. A Green Paper was prepared in 2016 on the National Policy on Poverty and National Poverty Reduction Programme.

The policy framework for poverty is intended to promote greater levels of policy coherence, programme and information coordination and improved targeting of specialized poverty reduction mechanisms and tools at both national and local levels. It is informed by the Social Protection Strategy (SPS), 2014 which notes that “sustainable development depends on the responsible utilization of the available natural resources, and this will be better achieved through the reduction in poverty and

improvement in human capacity that can be generated by effective social protection.”

Mainstreaming biodiversity as part of a national poverty alleviation strategy will first require making explicit links between poverty and negative impacts on biodiversity. This should be included in the work plan of the Poverty Reduction Coordinating Unit established within the Planning Institute of Jamaica (PIOJ).

These links must not only be made clear for the agencies working in poverty alleviation programmes such as the SDC and JSIF, but they must be clearly communicated with those vulnerable stakeholders (poor). Biodiversity conservation approaches must strive to include vulnerable groups and individuals in activities. Inclusion in conservation ensures that the poor become stewards of the very same biodiversity resources that they either depend on or might negatively impact through activities. The NBSAP Gap Analysis Report provides several recommended actions for including biodiversity considerations in national poverty alleviation strategies.

### 6.3 Incorporating Gender into Biodiversity Activities as a Cross-cutting Strategy

The Bureau of Gender Affairs (BGA) as a part of their national agenda, leads in the conduct of several gender mainstreaming sessions with various government ministries and agencies. Each institution is expected to identify a Gender Focal Point who represents the organization regarding gender related issues. Upon receiving a completed and approved Gender Equality Action Plan from the institution and meeting the Gender Equality Certification criteria, these institutions become gender certified by the BGA.

It was recognized, based on the stakeholder consultations, that gender issues are not fully understood within most of the sectors and not mainstreamed, and this represents a major gap. It is therefore recommended that gender analyses be conducted to get a better understanding of the issues, needs and circumstances hindering gender equality in each sector. This analysis would answer the following questions for each sector:

- a) What are the existing gender inequalities?
- b) Why do these inequalities exist?

- c) What adjustments will have to be made by institutions and other actors in order to reduce these inequalities?
- d) What opportunities and constraints exist in the larger environment to help reduce inequality?
- e) What possible opportunities exist for advocates and agents of change?

### 6.4 Incorporating Biodiversity into Climate Change and Disaster Risk Reduction Plans

Several local and national and internationally funded initiatives are being implemented to build climate resilience and to reduce disaster risk in Jamaica.

The Climate Change Division has been working with several key stakeholders that have a critical role to play in the conservation of Jamaica’s biodiversity. Included in this initiative is the work to get climate change mainstreamed within the key sectors. So far, actions have been taken for the following sectors:

- Forestry
- Agriculture
- Fisheries
- Energy
- Transport
- Health
- Water
- Coastal Resources
- Human Settlements

With respect to climate change and disaster risk reduction the Office of Disaster Preparedness and Emergency Management (ODPEM) plays a key role, and the agency has indicated some project and programme initiatives that are contributing to climate change adaptation by increasing the resilience of vulnerable areas and reducing the risks that are associated with natural hazards.

ODPEM is executing the Strategic Programme for Climate Resilience (SPCR), which entails the conduct of vulnerability studies for 15 communities in the upper Rio Minho Watershed. This project, which started in 2016, will look at the vulnerability of the communities to climatic hazards.

Jamaica Disaster Vulnerability Risk Project (JDVRP) funded by the World Bank will support preparation of risk and vulnerability studies for some coastal towns including Port Maria and Alligator Pond. This project will examine the vulnerabilities associated with both

climatic and geology-geomorphology related hazards.

It has been recognized that there are weaknesses associated with the capacity of ODPEM to assess vulnerabilities on ecosystems. ODPEM recognizes the importance of biodiversity protection and also the role that diverse ecosystems play in reducing disaster risk. In the past, assessing the vulnerability on ecosystems or restoring them was largely project-driven. It is now imperative to advance the study and implementation of measures for ecosystem-based adaptation, and this will require building the relevant partnerships among the relevant disciplines and agencies.

Some key recommendations for mainstreaming biodiversity, climate change, and disaster risk reduction plans in moving forward are outlined below:

Analyze existing National Climate Change Strategies and programs to look for synergies with biodiversity adaptation programs and propose mechanisms for the inclusion of biodiversity issues into the main national adaptation program

- i. The Green Climate Fund is the primary fund available under the United Nations Framework Convention on Climate Change (UNFCCC). Jamaica is in the process of formalizing arrangements with the implementing entity, and biodiversity can fall directly under the adaptation aspect of the Fund. Negotiations are currently underway regarding the climate finance infrastructure and it is anticipated that both the Planning Institute of Jamaica (PIOJ) and the Development Bank of Jamaica (DBJ) will be implementing entities for this Fund. It is proposed also that the GOJ seek to engage the private sector in this financing mechanism.
- ii. The National Spatial Plan is yet to be developed. This is an essential tool to facilitate the integration of biodiversity, climate change and other environmental considerations into the process of physical planning and development. For example, key areas for biodiversity conservation, forest reserves, heritage sites, fish sanctuaries and all other types of protected areas, as well as sensitive rainfall and temperature indicators, can be superimposed or layered to reflect relationships that can in turn guide appropriate land use. The spatial plan would

be a very powerful planning tool and it is recommended that this be given some priority in moving forward.

- iii. There is a need to examine climate change and biodiversity risks in more detail than currently exists. There is a need to develop a biodiversity adaptation to climate change research program. The detailed impacts of climate change on biodiversity have not been properly studied and it is recommended that the Climate Change Division and the Environmental Management and Conservation Division of NEPA lead on the development of the terms of reference and implementation of such research.
- iv. It is also recommended that integrated discussions be held among the focal points for climate change and international environmental interventions (including the UNFCCC and CBD) in order to drive the process of continued collaboration with respect to climate change, disaster risk reduction and biodiversity. These persons would meet on a scheduled biannual basis.
- v. ODPEM is currently undergoing a restructuring process and several skill sets were identified that needed to be on staff. Going forward, it has been recommended that the organization contract additional personnel with the capability of assessing the vulnerability of ecosystems particularly since vulnerability and risk assessments are critical components of their work plan. Ecosystem based adaptation approaches must be included.

## 6.5 Mainstreaming Biodiversity into Production Sectors

Successful biodiversity conservation can only be achieved through mainstreaming the respective concepts into sectors such forestry, fisheries, mining, tourism and agriculture. Some suggestions are outlined below.

## 6.5.1 Mainstreaming Biodiversity into the Forestry Sector in Jamaica

### 6.5.1.1 Sectoral Strategies, Action Plans and Programmes

Forty percent (40%) of Jamaica's territory or 439,938 hectares has been classified as forests. However, according to the Forestry Department (2015)<sup>27</sup>, approximately 350 hectares of forests are lost every year. Major threats include:

- Mining and quarrying;
- Bushfires to clear land for agricultural activity;
- Domestic animals being allowed to graze in forested areas;
- Natural hazards such as hurricanes, tropical storms;
- Insect pests and diseases;
- Illicit logging and theft of timber species and non-timber products;
- Invasive Alien Species; and
- Utilization of forests for subsistence and commercial agriculture.

According to the Forestry Department, the National Forest Management and Conservation Plan (NFMCP) provides a framework geared towards reducing rates of deforestation and addressing forest restoration as well as providing for the sustainable use of wood generated from forest plantations.

The forestry management framework is presented in the Strategic Forestry Management Plan (SFMP) 2010–2015. (Forestry Department, 2009)<sup>28</sup>. The SFMP sets targets by which the Agency's performance in relation to its management of Jamaica's State-owned forests is measured.

Based on management activities, the forestry sector in Jamaica appears to have conservation and sustainable use of biodiversity as core values. To enhance the protection of biodiversity within the forestry sector, it is necessary to amend existing legislation to more adequately treat with some of the threats highlighted above. The control of forests on private lands is an important extension of the existing jurisdiction of the Forestry Department if effective control of deforestation is to be achieved in Jamaica.

In addition, mainstreaming of biodiversity conservation and sustainable use in the Forestry Sector has to address the activities that impact forested areas as identified above. For this reason, the existing legal and institutional framework for mining and quarrying, agriculture, animal husbandry and housing need to be reviewed with a view to incorporating biodiversity so as to preserve the remaining forests in Jamaica.

An effective communication strategy is essential. Ideally, this would require an institutional effort involving representatives from the Forestry Department, NEPA, and the other respective divisions of the MEGJC as well as the Ministry of Industry, Commerce, Agriculture and Fisheries and other relevant stakeholders to establish and discuss required institutional roles, legislation amendments and the creation of joint standards and codes of practice.

The other component of the communication strategy would be external; it would involve reaching out to the general public and explaining the importance of forest conservation to the livelihood of Jamaicans. Implementation of biodiversity mainstreaming strategies will always require the presence of specific biodiversity specialists, working together with the Forestry Department and other relevant stakeholders.

### 6.5.1.2 Standards, Codes of Conduct, and Good Practice Guidelines

According to the Forestry Department (2015), a series of institutional improvements are required, including the creation of Standards, Codes of Conduct, and Good Practice Guidelines.

### 6.5.1.3 Certification Schemes

As suggested above, a certification for lawful use of forests in private lands would be desirable as a prerequisite for commercial use and transportation of timber as well as for sustainable use of timber and non-timber forest products in Jamaica. Guidance could be provided by existing certification schemes such as the Sustainable Forestry Initiative ([www.sfiprogram.org](http://www.sfiprogram.org)). Such initiatives could be developed by a team of biodiversity specialist consultants working in close connection with the Forestry Department and other relevant stakeholders.

<sup>27</sup>Forestry Department. Forest Policy for Jamaica. Green Paper. 2015.

<sup>28</sup>Forestry Department. Strategic Forest Management Plan 2010-2014. 2009.

#### **6.5.1.4 Using the UN Forest Principles and the CBD Ecosystem Approach**

While some biodiversity mainstreaming issues are straightforward, to address others may require more complex approaches. Often, these issues may involve conflicting demands and needs, such as the need to maintain ecosystem functions while enabling sustainable use of forest resources. Two useful guides are the UN Forest Principles (United Nations, 1992)<sup>29</sup> and the CBD Ecosystem Approach (CBD, 2016)<sup>30</sup>.

In addressing Forestry Biodiversity Management issues, the use of the UN Forest Principles for forest management as a template for the development of sustainable procedures, standards, guidelines and codes of practice is highly recommended. According to CBD (2007), these are defined as a new paradigm for forest management, through a set of 15 principles in support of the overall objective of contributing to the management, conservation and sustainable development of forests and their multiple functions and uses. An alternative to the forest principles would entail use of the CBD ecosystem approach. This would involve a series of steps to facilitate solving complex management issues.

Both the UN Forest Principles and the CBD Ecosystem Approach can be used to plan for the required mainstreaming of biodiversity conservation and sustainable use within the forestry sector.

### **6.5.2 Mainstreaming Biodiversity into the Fisheries Sector**

#### **6.5.2.1 Sectoral Strategies, Action Plans and Programmes**

The fisheries sector is a natural fit for the incorporation of BD and ecosystem-based approaches into the management system. This sector is primarily based on the harvest of biodiversity products. In a few instances, there is some aquaculture of (freshwater) fin and shellfish species. Historically, the Jamaican fisheries sector is governed by a policy that is focused on extractive activities. The current national policy (act) provides economic incentives to main actors in the fisheries

sector that encourage increased levels of harvesting, including net and fuel subsidies. There are, however, provisions for conservation activities, including levies on major export products (conch) and the implementation of seasonal closures. There is an excellent opportunity for BD mainstreaming with the pending promulgation of the updated Fisheries Act. Ecosystem-based approaches that include ecological baseline information in the decision-making process are critical components of mainstreaming. More will be discussed in the section below regarding the CBD ecosystem approach.

#### **6.5.2.2 Industry Standards, Codes of Conduct, and Good Practice Guidelines**

Standards and codes of conduct around managing Jamaican fisheries should be based on accurate and up-to-date baseline information on the ecology of the target species. This should be complemented by equally comprehensive information on the number of fishers, their range of activities and gear types used. Biodiversity considerations should be included when developing standards and guidelines for exporting and trade in key target species (conch and lobster). These details were provided in the NBSAP Gap Analysis section of this document. The development of these codes of conduct must occur in consultation with all key stakeholders, not just the major players in the industry, but with artisanal fishers, women's groups, NGOs and other civil society groups. Biodiversity information must be a foundation for any discussion around trade-offs on gear restrictions, quotas and other similar control measures. Science-based (ecological and economic) decision making will ensure that the biodiversity conservation needs are balanced sustainably with human and social needs.

National Biodiversity Targets have been outlined by key local stakeholders. These targets provide suggestions for activities and measurable indicators by which progress towards the relevant Aichi Targets can be assessed. These include improving the monitoring of fish harvest (tonnage per annum etc.), and reducing destructive fishing practices while at the same time creating alternative sources of livelihood for marine resource users (including aquaculture of marine plant and animal species).

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<sup>29</sup> Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests. 1992. <http://www.un.org/documents/ga/conf151/aconf15126-3annex3.htm>.

<sup>30</sup> Convention on Biological Diversity. Beginner's Guide to Use the Ecosystem Approach. <https://www.cbd.int/ecosystem/sourcebook/beginner-guide/>. Consulted in August, 2016.

### 6.5.2.3 Certification Schemes

The fisheries sector could benefit from certification schemes that provide information to consumers regarding the sustainable harvesting of species or the use of biodiversity considerations to determine rates of capture and the use gear types that conserve biodiversity. Certification programmes that promote “by catch” reduction, streamlined market chains and other measures of sustainable fishery good practice should be consumer driven. There are existing global models which Jamaica could use to design locally relevant certification schemes that are verifiable and effective.

### 6.5.2.4 Using CBD’s Ecosystem Approach

The CBD approach ensures that policies, plans and programmes consider biodiversity alongside economic and social objectives. The CBD ecosystem approach is recommended for supporting decision-making processes that inform; these include annual quotas, seasonal closures, gear restrictions for the major target species (conch, lobster and demersal reef finfish), designing rules for new fisheries (for example sea cucumber), and the protection of fisheries habitat.

As indicated above, ecosystem approaches for managing these and other marine species will depend on up-to-date and accurate biodiversity baseline data gathered from ecosystem assessments, population studies and other methods for assessing the status of the relevant fisheries habitats. Decisions for assigning harvest quotas and determining the amount of levies should be based on (biological and economic) data that is based on marine biodiversity and estimated production levels of target species.

## 6.5.3 Mainstreaming Biodiversity into the Mining Sector

### 6.5.3.1 Sectoral Strategies, Action Plans and Programmes

According to the Mining and Quarrying Sector Plan (GOJ, 2009)<sup>31</sup>, the mining and quarrying sector represents a critical component in the national development of countries like Jamaica that are endowed with exploitable mineral resources.

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<sup>31</sup>Government of Jamaica. Vision 2030 Jamaica. Mining and Quarrying Sector Plan 2009-2030. Mining and Quarrying Task Force. Final Draft. 2009.

Commercially exploitable mineral deposits are valuable natural resources which provide metals, fuels, construction aggregates and various other raw materials for many industries and play a central role in the development of modern economies.

In Jamaica the sector has significant linkages with other important sectors of the Jamaican economy providing inputs for construction, transportation, energy, manufacturing and professional services. The sector also depends on an efficient transport system for the movement of mineral products to domestic and export markets.

Having established the importance of mining and quarrying for the Jamaican economy, it is important to emphasize that this activity is responsible for widespread environmental and social degradation due to the very nature of the activity. This sector is therefore one where mainstreaming of biodiversity conservation and sustainable use is highly relevant. In order to establish mainstreaming priorities for this sector, it is important to understand the environmental impacts that are linked to this activity. One useful way of doing this is to report the impacts often recorded at the various stages of mining activity and also opportunities for mainstreaming biodiversity conservation and sustainable use.

A relevant communication exercise should be conducted involving regulators, relevant government departments and developers to adequately communicate the importance of mainstreaming biodiversity conservation and the sustainable use of natural resources within the mining industry.

### 6.5.3.2 Industry Standards, Codes of Conduct, Guidelines and Good Practices Guidance

Outlined below are a series of standards, codes of conduct, and good practice guidelines to improve the performance of the sector:

- Identification of land use restrictions linked to Land Use Planning and the setting of adequate criteria for enabling of forbidding mining in areas containing selected biodiversity attributes
- Definition of criteria for renewal of mining licenses, considering the accomplishment of Environmental and Biodiversity Management Plans.



- Guidelines for habitat assessments of proposed mining sites as a prerequisite to EIAs and the environmental licensing system

### 6.5.3.3 Certification Schemes

A possible additional means of mainstreaming biodiversity conservation and the sustainable use of natural resources are existing sustainability certification schemes for the mining industry. Often these are applicable to individual developers and are a useful additional method to ensure better environmental performance of mining companies. The government can play a role by assessing, approving and recommending a number of existing relevant sustainability certification schemes.

### 6.5.3.4 Using CBD's Ecosystem Approach

In addressing complex biodiversity issues the CBD's Ecosystem Approach (CBD, 2016) can be applied as recommended above. The steps would include the following:

- **Problem definition** – Define the problem to be addressed (e.g. loss of forest cover through strip mining)
- **Task identification** – Identify the tasks needed to solve the problem (e.g., what measures can be taken to ensure that ecosystems are managed within the limits of their functioning? What measures could be used to conserve ecosystem structure and functioning so as to maintain ecosystem services? How can an appropriate balance be sought between, and integration of, conservation and use of biological diversity?)
- **Creating a Management Plan** – This involves the identification of key issues, the creation of a draft management plan, choosing an appropriate timeframe, identifying key actors, setting objectives, planning for stakeholder engagement, defining boundaries for project implementation, preparation of the work plan, assessing and mitigating risks, and the definition of monitoring and evaluation methods
- **Project Implementation** – Build a project team, develop a work plan, establish advisory committees, determine project

activities, assess progress and provide adaptive management, if needed, and plan implementation and future initiatives, etc.

## 6.5.4 Mainstreaming Biodiversity into the Tourism Sector

### 6.5.4.1 Sectoral Strategies, Action Plans and Programmes

According to Jamaica's Tourism Sector Plan (GOJ, 2009)<sup>32</sup>, the tourism sector represents an important component of national development. The industry is largely dependent on the attributes of "beautiful land - and sea-scapes", which are the main appeal to tourists and local patrons. For this reason, mainstreaming of biodiversity conservation and sustainable use is a necessity for the industry. Site selection and development plans should assess and integrate the existing ecological characteristics in project cycle decision making especially as it relates to optimizing assets and minimizing negative effects. The environmental assessment process can be applied accordingly.

### 6.5.4.2 Industry Standards, Codes of Conduct, Guidelines and Good Practices Guidance

There are many opportunities to enhance mainstreaming of biodiversity conservation and the sustainable use of natural resources in the tourism industry. Some examples include:

- Code of practice for sustainable construction of tourism development
- Guidelines for land use planning of tourism developments
- Guidelines for the selection of tourism developments in environmentally sensitive areas
- Specific guidelines for the preparation of EIAs for the tourism sector
- Guidelines for conducting carrying capacity assessments of sensitive ecosystems such as coral reefs, mangroves, forests and other sensitive natural ecosystems
- Environmental management standards.

### 6.5.4.3 Certification Schemes

Certification schemes are often adopted by tourist operators. However, the government can play a

<sup>32</sup> Government of Jamaica. Jamaica Vision 2030: Tourism Sector Plan 2009-2030. Tourism Task Force. September, 2009.

decisive role by requesting certification as criteria for issuing permits for the activity, for instance. A number of certification schemes are available for tourism operators, such as certification for sustainable construction (LEED Standard), the Certification for Sustainable Tourism (CST) and the Global Sustainable Tourism Council (GSTC), which establishes standards and guiding principles for sustainable tourism, among others. Other schemes are available and a sustainable tourism certification is another means of ensuring mainstreaming of biodiversity conservation and the sustainable use of natural resources within the tourism sector.

#### **6.5.4.4 Using CBDs Ecosystem Approach**

The CBD's Ecosystem Approach may be used to solve conflicts and issues that arise from enterprise development and operations. The steps of this approach have been presented in previous sections of this report.

### **6.5.5 Mainstreaming Biodiversity into the Agriculture Sector**

#### **6.5.5.1 Sectoral Strategies, Action Plans and Programmes**

Agriculture has had a significant impact on Jamaica's biodiversity. These changes in the nation's landscape by early colonizers were particularly due to large-scale monoculture of sugarcane, coffee and banana. The post emancipation period and industrialization have also led to negative impacts to Jamaica's biodiversity. However, Aichi Target 7 establishes that by 2020 Jamaica should be sustainably managing its areas under agriculture, aquaculture and forestry. It is also important to note that agriculture is closely tied to Jamaica's national poverty alleviation strategies. These two areas of focus have a high level of overlap and should utilize cross-cutting approaches.

Mainstreaming biodiversity into the agriculture sector requires identifying and engaging all the relevant stakeholders. These include other ministries and portfolios (environment, mining, labour, etc.), academia and government research institutions as well as national focal points (trade, climate, CBD et al.). Private farms, agro-processors, agricultural training schools, beekeepers organizations, farm cooperatives, credit unions and others, should be included in the stakeholder engagement process.

The stakeholder engagement process is also useful for gathering as well as sharing information and knowledge on the significance of biodiversity to the sector.

#### **6.5.5.2 Industry Standards, Codes of Conduct, Guidelines and Good Practices Guidance**

Best management practices for agriculture and other sustainable approaches to farming provide the opportunity to insert biodiversity into the guidelines. The NBSAP National Targets document provides a few suggested actions and indicators that can be used to assess progress towards the relevant Aichi Target. These include updating the baseline information coverage of forest cover and potential impact of fragmentation from agriculture and other development.

#### **6.5.5.3 Certification Schemes**

As in the fisheries sector, certification schemes for agricultural products and by-products should be consumer-driven. Potential areas for increased incorporation of biodiversity approaches into agriculture include certified organic farm products (dairy, livestock, ground provisions vegetables etc.). Other potential areas for incorporating BD include good practice recommendations for key crops, for example, alternative options for forest harvest sticks used in yam cultivation and the elimination of slash and burn for land clearing, to name a few. Certification schemes would have to be verifiable and monitored by an independent body as per similar international examples.

#### **6.5.5.4 Using CBDs Ecosystem Approach**

The CBD ecosystem approach can be applied to the agricultural sector and is a useful tool for mainstreaming biodiversity into the sector (CBD 2011 Page 23–24). As mentioned previously, the first step is to involve all stakeholders in decisions associated with management of the agricultural sector. Assessment of the impacts of biodiversity conservation management actions should be taken into account and in particular, the economic and social aspects. Issues of ecosystem carrying capacity, structure and function as well as appropriate scales for managing resources over space and time must also be considered. Key to this is using relevant and accurate information to balance conservation and use to make trade-offs that result in sustainable use and conservation. The ecosystem

approach outlined here will be designed for the different agricultural productive sectors (animal, plant, byproducts), but should follow the same general format.

## **6.6 Using other Tools and Cross-sectoral Strategies for Mainstreaming Biodiversity**

### **6.6.1 Biodiversity Awareness**

Successful incorporation of biodiversity into the areas mentioned above will in part, rely on an informed Jamaican public. Public awareness strategies are therefore essential in order for various stakeholders – government, judiciary, experts, practitioners, civil society etc. – to be equipped with knowledge about biodiversity conservation and sustainable use issues.

The Public Education and Corporate Communication Branch (PEECB) of NEPA plays an important role in sharing of information through the National Environmental Education Committee. Some activities have included:

- Fostering collaboration among environmental groups and communities to reduce the impact of development and to restore degraded sites
- Celebration of national and international environmental days and occasions
- A biennial green exposition staged by the Jamaica Conservation Development Trust (JCDT)
- Print and electronic media campaigns
- Publication of the State of the Environmental Report.

Although these activities exist, biodiversity is not well understood by the public and as such, more interventions are required. Targeted interventions with selected stakeholders should be implemented to stimulate improved engagement and understanding of the interrelationships between Jamaica's biodiversity and development of land and livelihood. The target audience for these programmes should include all government agencies, the private sector, NGOs, CBOs and the general public so as to build awareness. Networking/Coordination is necessary at the national level to avoid duplication.

### **6.6.2 Integrating Biodiversity into the Legal Framework Specific to Sectors**

Laws governing the ownership, access and use of natural resources are particularly important for the protection and sustainable use of biodiversity. These include providing legal protection to key users, including access to and tenure (where applicable), over land and coastal resources. These laws can be instituted to encourage, control (carrot and stick), or prohibit particular uses. When instituting such laws, it is crucial that pre-existing customary laws, governance, and management structures be understood and considered, allowing new legal instruments to complement those (and aspects thereof) that promote sustainable and equitable use.

As with other tools, strategies and approaches (particularly financial and economic instruments) discussed below, legal instruments designed for specific sectors should take into account their effects on other sectors. Likewise, they should consider the full range of stakeholders and other civil society groups likely to be affected. This will require coordination across all the key sectors with the judiciary and responsible ministries (National Security, Justice and the Attorney General's Office).

### **6.6.3 Using EIAs and SEAs to Mainstream Biodiversity in Jamaica**

Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs) are two aspects of the environmental assessment process that can help to guide wise use of biodiversity resources in a development context. They provide useful vehicles for mainstreaming. As stated in previous sections of this document, many specific development types deserve specific guidelines for EIAs. As far as biodiversity conservation and sustainable use are concerned, EIAs must contain adequate assessment of biodiversity baseline conditions, providing for the identification of sensitive habitats, protected areas and information on the composition of both flora and fauna assemblages. In addition, baseline assessments must target specific endangered and endemic species of fauna and flora. Adequate EIAs must consider appropriate impact assessment of biodiversity, identification of feasible mitigation techniques, and appropriate biodiversity management and monitoring plans. Biodiversity management plans must be a mandatory element of any environmental management plan, particularly in

cases where developments are proposed in sensitive areas.

Strategic Environmental Assessments are used to evaluate assessments of policies, plans, programmes and multifaceted developments. They are used to assess wide-scale and cumulative aspects and impacts and must also consider available information on biodiversity at the strategic level, such as habitat types and distribution, protected areas, distribution of endangered species maps, and other relevant biodiversity information at the strategic level. In all cases appropriate communication of biodiversity impacts, mitigation measures and management plans to relevant stakeholders is an essential aspect of mainstreaming of biodiversity. This helps to raise awareness on the subject and encourages discussion and participation of stakeholders on the issues of biodiversity conservation and sustainable use.

#### 6.6.4 Using Financial Strategies and Tools

Economic and financial tools can be very powerful in mainstreaming biodiversity because economic forces underlie and explain much of the biodiversity degradation and loss in Jamaica. Economic tools are designed to “correct” or modify these economic forces (including market failures) and, in turn, create other economic incentives which favour the conservation and sustainable use of biodiversity.

Economic and financial tools that should be used in Jamaica’s mainstreaming efforts include:

- Economic valuation of natural resources;
- Environmental accounting;
- Elimination, phasing out or reform of subsidies and other incentives that may negatively impact biodiversity;
- Positive incentive measures, such as, payments for ecosystem services; and
- Taxes, user fees and other disincentives that apply the polluter-pays principle and internalize the costs associated with production or harvesting of biodiversity resources.

The economic and financial tools can be incorporated into economic decision-support tools such as EIAs and, in particular, Cost Benefit Analyses. These tools should also be used to set optimal harvest and extraction rates for renewable and nonrenewable resources.

These economic and financial tools are best implemented in a combination of ways and must be embedded in a sound regulatory framework. The tools must also form part of broader cross-sectoral policy framework that aims to create economic conditions and structures that are favorable to biodiversity conservation, sustainable use, and fair and equitable benefit sharing. The economic tools should be incorporated into macroeconomic planning and sector-wide planning. Application of the UN System of National Environmental Accounting and the incorporation of Natural Capital into Jamaica’s national budget process is a key biodiversity mainstreaming activity.



Jamaican Coney (*Geocapromys brownie*)

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## 7 Resource Mobilization Strategy

Successful implementation of a national biodiversity strategy and action plan, will require among other things the mobilization of resources to support the activities outlined. This section suggests feasible and implementable approaches to mobilizing existing or potential resources that can be directed towards general environmental conservation including a focus on biodiversity. The first thing that needs to be made explicitly clear is that a strategy for mobilizing resources must include human, institutional and other non-monetary (or financial) forms of resources. Resource mobilization must therefore be considered beyond the limited lens of financial or capital support. The recommendations outlined in the chapter on mainstreaming are critical to successful resource mobilization.

Funding for biodiversity conservation will continue to be limited given competing national priorities such as poverty reduction/job creation, crime and health. Successful mainstreaming including improving the efficiency of current institutions and agencies, involving new partners such as the private sector, and general improvements to cross-sectoral inclusion of biodiversity issues should lead to better conservation outcomes.

However, financial resources are essential and it is imperative that new and sustainable sources of funding are unearthed. Improving the Jamaican public's understanding of the benefits (including financial) of healthy and biodiverse ecosystems will can support this goal. As previously discussed (Section 6.6.4), various financial strategies and tools for generating financial resources. Many of these strategies are based on the economic value of biodiversity and associated ecosystem services. Funding strategies are based on the concept of capturing the "economic rent" associated with biodiversity. The previous sections of this report provided some of the theoretical rationale for this approach. It is explained in a bit more detail here, why understanding the concept of economic rent capture is critical to any successful resource mobilization strategy.

In economics, the term "*rent*" refers to a surplus value after all costs and normal returns have been accounted for, i.e. the difference between the price at which an output from a resource can be sold and its respective extraction and production costs, including normal return. When referring to rent in natural resources such as coastal biodiversity or

minerals, it is commonly called "*resource rent*". As long as there is sufficient accounting profit, governments can collect a portion of economic rent for the purpose of public finance. For example, economic rent can be collected by a government as royalties or extraction fees in the case of resources such as fisheries (conch levy) minerals (bauxite) and oil and gas. Rent-seeking behaviour is described with financial actors engage in the extraction of uncompensated value from others without making any contribution to productivity. An example of rent-seeking in a modern economy is spending money on lobbying for government subsidies in order to be given wealth that has already been created, or to impose regulations on competitors, in order to increase market share. Examples include when individuals or industries through lobbying or other means find ways to make money from something that used to be free or publicly accessible. Rent-seeking may be legal; for example, coastal tourism construction projects and in other instances it may be illegal; example, tax officials may take bribes for lessening tax burdens or wait times for document processing.

This discussion of resource rent is also relevant because the systems that can be designed for mobilizing financial resources are examples of the government capturing biodiversity resource rents in order to pay for conservation. In Jamaica's case the Tourism Enhancement Fund (TEF) is essentially an example of the Government capturing a small portion of the economic rent associated with Jamaica's main tourism product (sun, sea and sand). We suggest that there are other natural resources from which a portion of the economic rent can be dedicated to the conservation Jamaica's biodiversity.

### 7.1 Relevant Project Reports

The issue of resource mobilization for conservation has been examined previously. A number of outputs were produced related to "Strengthening the Operational and Financial Sustainability of the National Protected Area System" project. Of particular relevance is the Haas and Aukerman 2012 report that examined existing funding mechanisms and provided a set of 33 recommendations to the project steering committee regarding financing National Park Systems. This project report has a comprehensive list of recommendations some of which can be adapted to the existing national

environmental conservation funds, portions of which could serve to directly fund biodiversity conservation.

The Haas and Aukerman 2012<sup>33</sup> report references the development of the Caribbean Biodiversity Fund (CBF) which is supported by 8 national level Protected Area Trust Funds (PATFs). It is the recommendation of this report that local trust funds be adapted with some significant adjustments in order to make it applicable beyond Protected Areas. This is because biodiversity threats extend beyond protected areas and as mentioned in companion documents to this report, there are major economic sectors beyond Forestry and Tourism. Economic sectors such as, Fisheries, Mining and Agriculture have negative impacts on Jamaica's biodiversity. In fact, while two of these (fisheries and agriculture) have potential negative impacts, they are simultaneously dependent on healthy biodiversity for the sustainable production.

The 2012 project document highlighted four eligible trust funds for consideration of a consolidated national fund. These were;

- a) Jamaica National Parks Trust Fund
- b) Forest Conservation Fund
- c) Environmental Foundation of Jamaica<sup>34</sup>
- d) Tourism Enhancement Fund

These recommendations vary from where to locate the centralized fund, legal issues, organization of the funds, oversight, relevant stakeholders. The recommendations of particular relevance to mechanisms for revenue generation were #28 to #33 (pg 15-16). Of note authors of the report decided that the Tourism Enhancement Fund would not have been feasible and decided to exclude TEF from their analysis. This report differs with that assessment and will provide justifications for this below.

In addition to these 4 funds we recommend that two additional funds be created and added to this list of mechanisms for sustainable biodiversity financing. We recommend the creation of;

- i. Fisheries and Marine Biodiversity Fund
- ii. Mining and Aggregates Fund

## 7.2 Operationalize the National Conservation Trust Fund of Jamaica

The management of Jamaica's protected areas is guided by the Protected Area Master System Plan that was approved by government in 2015. The plan was the result of extensive consultations and was prepared by the Protected Areas Committee whose members included the Forestry Department, the National Environment and Planning Agency, the Ministry of Water, Land, Environment and Climate Change, CITIES Scientific Authority, the Fisheries Division and The Nature Conservancy. The approved protected area plan was influenced by other government initiatives including the 2002 Master Plan for Sustainable Tourism Development and Vision 2030 Jamaica: National Development Plan.

Internationally, Jamaica has committed to the Caribbean Challenge Initiative with its two goals: to set protect at least 20% of its marine and coastal environment by 2020 and to provide for sustainable financing to manage the areas set aside. Jamaica is also a party to the Convention on Biological Diversity.

The National Conservation Trust Fund of Jamaica (NCTFJ) Limited was incorporated under the Companies Act in 2014. The purpose of the fund is to assist in supporting the long-term sustainability of Jamaica's national system of protected areas by providing financial support for planning, management, research, public safety, law enforcement, facilities, infrastructure, training, interpretation, public education, restoration, rehabilitation, enhancement, monitoring and other needs and activities that contribute substantially to the conservation, protection and maintenance of the protected area system and the associated visitor experiences.

It is proposed that the fund will support operational, capital development (new facilities) and capital maintenance projects (reconstruction and replacement) from both government and non-government entities based on a submission and evaluation process similar to the TEF process.

The NCTFJ will set up both an endowment account and an operating account. Discussions are currently

<sup>33</sup> HAAS, G.; AUKERMAN, (2012) Suitability Recommendation for Locating the Proposed National Protected Area Trust Fund (Final Report). Strengthening the Operational and Financial Sustainability of the National Protected Area System Project. National Environment and Planning Agency Kingston, Jamaica. December 2012

<sup>34</sup> The Environmental Foundation of Jamaica was merged with the Forest Conservation Fund in 2015. The official name is the Environmental Foundation of Jamaica.

being had to identify funds to support the capitalization of both accounts various mechanisms. The capitalization is guided by the adopted strategy to engage the corporate sector and will be further guided by the NCTFJ business plan slated for completion in November, 2016.

In particular, it is recommended that the fund becomes operational and funded. The auspices of the fund would aid in the protection of biodiversity beyond the boundaries and limits of protected areas and national parks.

In addition, it is recommended that the capture of a portion of the economic rent from fisheries, mining and tourism can be used to fund the NCTFJ. It is also recommended that a dedicated portion of the existing TEF should be allocated towards environmental and biodiversity conservation. Of note the government of Jamaica has not been able to collect the \$2 head tax per cruise ship passengers arriving in the island. It is urgent that these funds be collected which could then be allocated directly for supporting marine and coastal biodiversity conservation into the proposed NCTFJ. New emerging fisheries such as sea cucumbers should be subject to levies based on sustainable harvest rates and added to the marine biodiversity component of the National Fund. Finally, the extractive non-renewable sectors (river and beach sand, bauxite, limestone and aggregate) should be subject to levies to account for associated resource rents. Portions of the fines for environmental violations in any of the 6 sectors should also be directed to the National Fund.

As indicated in the 2012 report it is difficult to collect entrance fees at disparate and varied designated protected areas and natural attractions (recommendations #29, 30 and 31). The development of a web based or electronic system where visitors (local and foreign) can purchase access passes that can be verified on site. The TEF currently functions in a similar manner since the fee is assessed on purchase of a ticket by visitors to Jamaica. A differential environmental tag system could however be created that has rates for Jamaican nationals vs tourists. There could also be a mandatory baseline fee assessed on visitors to the island (whether they intend to visit parks or not) but this could be accompanied by an optional or voluntary fee that might be more expensive but valid for 2-4 years and allows the holder to visit any national park or protected area while in the island (and on repeat visits). One regional example is the

Bonaire Dive Tag system<sup>35</sup> which was in large part based on natural resource valuation studies of the economic value of coral reefs to divers.

The greater allocations from the TEF could also be provided to responsible government agencies with biodiversity conservation mandates, including for the collection of relevant baseline ecological and socio-economic information. A review of how the current conch levy is implemented and managed is recommended. At present the rate (per kg) charged for exporting conch current seems to be arbitrary and based on market forces rather than scientific assessments of the population and projected harvest. We also recommend as a matter of urgency the passage of regulations governing emerging fisheries such as sea cucumbers and including them in similar levy system, the funds from which should be used for the sustainable management of these fisheries including data collection and enforcement.

### 7.3 Other Mechanisms

There are other mechanisms for mobilizing financial and human resources for Jamaican biodiversity conservation. Portions of pollution fees on offending actors in key industries such as mining, manufacturing, agriculture, road and major infrastructure construction, tourism development to name a few, can be allocated to the national fund (post-administrative costs). Another approach would be to co-opt private sector interests in targeted corporate social responsibility projects that focus on biodiversity conservation. This is particularly if their industry has a direct impact on natural resources or if they are in close proximity to sensitive or protected areas. They could also instead contribute to the central fund for any conservation activity projects including those not necessarily related to their industry. This could minimize the possibility of conflicts of interest where contribution to specific projects could result in reduced vigilance by monitoring agencies.

Other mechanisms for funding should rely on better coordination among various national focal points so that international funding can be accessed and aligned to complementary national goals. For example, the CBD, RAMSAR and UNFCCC national focal points should coordinate in order to access funds from international carbon markets and offsets. These include voluntary private sector led funds. This could also assist accessing existing intergovernmental sources of funding (GEF, World

<sup>35</sup> All users of the Bonaire National Marine Park ((BNMP) must pay admission fees to enter the parks. This fee lasts for one year but day

passes can also be purchased. This fee is for both divers and non-divers. More details here: <http://stinaponaire.org/nature-tags/>

Bank) more effectively. The coordination of other focal points (Marpol, Basel Convention etc.) with national planning agencies (such as the PIOJ) can also access relevant funds which can in part be used to support other national biodiversity conservation goals for the island.

Increases in environmental fines for damages would be another mechanism for generating sustainable financing. This requires increased capacity among the judiciary and other parts of legal system. Funding generated from these sources could support monitoring, patrol and enforcement of environmental breaches. Creative sentencing schemes that include fines as well as mandatory “community service” through restoring degraded habitats could be utilized. The level of fines and sentencing must be supported but updated natural resource valuation studies and other environmental economic approaches for assessing the costs of pollution. The creation of an environmental court or special sessions in the judiciary calendar dedicated to persecuting these cases is a necessary activity.

To summarize, there are pre-existing templates for designing a national mechanism that is feasible and implementable to support biodiversity conservation. This may in some instances require Parliamentary approval and changes to how some of these existing funds are operated. The development of this National Environmental Conservation Fund requires input from a variety of stakeholders, including key industries, civil society and vulnerable groups. With these recommendations in mind, the national plan for Jamaica is presented in Table 8.1.



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Dunns River Falls in Ocho Rios, St. Ann



## 8 Biodiversity Conservation Action Plan

The National Biodiversity Action Plan for conservation and management was updated with respect to conserving and protecting biodiversity across all sectors of Jamaica. The purpose of the action plan is to clarify what specific resources are needed and required to reach the goal, formulate a timeframe for when the activities needs to be completed by, who is responsible for executing/implementing the respective activities and the indicative cost of each. The proposed activities were based on information that was garnered from the Gap Analysis Report, the Stakeholder Workshops, the Organizational Capacity Assessment, and National Targets Report. It is recommended that a coordinating group be

established to oversee the execution of the NBSAP implementation plans. This group should be chaired by the Ministry of Economic Growth and Job Creation, particularly the Environment and Risk Management Division, who are the focal points for the CBD.

Numerous activities and strategies were proposed by stakeholders across different sectors. Those that were not only critical for Jamaica but practical and feasible to accomplish by 2021 were also included. A monitoring and evaluation plan, which follows in section 9, is designed to keep track of Jamaica's achievements based on the national targets and indicators previously presented in Section 5.



The Black River, St. Elizabeth showing the boats used to conduct ecotourism activities on the river.

©Richard Nelson

**Table 8.1 - National Biodiversity Action Plan for conservation and management**

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
Legislation	Determine mechanisms to modify constitution to support biodiversity conservation, sustainable use of biological resources, and ownership of genetic resources	Plan and execute Information campaign. - Partner with civil society groups to highlight section 13(3)(i) of the Jamaican Constitution and hold stakeholder discussions on constitutional reform and how recommended changes can be effected.	2	2019-2020	NEPA Ministry of Economic Growth & Job Creation (MEGJC)- Environment & Risk Mgmt. Division (ERMD)	60,000
	Determine the need to incorporate into legislation alternative regulatory instruments, such as economic incentives to promote sustainable use of biodiversity and ways and means to empower and support NGOs involved in environmental projects	Conduct legislative analysis of relevant or potential relevant laws and regulations. Collaborate with relevant ministries (AG, Finance, Security), to develop economic instruments (fines, green fees, polluter pays) mechanisms to generate dedicated biodiversity conservation funding for sustainable financing. 1. Conduct baseline economic and ecological studies 2. Conduct legislative analysis 3. Develop economic instruments to generate dedicated biodiversity conservation funding	1	2017-2020	NEPA MEGJC- ERMD AG MFPS	50,000 50,000 50,000
	Enforce legislation and regulations concerning scientific research, collection and export of endemic species	Modify and implement existing regulations for biological sampling and export of endemics. Link to Ministry of Agriculture, Veterinary Services Division and National Biosafety Committee.	2	2019-2021	NEPA MEGJG MICA MSET	TBD
	Develop legislation to address the commercial use of Living Modified Organisms (LMOs)	Re-establish the National Biosafety Committee – renew membership and sign off by appropriate Minister.  Prepare mandate for Committee based on content of the Biosafety Policy	1	2017-2018	MEGJB MICA  NEPA MSET <sup>36</sup> -	-  - -

<sup>36</sup> MSTEM - Ministry of Science Technology Energy and Mining

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		Designation of Secretarial Support (National Commission on Science and Technology (NCST)) and set meeting schedule/intervals.  The Plant Quarantine Act should be revised to address issues related to the import and export of Living Modified Organisms (LMOs). This should be supported by the preparation of supporting regulations.			National Commission on Science and Technology Plant Quarantine Division	10,000
	Increase sensitization among Ministries and agencies of Government to clarify roles and responsibilities in the management of biodiversity	Conduct one or two day sensitization workshops and field trips or study tours (repeated every 2-3 years) with selected agencies/ministries with biodiversity impact to increase inter-governmental collaboration and information sharing. Establish MOUs as necessary with targets and clear deliverables.	1	2017	Driven by NEPA	3,000
	Establish mechanisms to ensure awareness by the judiciary of the status of Jamaica's biodiversity especially threatened species	Convene Judicial symposia with clear outputs beyond sensitization.  Suggest draft recommendations for updating laws, increased fines for breaches etc. as an output	1	2017	NEPA MOJ AG	5,000
	Develop regulations or review current Acts to facilitate cost recovery for remedial actions to repair environmental damages and other biodiversity related breaches	Engage and sensitize the Attorney General's Chambers and Judiciary on environmental damages and other biodiversity related breaches.	3	2020-2022	MOJ AG NEPA - MEGJC	TBD
	Development of Protocol to support the implementation of the National Biodiversity Strategy and Action Plan	Develop Protocol to facilitate the implementation of the National Biodiversity Strategy and Action Plan	1	2017	NEPA MEGJC- ERMD	30,000
<b>Gender</b>	Ensure inclusion of gender considerations in key sectors related to biodiversity conservation following example set by RADA	Conduct gender analyses and develop strategies in the forestry sector to garner baseline information to fully understand gender issues within the sector.	3	2018-2020	MOE FD NEPA MLWECC	30,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		Conduct gender analyses and develop strategies in the mining and quarrying sector to garner baseline information to fully understand the issues gender issues within the sector.	3		Academia (UWI, UTECH, NCU) Bureau of Gender Affairs (BGA)	30,000
		Conduct gender analyses and develop strategies in the environmental sector to garner baseline information to fully understand the issues gender issues within the sector.				30,000
		Conduct gender analyses and develop strategies in the fisheries sector to garner baseline information to fully understand the issues gender issues within the sector.				30,000
	Ensure inclusion of gender considerations in the management of protected areas	<p>Conduct gender analysis and develop strategies to determine gender specific issues and circumstances related to protected areas.</p> <p>Promote understanding of the ecosystems and in particular plant and animal resources important to women and households within specific protected areas. The implementation of the Protected Areas System Master Plan should take this into consideration. This should inform the regulation and management, and commercial offtake from these protected areas.</p>	3	2018	MOE FD NEPA MEGJC Academia BGA	30,000
Promote inclusion of women on consultations regarding environmental and biodiversity issues	Inclusion of BGA and existing women's groups in stakeholder consultations in all environmental and natural resource management matters.	1	2016 and on-going	MOE FD NEPA BGA	-	
<b>Public Awareness including Youth Involvement</b>	Develop public education programmes to explain the socioeconomic benefits of protected areas and to show ways and means to reduce impacts on biodiversity	Create and implement targeted public education programmes for selected sectors (agriculture, tourism, mining, health, construction) to explain the benefits of protected areas to	1	2017-2019	NEPA MOE MEGJC FD Academia JIS	150,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		livelihoods, economic development and human well-being <ul style="list-style-type: none"> <li>- Design public education programme to improve the public's awareness of biodiversity and to increase support and behaviour change</li> <li>- Execute a pilot run of materials</li> <li>- Fully implement programme</li> </ul>			PSOJ NGOs CBOs IOJ (NHMJ)	
	Networking/Coordination at the national level to avoid duplication thereby promoting greater efficiency in the delivery of public environmental education programmes	Reactivate and convene the National Environment Education Committee <ul style="list-style-type: none"> <li>- Engage selected NGOs and private sector organisations on the above public education program</li> <li>- Identify and develop partnerships with key industry representatives to promote Corporate Social Responsibility Activities.</li> </ul>	2	2017-2019	MEGJC NEPA MOE FD	-
	Mainstreaming Biodiversity conservation issues into youth development programs and policies	<ol style="list-style-type: none"> <li>1. Revise the Youth Policy and the Youth Mainstreaming Strategy and Action Plan to integrate biodiversity</li> <li>2. Review of HEART Trust NTA Educational programs to include biodiversity awareness on the agenda and implement</li> <li>3. Create a conservation corps or complementary organization focused on youth - linkages with school and youth clubs and hold consultations on structure and mandate.</li> <li>4. Review and Integrate biodiversity awards as a part of the Youth Advocacy and Ambassador Training Program</li> </ol>	2	2018-2020	HEART National Centre for Youth Development (NCYD) National Secondary School Council (NSSC) Youth Environmental Advocacy Programme IOJ (JA-CHM)	40,000  20,000  30,000  5,000  20,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		5. Incorporate biodiversity awareness into programmes within Youth information centres				
Land Use Planning	Prevent uncontrolled or poorly planned human settlement and development activities	Prepare the National Spatial Plan to guide and monitor development that is spatially appropriate <ol style="list-style-type: none"> <li>Promote mapping and classification of high-risk biodiversity areas.</li> <li>NSP should take account of sites suitable for mining and quarrying, tourism, agriculture and other sectors.</li> <li>Promote private sector partnerships to facilitate inclusive execution of the National Spatial Plan (NSP)</li> <li>Hold discussions with CCD regarding access to funds from the Green Climate Fund. The NSP can help build Jamaica's resilience to CC with better land management.</li> <li>Establish Terms of Reference for NSP and contract service</li> </ol>	1	2019-2024	MEGJC NEPA Commissioner of Lands WRA FD CCD PSOJ Local Gov't - Parish Councils	1,000,000
	Prevent further deforestation and destruction of watersheds and wetlands	Review existing environmental legislation to ensure that riparian zones, estuaries and critical watersheds are included for protection. Ensure that enforcement and early action measures are in place for effective protection.	2	2019-2021	MEGJC – ERMD, Land Administration, CCD NEPA FD WRA NLA	100,000
	Establish incentives for private landowners to conserve biodiversity	Research and identify feasible incentive options for landowners located in forests or wetland areas with threatened species or important ecological functions, to preserve a portion of their property as privately owned legal reserves.	1	2018-2020	MEGJC NEPA FD WRA NLA	100,000
	Strengthen and enforce existing laws against trespassing and illegal developments (squatting)	Use the National Spatial Plan to guide the authorization for all planned developments in Jamaica. Hold public-	3	2020 and beyond	MEGJC	40,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		private consultations on regulations to be modified or to facilitate enforcement of the National Spatial Plan and preparation of recommendations.			Agriculture Land Management Division (ALMD) Local Gov't - Parish Councils	
	Prevent uncontrolled, illegal and inadequate development on environmentally sensitive areas	Build capacity for resource valuation. Seek to incorporate resource assessment in the early stage of the project cycle as a part of the environmental permitting process.	1	2018-2020	MLWECC NEPA FD	70,000
	Increase revenues for biodiversity protection	Examine and rationalize existing fees for the removal of key species and loss of environmental and ecological services	2	2019-2020	MEGJC NEPA FD	-
	Improve information management and filling information gaps	Update the Manual for Developments to include all relevant regulations, guidelines and requirements for developers and present on the Development Assistance Centre aspect of NEPA's website and the Biodiversity Policy, Legislation, Permit & Licences section of the JA-CHM.	1	2017	NEPA IOJ (JA-CHM)	-
	Develop regulations for Strategic Environmental Assessments for Policy, Programs, Plans and Projects	Develop regulations to require the conduct of Strategic Environmental Assessments including considerations of biodiversity for policies, programs, plans and projects that cover multifaceted interventions.	2	2019	MEGJC NEPA	40,000
	Engage key stakeholders and communicate NBSAP	Sensitize high school and tertiary level agriculture curricula on the NBSAP. - Develop and incorporate a summarized version of the biodiversity plan in the high school and tertiary level curricula as a resource to complement agricultural studies	2	2018	MICAF MOE PSOJ Ja Chamber of Commerce MEGJC – NEPA IOJ (NHMJ)	20,000
<b>Agriculture</b>	Increase biodiversity awareness in the agricultural sector and consider certification schemes for agricultural products and by products	1. Develop and implement biodiversity awareness/training programmes to target farmers and other key stakeholders in the supply chain including supermarkets and traders.	1	2018	MICAF - RADA PSOJ Ja Chamber of Commerce Consumer Affairs Commission	70,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		2. Ensure biodiversity protection is included in Good Agricultural Practices. 3. Enforce Biosafety to reduce risk of accidental or deliberate introduction of species.  Certification schemes for Aquaculture - 1. Review existing international sustainable fish farm certification schemes and identify one that may be suitable for Jamaica. This selection must involve the private sector as a part of the decision making process <sup>37</sup> . Any certification programme should also take into consideration NEPA's 2015 regulatory requirements for aquaculture facilities.			MSET – NCS SRC JIS IOJ (NHMJ) Fisheries Division	60,000
	Increase control over the importation of agricultural plants and animals to prevent the introduction of harmful alien species	Expand training and information to customs, coast guard, marine police and other agencies regarding the entry of harmful alien species. Link with biosafety committee.	2	2019	NEPA Jamaica Customs FD Marine Police Coast Guard	40,000
Forestry and Watershed Protection	Increase participation of the private sector, community based organizations, and non-government organizations in the sustainable management and conservation of Jamaica's forests	Target Private Sector Organization of Jamaica (PSOJ) as a marketing strategy (e.g. Planting a tree or establishing an environmental fund)	2	2019	FD PSOJ NEPA Jamaica Chamber of Commerce (JCC)	-
	Maintain and restore forest cover	1. Develop an Urban Forest Plan (establishment of a policy and legislation in work plan) 2. Continue preparation of Forest Management Plans and increase the number of Local	3	2020-2022  2017 and beyond	FD NEPA NWC WRA	40,000

<sup>37</sup> Certification schemes for consideration may include: Aquaculture Stewardship Council, Best Aquaculture Practices Certification



Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		Forest Management Committees				
	Develop livelihood enhancement programmes for farmers	<ol style="list-style-type: none"> <li>1. Enforce policy and fines relating to forestry conservation</li> <li>2. Introduce livelihood enhancement programmes that include conserving forested areas to farmers.</li> <li>3. Pilot Conservation Agreements/Easements</li> </ol>	2	2018-2020	FD NWC WRA NEPA	TBD 40,000
	Encourage sustainable harvesting of prescribed non-timber forest products	Develop standards for the sustainable harvesting of prescribed non-timber forest products on Crown Lands	3	2020	NEPA FD MICA	25,000
	Establish programmes for capacity building and application of environmental accounting to climate change mitigation through the forest sector.	<ol style="list-style-type: none"> <li>1. Conduct additional research on environmental accounting (economics)</li> <li>2. Include environment in natural accounting</li> <li>3. Develop and execute a capacity building programme for environmental resource accounting</li> </ol>	3	2019-2022	MEGJC FD PIOJ MoF Academia	70,000 70,000
	Promote public awareness on the importance of forest cover and watershed protection	<p>Promote widespread awareness of the importance of watersheds protection for sustained quality water supply, flood control and slope stability, and climate change mitigation</p> <ul style="list-style-type: none"> <li>• Create a public education program on the importance of watershed protection to be used in public schools in Jamaica;</li> <li>• Promote sensitization seminars on the use of ecosystem valuation involving the agencies that work with biodiversity protection and conservation</li> </ul>	2	2019-2021	NEPA FD WRA MICA	60,000
<b>Fisheries</b>	Collect baseline information on the ecology of the target species	<ol style="list-style-type: none"> <li>1. Conduct baseline surveys needed for target species</li> </ol>	1	2017-2019	MICA - Fisheries Division	150,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
	and development of standards/code of conduct for exploitation of these target species.	(conch, sea cucumber, lobster, parrot fish, Irish moss, seagrass and spirulina) of the life history, ecology abundance and population distribution; and develop standards for exploitation for each species (excluding conch since standards already developed)  2. Stakeholder awareness programmes on the results of studies and hold consultations on the standards during and after their development.			Academia Local Fishery Groups/ beaches Large Fisheries operators JDF – Coast Guard JCF-Marine Police Bureau of Standards	50,000
	Comprehensive information on the number of fishers, their range of activity and gear types used in the fishery sector.	Survey and collect updated information on: 1. Number of people involved in fishing 2. Type of gears used and impacts associated with gears/method 3. Details of type of catch (including details on type of fish and seafood) 4. Details on the average numbers, weight, and sizes of the different types of catch 5. Review and upgrade current catch and effort savings 6. Geo-reference Fisheries data	1	2017-2019	Fisheries Division Academia SDC NEPA	500,000
		Set up electronic server and back-up system to support the database storage and analysis of critical fisheries data.	1	2017	Fisheries Division NEPA	30,000
	Increase the coverage and enforcement of Marine Protected Areas	Assess and create at least two new Marine Protected Areas (MPAs) or Fish Sanctuaries to protect marine ecosystems in Jamaica currently under pressure. Specific activities will include: 1. Conduct ecological assessments, public consultations and feasibility assessments to develop and	2	2019-2021	MLWECC NEPA UWI	100,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		<p>enforce these additional MPAs or Fish Sanctuaries</p> <ol style="list-style-type: none"> <li>2. GIS and spatial mapping work to determine boundaries for the two MPAs or Fish Sanctuaries</li> <li>3. Contract legal specialist to develop regulations and legal documentation to support the two MPAs or Fish Sanctuaries.</li> <li>4. Identify management arrangements, develop and implement management plans and establish enforcement arrangements for the two new Sanctuaries/Marine Parks.</li> </ol>				<p>100,000</p> <p>100,000</p>
	Biodiversity considerations to be included when developing standards and guidelines for trade in key target species (conch and lobster).	<ol style="list-style-type: none"> <li>1. Incorporate biodiversity in guidelines and protocols with respect to trade in selected species</li> <li>2. Set appropriate levies based on annual population estimates for target species and commensurate fines for breaches</li> <li>3. Include key stakeholders in decision making</li> </ol>	3	2020-2021	Fisheries Division Coast Guard Marine Police SDC Academia	70,000
	Improve monitoring and enforcement within the fisheries sector	Employ enforcement officers to effectively monitor and sanction	1	2017 and ongoing	Fisheries Division Coast Guard Marine Police SDC Academia	TBD
<b>Mining and Quarrying</b>	Ensure biodiversity assessments are included as part of investigation for viability of mining and quarrying sites	<ol style="list-style-type: none"> <li>1. Conduct baseline assessments of fauna, flora, geophysical conditions, meteorology, water resources (surface and underground), and landscape impacts for all mining and quarrying sites.</li> <li>2. Ensure results are fully integrated into the planning process for mining and quarrying.</li> </ol>	1	2017 and ongoing	MGD NEPA	-

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
	Environmental Assessments (permitting phase) and Environmental Management Plans (construction phase) to be conducted for viable ore sites	<ol style="list-style-type: none"> <li>1. Develop specific guidelines to promote holistic assessment of environmental assets and liabilities of the proposed mining and quarrying sites, whether or not EIAs are required.</li> <li>2. Develop specific guidelines to promote full implementation of Degraded Area Recovery Plans for mining and quarrying projects.</li> <li>3. Develop specific guidelines to cover the implementation of Biodiversity Management Plans for mining and quarrying projects (existing and proposed).</li> </ol>	2	2018-2020	NEPA MGD	30,000
	Mandatory monitoring of air/water/groundwater/soil of contamination sources, the recovery of degraded areas, the protection of water resources (riparian zones) during the operating phase	Expand and enforce regulations under the existing permitting system to demand regular monitoring of air, water, groundwater, noise, air quality, biodiversity, protection of riparian zones and the recovery of degraded areas for mining projects as part of their Environmental Management Plans. Develop and fund enforcement of these regulations	1	2017-2019	MEGJC NEPA FD	TBD
	Communicate the importance of mainstreaming biodiversity conservation and sustainable use within the mining industry via workshops involving all stakeholders and biodiversity experts	Conduct workshops to inform mining and construction development interests of the value of biodiversity for both existing mining areas and new mining proposals. Promote a consultation exercise with existing mine operators to discuss possible approaches for impact mitigation on existing projects	3	2019	MEGJC NEPA FD	5,000
<b>Tourism</b>	Engage local folk in biodiversity preservation	<ol style="list-style-type: none"> <li>1. Set up eco-tourism enterprises and train local folk including fishermen to serve</li> </ol>	3	2019	TPDCo Fisherman Cooperation	5,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		as guides for biodiversity appreciation. 2. Complete Guidelines for Eco-Tourism			Fish Sanctuary networks	
	The use of sustainable techniques for the construction and operation of resort installations (recycling of waste, effluent treatment, etc.) and foster sustainable certification schemes	Implement an educational conversation on efficient use of resources within the industry. <ul style="list-style-type: none"> <li>Water, waste, energy and materials management</li> <li>Encourage adoption of existing certification schemes</li> </ul>	2	2018	TPDCo Jamaica Hotel and Tourism Association (JHTA) Parish council NEPA	10,000
	Conduct carrying capacity assessment of sensitive ecosystems such as coral reefs, rivers, mangroves, forests and other sensitive natural ecosystems	1. Implement existing plans for carrying capacity studies and integrate results into the tourism sector 2. Conduct carrying capacity studies and environmental assessments	1	2017-2021	NEPA MOT TEF TPDCo River Rafting Authority	TBD
<b>Conservation</b>	Continuing to build partnerships among governments, NGOs, local communities, and private sector interests to establish and maintain protected areas	Create a program to build stronger partnerships among private. Public and civil sectors. Foster corporate social responsibility and branding as it relates to biodiversity conservation in the private sector.	2	2018	NEPA	20,000
	Seek adequate funding for research on the status of existing Protected Areas and also to ensure adequate maintenance of conservation infrastructure and team.	Capitalize the NCTFJ to sustain the Protected Areas: <ul style="list-style-type: none"> <li>Establish visiting fees linked to visitation of conservation areas;</li> <li>Expand existing body of regulations related to compensation fees for non-mitigable impacts from developments</li> </ul>	3	2019-2021	MEGJC FD NEPA Academia PIOJ	20,000
	Promote establishment of zones	1. Establish zones (inclusive of buffer zones) in Protected Areas where none currently exist 2. Prepare map with established zones	3	2019-2021	MEGJC NEPA FD NGOs	30,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		(inclusive of buffer zones) in Jamaica's National Spatial Plan 3. Define criteria for complementary land use activities inside the established zones (including buffer zones)				
	Implement the Protected Areas System Master Plan (PASMP)	Solicit resources to execute activities within the PASMP	1	2017 and ongoing	MEGJC NEPA FD	TBD
Freshwater resources	Protect freshwater resources against contamination	Enforce regulations regarding water abstraction and effluent disposal into freshwater resources.	1	2017	NEPA WRA	-
		Revamp criteria for establishment and management of waste disposal sites.  Implement plans for establishment of appropriate landfill sites.  Develop site remediation plans for existing waste disposal sites and implement at least one.	3	2020	MEGJC NEPA NSWMA FD ALMD	70,000
	Ensure regular monitoring of freshwater resources conditions	Develop a systematic approach to assess the status and quality of Jamaica's freshwater resources: <ul style="list-style-type: none"> <li>- Establish a national sampling network for freshwater resources;</li> <li>- Develop and promote a complementary "Citizen Science" monitoring programme using basic indicators along with more rigorous scientific monitoring.</li> <li>- Define a set of parameters to be monitored;</li> <li>- Establish biological monitoring of freshwater resources;</li> </ul>	2	2019	NEPA WRA NGOs CBOs Academia JSIF	50,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
		<ul style="list-style-type: none"> <li>Report on the status of Jamaica's Freshwater resources yearly</li> </ul>				
	Enhance capacity on freshwater resource conservation	Develop a National Biological Index for water quality monitoring	2	2018-2023	NEPA MICAF WRA Academia	TBD
<b>Coastal and Marine Protection</b>	Enhance protection against marine invasive species	<p>Create mechanisms to enhance control of marine invasive species:</p> <ul style="list-style-type: none"> <li>Develop regulations to control ballast water exchange in Jamaica</li> <li>Promote specific monitoring of potential introduction of invasive species at hotspots (ports, marinas, harbours, etc.)</li> <li>Prepare marine invasive species eradication protocol</li> </ul>	1	2017-2019	NEPA MEGJC Coast Guard Maritime Authority	60,000
	Minimize the impact of dredging activities	Define appropriate sites for disposal of dredge spoil, considering areas that are distant from environmentally sensitive areas. Utilize scientific methods including modelling to identify areas.	2		NEPA Academia Port Authority Maritime Authority	100,000
		Develop quality standards for marine sediment disposal.  Differentiate contaminated and non-contaminated material	2		NEPA Academia Port Authority Maritime Authority	20,000
	Enhance preparedness for marine oil spills	Map sensitive coastal habitats that are most sensitive to oil spills.	1	2 years	NEPA Academia	40,000
		Prepare policies, strategies and guidelines for oil exploration and extraction.	2	2019	NEPA Academia	30,000
		Using supporting data on ecosystem service valuation information services, update legislation for marine pollution and environmental damage to increase fines and other punitive measures.	2			

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Timeframe	Responsible Entities	Indicative Budget (US\$)
Environmental Management - Wildlife Protection	Complete amendments to the Wild Life Protection Act to protect plants, invertebrates and micro-organisms	Complete amendments to the Wild Life Protection Act to include plants and invertebrates and get them promulgated.	1	2017	MEGJC NEPA	10,000
	Ensure the continued survival of endangered species	Prepare National Recovery/Conservation Plans for key target endangered species and their habitats. Prepare reports on management activities (Species include: American Crocodile, West Indian Manatee and Sea Turtles)	2	2018	MEGJC NEPA	60,000
	Increase baseline data on the ecology, taxonomy and systematics, and status of species, and build capacity to conduct the relevant scientific studies	Organize and execute research to determine current distribution, ecology and status of key endangered species in Jamaica. [Key species: Jamaican Iguana ( <i>Cyclura collei</i> ), the Jamaican Giant (GS) Swallowtail ( <i>Papilio homerus</i> ), the Yellow Billed Parrot ( <i>Amazonia collaria</i> ), the Jamaican Boa ( <i>Epicrates subflavus</i> ) and the Jamaican Hutia ( <i>Geocrapromis brownii</i> )]	2	2018-2023	MEGJC NEPA UWI IOJ (NHMJ)	300,000
	Increase public awareness on endangered and endemic species in Jamaica.	Prepare and implement a public education program to increase awareness on the existing endangered and endemic species in Jamaica as well as their ecological importance.	2	2019	MEGJC NEPA UWI IOJ (NHMJ)	100,000



## 9 Monitoring and Evaluation Plan for Achieving National Targets

Measuring Jamaica's progress towards achieving the strategic Aichi Goals and Targets will require selecting relevant and feasible monitoring approaches. The plan will be developed to focus on the monitoring of the progress of the goals and outputs and evaluation of the outcomes (with reference to objectives) and impacts, in terms of the overall goals<sup>38</sup>.

The Monitoring and Evaluation (M & E) plan is designed to be feasible and achievable considering the challenges and limitations facing the various sectors and the agencies responsible for conservation of biodiversity that might be affected by each sector's activities.

The M&E plan will be organized by strategic goals. This means that they may not be specific to a particular agency or ministry. However, monitoring plans are grouped under each Aichi Goal and are general enough to allow individual agencies, entities (public and private), and other key stakeholder groups to develop more specific monitoring plans that can feed into a national monitoring plan. Table 9.1 below contains the monitoring and evaluation approaches and draws from the National Strategy and Action Plan that received input from several key stakeholders. Naturally, many of the suggested indicators for monitoring Jamaica's progress towards the Aichi Targets are drawn from the Tables of Targets and Indicators throughout the Action Plan document.

The goal of this document is to provide a few high level monitoring activities and targets that may include many of the suggested indicators in Table 5.1. As a reminder, any national monitoring plan for tracking Aichi Biodiversity Targets must be based on measurable outcomes and indicators. Wherever feasible, these outcomes should be linked to ecological and social measures. It should be noted that biodiversity outcomes are distinct from process indicators such as number of workshops, community meetings and trainings. Instead, M&E plans should be designed to track measurable improvements such as increased bird diversity and healthy populations of economically important fish and invertebrate species. Social and economic indicators could include monetization of ecosystem services and biodiversity, for example, sustainable forest products

(honey, medicinal plants), national park entrance fees, biomedical revenue sharing and increases in fines and levies.

The reporting of the achievements of the Aichi Goals and Targets should be facilitated through the Jamaica Vision 2030 and Medium Term Framework mechanisms. The NEPA will also monitor and evaluate the progress through its internal M&E mechanism conducted by the Planning Projects Evaluation and Research Division.

Evaluation of the country's achievements towards the Aichi targets should be conducted by 2018 and in 2021.



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*Broughtonia sanguinea* (orchid)

<sup>38</sup> World Bank Group (2008). The monitoring and evaluation handbook for business environment reform.

**Table 9.1: Monitoring Plan for Achieving the National Targets**

<u>Reference #</u>	<u>National Aichi Target</u>	<u>Monitoring Frequency</u>	<u>Output/Result</u>	<u>National Indicators</u>	<u>Indicator Targets by 2021</u>	<u>Means of Verification</u>	<u>Related Strategic Goals/Aichi Targets</u>	<u>Responsible</u>
T1-a	By 2021, at the latest, Jamaicans are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	Once every 5 years	Increase in knowledge of Jamaicans understanding of biodiversity	Extent to which baseline KAP <sup>39</sup> survey completed (Categories: Not done, to some extent, great extent, Completed) <sup>40</sup>	1	KAP survey report	GOAL A Target 1	NEPA
T1-b			Comprehensive national strategies that promote awareness of the values of biodiversity in various sectors	Extent to which comprehensive national strategies completed (Categories: Not done, to some extent, great extent, Completed)	1	Jamaica's National Report to the CBD	GOAL A Target 1	NEPA
T1-c			Biodiversity educational curricula for schools	Extent to which the educational curricula relating to biodiversity developed (Categories: Not done, to some extent, great extent, Completed)	3	MoE Curricula	GOAL A Target 1	NEPA, Min. of Education, Youth & Information
T1-d			Increased awareness	Number of public awareness campaigns on biodiversity	2	NEPA's Annual Reports	GOAL A Target 1	NEPA
T2-a	By 2021, at the latest, biodiversity values have been integrated into national and local development and poverty reduction and planning processes are being incorporated into national accounting as appropriate, and reporting systems.	Annual Reporting	National projects using TEEB and SEEA <sup>41</sup> approaches implemented	Extent to which TEEB and SEEA approaches developed. (Categories: Not done, to some extent, great extent, Completed)	1	Jamaica's National Report to the CBD	GOAL A Target 2	NEPA
T2-b			Policies using TEEB and SEEA approaches	Number of policies that used TEEB and SEEA approaches.	1	Jamaica's National Report to the CBD	GOAL A Target 2	NEPA
T2-c			Legislation and policies relating to conservation and protection of biodiversity updated.	Number of legislation and policies relating to conservation and protection of biodiversity updated.	2	NEPA's Annual Reports	GOAL A Target 2	NEPA, Forestry Dept. Fisheries Div. MICAFA (Agriculture)
T2-d			At least two fines revised relating to conservation and protection of biodiversity	Number of fines revised and developed to incorporate biodiversity conservation strategies.	2	NEPA's Annual Reports	GOAL A Target 2	NEPA, Forestry Dept. Fisheries Div. MICAFA

<sup>39</sup> KAP means Knowledge Attitudes and Practices

<sup>40</sup> To some extent- 50%; Great extent-80%; Completed-100%

<sup>41</sup> The Economics of Ecosystems and Biodiversity; System of Environmental-Economic Accounting

<u>Reference #</u>	<u>National Aichi Target</u>	<u>Monitoring Frequency</u>	<u>Output/Result</u>	<u>National Indicators</u>	<u>Indicator Targets by 2021</u>	<u>Means of Verification</u>	<u>Related Strategic Goals/Aichi Targets</u>	<u>Responsible</u>
								(Agriculture) MGD
T2-e			Inclusion of natural capital into national budgets and priorities	% of natural capital reflected in the national budget	20%	Jamaica's National Report to the CBD	GOAL A Target 2	Min. of Finance & Public Sector MEGJC (ERMD) NEPA
T3-a	By 2021, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant obligations, taking into account national socioeconomic conditions.	Match with the frequency of the SOE Reports	Introduction of incentive programmes to private and public sector companies such as the Green Business Certification	Number of pilot incentive programmes introduced	2	Jamaica's State of the Environment Reports	GOAL A Target 3	NEPA, MEGJC (ERMD)
T3-b			Ecological limits/footprint and carrying capacity assessments for key economic sectors completed	Number of Ecological Carrying Capacity studies completed	3	Carrying Capacity reports	GOAL A Target 3	NEPA
T3-c			Conservation easements mechanisms or programs Increase by 10% island-wide	Number of conservation easement programmes offered to landowners	1	Jamaica's National Report to the CBD	GOAL A Target 3	NEPA
T4-a	By 2021, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and	Match with the frequency of the SOE Reports	Tools developed that allow key stakeholders to implement plans leading to sustainable production levels and use of natural resources	Number of tools developed to conduct rapid ecological footprint assessments	1	Jamaica's State of the Environment Reports	GOAL A Target 4	NEPA
T4-b			Updated State Of The Environment (SOE) Report by 2019 to include annual trends	Number of sectors included in the State of the Environment Report presenting annual trends	2 (At least two sectors with full	Jamaica's State of the Environment Reports	GOAL A Target 4	NEPA

<u>Reference #</u>	<u>National Aichi Target</u>	<u>Monitoring Frequency</u>	<u>Output/Result</u>	<u>National Indicators</u>	<u>Indicator Targets by 2021</u>	<u>Means of Verification</u>	<u>Related Strategic Goals/Aichi Targets</u>	<u>Responsible</u>
	consumption and have kept the impacts of use of natural resources well within safe ecological limits.		for production and consumption of key natural resources of at least two key sectors	for production and consumption of key natural resources.	consumption & production data)			
T5-a	By 2021, at the latest, the rate of loss of natural habitats, including forests, is at least halved and where feasible, brought close to zero, and degradation and fragmentation is significantly reduced.	Annually or Biennially	Updated report at three year intervals	Trend in the population of endangered terrestrial organisms by species reported	5	NEPA's Annual Reports	GOAL B Target 5	NEPA, Forestry Dept. (for the GS butterflies via water mahoe)
T5-b			Updated report at three-year intervals	Area coverage (hectares) of at least 5 types of forests and wetlands	5	Forestry Department's Annual Reports	GOAL B Target 5	Forestry Dept.
T5-c			Updated report at three-year intervals	Trend in area coverage (hectares) and number of fragments per habitat type	Less fragments and larger total areas over time	Forestry Department's Annual Reports	GOAL B Target 5	Forestry Dept.
T6-a	By 2021, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species	Annually or Biennially	Annual monitoring Report on fishing production	Trends in population of the 5 most important fish species disaggregated by fish species	5 (reports on 5 fish species)	MICAF's Annual Reports	GOAL B Target 6	Fisheries Div.
T6-b			Annual monitoring Report on fishing production	Trends in population of the 3 most important invertebrate species disaggregated by fish species	3 (reports on 3 fish species)	MICAF's Annual Reports	GOAL B Target 6	Fisheries Div.
T6-c			Fish Sanctuaries declared	Number of new fish sanctuaries or Special Fishery Conservation Areas declared	17 (3 more sanctuaries declared)	MICAF's Annual Reports	GOAL B Target 6	Fisheries Div.
T6-d			10 Year Plan for reducing destructive fishing practices  Increased number of fishing areas monitored	Number of destructive fishing cases prosecuted and recorded by Marine Police	3 reported	MICAF's Annual Reports	GOAL B Target 6	Fisheries Div., Marine Police
T6-e			Management Plan for Commercial Fishery Species	Extent to which the Commercial Fisheries Species Management Plan has been developed. (Categories: Not done, to some extent, great extent, Completed)	2	MICAF's Annual Reports	GOAL B Target 6	Fisheries Div., NEPA

<u>Reference #</u>	<u>National Aichi Target</u>	<u>Monitoring Frequency</u>	<u>Output/Result</u>	<u>National Indicators</u>	<u>Indicator Targets by 2021</u>	<u>Means of Verification</u>	<u>Related Strategic Goals/Aichi Targets</u>	<u>Responsible</u>
T6-f	and ecosystems are within safe ecological limits.		Monitoring Report Produced on extraction rates commercial fisheries species  Management Plan implemented	Number of target fishery species caught, disaggregated by species outlined in management plan  Number of species for which Sustainability level defined	3 (At least three species reported)  3 (At least 3 species reported)		GOAL B Target 6	Fisheries Div., NEPA
T7-a	By 2021, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	Annually or Biennially	List of existing agriculture-dependent species <sup>42</sup> in production systems highlighting the 10 most relevant species.  Report on the location and population status of at least 10 agriculture-dependent species	Extent to which the list of agriculture-dependent species completed. (Categories: Not done, to some extent, great extent, Completed)  Number of locations reported for most relevant agriculture-dependent species Number of relevant agriculture-dependent species disaggregated in which abundance is determined	2  10  Abundance determined for the 10 most relevant	MICAF's Annual Reports	GOAL B Target 7	MICAF (Agriculture)
T7-b			Maintenance and sustainability strategy defined and adopted	Extent to which Maintenance and Sustainability strategy developed (Categories: Not done, to some extent, great extent, Completed)	1			
T7-c			Increasing areas where the sustainable agricultural practices are used.	Area coverage (hectares) of sustainable agricultural areas  Number of farmers utilising sustainable practices	Increase sustainable areas by 2%. Increase in number of farmers			

<sup>42</sup> Agriculture-dependent species refers to those plant and animal species that Jamaica relies on for food.

<u>Reference #</u>	<u>National Aichi Target</u>	<u>Monitoring Frequency</u>	<u>Output/Result</u>	<u>National Indicators</u>	<u>Indicator Targets by 2021</u>	<u>Means of Verification</u>	<u>Related Strategic Goals/Aichi Targets</u>	<u>Responsible</u>
T7-d			Increasing area where sustainable forestry practices are utilized.  Updated report at three-year intervals	Area coverage (hectares) under sustainable forestry practices	Increase area by 2%.	MICAF's Annual Reports	GOAL B Target 7	MICAF (Agriculture)
T7-e		Annually or Biennially	Regulations to incentivise sustainable agricultural and forestry practices  Enforcement Strategy for incentives	Extent to which regulations drafted with incentives to promote sustainable agriculture and forestry practices (Categories: Not done, to some extent, great extent, Completed)  Extent to which enforcement Strategy developed. (Categories: Not done, to some extent, great extent, Completed)	1  1	MICAF and Forestry Department's Annual Reports	GOAL B Target 7	MICAF (Agriculture) Forestry Dept.
T8-a	By 2021, pollution, including from excess nutrients and solid waste, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	Annual	Annual Monitoring Report on water quality in coastal waters and key freshwater resources.	Number of sampling stations showing "in spec" water quality disaggregated by location  Number of land based sources of pollution identified.	Increase in numbers by at least 2 "in spec" location.  At least 2 additional identified	NEPA's Annual Reports	GOAL B Target 8	NEPA
T8-b			Monitoring Report on the quality of industrial effluents from industries.	Number of industries where effluents are discharged in the environment  Number of ambient sampling stations monitored for water quality  Number of "in spec" ambient sampling stations  Number of "in spec" industry effluent being discharged in the environment	At least 2 additional monitored  At least 2 additional monitored  At least 2 additional "in spec"  At least 2 additional "in spec"	NEPA's Annual Reports	GOAL B Target 8	NEPA

<u>Reference #</u>	<u>National Aichi Target</u>	<u>Monitoring Frequency</u>	<u>Output/Result</u>	<u>National Indicators</u>	<u>Indicator Targets by 2021</u>	<u>Means of Verification</u>	<u>Related Strategic Goals/Aichi Targets</u>	<u>Responsible</u>
T8-c			Annual Monitoring Report on the quality of domestic effluents from existing wastewater treatment plants	Number and location of wastewater treatment plants sampled for effluent quality  Number and location of "in spec" wastewater treatment plants sampled for effluent quality	At least 2 additional monitored  At least 2 additional "in spec"	NEPA's Annual Reports	GOAL B Target 8	NEPA
T9-a	By 2021, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	Annually or Biennially	Draft legislation for discharge, treatment and management of ballast water	Extent to which Legislation drafted for the discharge, treatment and management of ballast water in Jamaica (Categories: Not done, to some extent, great extent, Completed)	1	NEPA's Annual Reports	GOAL B Target 9	NEPA, Maritime Authority of Jamaica
T9-b			Annual Monitoring report on existing invasive alien species.	Number of invasive alien species control programmes developed and implemented	Number of control programmes increased by at least 2	NEPA's Annual Reports	GOAL B Target 9	NEPA IAS Working Group
T9-c			Strategy and action plan for control and management of known invasive alien species.	Extent to which the strategy and action plan developed. (Categories: Not done, to some extent, great extent, Completed)	1 (revised)	National Invasive Species Strategy and Action Plan	GOAL B Target 9	NEPA
T9-d			Draft regulations to improve management of invasive alien species	Extent to which legislation and regulations have been drafted. (Categories: Not done, to some extent, great extent, Completed)	1		GOAL B Target 9	NEPA
T10-a	By 2021, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their	Every 4-5 years	Monitoring Report on coral coverage and condition on key coral reefs.	Coverage area (hectares) of key coral reefs surveyed  Percentage of coral recruitment in monitored areas  Percentage in macro-algal cover  Number of herbivorous fish in monitored areas	No net loss or increased coral coverage, coral recruitment, macro-algal cover, herbivorous and commercial fish, and	Annual Coral Reef Monitoring Reports	GOAL B Target 10	NEPA

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	integrity and functioning.			Number of commercial fish in monitored areas  Number of <i>Diadema</i> sp. in monitored areas	<i>Diadema</i> sp. by 2%.			
T11-a	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective based conservation measures, and integrated into the wider landscapes and seascapes.	Every 5 years	Management effectiveness of existing network of protected areas improved over 2016 levels.	Percentage increase in Management Effectiveness Tracking Tool (METT) Scores for all protected areas (Categories: Not done, to some extent, great extent, Completed)	1	Jamaica's State of the Environment Report	GOAL C Target 11	NEPA
T11-b			Final Policy and legislation on Protected Area System (PAS)	Extent to which Policy and legislation on Protected Area System (PAS) has been developed. (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's State of the Environment Report	GOAL C Target 11	MEGJC (ERMD) NEPA,
T11-c			Coverage of both terrestrial and marine protected areas in relation to Jamaica's territory.	% Coverage of (hectares) of protected areas across Jamaica.	Increase by 3%	Jamaica's State of the Environment Report	GOAL C Target 11	MEGJC (ERMD, Forestry) MICAFA (Agriculture), Min. of Culture, Gender Entertainment and Sports (Culture)
T11-d			Two New Protected Areas Declared	Number of new protected areas declared for the marine environment.	At least 2	Jamaica's State of the Environment Report	GOAL C Target 11	NEPA
T12-a	By 2021, the extinction of known threatened species has been prevented and their conservation	Every 3 years	Annual Population Assessments  Red listing re-evaluation of 3 groups of species.	Number of population assessments conducted on AZE species.  Trend in population of AZE species assessed	At least 3 re-evaluated  At least 1 species increases in population	NEPA's Annual Reports	GOAL C Target 12	NEPA



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T12-b	status, particularly of those most in decline, has been improved and sustained.		At least two more species added to the head-start projects and rare and endemic plant propagation project.	Number of head-start and propagation Projects developed.	2	NEPA's Annual Reports	GOAL C Target 12	NEPA
T12-c			Distribution assessment of selected key endangered and vulnerable species with the existing and proposed network of protected areas	Number of opportunities for optimizing protected area boundaries for endangered species	2	NEPA's Annual Reports	GOAL C Target 12	NEPA
T13-a	By 2021, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	Catalogue genomes of key species incrementally over time. Annual Updated Report	Assessment Report on genetic diversity of cultivated plants and farmed animals and their wild relatives completed	Extent to which genetic diversity of cultivated plants and farmed animals and their wild relatives have been identified. (Categories: Not done, to some extent, great extent, Completed)	100%	Jamaica's National Report to the CBD	GOAL C Target 13	MICAF (Agriculture)
T13-b			Comparison of genetic diversity of cultivated plants and farmed animals to their relatives over time	Extent to which the comparison of genetic diversity of cultivated plants and farmed animals to their wild relatives is documented. (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's National Report to the CBD	GOAL C Target 13	MICAF (Agriculture)
T13-c			Management Plan to prevent genetic erosion of key agricultural species and farmed animals and their wild relatives	Extent to which the plan for genetic erosion of key agricultural species and farmed animals to their wild relatives have been developed. (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's National Report to the CBD	GOAL C Target 13	MICAF (Agriculture)

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T14-a	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded,	Biennial Report	Conservation measures implemented and reflected in vulnerable/sensitive ecosystem areas restored  National environmental management strategies	Coverage (hectares) of vulnerable ecosystems restored and safeguarded/protected based on previous baseline data	Increase in hectares restored by 5%	NEPA's Annual Reports	GOAL D Target 14	NEPA
T14-b	taking into account the needs of women, and local communities and the poor and vulnerable.		National strategies or policies for enhanced and equitable provision of and access to essential ecosystem services  Standard assessment tool utilized by different groups for reporting on the conservation status of the ecosystems they utilize and/or are charged with protecting	Extent to which the national strategies or policies has been developed. (Categories: Not done, to some extent, great extent, Completed)  Number of communities groups sensitized on reporting the services utilized in the ecosystem (including selected farmers, fisher folk or other local community groups)	Completed  5	Jamaica's National Report to the CBD	GOAL D Target 14	NEPA, Forestry Dept., Fisheries Div.
T15-a	By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, hereby contributing to climate change	Every 3 years	Development and implementation of a National Plan for Ecosystem Restoration	Extent to which the national plan for ecosystem restoration has been developed (Categories: Not done, to some extent, great extent, Completed)  Number of Workshop/seminar of the National Plan for Ecosystem Restoration held	Completed  At least 1	NEPA's Annual Reports	GOAL D Target 15	NEPA
T15-b			Workshops hosted on importance of biodiversity to national development	Number of workshops held on importance of biodiversity to national development	At least 1  At least 1	NEPA's Annual Reports	GOAL D Target 15	NEPA

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	mitigation and adaptation and to combating desertification.		Information on the potential contribution of biodiversity and the maintenance of ecosystem services to resilience and adaptive capacity in the face of impacts from climate change, is compiled, generated, and reviewed.	Number of projects that address climate change adaptation and mitigation measures relating to biodiversity				
T15-c			Ecosystem-based adaptation (EBA) methods and tools for biodiversity restoration developed  Training workshops on proper use and utilization of tools and resources relevant to sectors arranged and disseminated  Integration of ecosystem restoration into national adaptation strategies (including REDD-plus)	Extent to which tools and methods for supporting ecosystem-based adaptation have been developed (Categories: Not done, to some extent, great extent, Completed)  Number of training workshop held on proper use and utilization of EBA tools and resources  Number of national adaptation strategy integrating ecosystem restoration	Completed  At least 1  At least 1	NEPA's Annual Reports	GOAL D Target 15	NEPA
T16-a	By 2020, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in	Biennial Reports	Reviewed ABS agreements to examine ecological, social and economic impacts of different products (ganja, marine products etc.) and the national access and benefit sharing plan (ABS)	Number of products for which the ecological, social and economic impacts have been identified	At least 3	Jamaica's National Report to the CBD	GOAL D Target 16	NEPA and MEGJC (EMRD)

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T16-b	force and operational consistent with national legislation.		Study of ecological, social and economic impacts of ABS agreements for different products (ganja, marine products etc.)	The extent to which the national access and benefit sharing plan has been developed (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's National Report to the CBD	GOAL D Target 16	NEPA and MEGJC (EMRD)
				Number of academic institutions consulted for this study	At least 3			
			Annual workshops	Number of workshops held on the status of the legal frameworks for governing access to, and sharing the benefits of Jamaica's genetic resources	At least 2			
			Legal framework for governing access to, and sharing the benefits of Jamaica's genetic resources	The extent to which the legal framework for governing access to, and sharing the benefits of Jamaica's genetic resources developed. (Categories: Not done, to some extent, great extent, Completed)	Great extent			
T17-a	By 2019, Jamaica has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.		Gather and collate stakeholder input into JA-CHM website	Proportion of stakeholders sensitized on national activities under the updated NBSAP	At least all 80% <sup>43</sup>	Jamaica's National Report to the CBD	GOAL E Target 17	NEPA, IOJ (JA-CHM)
Update of JA-CHM website (2016-2017) with information on revised NBSAP			Extent to which the JA-CHM website has been updated. (Categories: Not done, to some extent, great extent, Completed)	Completed				
T17-b			JA-CHM Relunched.	Relaunch of the JA-CHM website	1 Launch held	Jamaica's National Report to the CBD	GOAL E Target 17	NEPA, IOJ (JA-CHM)
			Increased traffic on website.	Numbers of hits on CHM website	Increase traffic by 10%			
			NBSAP integrated into agencies' work plans,	Number of agencies that have incorporated NBSAP into their workplan	At least 5 agencies using NBSAP			

<sup>43</sup> At least 80% of those listed in the Communication Strategy

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			of Key Ministries and Agencies					of Tourism, MSET, MICAFA (Agriculture), MEGJC Ministry of Finance & the Public Service
T18-a	By 2021, the traditional knowledge, innovations and practices of local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of local communities, at all relevant levels.	Every 3 years	Inventory or status report on traditional knowledge cultural practices linked to biodiversity	Extent to which guidelines that protect/govern traditional knowledge and cultural practices linked to biodiversity have been developed (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's National Report to the CBD	GOAL E Target 18	NEPA, IOJ, JIPO
T18-b			Legislation and Regulations that protect/govern traditional knowledge and cultural practices linked to biodiversity	Extent to which legislation and regulations that protect/govern traditional knowledge and cultural practices linked to biodiversity have been developed (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's National Report to the CBD	GOAL E Target 18	NEPA, IOJ, JIPO
T18-c			Report on the status of and trends of the practice of traditional occupations that depend on or impact biodiversity resources (e.g., wild honey harvesting, bussu/ganga harvesting)	Percentage of practices that traditional occupations that depend on or impact biodiversity resources reported	At least 5%	Jamaica's National Report to the CBD	GOAL E Target 18	NEPA
T18-d			Inclusion in the State of the Environment Report (SOE)	Extent to which the status and practices of traditional occupations that depend on or impact biodiversity resources are included in the SOE report (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's updated SOE report  Jamaica's National Report to the CBD	GOAL E Target 18	NEPA

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T18-e			Signed agreement between local communities and government for access, benefit sharing and traditional knowledge on biodiversity	Percentage of stakeholders that have signed the agreement with the government for access, benefit sharing and traditional knowledge on biodiversity	50%	Jamaica's National Report to the CBD	GOAL E Target 18	NEPA
T19-a	By 2020, the knowledge, the science base and technologies relating to biodiversity, its values, functioning, status, and trends, the consequences of its loss, are improved, widely shared and transferred and applied.	Annually	Online Catalogue on Jamaica-CHM website of publicly available databases and information resources supporting biodiversity conservation	Number of membership on JA-CHM	Increase by 5%	Jamaica's National Report to the CBD	GOAL E Target 19	IOJ (JA-CHM), NEPA
Number of entities listed on the Data and Conservation webpage of the JA-CHM website				Increase by 10%				
Number of user sessions on the Data and Conservation webpage of the JA-CHM website				Increase by 10%				
Number of Public Awareness and Education Programmes on Science base and technologies relating to biodiversity executed.				At least 2 more				
T19-b			Workshops hosted and campaigns developed to build stakeholder awareness and buy-in to biodiversity conservation/protection	Number of awareness campaigns held	At least 2	Jamaica's National Report to the CBD	GOAL E Target 19	NEPA
T20-a	By 2019, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2016-2021 from all sources, and in accordance with the consolidated	Annually	National Strategy for Resource Mobilization is developed and implemented.	Extent to which the National Strategy for Resource Mobilization is implemented. (Categories: Not done, to some extent, great extent, Completed)	Completed	Jamaica's National Report to the CBD	GOAL E Target 20	NEPA, Ministry of Finance & the Public Service, PIOJ
T20-b				National external funding strategy for	Number of funding sources			

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	and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.		biodiversity conservation drawing from related funding sources and international agreements (UNFCCC, CBD, etc.) with the aim to increase the number of funding sources.	Number of international agreements with potential funding being utilised	4			

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## Appendices

### Appendix I – Alignment of the NBSAP with Vision 2030 National Strategies and the Priority Sector Strategies

NATIONAL OUTCOME	NATIONAL STRATEGIES	PRIORITY SECTOR STRATEGIES
<p>13 Sustainable Management and Use of Environmental and Natural Resources</p>	<p>13-1 Integrate environmental issues into economic and social decision-making policies and processes</p>	<p>Create frameworks that will enable the integrated management and use of Jamaica's natural resources (e.g., guidelines for mining, etc.)</p>
	<p>13-2 Develop and Implement Mechanisms for Biodiversity and ecosystem management</p>	<p>Adopt an ecosystems management approach which focuses on access to biological resources for benefit sharing by our people. Promote the use of biological resources safe transfer, handling and conservation of organisms implementation of forestry management plans in terrestrial and marine protected areas, research and monitoring, understanding of ecosystems, including their economic value and development.</p> <p>Develop a comprehensive framework to reverse the loss of biological resources through restoration initiatives and conservation of species.</p>
	<p>13-3 Develop efficient and effective governance structures for environmental management</p>	<p>Establish institutional mechanisms to foster coordination and cooperation among resource management agencies of resource management</p> <p>Create a dynamic and responsive regulatory environment through strengthening of relevant environmental legislation</p>
	<p>13-4 Manage all forms of waste effectively</p>	<p>Create an appropriate institutional framework for the management of all types of waste, including the development of a waste management policy and associated standards and regulations</p>
<p>14 Hazard Risk Reduction and Climate Change Adaptation</p>	<p>14-1 Improve resilience against all forms of hazards</p>	<p>Create and strengthen national platforms and mechanisms for hazard risk reduction by engaging in multi-stakeholder dialogues</p>
	<p>14-3 Develop measures to adapt to climate change</p>	<p>Create mechanisms to fully consider the impacts of climate change on all national policies and plans</p> <p>Adopt best practices for climate change adaptation</p>
	<p>14-4 Develop mechanisms to influence the global rate of climate change</p>	<p>Lobby at the international level for high greenhouse gas emissions to become more energy and resource efficient</p>
<p>15 Sustainable Urban and Rural Development</p>	<p>15-1 Create a comprehensive and efficient planning system</p>	<p>Rationalize the roles and responsibilities of agencies involved in planning</p>
		<p>Develop and adopt mechanisms for better integration of land use planning for decision-making</p>
	<p>15-2 Create an appropriate framework for sustainability planning</p>	<p>Ensure that development decisions are guided by a national physical plan (national physical plan)</p>
		<p>Accelerate development of strategic regional centres to play a key role in balancing development</p> <p>Review existing land use patterns, zoning regulations and standards in the context of housing and urban development</p>

NATIONAL OUTCOME	NATIONAL STRATEGIES	PRIORITY SECTOR STRATE
		formulate forward-looking land use and developme optimum utilization of land
	15.5 Ensure safe, sanitary and affordable shelter for all	Integrate national housing and urban development p adequate shelter and services to all

**Source: PIOJ (2009) Vision 2030 Jamaica – National Development Plan**

## Appendix II - International Treaties related to Biodiversity

International Agreements (Year of entry into force)	Main Provisions and Jamaica's Status (Date of entry into force of ratification, accession or acceptance)
Convention on Biological Diversity, 1993	The Convention on Biological Diversity creates the framework for countries to implement national legislative, policy and administrative measures. Jamaica became a Party on 6 April, 1995;
Cartagena Protocol on Biosafety, 2003	The Protocol to the Convention on Biological Diversity aims to ensure the safe handling, transport and use of Living Modified Organisms (LMOs). Jamaica became a party to this protocol on 24 December, 2012
International Plant Protection Convention, 1952	The Convention encourages cooperation among contracting parties to prevent the transboundary movement of pest of plants into areas where they are not present. Jamaica accepted this Convention on 24 November 1983
Convention concerning the Protection of the World Cultural and Natural Heritage, (World Heritage Convention) 1972	This Convention seeks to protect the world's cultural and natural heritage, which includes biodiversity. Jamaica accepted this Convention on 24 November 1983
International Treaty on Plant Genetic Resources for Food and Agriculture, 2004	The objective is to conserve and use sustainably plant genetic resources for food and agriculture, and share equitably the benefits arising out of their use, in harmony with the Convention on Biological Diversity. Jamaica accepted the treaty 12 June, 2006.
Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), 1975	The aim of this Convention is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Jamaica became a party to this Convention on 22 July, 1997
Convention on Wetlands (Ramsar Convention), 1971	The aim of the Convention is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world." Jamaica acceded to this Convention and it entered into force for the country on 7 February, 1998.
United Nations Convention to Combat Desertification, 1996	This Convention aims to counter the process of desertification and droughts. Jamaica acceded to this Convention on 16 March, 1998
United Nations Framework Convention on Climate Change, 1992	This Convention established the need to reduce the emissions of greenhouse gases to the atmosphere. Jamaica ratified this Convention on 6 April, 1992
United Nations Convention for the Law of the Sea, Montego Bay, 1994	This Convention defines rights and responsibilities of nations with respect to their use of the world's oceans. Jamaica ratified this Convention on 24 November 1983
Convention on the Protection and Development of the Marine Environment of the Wider Caribbean Region, (Cartagena Convention), 1986	This Convention is a regional agreement to protect the marine environment (and associated biodiversity). Jamaica ratified this Convention on 24 November 1987.
Protocol concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region, 1986	This Protocol to the Cartagena Convention establishes cooperative arrangements between Caribbean States in case of response to oil spills and also requires parties to the Cartagena Convention maintain the means of response to oil spills. Jamaica ratified the Protocol on 1 April, 1987
Protocol concerning Pollution from Land-Based Sources and Activities (LBS Protocol), 2010	This Protocol to the Cartagena Convention is a regional mechanism for Parties to meet the goals and obligations of two international agreements: the United Nations Convention on the Law of the Sea and the Global Action for the Protection of the Marine Environment from Land-Based Activities. The LBS Protocol seeks to respond to the need to protect the marine environment from land-based point and non-point sources



International Agreements (Year of entry into force)	Main Provisions and Jamaica's Status (Date of entry into force of ratification, accession or acceptance)
	pollution by outlining the types of control and management response for addressing land-based issues. Jamaica's ratification of the Protocol into force on 5 November, 2015.
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (as amended), London, Mexico City, Moscow (Washington), 1972	This Convention aims to prevent the release of waste into the environment, thus preventing impacts on marine biodiversity. Jamaica ratified this Convention on 13 June, 1991
International Convention on the Prevention of Pollution from Ships, London, 1973	Also known as MARPOL, this Convention aims to prevent pollution from ships. As environmental pollution is one of the main causes behind biodiversity decline, this Convention is relevant for this work. Jamaica ratified this Convention on 13 June, 1991
Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, London, 1973	The Protocol to MARPOL adopted following a series of accidents involving oil tankers in 1976–77. Jamaica ratified this Protocol also on 13 June, 1991

### Appendix III – Complete List of Stakeholders involved in the NBSAP process

	Stakeholder	Name
<b>Interviews (Skype, Phone, In-person)</b>		
1.	NEPA – Public Education and Corporate Communications Branch	Ms. Dionne Rose, Manager
2.	NEPA – Environmental Management and Conservation Division NEPA - Conservation and Protection Sub-Division NEPA – Ecosystems Management Branch NEPA – Protected Areas Branch NEPA – Environmental Management Sub-Division	<ul style="list-style-type: none"> <li>• Mr. Anthony McKenzie</li> <li>• Ms. Yvette Strong,</li> <li>• Andrea Donaldson</li> <li>• Ms. Carla Gordon</li> <li>• Paulette Kolbusch</li> </ul>
3.	NEPA – Spatial Planning Division	<ul style="list-style-type: none"> <li>• Mr. Leonard Francis</li> </ul>
4.	NEPA – Applications Processing Branch	<ul style="list-style-type: none"> <li>• Ms. Aisha Bedasse</li> </ul>
5.	Ministry of Industry Commerce Agriculture and Fisheries - Agriculture and Fisheries Portfolio	<ul style="list-style-type: none"> <li>• Mr. Carlton Wedderburn (Economic Planning Division)</li> <li>• Ms. Gillian Taylor-Ellis (Veterinary Services Division)</li> <li>• Mr. Wintorph Marsden (Veterinary Services Division)</li> <li>• Mrs. Marina Young (Rural Agricultural Development Authority)</li> <li>• Ms. Carla Douglas (Research &amp; Development)</li> <li>• Ms. Tracey-Ann Wright (Policy &amp; Planning)</li> <li>• Mr. Fitzroy White (Plant Quarantine Produce Inspection Branch)</li> <li>• Ms. Sanniel Wilson (Plant Quarantine Produce Inspection Branch)</li> <li>• Mr. Andre Kong (Director of Fisheries, Fisheries Division)</li> <li>• Ms. Shellene Berry (Fisheries Instructor)</li> <li>• Ms. Dionne Walker (Secretary, Fisheries Division)</li> <li>• Mr. Fabian Gordon (Fisheries Instructor, Fisheries Division)</li> </ul>
6.	Ministry of Transport and Mining – Mines and Geology Division	<ul style="list-style-type: none"> <li>• Mr. Leighton Williams, Deputy Commissioner of the Mines</li> <li>• Mrs. Stacy Plummer - regulatory aspect of mining and quarrying</li> </ul>
7.	Tourism Product Development Company Limited (TPDCO)  Ministry of Tourism (MT)	<ul style="list-style-type: none"> <li>• Ms. Sandy Chung (TPDCO)</li> <li>• Ms. Opal Browning (TPDCO)</li> <li>• Mrs. Althea Heron (MT)</li> <li>• Ms. Georgia Lumley (MT)</li> <li>• Mr. Elecia Myers (MT)</li> </ul>
8.	Forestry Department	<ul style="list-style-type: none"> <li>• Mr. Jerome Smith</li> </ul>

	<b>Stakeholder</b>	<b>Name</b>
9.	Ministry of Economic Growth and Job Creation	<ul style="list-style-type: none"> <li>• Mr. Gerald Lindo (Climate Change Division),</li> <li>• Ms. Joni Jackson (Environment and Risk Management),</li> <li>• Mrs. Gillian Guthrie (Head of ERM),</li> <li>• Ms. Janet Hyde(Land Division),</li> <li>• Dr. Orville Gray (Climate Change Division)</li> </ul>
10.	Chair, Scientific Authority, CITES	<ul style="list-style-type: none"> <li>• Dr. Elaine Fisher</li> </ul>
11.	Attorney General's Office	<ul style="list-style-type: none"> <li>• Mrs. Nicole Foster-Pusey - Solicitor general</li> </ul>
12.	University of West Indies (UWI) University of the West Indies	<ul style="list-style-type: none"> <li>• Dr. Dayne Buddo (Discovery Bay Marine Lab)</li> <li>• Professor Mona Webber (Centre for Marine Sciences)</li> <li>• Dr. Karl Aiken (Department of Life Sciences)</li> </ul>
13.	Caribbean Coastal Area Management (C-CAM)	<ul style="list-style-type: none"> <li>• Mr. Brandon Haye</li> </ul>
14.	Museum of Natural History (Clearing-House Mechanism)	<ul style="list-style-type: none"> <li>• Dr. Suzanne Davis</li> </ul>
15.	Bureau of Gender Affairs	<ul style="list-style-type: none"> <li>• Ms. Nardia McLaren</li> </ul>
16.	United Nations Development Programme	<ul style="list-style-type: none"> <li>• Mr. Upul Ranaweera</li> </ul>
17.	Office of Disaster Preparedness and Emergency Management	<ul style="list-style-type: none"> <li>• Ms. Leiska Powell</li> <li>• Ms. Michelle Edwards</li> </ul>
<b>Stakeholder Workshops**</b>		
18.	Caribbean Maritime Institute (CMI)	<ul style="list-style-type: none"> <li>• Mr. Herman Shim</li> </ul>
19.	Environmental Health Foundation (EHF)	<ul style="list-style-type: none"> <li>• Mrs. Latoya Aquart-Foster</li> </ul>
20.	Forestry Department	<ul style="list-style-type: none"> <li>• Mr. Brahim Diop</li> </ul>
21.	Trade Board	<ul style="list-style-type: none"> <li>• Mr. Douglas Webster</li> </ul>
22.	Planning Institute of Jamaica	<ul style="list-style-type: none"> <li>• Ms. Le-Anne Roper</li> </ul>
23.	Institute of Jamaica	<ul style="list-style-type: none"> <li>• Mrs. Dionne Newell (Natural History Museum of Jamaica)</li> <li>• Mr. Keron Campbell (Natural History Museum of Jamaica)</li> </ul>
24.	Ministry of Economic Growth and Job Creation	<ul style="list-style-type: none"> <li>• Ms. Joni Jackson</li> </ul>
25.	Jamaica Intellectual Property Office (JIPO)	<ul style="list-style-type: none"> <li>• Ms. Lilyclaire Bellamy</li> </ul>
26.	C-CAM/BIOS Caribbean	<ul style="list-style-type: none"> <li>• Dr. Ann Sutton</li> </ul>
27.	Ministry of Science, Energy and Technology (MSET)	<ul style="list-style-type: none"> <li>• Dr Betsy Bandy</li> <li>• Ms. Kimberly Nirine</li> </ul>
28.	Ministry of Transport and Mining	<ul style="list-style-type: none"> <li>• Mrs. Monifa Blake</li> </ul>
29.	Ministry of Local Government and Community Development	<ul style="list-style-type: none"> <li>• Ms. Joan Sampson</li> </ul>
30.	Ministry of Industry, Commerce, Agriculture and Fisheries (MICAF)	<ul style="list-style-type: none"> <li>• Ms. Carla Douglas</li> </ul>
31.	Global Environment Facility Small Grants Programme (GEF SGP)	<ul style="list-style-type: none"> <li>• Ms. Hyacinth Douglas</li> </ul>
32.	Trade Board (TB)	<ul style="list-style-type: none"> <li>• Mr. Douglas Webster</li> </ul>
33.	Environmental Foundation of Jamaica (EFJ)	<ul style="list-style-type: none"> <li>• Mrs. Allison McFarlane</li> <li>• Ms. Charmaine Webber</li> </ul>

	Stakeholder	Name
		<ul style="list-style-type: none"> <li>Mr. Mark Constable</li> </ul>
34.	National Environment and Planning Agency (NEPA)	<ul style="list-style-type: none"> <li>Ms. Frances Blair</li> <li>Ms. Dionne Rose</li> <li>Mrs. Sheries Simpson</li> <li>Ms. Yvette Strong</li> <li>Mrs. Vivienne Williams Thompson</li> <li>Ms. Petricia Hamilton</li> </ul>
35.	Water Resources Authority (WRA)	<ul style="list-style-type: none"> <li>Ms. Nia Ramsoogoon</li> </ul>
36.	Jamaica Conservation and Development Trust (JCDDT)	<ul style="list-style-type: none"> <li>Ms. Gabrielle Watson</li> </ul>
37.	Urban Development Corporation (UDC)	<ul style="list-style-type: none"> <li>Mr. Damion Whyte</li> </ul>
38.	National Solid Waste Management Authority (NSWMA)	<ul style="list-style-type: none"> <li>Ms. Stephney Duhaney</li> </ul>

### THE CONSULTANCY TEAM FROM ENVIRONMENTAL SOLUTIONS LIMITED

Name	Role
Mrs. Eleanor Jones	Team Leader
Mrs. Annmarie Goulbourne	Natural Resource Management Specialist and Project Manager
Mr. Pablo Cotsifis	Biodiversity Specialist
Mr. Peter Edwards	Ecologist
Ms. Nalini Jagarine	Environmental and Development Analyst

### MEMBERS OF THE TECHNICAL WORKING GROUP FOR THE NBSAP

Name	Organization
Ms. Yvette Strong (Chairperson)	National Environment & Planning Agency (NEPA)
Mr. Jerome Smith	Forestry Department
Dr. Elaine Fisher	CITES Authority
Dr. Betsy Bandy	Ministry of Science Technology Energy & Mining (MSTEM)
Dr. Suzanne Davis	Institute of Jamaica (IOJ)
Mr. Selvenious Walters	Jamaica National Heritage Trust (JNHT)
Mrs. Elecia Myers	Ministry of Tourism & Entertainment (MTE)
Mr. Vaughn Barnaby	Rural Agricultural Development Authority
Mr. Brahim Diop	Department of Forestry
Mr. Ian Jones	Ministry of Agriculture & Fisheries
Ms. Andrea Donaldson	NEPA
Ms. Paulette Kolbusch	NEPA
Mr. Marcus Goffe	Jamaica Intellectual Property Office (JIPO)
Dr. Paula Tennant	UWI Department of Life Sciences
Dr. Ann Sutton	Caribbean Coast Area Management (C-CAM)

Name	Organization
Ms Joni Jackson	Ministry of Economic Growth and Job Creation
Ms. Frances Blair	NEPA

### MEMBERS OF BIODIVERSITY & GAMES BIRD COMMITTEE 2016

Name	Organization
Dr. Susan Otuokon (Chairman)	Jamaica Conservation & Development Trust 29 Dumbarton Avenue Kingston 10
Dr. Geoffrey Williams	Suites 45/46, Freeport Centre Montego Bay, St. James
Mr. Sean Azan	Malarc Management Services Limited 228 Mountain View Avenue Kingston 6
Mr. Robert Woodstock	Harold Morrison + Robert Woodstock and Associates 15 Bedford Park, Kingston 10
Mr. Timothy Thwaites NEPA's Advisory Board	Daley, Thwaites & Company 13 West Avenue Kingston 4
Ms. Leonie Barnaby NEPA's Advisory Board	---
Ms. Yvette Strong Senior Manager	Conservation and Protection Sub-Division
Ms. Suzanne Davis	Institute of Jamaica 10 – 16 East Street Kingston
Mrs. Kimberlee Cooke-Panton  OR Ms. Stacey-Ann Gray	Fisheries Division c/o Ministry of Agriculture & Fisheries, ( <i>past the Coffee Industry Board</i> ) turn on Willie Henry Drive ( <i>off Marcus Garvey Drive</i> ) Kingston 13
Mr. Osbourne Chin  <i>Notices advising of meetings should also be copied to Ms. Elecia Myers, Senior Director, Tourism Policy &amp; Monitoring Division (MTE)</i>	Ministry of Tourism & Entertainment 64 Knutsford Boulevard Kingston 5
Mr. Kevin Boswell	Forestry Department 173C Constant Spring Road Kingston 8
Dr. Betsy Bandy  OR Mrs. Yvonne Barrett-Edwards	Ministry of Science, Technology & PCJ Building 36 Trafalgar Road Kingston 5
Dr. Bryon Wilson	c/o University of the West Indies BirdLife UWI, Mona Kingston 7
Mr. John Fletcher OR Mr. Marlon Beale	c/o University of the West Indies BirdLife UWI, Mona Kingston 7

Name	Organization
Ms. Elaine Fisher	Scientific Authority of Jamaica c/o Horace Fisher Oxford Medical Centre 22H Old Hope Road Kingston 5
Philip Cross Legal Officer	Legal Services Branch NEPA
Ms. Andrea Donaldson	Ecosystem Management Branch NEPA
Ms. Carla Gordon Manager	Protected Areas Branch NEPA
Mr. Richard Nelson Manager	Enforcement Branch NEPA
Ms. Paulette Kolbusch Manager	Environmental Management Sub-Division
Ms. Dionne Rose Manager	Public Education & Corporate Communication Branch

#### INTERNATIONAL REVIEW TEAM

Name	Organization
Dr. Peter Smith	Independent Climate Change/Ecological Consultant Honorary Fellow, Macquarie University, Sydney NSW, Australia Regional Chair, Oceania IUCN Commission on Ecosystem Management
Christina Supples	Global NBSAP Support Project Manager and NBSAP Forum Moderator NBSAP Technical Peer Review Group United Nations Development Programme-GEF Denver, Colorado, USA

## Appendix IV - Stakeholder Mapping Results from the Communication Strategy

**Table 1: Stakeholders and Communication Needs for Developing the Revised NBSAP**

<b>STAKEHOLDER ANALYSIS AND MAPPING</b>				
<b>Stakeholders</b>	<b>Influence Rating (L,M,H)</b>	<b>Interest Rating (L,M,H)</b>	<b>Level of Engagement</b>	<b>Communication Needs</b>
<b><i>Government Institutions / Policy Makers</i></b>				<b><i>Primary Target Audience</i></b>
Ministry of Economic Growth and Job Creation <ul style="list-style-type: none"> <li>• Climate Change Division</li> <li>• Environment &amp; Risk Management Division</li> <li>• Water</li> <li>• Housing</li> <li>• Forestry Department</li> <li>• National Environment and Planning Agency (NEPA)</li> </ul>	High	High	Consult, Involve, Collaborate	Awareness – messages to inform stakeholder on activities  Two-way consultation to inform gap analysis and developing of targets – meeting, stakeholder workshop
Ministry of Industry, Commerce, Agriculture and Fisheries <ul style="list-style-type: none"> <li>• Plant Quarantine Produce Inspection Branch</li> <li>• Veterinary Services</li> <li>• Rural Agricultural Development Authority</li> <li>• Fisheries Division</li> <li>• Agricultural Land &amp; Management</li> <li>• Research &amp; Development</li> </ul>	High	High	Consult, Involve, Collaborate	Awareness – messages to inform stakeholder on activities  Two-way consultation to inform gap analysis and developing of targets – meeting  Stakeholder workshop
Jamaica Customs Agency	Medium	Medium	Consult, Involve	Awareness – messages to inform stakeholder on activities
Ministry of Science, Energy and Technology <ul style="list-style-type: none"> <li>• Scientific Research Council</li> <li>• Mining</li> </ul>	High	High	Consult, Involve, Collaborate	Two-way consultation to inform gap analysis and developing of targets – meeting
Ministry of Education, Youth and Information	Medium	Medium	Consult, Involve	Stakeholder workshop
Ministry of Foreign Affairs and Foreign Trade	Medium	Medium	Consult, Involve	
Ministry of Health	High	High	Consult, Involve	
Ministry of Tourism	High	High	Consult, Involve	
Ministry of Local Government and Community Development <ul style="list-style-type: none"> <li>• Parish Councils</li> </ul>	High	High	Consult, Involve, Collaborate	Awareness - messages to inform stakeholder on activities

STAKEHOLDER ANALYSIS AND MAPPING				
Stakeholders	Influence Rating (L,M,H)	Interest Rating (L,M,H)	Level of Engagement	Communication Needs
				Two-way consultation to inform gap analysis and developing of targets Stakeholder workshop
Ministry of National Security	Low	Low	Consult, Involve	Awareness - messages to inform stakeholder on activities
Attorney General's Office	High	Low	Consult, Involve	
Ministry of Finance and the Public Service	High	Low	Consult, Involve	Two-way consultation to inform gap analysis and developing of targets – meetings, Stakeholder workshop
Planning Institute of Jamaica	High	High	Consult, Involve	
<b>Academic Institutions</b>				<b>Secondary Target Audience</b>
College of Agriculture, Science and Education	Medium	High	Consult, Involve	Awareness – messages to inform stakeholder on activities
Jamaica Maritime Institute	Medium	Medium	Consult, Involve	
Northern Caribbean University	Medium	High	Consult, Involve	Two-way consultation at stakeholder workshop
University of the West Indies	High	High	Consult, Involve	
University of Technology	High	High	Consult, Involve	
Centre for Environment and Development	Medium	High	Consult, Involve	Awareness – messages to inform stakeholder on activities
Centre for Marine Sciences	High	High	Consult, Involve	
Discovery Bay Marine Lab	High	High	Consult, Involve	Two-way consultation to inform gap analysis and developing of targets – meetings, stakeholder workshop
Port Royal Marine Laboratory & Biodiversity Centre	High	High	Consult, Involve	
<b>Environmental NGOs</b>				<b>Primary Target Audience</b>
Caribbean Coastal Area Management Foundation (C-CAM)	High	High	Consult, Involve, Collaborate	Awareness – messages to inform stakeholder on activities
Protect the Environment Trust (PET)	High	High	Consult, Involve	
Jamaica Environment Trust (JET)	High	High	Consult, Involve	Two-way consultation to inform gap analysis and attaining of targets – meeting
Environmental Foundation of Jamaica (EFJ)	High	High	Consult, Involve	
Jamaica Recyclers	Medium	Medium	Consult, Involve	Stakeholder workshop
Negril Coral Reef Preservation Society (NCRPS)	High	High	Consult, Involve, Collaborate	



STAKEHOLDER ANALYSIS AND MAPPING				
Stakeholders	Influence Rating (L,M,H)	Interest Rating (L,M,H)	Level of Engagement	Communication Needs
Montego Bay Marine Park Trust (MBMPT)	High	High	Consult, Involve	
Negril Environmental Protection Trust (NEPT)	High	High	Consult, Involve, Collaborate	
Southern Trelawny Environmental Agency (STEA)	High	High	Consult, Involve	
CARIBSAVE (INTASAVE Caribbean)	High	High	Consult, Involve	
Windsor Research Centre	High	High	Consult, Involve, Collaborate, Empower	
The Nature Conservancy	High	High	Consult, Involve, Collaborate	
<b>Private Sector Institutions</b>				
Jamaica Developers Association Ltd.	High	Medium	Consult, Involve	Awareness – messages to inform stakeholder of activities
Jamaica Institute of Architects	High	High	Consult, Involve	
Land Surveyors Association of Jamaica	Medium	Low	Consult, Involve	Two-way consultation to inform gap analysis and attaining of targets – meeting
Jamaica Institute of Engineers	High	High	Consult, Involve	
Jamaica Institute of Environmental Professionals	High	High	Consult, Involve	Stakeholder workshop
Incorporated Master Builders Association of Jamaica	High	Low	Consult, Involve	
Jamaica Exporters' Association	High	Medium	Consult, Involve	
Competitiveness Project	High	Medium	Consult, Involve	

**Table 2: Stakeholders and Communication Needs Implementing the NBSAP**

STAKEHOLDER ANALYSIS AND MAPPING				
Stakeholders	Influence Rating (L,M,H)	Interest Rating (L,M,H)	Level of Engagement	Communication Needs
<b>Government Institutions / Policy Makers</b>				<b>Primary Target Audience</b>
Ministry of Economic Growth and Job Creation <ul style="list-style-type: none"> <li>• Climate Change Division</li> <li>• Environment and Risk Management Division</li> <li>• Water Resources Authority</li> <li>• Housing</li> <li>• Forestry Department</li> <li>• NEPA</li> <li>• Urban Development Corporation (UDC)</li> </ul>	High	High	Consult, Involve, Collaborate, Empower	Biodiversity mainstreaming through the government plans, policies  Implementation of relevant aspects of the Action Plan  Knowledge sharing through Clearing House Mechanism
Ministry of Industry, Commerce, Agriculture and Fisheries <ul style="list-style-type: none"> <li>• Plant Quarantine Produce Inspection Branch</li> <li>• Veterinary Services</li> <li>• Rural Agricultural Development Authority</li> <li>• Fisheries Division</li> <li>• Agricultural Land &amp; Management</li> <li>• Research &amp; Development</li> <li>• Consumer Affairs Commission</li> <li>• JAMPRO Trade and Investment Jamaica</li> </ul>	High	High	Consult, Involve, Collaborate, Empower	Biodiversity mainstreaming through the government plans, policies  Implementation of relevant aspects of the Action Plan  Knowledge sharing through Clearing House Mechanism
Jamaica Customs Agency	Medium	Medium	Consult, Involve	Biodiversity mainstreaming through the government plans, policies
Ministry of Science, Energy and Technology <ul style="list-style-type: none"> <li>• Scientific Research Council</li> <li>• Mining</li> <li>• National Commission on Science and Technology (NCST) (Operate under Office of Prime Minister)</li> </ul>	High	Medium	Consult, Involve, Collaborate, Empower	Implementation of relevant aspects of the Action Plan  Knowledge sharing through Clearing House Mechanism
Ministry of Education, Youth and Information <ul style="list-style-type: none"> <li>• National Commission on Science and Technology</li> </ul>	Medium	Medium	Consult, Involve	

STAKEHOLDER ANALYSIS AND MAPPING				
Stakeholders	Influence Rating (L,M,H)	Interest Rating (L,M,H)	Level of Engagement	Communication Needs
Ministry of Culture, Gender, Entertainment and Sport <ul style="list-style-type: none"> <li>Institute of Jamaica: Natural History Museum of Jamaica &amp; African Caribbean Institute of Jamaica (ACIJ)</li> <li>Jamaica National Heritage Trust</li> </ul>	Medium	Medium	Consult, Involve	
Ministry of Foreign Affairs and Foreign Trade	Medium	Medium	Consult, Involve	
Ministry of Health	High	High	Consult, Involve	
Ministry of Tourism	High	High	Consult, Involve, Empower	
Ministry of Local Government and Community Development <ul style="list-style-type: none"> <li>Parish Councils</li> </ul>	High	High	Consult, Involve, Collaborate, Empower	Biodiversity mainstreaming through the government plans, policies  Implementation of relevant aspects of the Action Plan  Knowledge sharing through Clearing House Mechanism
Ministry of National Security	Low	Low	Consult, Involve	Biodiversity mainstreaming through the government plans, policies  Knowledge sharing through Clearing House Mechanism
Attorney General's Office	High	Low	Consult, Involve, Empower	Biodiversity mainstreaming through the government plans, policies
Ministry of Finance and Public Service	High	Low	Consult, Involve, Empower	Implementation of relevant aspects of the Action Plan
Planning Institute of Jamaica	High	High	Consult, Involve, Empower	Knowledge sharing through Clearing House Mechanism
<b>Academic Institutions</b>				<b>Secondary Target Audience</b>
College of Agriculture, Science and Education	Medium	High	Consult, Involve	Knowledge sharing Clearing House Mechanism
Jamaica Maritime Institute	Medium	Medium	Consult, Involve	
Northern Caribbean University	Medium	High	Consult, Involve	
Management Institute for National Development (MIND)	Medium	High	Consult, Involve, Empower	

STAKEHOLDER ANALYSIS AND MAPPING				
Stakeholders	Influence Rating (L,M,H)	Interest Rating (L,M,H)	Level of Engagement	Communication Needs
University of the West Indies <ul style="list-style-type: none"> <li>• Centre for Environment and Development</li> <li>• Centre for Marine Sciences</li> <li>• Discovery Bay Marine Lab</li> <li>• Port Royal Marine Laboratory &amp; Biodiversity Centre</li> </ul>	High	High	Consult, Involve	Knowledge sharing Clearing House Mechanism  Implementation of relevant aspects of the Action Plan
<b>Environmental NGOs</b>				<b>Primary Target Audience</b>
Caribbean Coastal Area Management Foundation (C-CAM)	High	High	Consult, Involve, Collaborate, Empower	Implementation of relevant aspects of the Action Plan  Awareness of the issues impacting biodiversity and conflicting activities  Consensus building and change management  Knowledge sharing Clearing House Mechanism
Protect the Environment Trust (PET)	High	High	Consult, Involve	
Jamaica Environment Trust (JET)	High	High	Consult, Involve	
Jamaica Recyclers	Medium	Medium	Consult, Involve	
Negril Coral Reef Preservation Society (NCRPS)	High	High	Consult, Involve, Collaborate, Empower	
Jamaica Conservation and Development Trust	High	High	Consult, Involve, Collaborate	
Bluefields Bay Fisherman's Friendly Society	High	High	Consult, Involve, Collaborate, Empower	
Oracabessa Foundation	High	High	Consult, Involve, Collaborate	
Montego Bay Marine Park Trust (MBMPT)	High	High	Consult, Involve, Empower	
Sandals Foundation	High	High	Consult, Involve, Collaborate	
Negril Environmental Protection Trust (NEPT)	High	High	Consult, Involve, Collaborate, Empower	
Southern Trelawny Environmental Agency (STEA)	High	High	Consult, Involve, Empower	

STAKEHOLDER ANALYSIS AND MAPPING				
Stakeholders	Influence Rating (L,M,H)	Interest Rating (L,M,H)	Level of Engagement	Communication Needs
Windsor Research Centre	High	High	Consult, Involve, Collaborate, Empower	
The Nature Conservancy	High	High	Consult, Involve, Collaborate	
<b>Private Sector Institutions</b>				<b>Secondary Target Audience</b>
Jamaica Developers Association Ltd.	Medium	Low	Consult, Involve	Awareness of the issues impacting biodiversity and conflicting building practices  Consensus building and change management  Knowledge sharing Clearing House Mechanism
Jamaica Institute of Architects	Medium	Low	Consult, Involve	
Land Surveyors Association of Jamaica	Medium	Low	Consult, Involve	
Jamaica Manufacturers' Association	Medium	Low	Consult, Involve	
Jamaica Institute of Engineers	Medium	Low	Consult, Involve	
Jamaica Hotel and Tourist Association	Medium	Low	Consult, Involve	
Jamaica Institute of Environmental Professionals	Medium	Low	Consult, Involve	
Incorporated Master Builders Association of Jamaica	Medium	Low	Consult, Involve	
Jamaica Exporters' Association	Medium	Low	Consult, Involve	
Competitiveness Project	Medium	Low	Consult, Involve	
<b>Media Houses</b>				<b>Secondary Audience</b>
1834 Investments Limited (formerly The Gleaner Company Limited)	Medium	Medium	Monitor, Inform	To inform message for awareness
The Jamaica Observer	Medium	Medium	Monitor, Inform	To inform message for awareness
Radio Stations of Choice (e.g., Nationwide, Irie FM, Fame)	Medium	Medium	Monitor, Inform	To inform message for awareness
Television (TVJ/CVM)	Medium	Medium	Monitor, Inform	To inform message for awareness
<b>Community-Based Organisations</b>				<b>Primary Audience</b>
Farming-related Groups and Friendly Societies	Low	High	Involve, Collaborate, Empower	Can be targeted through RADA extension officers  Awareness of the issues impacting biodiversity and conflicting farmer practices  Consensus building and change management

STAKEHOLDER ANALYSIS AND MAPPING				
Stakeholders	Influence Rating (L,M,H)	Interest Rating (L,M,H)	Level of Engagement	Communication Needs
Fisherfolk Groups and Friendly Societies and Co-operatives	Low	High	Involve, Collaborate, Empower	Can be targeted through Fisheries Division – fishing beach meetings  Awareness of the issues impacting biodiversity and conflicting fishing practices  Consensus building and change management
Wood cutters and coal burners	Low	High	Involve, Collaborate, Empower	Can be targeted through Forestry Department  Awareness of the issues impacting biodiversity and conflicting practices  Consensus building and change management
Local Forest Management Committees	Low	High	Involve, Collaborate, Empower	Can be targeted through Forestry Department  Awareness of the issues impacting biodiversity and conflicting practices  Consensus building and change management
<b>General Public</b>				<b>Secondary Target Audience</b>
General public	Low	Low	Inform	Awareness of biodiversity concepts, its importance and ways we impact biodiversity conservation
<b>Donor Agencies</b>				<b>Primary Audience</b>
Global Environment Facility (GEF)	High	High	Involve, Collaborate	Gain buy-in to assist with funding awareness activities
Caribbean Biodiversity Fund	High	High	Involve, Collaborate	Gain buy-in to assist with funding awareness activities
Environmental Foundation of Jamaica (EFJ)	High	High	Consult, Involve	Gain buy-in to assist with funding awareness activities
Others <sup>44</sup>	High	High	Involve, Collaborate	Gain buy-in to assist with funding awareness activities

<sup>44</sup> To be identified

## Glossary

**Acceptance** The instruments of "acceptance" or "approval" of a treaty have the same legal effect as ratification and consequently express the consent of a state to be bound by a treaty. In the practice of certain states acceptance and approval have been used instead of ratification when, at a national level, constitutional law does not require the treaty to be ratified by the head of state. (Arts.2 (1) (b) and 14 (2), Vienna Convention on the Law of Treaties 1969)

**Accession** is the act whereby a state accepts the offer or the opportunity to become a party to a treaty already negotiated and signed by other states. It has the same legal effect as ratification. Accession usually occurs after the treaty has entered into force. (Arts.2 (1) (b) and 15, Vienna Convention on the Law of Treaties 1969)

**Biological diversity (Biodiversity)** means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (Convention on Biological Diversity [CBD]).

**Biological resources** include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity (CBD).

**Biosafety** is concerned with the need to protect the environment and human health from the possible adverse effects of the products of modern biotechnology (Jamaica Biosafety Clearing House [BCH])

**Biotechnology** means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use (CBD).

**Ecosystem** means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit (CBD).

**Endemic** refers to species or subspecies that are restricted in occurrence to a specified region or locality and do not occur naturally in any other region. (NEPA)

**Ex-situ conservation** means the conservation of components of biological diversity outside their natural habitats (CBD).

**Gender** is a concept that refers to the social differences (as opposed to the biological ones) between women and men that change over time and which vary widely both within and between cultures.

**Gender mainstreaming** is the systematic integration of the respective needs, interests and priorities of men and women in all the organisation's policies and activities. This rejects the idea that gender is a separate issue and something to be tacked on as an afterthought.

**Gender balance** means having the same (or a sufficient) number of women and men at all levels within the organization to ensure equal representation and participation in all areas of activity and interest.

**Gender analysis** is the study of the differences in the conditions, needs, participation rates, access to resources and development, control of assets, decision-making powers, etc., between women and men in their assigned gender roles.

**Genetic resources** refer to genetic material of actual or potential value (CBD).

**Greenhouse Gases (GHGs)** atmospheric gases responsible for causing global warming and climate change. The major GHGs are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Less prevalent --but very powerful

-- greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). (UNFCCC)

**Habitat** means the place or type of site where an organism or population naturally occurs (CBD).

**Indigenous** refers to species that, while occurring naturally in a particular region, may be found to occur naturally elsewhere. (NEPA).

**In-situ conservation** means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties (CBD).

**Introduced species** are those that have been brought into the island through the direct or indirect influence of man. This group includes all domestic animals and species such as the mongoose, breadfruit and tilapia. (NEPA)

**Invasive alien species** An alien species whose introduction and/or spread threaten biological diversity (For the purposes of the present guiding principles, the term "invasive alien species" shall be deemed the same as "alien invasive species" (CBD).

**Living modified organism** means any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology (CBD). May also be referred to as Genetically Modified Organisms. (Jamaica Biosafety Clearing-House).

**Living organism** means any biological entity capable of transferring or replicating genetic material, including sterile organisms, viruses and viroids (CBD).

**Lotic** refers to fast renewal of the water supply as in rivers and streams. Basically the water is in constant movement. **Lentic** refers to **ecosystems** where water is trapped in some ground depression like lakes, ponds, marshes, etc.

**Main-stem** (hydrology) is the principal watercourse in a riverine drainage system with multiple named streams (Wikipedia)

**Mainstreaming biodiversity** refers to the integration of the conservation and sustainable use of biodiversity in both cross-sectoral plans, such as, sustainable development, poverty reduction, climate change adaptation/mitigation, trade and international cooperation, and sector-specific plans, such as those developed for agriculture, fisheries, forestry, mining, energy, tourism, transport and others. It also refers to changes in development models, strategies and paradigms accordingly (CBD).

**Native** species are those that occur naturally within a certain region and they may be endemic or indigenous. (NEPA).

**Protected area** means a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives (CBD).

**Ratification** means the international act whereby a state indicates its consent to be bound to a treaty if the parties intended to show their consent by such an act. The institution of ratification grants states the necessary time-frame to seek the required approval for the treaty on the domestic level and to enact the necessary legislation to give domestic effect to that treaty. (Arts.2 (1) (b), 14 (1) and 16, Vienna Convention on the Law of Treaties 1969)

**Signature (of a treaty):** Where the signature is subject to ratification, acceptance or approval, the signature does not establish the consent to be bound. However, it is a means of authentication and expresses the willingness of the signatory state to continue the treaty-making process. The signature qualifies the signatory state to proceed



to ratification, acceptance or approval. It also creates an obligation to refrain, in good faith, from acts that would defeat the object and the purpose of the treaty. (Arts.10 and 18, Vienna Convention on the Law of Treaties 1969)

**Sustainable use** means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (CBD).

**Traditional Knowledge** refers to the content or substance of knowledge that is the result of intellectual activity and insight in a traditional context, and includes the know-how, skills, innovations, practices and learning that form part of traditional knowledge systems, and knowledge that is embodied in the traditional lifestyle of a community or people, or is contained in codified knowledge systems passed between generations. It is not limited to any specific technical field, and may include agricultural, environmental and medicinal knowledge, and knowledge associated with genetic resources. (World Intellectual Property Organization's Working Definition).

