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# 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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Cover Photos (clockwise) are: A view of the Cockpit Country, Trelawny; an Orchid ; Jamaican Tody, *Todus todus*; A Jamaican market scene; A section of the Black River Morass, St. Elizabeth

## Table of Contents

Table of Contents .....	i
Foreword.....	vi
Acknowledgements.....	vii
List of Acronyms .....	viii
Executive Summary .....	xii
PART I – INTRODUCTION.....	1
1 Introduction.....	2
1.1 The People of Jamaica - Land of Wood and Water.....	2
1.1.1 People and Culture .....	2
1.1.2 History of Jamaica.....	3
1.2 Contextual Background.....	3
1.2.1 Jamaica and the Convention on Biological Diversity (CBD).....	3
1.2.2 Progress in implementing the 2003 NBSAP .....	4
1.3 Methodology to develop the updated NBSAP .....	7
PART II – SITUATIONAL ANALYSIS ON JAMAICA’S BIODIVERSITY .....	8
2 Summary Policy and Legal Framework Governing Biodiversity .....	9
2.1 Legislation Governing Biodiversity .....	9
2.1.1 The Natural Resources Conservation Authority Act, 1991 .....	9
2.1.2 The Wild Life Protection Act, 1945 .....	10
2.1.3 The Watershed Protection Act, 1965 (updated 1991) .....	10
2.1.4 The Beach Control Act, 1956 .....	10
2.1.5 The Forest Act, 1996 .....	11
2.1.6 The Fishing Industry Act, 1975 .....	11
2.1.7 Endangered Species (Protection, Conservation and Regulation of Trade) Act, 2000.....	12
2.1.8 The Protection of Plant Genetic Resources for Food and Agriculture Act, 2013 .....	12
2.1.9 Water Resources Authority Act, 1995.....	12
2.1.10 Other Legislation Relating to Biodiversity.....	12
2.2 The Jamaican Constitution .....	14

2.2.1	Convention on Biological Diversity .....	14
2.3	International Agreements .....	14
2.4	National Policies, Plans and Strategies .....	14
2.4.1	The Jamaica National Environmental Action Plan .....	15
2.4.2	Jamaica National Industrial Policy (1996) .....	15
2.4.3	Jamaica National Land Use Policy (1996) .....	15
2.4.4	Policy for Jamaica's System of Protected Areas (1997) .....	15
2.4.5	The National Physical Plan (1978) .....	18
2.4.6	Management and Recovery Plans for Endangered Species.....	18
2.4.7	The Protected Area System Master Plan (PASMP), 2015 .....	18
2.4.8	The Forestry Policy (Green Paper), 2015.....	19
2.4.9	The Orchid Policy .....	19
2.4.10	Sustainable Financing Plan for Jamaica's System of Protected Areas.....	19
2.4.11	The Draft Watersheds Policy, 2015.....	19
2.4.12	Biosafety Policy.....	20
2.4.13	Others.....	20
2.5	Future Initiatives .....	20
2.5.1	Traditional knowledge.....	20
2.5.2	Other Policies, Strategies, Guidelines and Plans .....	20
3	Situational Analysis of Jamaica's Biodiversity .....	21
3.1	Biodiversity and its Value .....	21
3.2	Status and Trends of Biodiversity .....	21
3.2.1	Terrestrial Biodiversity .....	22
3.2.2	Coastal and Marine Biodiversity .....	28
3.3	Threats to Biodiversity .....	34
3.3.1	Habitat Degradation .....	34
3.3.2	Overexploitation.....	35
3.3.3	Invasive Alien Species.....	36
3.3.4	Pollution .....	37
3.3.5	Climate Change .....	38
3.3.6	Biosafety .....	40

3.4	Summary of Conservation Issues.....	42
3.4.1	Status of Endangered/Threatened Species .....	42
3.4.2	Protected Areas .....	43
PART III – ASSESSMENT .....		46
4	Gaps and Challenges Affecting the Conservation and Sustainable Use of Jamaica's Biodiversity .....	47
4.1	Drivers of Pressures on Biodiversity .....	47
4.1.1	Socio-economic Factors.....	47
4.1.2	Economic Assessment of the Value of Biodiversity.....	49
4.2	Gender .....	50
4.3	Public Awareness, Education, and Community Responsibility and Empowerment .....	51
4.4	Enhancing the Legislative Framework for Biodiversity.....	52
4.5	Land Use Planning and Environmental Impact Assessments.....	54
4.6	Agricultural Sustainability.....	54
4.7	Mining and Quarrying .....	55
4.8	Tourism .....	56
4.9	National Security and Justice .....	57
4.10	Access to Genetic Resources and Fair and Equitable Sharing of Benefits and Traditional Knowledge.....	57
4.11	Summary of Progress towards Achieving Aichi Targets .....	59
PART IV – THE BIODIVERSITY STRATEGY AND IMPLEMENTATION PLAN .....		72
Vision.....		73
Goals.....		73
Guiding Principles .....		73
5	National Biodiversity Targets and Indicators.....	73
5.1	National Targets and Indicators .....	74
6	Mainstreaming National Biodiversity Strategy .....	99
6.1	Incorporating Biodiversity into Jamaica's Sustainable Development Plans .....	99
6.2	Incorporating Biodiversity into Jamaica's Poverty Reduction Plans .....	101
6.3	Incorporating Gender into Biodiversity Activities as a Cross-cutting Strategy.....	101
6.4	Incorporating Biodiversity into Climate Change and Disaster Risk Reduction Plans ..	102

6.5	Mainstreaming Biodiversity into Production Sectors.....	103
6.5.1	Mainstreaming Biodiversity into the Forestry Sector in Jamaica .....	103
6.5.2	Mainstreaming Biodiversity into the Fisheries Sector.....	104
6.5.3	Mainstreaming Biodiversity into the Mining Sector .....	106
6.5.4	Mainstreaming Biodiversity into the Tourism Sector.....	107
6.5.5	Mainstreaming Biodiversity into the Agriculture Sector.....	107
6.6	Using other Tools and Cross-sectoral Strategies for Mainstreaming Biodiversity in Jamaica.....	108
6.6.1	Biodiversity Awareness .....	108
6.6.2	Integrating Biodiversity into the Legal Framework Specific to Sectors.....	109
6.6.3	Using EIAs and SEAs to Mainstream Biodiversity in Jamaica.....	109
6.6.4	Using Financial Strategies and Tools.....	109
7	Resource Mobilization Strategy .....	110
7.1	Relevant Project Reports .....	111
7.2	Operationalize the National Conservation Trust Fund of Jamaica.....	112
7.3	Other Mechanisms .....	113
8	Biodiversity Implementation Plan.....	115
9	Monitoring and Evaluation Plan for Achieving National Targets.....	132
	References.....	139
	Appendices.....	145
	Appendix I – Alignments of the NBSAP with the Vision 2030 and the Priority Sector Strategies .....	145
	Appendix II – Complete List of Stakeholders.....	147
	Glossary.....	152

## **List of Figures**

Figure 3.1: Status of Jamaican Watersheds (Source: State of the Environment Report, 2010) .....	27
Figure 3.2: Location of Coral Reefs, Seagrass Beds and Mangroves in Jamaica.....	31
Figure 3.3: Average Coral Cover for 2007 – 2013 (Source, Fifth National Report, 2015).....	32
Figure 3.4: Examples of Overexploited Species in Jamaica (NEPA, 2015) .....	36

Figure 3.5: Legally Declared Protected Areas in Jamaica (source: State of the Environment Report, 2010) ..... 44

Figure 4.1: End of Year Population for Jamaica (Source: STATIN, 2016)..... 47

## **List of Tables**

Table 2.1: Other biodiversity related legislation ..... 13

Table 2.2: Relevant International Agreements ..... 16

Table 3.1: Species Diversity in Jamaica..... 22

Table 3.2: Land area reforested and deforested in Jamaica in hectares (2006-2013) ..... 25

Table 3.3: Estimates of Marine Species in Jamaican Shallow, Shelf, or Shore Waters (Source: State of the Environment Report, 2010) ..... 29

Table 3.4: Change in Wetland Areas in Six Parishes (Source: Statement of the Environment Report, 2010) ..... 33

Table 3.5: Impacts of Climate Change on Biodiversity..... 39

Table 3.6: Alliance for Zero Extinction Species and Sites ..... 42

Table 3.7: Types of Protected areas in Jamaica and their respective numbers as of 2010..... 43

Table 4.1: Policy and Legislative Gaps and Needs ..... 52

Table 4.2: Summary of Jamaica's Progress towards Achieving the Aichi Targets..... 61

Table 5.1: National Biodiversity Targets and Indicators..... 75

Table 6.1: National Outcomes 13 to 15 and related National Strategies (Source: PIOJ, 2009)..... 100

Table 8.1: National Biodiversity Implementation Plan ..... 116

Table 9.1: Monitoring Plan for Achieving the National Targets..... 133

## Foreword

Jamaica is a small island developing state and one of 12 independent nations and several British, Dutch, French and U.S. overseas territories in the Caribbean Islands Hotspot (Birdlife International, 2009). Jamaica supports exceptionally diverse ecosystems, ranging from montane cloud forests to cactus scrublands (ibid). The diversity of the biological environment is important to all for the various services. It provides: 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, the Blue Mountain forest ecosystem and the John Crow Mountain forest ecosystem.

Jamaica is considered to have a high natural diversity as well as cultural and socioeconomic diversity, which includes a history of indigenous American, African, Spanish and Asian cultures..

Biodiversity is not generally considered priority by the average Jamaican citizen. It is therefore important to expand the understanding of the link between ecosystem services and sustainable economic and social development.

Population growth and increasing urbanization are two of the largest sources of environmental pressures in Jamaica. Adequate land use planning is therefore key to environmental and biodiversity protection in and around urban and industrialized areas.

Jamaica became a party to the CBD in 1995, and began the thrust to implement the stipulations. In 2003, Jamaica completed the development of the first NBSAP in accordance with Article 6 of the CBD. This updated NBSAP 2016-2021 document reinforces the need to have adequate tools and personnel to improve planning and management. In summary, this NBSAP 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 by the Jamaican Government, and the engagement of civil society. If the Action Plans within this NBSAP are promoted as suggested, significant enhancement on the effectiveness of biodiversity protection in Jamaica is expected.

## 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 the many stakeholders. The funds to support the update of the NBSAP document were provided by the Global Environment Facility (GEF) through the executing entity 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, to not only share their knowledge and experience, but also to assist in providing insight to the various topics and sectors. Without their invaluable input, compilation of this report would not have been possible.

Special thanks to the project 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, 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 all the names of 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

ABNJ	Areas Beyond National Jurisdiction
ABS	Access and Benefit Sharing
ADRM	Agricultural Disaster Risk Management
AMANDA	Application Management and Data Automation
AnGR	Animal Genetic Resources
APCAR	Action Plan for Corals and Reefs
BCH	Biosafety Clearing House
BGA	Bureau of Gender Affairs
BJMNP	Blue and John Crow Mountains National Park
BMP	Biodiversity Management Plan
BSE	Bovine Spongiform Encephalopathy
CBD	Convention on Biological Diversity
CBO	Community-Based Organizations
CC	Climate Change
CCA	Climate Change Adaptation
C-CAM	Caribbean Coastal Area Management Foundation
CCD	Climate Change Division
CEATA	Centre of Excellence for Advanced Technology in Agriculture
CH <sub>4</sub>	Methane Gas
CHM	Clearing House Mechanism
CITES	Convention on International Trade in Endangered Species
COP	Conference of the Parties
CRHI	Coral Reef Health Index
CRIMP	Centre for Research on Introduced Marine Species
DARP	Degraded Area Recovery Plans
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ENACT	Environmental Action
ESL	Environmental Solutions Limited
ESV	Ecosystem Service Valuation
EU	European Union
FAO	Food and Agriculture Organization
FD	Forestry Department
FFS	Farmer Field School
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GEF	Global Environment Facility

GHG	Green House Gases
GIS	Geographic Information System
GMP	Good Manufacturing Practices
GOJ	Government of Jamaica
GPS	Global Positioning System
HACCP	Hazard Analysis and Critical Control Point
IAS	Invasive Alien Species
IMO	International Maritime Organization
IMP	Integrated Pest Management
IOJ	Institute of Jamaica
IUCN	International Union for Conservation of Nature
JBI	Jamaica Bauxite Institute
JCDT	Jamaica Conservation and Development Trust
JCF	Jamaica Constabulary Force
JDF	Jamaica Defense Force
JET	Jamaica Environment Trust
JHTA	Jamaica Hotel and Tourist Association
JIOP	Jamaica Institute of Planning
JIPO	Jamaica Intellectual Property Office
JIS	Jamaica Information Service
JNHT	Jamaica National Heritage Trust
JSIF	Jamaica Social Investment Fund
KAP	Knowledge Attitudes and Practices
KHEMP	Kingston Harbour Environmental Management Programme
KMA	Kingston Metropolitan Area
KP	Kyoto Protocol
LANDSTAT	Land Satellite
LFMC	Local Forest Management Committee
LICJ	Land Information Council of Jamaica
LMO	Living Modified Organisms
LR	Legal Reserve
LSDP	Local Sustainable Development Plans
MET	Meteorological
MEGJC	Ministry of Economic Growth and Job Creation
MGD	Mines and Geology Division
MOAF	Ministry of Agriculture and Fisheries
MOU	Memorandum of Understanding
MTF	Medium Term Socio-Economic Policy Framework
MTIASIC	Mitigating the Threat of Invasive Alien Species within the Insular Caribbean
MTSEF	Medium Term Socio-Economic Framework
NBSAP	National Biodiversity Strategy and Action Plan

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
NPGE	National Policy for Gender Equality
NRCA	Natural Resources Conservation Authority
NRV	Natural Resource Valuation
NSDMD	National Spatial Data Management Division
ODPEM	Office of Disaster Preparedness and Emergency Management
PAH	Poly Aromatic Hydrocarbons
PAS	Protected Areas System
PASMP	Protected Areas System Master Plan
PES	Payments for Environmental Services
PGRA	Plant Genetic Resources Act
PIOJ	Planning Institute of Jamaica
PMAB	Pollution Monitoring and Assessment Branch
POPs	Persistent Organic Pollutants
PPA	Permanent Protection/Preservation Area
PPCR	Pilot Programme for Climate Resilience
RADA	Rural Agricultural Development Agency
RAMSAR Habitats	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
SMU	Squatter Management Unit
SPAW	Specially Protected Areas and Wildlife
STATIN	Statistical Institute of Jamaica
TEEB	The Economics of Ecosystems and Biodiversity
TEF	Tourism Enhancement Fund
TESI	Tourism Environmental Stewardship Initiative
TMP	Tourism Master Plan
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
UWI	University of the West Indies
WAMM	Watershed Area Management Mechanism
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WIDECAST	Wider Caribbean Sea Turtle Conservation Network
WMU	Watershed Management Unit
WRA	Water Resources Authority
WRC	Windsor Research Centre
WROC	Women's Resource and Outreach Centre

## Executive Summary

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 by 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 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.

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 updated NBSAP presents several activities to achieve the Aichi Targets which have been prioritized based on consultations and professional judgement of the technical team that prepared the strategy and action plan. 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 regards 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 four parts:

- **Part I** presents the contextual background.
- **Part II** outlines the situational analysis of Jamaica's biodiversity and arising challenges.
- **Part III** presents the results of both the gap analysis and the organizational capacity assessment.

- **Part IV** presents the Strategy and Implementation Plan which includes the National Biodiversity Targets and indicators and the supporting Monitoring Plan that determines Jamaica's performance on 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 was 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. 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 as follows:

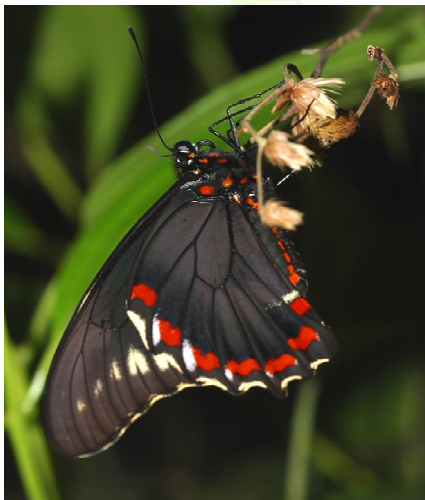
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<b>National Targets</b>
<b>STRATEGIC GOAL A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society</b>
1. By 2021, Jamaicans are aware of the values of biodiversity and the steps they can take 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 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.
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, 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

---



# 1 Introduction

Biological diversity also referred to as biodiversity, is defined as 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).

The physical, social and biological setting of Jamaica influences its biodiversity. Jamaica is a small island developing state with a diversity of species and ecosystems. The Convention on Biological Diversity (CBD) directly addresses this issue using a top-down approach, from the overarching international body, to the national strategies and actions of each member country. This document represents Jamaica's Updated National Strategy and Action Plan for Biodiversity Diversity in Jamaica (NBSAP) for 2016 to 2021.

The purpose of the NBSAP 2016-2021 is to update the 2003 NBSAP based on the gaps identified and to incorporate CBD's Aichi Targets. The report presents a summary of Jamaica's Biodiversity, the Gap Analysis and Action Plan to address national biodiversity concerns so that biodiversity conservation can be effectively mainstreamed in Jamaica in accordance with Articles 6 (b) of the Convention on Biological Diversity (CBD) under the various environmental and socio-economic sectors.

The report is presented in four parts; Part I of the document provides the contextual background for development of the NBSAP, speaking to provisions of selected Articles of the Convention (Articles 1 and 6) the Strategic Plan of 2010 and key international protocols. Part II presents the situational analysis of Jamaica's biodiversity and arising challenges, Part III presents the results of both the gap analysis and the organizational capacity assessment, Part IV presents the Strategy and Implementation Plan which includes the National Biodiversity Targets and indicators and the supporting Monitoring Plan for achieving the national targets.

## 1.1 The People of Jamaica - Land of Wood and Water

Jamaica is the third largest island in the Caribbean, with a land area of 10,981 sq. km<sup>1</sup>. Located at 17°22' North latitude and 77° 30' West longitude, the island lies 145 km south of Cuba and 161 km west of the island of Hispaniola.

### 1.1.1 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, live in western and eastern Jamaica. They, along with other Jamaicans, possess 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 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.

### 1.1.2 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 has impacted significantly on marine and coastal resources.

At the end of 1998, the population of Jamaica was estimated at 2,576,300. An increasing percentage of the population lives in urban areas (Map 2). 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 represents the main population centres

## 1.2 Contextual Background

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

Biological diversity is a global asset and it is not only important for present populations, but for future generations. However, due to many anthropogenic activities, the threat to species and ecosystems has increased dramatically. Species are becoming extinct at an alarming rate due to human activities. The need to conserve and protect the resources and diversity has become more than a priority.

The inception of the Convention on Biodiversity (CBD) arose from the understanding that the Earth's biological resources are important to humanity's economic and social development and that these resources are under threat across large proportions of the globe. The CBD was inspired by the world's commitment to sustainable development and there are 168 countries including Jamaica who are signatories to the convention.

In 1992, the Convention on Biological Diversity was opened for signature on 5 June at the United Nations Conference on Environment and Development (the Rio "Earth Summit"), which Jamaica attended. Jamaica became a party to the CBD in 1995, and began the thrust to implement the obligations under the convention. In 1999, Jamaica 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.

National Strategies and Action Plans on Biological Diversity (NBSAPs) are the principal instruments for implementing the Convention at a national level. The Convention requires countries to prepare a national biodiversity strategy and to ensure that the strategy is mainstreamed into all the planning activities of the sectors that have activities which can impact biodiversity. In becoming a Party to the CBD, Jamaica bound itself to implement specific obligations under the Convention. These obligations include, but are not limited to:

1. putting in place measures to develop or maintain the necessary legislative and / or regulatory provisions for the protection of threatened species and populations;
2. take legislative, administrative or policy measures to facilitate access to genetic resources by national legislation.
3. Regulating and managing the collection of biological resources from natural habitats for ex-situ conservation purposes;
4. subject to national legislation, respecting, preserving and maintaining knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity; and
5. introducing, as far as possible, appropriate procedures requiring environmental impact assessments (EIAs) of proposed projects which may have a significant adverse effect on biodiversity and where appropriate, allowing public participation.

There are two protocols to the Convention on Biological Diversity (CBD), namely:

1. The Cartagena Protocol – *The Cartagena Protocol on Biosafety to the Convention on Biological Diversity* is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.

2. The Nagoya Protocol – *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* is an international agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.

In 2001 Jamaica became a signatory to the Cartagena Protocol on Biosafety in 2001 and a party in 2012. Since then it has established its Biosafety Clearing House (BCH), which directly meets the requirements of 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.

In 2003, Jamaica completed the development of the NBSAP in accordance with Article 6 of the CBD. This 2003 NBSAP reviewed the status of biodiversity in Jamaica, determined the reasons for its existing state, and made recommendations to address the shortfalls identified in conserving and protecting biodiversity. Engaging with key stakeholders was a critical factor to this process.

### 1.2.2 Progress in implementing the 2003 NBSAP

The Convention on Biological Diversity's (CBD) Strategic Plan 2011-2020 recognised that at the end of the last strategic period in 2010, there were significant issues, including that the rate of biodiversity loss is still accelerating. In the review of Jamaica's NBSAP 2003, several gaps were recognised in including the fact that gender, climate change, disaster risk reduction, ecosystem services and resource valuation were not integrated. As such, it was crucial for many countries including Jamaica to produce an updated NBSAP document.

To address the fact a number of countries had not achieved the 2010 target of the 2010 CBD strategic plan, a new CBD Strategic Plan was adopted at CoP-10 in 2010 in Nagoya, Japan. The 2010 Plan presented five Strategic Goals and twenty Aichi Targets, which the Government of Jamaica is embracing for the next 5 years starting 2016 and ending 2021. The CBD goals

were recognised to be very relevant in the Jamaican context and there was a consensus from the Jamaican stakeholders that all five strategic goals be embraced by Jamaica. These are as follows:

1. Strategic Goal A – Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
2. Strategic Goal B – Reduce direct pressures on biodiversity loss and promote sustainable use;
3. Strategic Goal C – Improve the status of ecosystems by safeguarding ecosystems, species and genetic diversity;
4. Strategic Goal D – Enhance the benefits to all from biodiversity and ecosystem services; and

5. Strategic Goal E – Enhance the implementation through participatory planning, knowledge management and capacity building.

Since Jamaica completed its first NBSAP in 2003, there have also been several global and national initiatives including the preparation of the Sustainable Development Goals (SDGs), and for Jamaica the Vision 2030 National Development Plan in 2009 along with the supporting Medium Term Framework, which has been recently updated to cover 2015–2018. The documents reflect the current policy direction for Jamaica, which needed to be reflected in a revised NBSAP.

As of 2016, Jamaica has completed five national reports and is looking to ensure that its sixth national report is submitted in the requisite time. This Updated NBSAP takes into account the five strategic goals and twenty Aichi Targets outlined within the CBD's Strategic Plan for 2016-2021.

### Box 1: Aichi Targets

#### Strategic Goal A

*"Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society."*

Targets related to this Strategic Goal include:

- A. Target 1 – By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably;
- B. Target 2 – By 2020, 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;
- C. Target 3 – By 2020, 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 socio- economic conditions;
- D. Target 4 – By 2020, 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.

#### Strategic Goal B

*"Reduce the direct pressures on biodiversity loss and promote sustainable use."*

Targets related to this Strategic Goal include:

- A. Target 5 – By 2020, 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 are significantly reduced;
- B. Target 6 – By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits;
- C. Target 7 – By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity;

- D. Target 8 - By 2020, pollution, including from excess nutrients and solid waste, has been brought to levels that are not detrimental to ecosystem function and biodiversity;
- E. Target 9 – By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment;
- F. Target 10 – By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

#### Strategic Goal C

*"To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity."*

Targets related to this Strategic Goal include:

- A. 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;
- B. Target 12 – By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained;
- C. Target 13 – By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

#### Strategic Goal D

*"Enhance the benefits to all from biodiversity and ecosystem services."*

Targets related to this Strategic Goal include:

- A. Target 14 – By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities and the poor and vulnerable;
- B. Target 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;
- C. Target 16 – By 2015, 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.

#### Strategic Goal E

*"Enhance the implementation through participatory planning, knowledge management and capacity building."*

Targets related to this Strategic Goal include:

- A. 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;
- B. Target 18 – By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels;
- C. Target 19 – By 2020, the knowledge, the science base and technologies relating to biodiversity, its values, functioning, status, and trends, and the consequences of its loss, are improved, widely shared and transferred and applied;
- D. Target 20 – By 2020, 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.

As part of the Fifth National Report process, 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 results of the assessment revealed that Jamaica has made significant progress towards the Aichi Targets thus far though weaknesses exist. Further details are elaborated in in Part II of this document under the gaps and challenges and? a few issues have been highlighted below.

Whilst Jamaica has exceeded the 17% of terrestrial areas protected as stated in Target 11, <2% of marine areas are protected and therefore more effort is needed towards the latter. Additionally, Jamaica has not yet ratified 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 (Target 16). Despite the new Natural Resource Conservation Wastewater Regulations (2013), there are weaknesses in monitoring and enforcement with respect to effluent discharges (Target 8). With respect to traditional knowledge, Jamaica has not legislated or made any plans to legislate the protection of any traditional knowledge, innovations and practices of local communities relevant for the conservation and sustainable use of biodiversity (Target 18). There are also difficulties in mobilising financial resources and the application of natural resource valuation (NRV) methods (Target 20).

### **1.3 Methodology to develop the updated NBSAP**

In order to complete this NBSAP 2016-2021, document review and stakeholder consultations were a significant part of the process. 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 myriad of Ministries and government agencies, Non-Governmental Organization (NGOs), Academia and the private sector. Appendix II shows a list of these persons. CBD's Training Packages for updating the NBSAP also provided significant guidance. A Gap Analysis and an Organizational Capacity Assessment were also integral in informing this document.

Mainstreaming biodiversity refers to the integration of the conservation and sustainable use of biodiversity in 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 (Secretariat of the Convention on Biological Diversity, 2011).

When developing the strategy and action plan, integrating biodiversity conservation and sustainable use into sectoral and/or cross-sectoral documents and guidelines were primary considerations. Specifically, recommendations related to policy documents, plans and actions, budgets, legislation, and indicators and monitoring systems were identified for key sectors such as those listed below as well as for as well as for mainstreaming biodiversity within the general public.

- Agriculture
- Forestry
- Fisheries
- Mining and Quarrying
- Tourism
- Education
- Energy
- Transportation, Housing and Construction.

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

It is important to note that mainstreaming is an evolutionary process that requires capturing the attention of the key players in such a way that biodiversity considerations become enveloped in the regular thought processes within the daily work plans of these stakeholders. Strategies and activities have been prioritized for completion within the 5-year timeframe.

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

## PART II – SITUATIONAL ANALYSIS ON JAMAICA'S BIODIVERSITY

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## 2 Summary Policy and Legal Framework Governing Biodiversity

### 2.1 Legislation Governing Biodiversity

Jamaica's current environmental legislation provides a basic framework for the conservation and sustainable use of biodiversity. There are at least 52 pieces of legislation which have aspects that directly relate to the management of the environment. However, very few of these statutes deal comprehensively with the protection, conservation and sustainable use of biodiversity, as they are primarily sectoral in nature.

In becoming a Party to the Convention on Biological Diversity, Jamaica bound itself to implement specific obligations under the CBD. The CBD requires State Parties to put in place measures to develop or maintain the necessary legislative and or regulatory provisions for the conservation and protection of national biodiversity

The legislative framework in Jamaica does not comprehensively protect ecosystem diversity, species diversity or genetic diversity. A new framework is needed that recognizes the components of biodiversity and ensures the sustainable use of biodiversity in Jamaica. In this regard, 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 and enactment of the Forest Act, 1996, the Plant Quarantine Act, 1994; enactment of the new Fisheries Bill; the creation of a new Watershed Act; and the creation of regulations under the revised Endangered Species (Protection, Conservation and Regulation of Trade) Act 2015. There are, however, still some gaps in the framework, which are described further in Section 4.4. Sections 2.1.1 to 2.5 below presents the key legislation and policies making up the existing framework and outlines current activities on policy and legislation critical to biodiversity conservation.

#### 2.1.1 The Natural Resources Conservation Authority Act, 1991

The Natural Resources Conservation Authority Act (1991) created the Natural Resources Conservation Authority (NRCA), the governments' environmental agency. Under this Act, the NRCA may take the necessary steps to:

- Manage effectively the physical and natural resources of Jamaica so as to ensure their conservation, protection and proper use; promote public awareness of Jamaica's ecological systems and their importance to the social and economic life of Jamaica; manage national parks, marine parks, protected areas, and public recreational facilities; and advise the Minister on general policies relevant to the management, development, conservation and care of the environment;
- Develop, implement and monitor plans and programmes relating to the management of the environment, conservation and protection of natural resources and conduct research into such matters in carrying out its functions;
- Regulate and control development, in keeping with the power given to the Authority, so as not to cause injury to public health or to any natural resource.

A number of regulations have been enacted to enable the effective implementation of the objectives of the Act. The main one is regulations which govern developmental activities in Jamaica.

Under the Natural Resources Conservation (Prescribed Enterprise, Construction and Development) Order, 1996, the island of Jamaica was prescribed, subject to special controls to minimize adverse environmental and health impacts of development. A list of the prescribed types of enterprises, construction or development, is contained in the Order, e.g., reclamation of wetlands, hotel development, construction of roads, and clear-cutting of forested areas. A permit is required to undertake any of the prescribed developmental activities. The Permit and Licensing System became effective in January, 1997.

The regulations also establishes the requirement for a licence to discharge any poisonous, noxious or polluting substance into waters or the ground. Licences are also used to control the quality of effluent discharged. Regulations and Standards governing the discharge of wastewater are soon to be completed.

The other important regulations under the NRCA Act are the Natural Resources Conservation (Air Quality) Regulations, 2006, Natural Resources (Hazardous Waste) (Control of Transboundary Movement) Regulation, 2002 and Natural Resources Conservation (Wastewater and Sludge) Regulations, 2013

The NRCA Act is the only legislation in Jamaica that includes a requirement to conduct Environmental Impact Assessments (EIAs). Section 10 of the Act stipulates that the Authority may require an EIA:

*By notice in writing to an applicant for a permit or a person responsible for undertaking any enterprise, construction or development in a prescribed area, or of a prescribed description or category where it is of the opinion that the activities of such enterprise, construction or development are having or are likely to have an adverse effect on the environment.*

### **2.1.2 The Wild Life Protection Act, 1945**

The Wild Life Protection Act is the only statute in Jamaica that specifically protects designated species of animals and regulates hunting in Jamaica. The main provision that ensures the protection of animals is found in Section 6 of the Act, which makes it a criminal offence for any person to be in possession of any protected animal, or part thereof. A person may be liable on summary conviction to a fine of one hundred thousand dollars.

The Act includes a list of fourteen animals that are designated as protected in the Third Schedule of the Act. All birds in Jamaica, except those in the second part of the Second Schedule of the Act, are protected.

The Act also regulates the hunting of game birds and provides for the declaration of game sanctuaries and games reserves in which no hunting is allowed. The First Schedule of the Act

declares all Forest Reserves as Game Reserves.

Specific provisions are also in place for the protection of fish and the protection of turtles, including the taking of turtle eggs. Several amendments were made on this legislation, mostly covering updating of first, second and third schedule animals. The most recent update dates from 2002.

### **2.1.3 The Watershed Protection Act, 1965 (updated 1991)**

The Watershed Protection Act provides a framework for the management of watersheds in Jamaica. There are 26 watershed management units declared under the Act. The Act governs the entire island of Jamaica and makes provisions 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 ever been prepared under this Act and therefore, voluntary compliance and training have been the only measures available to ensure appropriate management practices in watersheds in Jamaica. Proposed amendments to the Watershed Act have been completed to remedy the deficiencies in the Act, as there is currently no legal framework for appropriate soil conservation and land use management measures that can be implemented. The last amendment on this Act dates from 1991.

### **2.1.4 The Beach Control Act, 1956**

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 to:

- Control the disposal of rubbish or other waste matter;

- Control dredging or disturbance in any way of the floor of the sea;
- Prevent or control the destruction or removal of sea fans and sedentary marine animals; and
- Control the searching for or removal of any treasure or artefact from the floor of the sea.

This Beach Control Act is limited in its mandate to govern development and commercial activities on the foreshore and floor of the sea, and does not appropriately address the larger issues of the proper management of the coastal zone and marine resources. This Act was last amended in 2004.

### 2.1.5 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 function 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. Provisions have been made in the Act 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 acquired for declaration 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, conservation and protection measures, and 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.

The Act makes it 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.

### 2.1.6 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.

The Act provides for the protection of fish through the designation of fish sanctuaries and the declaration of open and closed fishing seasons (for conch and lobster). Two fish sanctuaries have been declared under this Act.

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 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 already been drafted to replace the Fishing Industry Act (1975); the 1976 Regulations; sections of the Wild Life Protection Act dealing with fish; and the Morant and Pedro Cays Act. The Morant and Pedro Cays Act provide a licensing system for fishing and prohibit the killing of turtles and birds on the Cays.

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. This Bill is currently being reviewed. This law was amended in 2015.

Special Fishery Conservation Areas are no-fishing zones reserved for the reproduction of fish populations. Their nature reserve status is declared by the Agriculture Minister under Orders privileged through Section 18 of the Fishing Industry Act of 1975. It is, therefore, illegal and punishable by law to engage in any unauthorized fishing activities in the demarcated zones.

### **2.1.7 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. The First Schedule governs endangered species that are threatened with extinction and which may be affected by trade. The Second Schedule governs species which could become extinct if trade is not regulated. The Third Schedule governs species which any contracting party wishes to regulate within its own jurisdiction. The Fourth Schedule is particular to Jamaica and lists Jamaican indigenous species. Domestic trade in these endangered species is controlled under the Regulations.

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

The Protection of Plant Genetic Resources for Food and Agriculture Act facilitates Jamaica's compliance with its obligations under the International Treaty on Plant Genetic Resources for Food and Agriculture.

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.

### **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

### **2.1.10 Other Legislation Relating to Biodiversity**

There are several other Acts that relate to the preservation/conservation of Jamaica's biodiversity (also see Table 2.1).

#### **2.1.10.1 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 a 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. Existing orders are not 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.

**Table 2.1: Other biodiversity related legislation**

Other Legislation	Impact on Biodiversity
Animals (Disease) and Importation Act, 1969	Allows for controlling the spread and treatment of diseases within the island via importation controls on animals, and the eradication and disposal of infected animals or where such infection is suspected
Black River (Upper Morass) Reclamation Act, 1941	Empowers the Black River Drainage and Irrigation Board to regulate and maintain water courses and damming structures; keep the Black River clean, clear and navigable to a certain point; and can also require landowners to clean canals, trenches, etc. located on their lands
Clean Air Act, 1964	Makes provision for the prevention of the discharge of noxious or offensive gases into the air including fumes and dust from alumina, cement, lime, petroleum and gypsum works
Harbours Act, 1874	Regulates activities within harbours through the Marine Board by regulating the movement of boats and vessels in harbours, channels or approach thereto; the placement of buoys and removal of sunken structures from harbours; penalties for the depositing of refuse and waste matter from vessels; and removal of sand, stone, ballast, etc., from harbours, reefs or shoals
Institute of Jamaica Act, 1978	Promotes Literature, Science and Art, designates the Institute as the body with responsibility for national museums
Jamaica National Heritage Trust Act, 1985	Establishes a statutory body to protect Jamaica's national heritage, including any place, animal or plant species or object/building
Litter Act, 1985	Defines what constitutes litter on private and public properties and prescribes penalties for offences against the Act and the provision of receptacles for proper disposal
Local Improvements Act, 1914	Governs all development of lands within Kingston or other such Ministerial prescribed areas via the requirement for subdivision approval from the relevant local authority
Morant and Pedro Cays Act, 1907	Affirms the status of the Morant and Pedro Cays and prohibits fishing inside certain limits, slaying or catching of birds on the Cays or the catching of turtles within the territorial limits of the Cays
Petroleum Act, 1979	Vets all petroleum in the State and makes provisions for the creation of Regulations which prevent pollution and orders remedial action where this takes place, as well as the protection of fishing, navigation, etc.
Plants (Importation) Control Regulation, (1997)	Outlines the role of the National Biosafety Committee in monitoring and regulating the importation of Living Modified Organisms for research only
Plant Quarantine Act, 1993	Provides protection for Jamaica's flora from imported diseases or pests transported via plants, plant products, and soil or via other means as well as the course of action to be taken when these are discovered within the island
Public Health Act, 1985	Allows for the establishment of Local Boards to regulate activities carried out in private or public buildings or properties where such activities prove injurious to public health
Urban Development Corporation Act, 1968	Establishes the Urban Development Corporation as a statutory body, which has amongst its functions the duty to carry out construction, maintain public parks, car parks, etc. in such manner to ensure preservation of architectural or historical objects or sites

Source: Natural Resources Conservation Authority, 1999

### **2.1.10.2 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 from Jamaica 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 Regulation 2004 accommodated the amendment of penalties for non-compliant licencees.

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.

#### **2.1.10.3 The Quarry Control (Amendment) Act (2015)**

The Quarries Control Act was amended in 2015. The Act provides for the establishment of a Quarries Advisory Committee (Section 6) to designate quarrying zones and to license operators. It makes provisions for written notice to be served on persons operating quarries 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.

#### **2.1.10.4 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.

## **2.2 The Jamaican Constitution**

The Constitution protects property rights and establishes the 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.

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.

### **2.2.1 Convention on Biological Diversity**

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

## **2.3 International Agreements**

Environmental management in Jamaica is guided not only by national policies and legislation, but also by several international and regional agreements. The island's commitment to a number of international agreements relating to biodiversity is shown in Table 2.2 below.

## **2.4 National Policies, Plans and Strategies**

Despite the historical tendency in Jamaica to have several policies that remain in draft, the State of the Environment Reports (2010 & 2013), the Stocktaking Report (2015), and all Jamaica's national reports to the CBD have pointed to a number of new standards and policies that were implemented favouring biodiversity conservation. This includes the

Orchid Conservation Policy Jamaica which was finalized and approved by Parliament in 2014.

#### **2.4.1 The Jamaica National Environmental Action Plan**

The first Jamaica National Environmental Action Plan (JANEAP) was prepared by the GOJ in 1995. The Plan highlights the major environmental problems facing the country and also emphasizes and establishes the necessary corrective measures to be undertaken by various Government agencies, ministries and non-governmental organisations. The Action Plan recognizes that there are increasing threats to Jamaica's biological resources due to habitat degradation, pollution and unsustainable levels of utilization. It states specific actions that have been and will be undertaken by Government and the private sector towards the development and management of a system of protected areas and the sustainable use of biological resources.

The Sustainable Development Planning and Policy section of the JANEAP focuses on forest, marine and terrestrial resources, an integrated watershed system and the economic sectors such as agriculture, industry, mining, and tourism.

The JANEAP is updated every three years and status reports are prepared annually. Four Status Reports have been prepared and JANEAP 1995 has now been updated to JANEAP 2006–2009.

#### **2.4.2 Jamaica National Industrial Policy (1996)**

The National Industrial Policy was developed by the GOJ to focus on issues of investment, productivity and growth. After an extensive consultation process, this document was presented to the nation to provide the necessary basis for a clear, coherent and consistent set of policies to guide the economy on a path of renewed growth and development into the 21<sup>st</sup> century. The Policy states that environmental management plays an important role in industrial development by ensuring the implementation of cleaner production and the appropriate standards.

#### **2.4.3 Jamaica National Land Use Policy (1996)**

The comprehensive National Land Use 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.

This 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. This Policy must be used for sustainable development of the island.

#### **2.4.4 Policy for Jamaica's System of Protected Areas (1997)**

After an extensive consultation process, this Policy was adopted by the GOJ as the official policy framework for the establishment of a National System of Protected Areas. The Policy is of paramount significance to the implementation of the CBD, since the establishment of protected areas may be one of the most effective mechanisms to support the conservation of Jamaica's biodiversity.

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

The successful implementation of the Protected Areas Policy will depend on the coordination of policy, and the planning and implementation among the agencies with responsibility for the different types of protected areas. The following documents have been prepared for implementation: the St. Elizabeth Environmental Policy Framework; the Black River Protection Area Management Plan; and the Palisadoes/Port Royal Environmental Policy Framework and draft guidelines. Jamaica is currently preparing a new policy to guide protected areas.

In 2016, the country completed a draft overarching policy for Jamaica's protected area system. The new overarching policy will seek to

harmonize the administrative and management processes for all protected areas within the country.

**Table 2.2: Relevant International Agreements**

International Agreements	Relevance
Convention on Biological Diversity, 1993	This convention is the source for the development of national strategies and action plans to protect biodiversity. 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 ratified this convention on 6 April, 1995;
Cartagena Protocol on Biosafety, 2013	This is an International Agreement that aims to ensure safe handling, transport and use of Living Modified Organisms (LMOs). As such, it is relevant to biodiversity conservation and management in Jamaica. Jamaica ratified this protocol on 24 December, 2012
International Plant Protection Convention, Rome, 1951	This Convention is an international treaty that encourages cooperation among contracting parties to prevent the transboundary movement of pest of plants into areas where they are not present. The introduction of alien pests may pose Jamaica's indigenous biodiversity at risk, so this treaty is relevant to the present work. Jamaica accepted this Convention on 24, November, 1969
Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1983	This Convention seeks to protect the world's cultural and natural heritage which includes biodiversity. Jamaica accepted this Convention on 14 June, 1983
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 marine environment, thus preventing impacts on marine biodiversity. Jamaica Ratified this Convention on 22 March, 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	This is related to the above Convention and was adopted following a series of accidents involving tankers in 1976–77. Jamaica also ratified this Protocol on 13 June, 1991
United Nations Convention for the Law of the Sea, Montego Bay, 1982	Also known as the Law of the Sea or UNCLOS, this Convention defines rights and responsibilities of nations with respect to their use of the world's oceans. Jamaica ratified this Convention on 21 March, 1983
Convention on the Protection and Development of the Marine Environment of the Wider Caribbean Region, Cartagena de Indias, 1983	This Convention is a regional agreement to protect the marine environment (and associated biodiversity). Jamaica ratified this Convention on 1 May, 1987
Protocol concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region	This Protocol establishes cooperation among Caribbean States in case of response to oil spills and also demands that the signatories of the Cartagena Convention maintain the means of responding to oil spills. As oil spills can bring significant impacts on biodiversity, this Protocol is relevant. As part of the Cartagena Convention, it entered into force in 1 May, 1987
Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985	This Convention aims to promote cooperation among signatory states to detect the impact of human activities on the Earth's atmosphere ozone layer and to adopt measures to mitigate against human activities likely to affect the

International Agreements	Relevance
	ozone layer. As impacts on the atmosphere ozone layer may affect biodiversity significantly, this Convention is relevant to biodiversity. Jamaica became a signatory State under this Convention on 31 March, 1993 and it came into force on 29 June, 1993
Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1989	This is a Protocol established under the Vienna Convention that demands the phasing out of the production of substances that deplete the Earth's atmosphere ozone layer. Jamaica accessed this Protocol on 6 January, 1995 and it entered into force on 5 April, 1995
London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	This Protocol seeks to reinforce the measures laid down in the 1987 Montreal Protocol by extending its scope to new substances and establishing financial mechanisms. The Montreal Protocol aims to protect the ozone layer through enhanced international cooperation by taking precautionary measures to control equitably total global emissions of substances that deplete it. Jamaica ratified the London Amendment on 31 March, 1993
United Nations Framework Convention on Climate Change, New York, 1992	This Convention established the need to reduce the emissions of greenhouse gases to the atmosphere. Climate change can bring significant impacts on biodiversity as it may affect the distribution of species and also alter the regularity of ecological cycles. Jamaica ratified this Convention on 6 January, 1995
Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement among governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Jamaica joined this Convention on 23 April, 1997
Convention on Wetlands of International Importance especially as Waterfowl Habitats (RAMSAR Convention)	This Convention aims to conserve and ensure the sustainable use of wetlands as critical habitats used by migratory birds as feeding and breeding grounds. Jamaica ratified this Convention and it entered into force in the country on 7 February, 1998. Currently Jamaica has four wetlands designated as Ramsar Sites
The Copenhagen Amendment to the Montreal Protocol on Ozone Depleting Substances	This amendment aims to increase the list of ozone depleting substances to be controlled under the auspices of the Vienna Convention
Convention to Combat Desertification	This is a Convention that aims to counter the process of desertification and severe droughts. Desertification can affect biodiversity by restricting environmental conditions beyond the tolerance levels of most animals and plants, and thus causing biodiversity losses in affected areas. Jamaica ratified this Convention on 12 November, 1997
International Treaty on Plant Genetic Resources for Food and Agriculture	This is an international agreement that aims to guarantee food security through the conservation, exchange and sustainable use of the world's plant genetic resources for food and agriculture as well as the fair and equitable benefit sharing arising from its use. Jamaica signed and accepted the terms on this treaty.

#### 2.4.5 The National Physical Plan (1978)

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 update the National Spatial Plan and working with the local Parish Councils in revising the Parish Development Orders across Jamaica.

#### 2.4.6 Management and Recovery Plans for Endangered Species

Management and recovery plans for endangered species have been completed over the last few years. These include the Crocodile Action Plan; the Giant Swallowtail Butterfly Recovery Action Plan; the Jamaican Iguana Conservation Strategy; the Sea Turtle Management Plan; the Jamaica Coral Reef Action Plan; the Development Management Plan for Game Birds; the Development Management Plan for Bats; 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 and threatened;
- seek to mitigate adverse impacts on 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.

#### 2.4.7 The Protected Area System Master Plan (PASMP), 2015

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

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

The Protected Areas System Master Plan (PASMP) aims to develop a comprehensive and representative system of protected areas and a framework for management that supports national development. The PASMP sets out to ensure long-term viability by maintaining ecological processes and systems and protecting the country's natural and cultural heritage. The master plan consists of 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 has prepared drafting instructions for an overarching protected areas act. This new act will seek to harmonize the common management aspects for protected areas. This

will serve to increase the management effectiveness for all areas.

Despite the developments outlined above, Jamaica's biodiversity still sustains threats from habitat loss, overexploitation, the impact of alien invasive species, weak law enforcement, inadequate awareness of the value of natural resources, urban population growth, poor spatial planning and land use, and climate change. These will be discussed throughout this Gap Analysis Report.

#### **2.4.8 The Forestry Policy (Green Paper), 2015**

This Policy governs all forests in Jamaica whether owned by the State or by private interests. Its scope covers land with reforestation potential and forests in urban settings and addresses national priorities as well as international obligations and commitments relating to climate change, biodiversity conservation, and the sustainable use of wetlands. The Goals of this Policy can be classified under three broad headings which relate to:

- Governance of the forestry sector and more specifically the mandate of the Agency, other public sector entities and other interest groups in this regard;
- The conservation and protection of forest ecological systems; and
- Relevant Socio-Economic considerations.

Following two years (2011–2012) of extensive consultations, a new Draft Forest Policy (2013) was presented and moved to Green Paper status in February 2015. This new policy will provide the basis on which the necessary changes to the legislative and management framework can be instituted. 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.

It is expected that amendments will be made to the Forest Act upon completion of the Forest Policy legislative process.

#### **2.4.9 The Orchid Policy**

This policy was adopted in 2014 and it 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.

#### **2.4.10 Sustainable Financing Plan for Jamaica's System of Protected Areas**

The Financial Sustainability Plan for the Protected Areas System of Jamaica intends to guide an integrated process to ensure long-term and stable funding for the Jamaican Protected Areas System (JPAS). It will be integrated into the Protected Areas System Master Plan (PASMP). The plan is based on a comprehensive view of costs and benefits, ensuring that those who bear protected area costs are recognized and adequately compensated, and that those who benefit from protected areas (PAs) make a fair contribution to their maintenance. This plan was prepared in 2009 and covers the period 2010–2020.

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

The Draft Watersheds Policy for Jamaica was updated in 2015 following the commencement of the review process in 2012. The policy, which includes drafting to amend the Watershed Protection Act (1965), is intended to guide all watershed management activities, strategies and programmes as well as legislative and institutional reforms related to watersheds management to be undertaken over the next

three (3) years by Government departments and agencies, private land owners and donor agencies.

#### 2.4.12 Biosafety Policy

The Biosafety Policy is currently undergoing revision and remains in draft stage. 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.

The draft Policy has been revised and reviewed by the NRCA and will be submitted to the Ministry responsible for the environment.

#### 2.4.13 Others

Several public consultations have been held for the drafting of the Dolphin Policy which has since been revised.

The Ministry of Investment, Commerce, Agriculture and Fisheries also reported new policy instruments since 2010 to include the Food and Nutrition Security Policy (2012), the Plant Health Policy (2011) and the draft Seed Policy Plan.

### 2.5 Future Initiatives

#### 2.5.1 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. However, the obligation to protect and preserve this traditional knowledge has not been addressed in any systematic manner and there is no standard definition of what traditional knowledge should include.

There is a need for the protection of traditional knowledge through national policy and legislation to ensure equitable access and benefit sharing. The Jamaica Intellectual

Property Office (JIPO) was established in 2001 and is responsible inter alia for the protection of traditional

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

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

- The draft Watershed Management Policy (2014)
- The Water Sector Policy and Implementation Plan (2015)
- The Pollution Information System
- A Plant Conservation Strategy for Jamaica (2013)
- National Invasive Alien Species Strategy and Action Plan (2013)
- The Ocean and Coastal Zone Management Policy
- The National Policy and Strategy on Environmental Management Systems
- Draft Wildlife Trade Policy

Several draft guidelines are also being considered 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
- Research

### 3 Situational Analysis of Jamaica's Biodiversity

#### 3.1 Biodiversity and its Value

Jamaica is an island nation with a diverse range of ecosystems and related habitats. This includes terrestrial and marine flora and fauna that have adapted to these different environments. The terrestrial habitats extend from lowland (dry coastal scrub) to montane forests in the highlands. Given Jamaica's relative size and topography, there are significant freshwater habitats in the form of rivers and small ponds. Additionally, 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, namely coral reefs, seagrass beds and deep ocean basins. The range and variety of ecosystems present challenges for conservation and management of Jamaica's biodiversity. The value to the Jamaican people is evident from the various extractive activities that have in some cases, led to overexploitation and losses in biodiversity.

In Latin America and the Caribbean, biodiversity and ecosystems are among the regions most valuable assets and of strategic importance for attaining long-term sustainable development (Siikamaki *et al*, 2015). Biodiversity contributes positively to the social, environment and economic growth of Jamaica. For example, increasing the variety of agricultural plant species can benefit the agricultural sector; rich biodiversity increases the capacity of Jamaica to better withstand and recover from a variety of natural disasters, such as, drought and flooding.

A distinct relationship (direct) exists between a diverse habitat and the opportunities available for: new medical discoveries; economic development; and adaptive responses to new

challenges, such as, climate change and global warming. 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 respectively. 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 (Parchman *et al*, n.d.) to name a few.

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.

#### 3.2 Status and Trends of Biodiversity

Species diversity incorporates/includes? all the various types of species found in the different habitats and or ecosystems? of Jamaica. This includes marine, terrestrial, and freshwater species and ecosystems. Their status is usually classified according to the status of their existence on the island (NEPA, n.d.). Subgroups of these are listed below and details are indicated in Sections 2.1.1 to 2.3.5:

- Terrestrial – coastal (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

### 3.2.1 Terrestrial Biodiversity

The land or terrestrial habitats (plants and animal species) of Jamaica include the lowland and coastal forests to the montane forests of its highlands. Jamaica's terrestrial biodiversity is characterized by over 3,304 vascular plant species, 600 species of ferns, 116 species of butterflies, and 256 known bird species (106 of which are indigenous to Jamaica and are migratory).

Table 3.1 lists the number of indigenous terrestrial plant and animal species in Jamaica along with revised data on some species (NEPA, 2015). The values in red reflect those species that have reduced in number. In total eight species have reduced in numbers. 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) (ibid).

At least six species of Jamaica's terrestrial vertebrates are thought to have become extinct in Jamaica in the last 150 years, and many more species are considered endangered, threatened or rare. These include Monk Seal (*Monachus schauinslandi*), Black Racer (*Coluber constrictor priapus*), Giant Galliwasp (*Celestus occiduus*), Jamaican Rice Rat (*Oryzomys antillarum*), Jamaican Parauque (*Siphonorhis americana*) and the Black-Capped Petrel (*Pterodroma hasitata*) (NEPA, n.d.). Some of these species are protected by the Wild Life Protection Act (NEPA, n.d.).

**Table 3.1: Species Diversity in Jamaica**

Fauna/Flora	2013	
	Estimated number of species	Number of Endemic species
<b>Fauna</b>		
Rotifers	211	21
Land Snails	514	499
Grapsid Crabs	9	9
Jumping Spiders	26	20
Fireflies	48	45
Butterflies	136	38
Amphibians	21	21
Reptiles	43	33
Shore and Sea Birds	39	1
Land Birds	67	30
Bats	21	5
Other mammals	2	2
Shore/Seabirds	39	1
Frogs	21	21
Crocodiles	1	0
Lizards	29	28
Snakes	9	9

Fauna/Flora	2013	
	Estimated number of species	Number of Endemic species
Freshwater turtles	1	1
Marine turtles	4	0
Ants	59	6
Carabid beetles		
Scolytid & Platypodid beetles	69	31
Butterflies	136	38
Moths	730	292
Lampyridae Fireflies	48	45
Grapsid crabs	9	9
Jumping spiders	26	20
Rotifers	211	21
Freshwater fish	29	4
<b>Flora</b>		
Bromeliads	60	26
Orchids	219	62
Ferns	579	67
Cacti	20	4
Palms	12	7
Grasses	200	1
Seed Plants	3,175	925
Trees	-	316
Palms	10	7
Orchids	227	60
Bromeliads	60	26
Ferns	579	67
Cacti	15	4
Grasses	200	1
<b>Note: Red indicates reduction in numbers of species</b>		

(Source: Fifth National Report, 2015)

### 3.2.1.1 Forests

The wide range in microclimates, soils and physical features give rise to a variety of forest types. Jamaica's forests cover approximately three hundred and thirty-six thousand (336,000) hectares of land which represent roughly 40% of the entire island (Forestry Department, 2015). The seven (7) forest types include:

- 1) Closed Broadleaf (closed primary forest with broadleaf trees with minimal human

disturbance. Examples include Blue and Port Royal Mountains);

- 2) Disturbed Broadleaf- The majority of forest land in Jamaica, over 178,000 hectares, is classified as disturbed broadleaf forest. These forests have varying degrees of disturbance but have broadleaf trees at least 5 m tall with species indicators of disturbance such as Trumpet Tree (*Cecropia peltata*) and Broke Axe (*Miconia spp*);

- 3) Tall Open Dry (open natural woodland or forest with trees at least five (5) metres tall and crowns not in contact);
- 4) Short Open Dry (open scrub, shrub or brushland and crowns not in contact);
- 5) Bamboo forests. Found in more damaged or cleared areas where a savanna-type vegetation occurs such as *Bambusa vulgaris*);
- 6) Swamp (edaphic forest, soil waterlogged, with species indicators such as *Symphonia globulifera* – Chewstick and *Roystonea princeps* – Royal Palm); and
- 7) Mangrove forests (edaphic forests with brackish water composed of trees with stilt roots or pneumatophores, species-indicators such as *Rhizophora mangle* – Red Mangrove)<sup>1</sup>.

Jamaica's forests are the main repositories of terrestrial biodiversity, especially of endemic flora and fauna. 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 has reported that on average, approximately one hundred and twenty (120) hectares of land, have been planted per annum during the period under review. The FD's thrust towards sustainable management of forests was supported through the Government of Jamaica's (GOJ) European Union/United Nations Environment Programme Climate Change Adaptation Disaster Risk Reduction Programme (GOJ/EU/UNEP CCADRP) 2010–2013, which involved the rehabilitation of fifty (50) hectares 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 where 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.

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<sup>1</sup> Draft Forest Policy for Jamaica, 2015

**Table 3.2: Land area reforested and deforested in Jamaica in hectares (2006-2013)**

Action	2006	2007	2008	2009	2010	2011	2012	2013	Total
Reforestation (A)*	174	253	150	281	200	274	163	50	<b>1,545</b>
Deforestation (B)#	339	338	338	337	337	337	336	-1,437	<b>925</b>
<b>Balance (A-B)</b>	<b>-165</b>	<b>-85</b>	<b>-188</b>	<b>-56</b>	<b>-137</b>	<b>-63</b>	<b>-173</b>	<b>1,487</b>	<b>620</b>

Source: Forestry Department; \* Reflects areas planted on lands managed by the Forestry Department and does not include Private lands; #Includes an upward revision of forest cover in 2013 following the Land Use Cover Assessment in 2013 in Jamaica.

A National Land Use Change Assessment was completed in 2013 it revealed that 40% of the island is actually under some forest cover. There has been a small gain of 620 ha. in reforestation between 1998 and 2013, reflected in Table 3.2. This gain (0.4%) is mainly attributable to re-growth of secondary forest (ruinate forest) and to a lesser extent to an increase of forest plantations. However, although forest cover at the national level has increased, the quality of forest stands in all forest types (FD) have been degrading with time as there is a general decrease in the acreages of those better quality forests (e.g. Closed broad leaf) and an increase in the disturbed and secondary forest stands. Broadleaf forest (closed and disturbed) noted for its stratification and high levels of biodiversity<sup>2</sup>accounts for almost 59% (263,000 ha) of total forest cover (441,300 ha). Degradation is largely due to issues, such as:

- Illegal and un-sustainable harvesting of timber or fuel wood
- Illegal or excessive grazing by livestock and crop farming in forested areas
- Setting of fires that impact forests
- Non-forest uses of land with forest cover, such as mining and illegal settlement

<sup>2</sup>Broadleaf trees usually grow beyond 5m in height and their crown cover extends beyond 10%. *Disturbed Broadleaf* refers to disturbance of less than 15 % of the total broadleaf forest area. More pronounced disturbances in this forest class (i.e. between 15 and 25% of broadleaf cover) are classified as Secondary forest.

### 3.2.1.2 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 are 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.

### 3.2.1.3 Conservation Issues

The NBSAP reports on the status of Jamaican forests up to 2003 where more than 30% of Jamaica has retained some of the forest cover with only 8% of the remaining forests classified as undisturbed natural forest. Recent information obtained from the Forestry Department, 2016 indicates that even though there has been an increase in forest cover, a decrease in the quality of forests remains. This is primarily linked to agricultural expansion for the production of export crops and unsustainable harvesting of trees for charcoal production. The impacts of loss of forest cover to endemic mega fauna such as the Jamaican Hutia (coney), Iguana and Swallowtail butterfly were mentioned as areas of concern.

Since the 2003 NBSAP and subsequent 2015 Stocktaking Report, there have been a number of activities implemented towards addressing biodiversity conservation. The list below outlines some needs based on the gaps that were identified:

- Assess if forestry restructuring has led to measurable improvements in conserving biodiversity. Implement evaluation systems if non-existent.
- Assess if there has been an increase in cases being brought to the courts. Fines etc.
- Develop mechanisms to track and report changes in public attitudes to forest degradation
- Coordination between land agencies, judiciary and law enforcement and social development agencies are needed due to the prevailing economic pressures that result in unsustainable land use and public attitudes to overcome indifference to forest degradation.
- It is important to track the outcomes of existing capacity building actions
- Confirm progress of Revised Forest Policy, link to existing laws
- Develop evaluation criteria including measuring increases in compliance, or reported number of infringements and fines/arrests
- A percentage from the Forest Fund and Metrical Conservation Trust Fund may be necessary to be directed towards biodiversity conservation (Edwards, 2009)
- Form linkages with Tourism Product Development Company and Ministry of Agriculture regarding sustainable use of forest products (craft, honey, etc.)
- Need to demonstrate tangible increases in compliance, reports of infringements and fines/arrests
- Report the outcomes of community engagement programmes
- Track measurable changes/improvements in forest conservation and biodiversity

- Include results and findings from this NBSAP study as part of decision making process
- Include in boundary setting and public consultation
- Incorporated data into national environmental accounting system [Aichi Targets 14 & 15]
- Develop process for consistent government support via Tourism Enhancement Fund or new debt swap mechanisms
- Dedicated funding towards biodiversity conservation
- Consider feasible models of payments for ecosystem services

These activities will have to be monitored and evaluated using a SMART (specific, measurable, realistic and time-bound) framework to assess progress on biodiversity conservation in Jamaica.

#### 3.2.1.4 Watersheds

The island is divided into 26 Watershed Management Units (WMUs) containing over 100 streams and rivers. These units are essentially composites of watersheds areas that fall within 10 hydrological basins (regions).

The results of “routine monitoring of watershed management units” conducted by NEPA in 2008 and 2009 classified 10 watershed units as being in critical condition, namely, the Hope, Wagwater, Yallahs River, Pencar/Buff Bay, Morant River, Oracabessa/Pagee and Swift River, as well as, the Rio Cobre, Rio Grande, and Rio Minho (State of the Environment Report, 2010). The remaining 16 watershed units were considered either less degraded or least degraded (Figure 3.1). The critical watershed units were assigned high priority for rehabilitation by the Government. Reasons for degradation have been attributed to land use activities driven by constant socioeconomic pressures in communities and inappropriate management (State of the Environment Report, 2010).

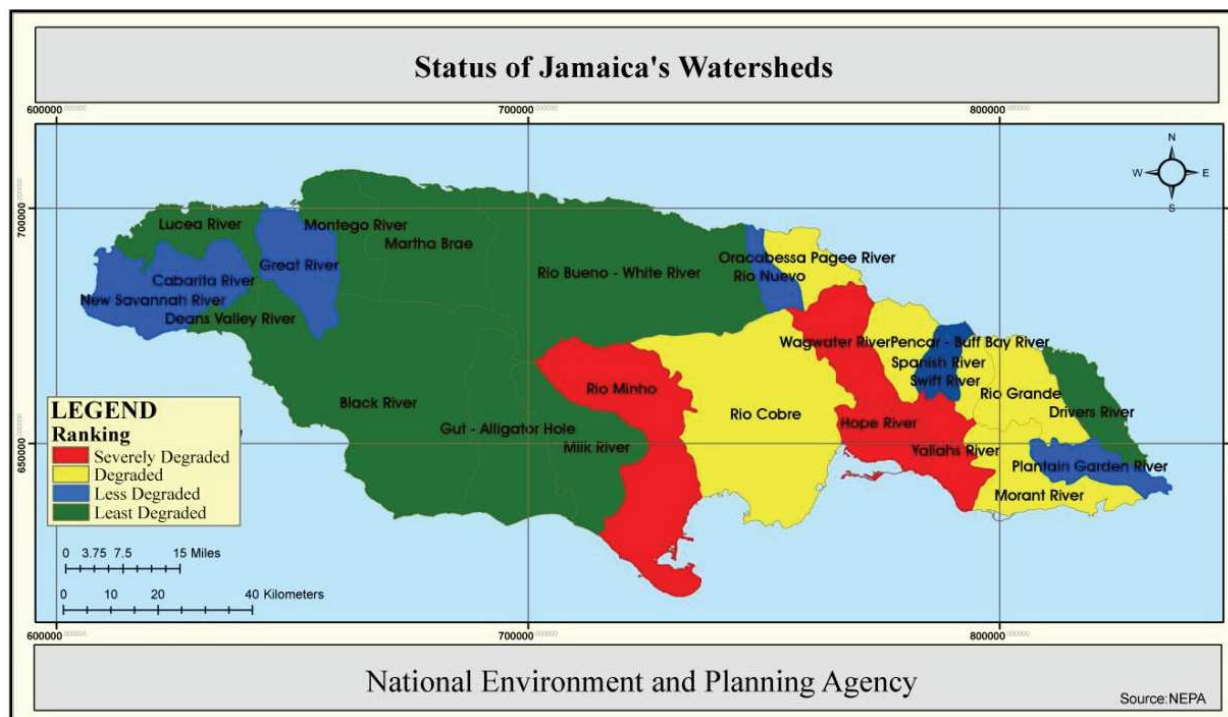


Figure 3.1: Status of Jamaican Watersheds (Source: State of the Environment Report, 2010)

The heavy dependence of Jamaicans on water from fresh water resources for domestic, agricultural and industrial purposes rendered this ecosystem as a high value resource that supports several faunal and floral communities. Wetlands were reported to have declined over the years due to reclamation for activities, such as, road construction, port and harbour development, housing and other development projects (SOE, 2013).

From the Stocktaking Report (NEPA, 2015), the main gaps include the need to update legislation (e.g., Draft Watersheds Policy, Watershed Act), inadequate public awareness campaigns, regulations and inadequate enforcement for effluent disposal, poor control of harvesting, as well as inadequate research and monitoring.

According to the Draft Watershed Policy of Jamaica (GOJ, 2015)<sup>3</sup>, farming activities on the slopes have long been recognized as the single most important cause of the degradation of watersheds in Jamaica and the disruption on biodiversity (removal of habitats, soil erosion).

<sup>3</sup> GOVERNMENT OF JAMAICA (2015). Draft Watershed Policy.

Depending on the crops and practices, the average soil loss reaches approximately 30 tons per hectare per year (GOJ, 2015)<sup>4</sup>. Due to a lack of intensive agricultural extension, incentives and the insecurity of land tenure, most small farmers and other land users do not consider protection and conservation of natural resources in a watershed to be a priority. The variety of activities occurring in Jamaica's watersheds (both legal and illegal) will continue to present challenges to biodiversity conservation.

Forest degradation in watershed areas is a key cause of significant losses to freshwater flora and faunal resources.

### 3.2.1.5 Freshwater Biodiversity

Information on biodiversity status and trends in Jamaica's freshwater ecosystems remain limited. Jamaica's freshwater ecosystems have not been as well studied or protected as terrestrial and marine systems. However, past assessments have recognised Jamaica's freshwater biodiversity as regionally important

<sup>4</sup> GOVERNMENT OF JAMAICA (2015). Draft Watershed Policy.

and characterised by moderate to very high rates of endemism (John, 2006). These ecosystems do 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.

Freshwater conservation areas that have been considered a priority in Jamaica based on their vulnerability to various impacts (mainly anthropogenic) include Black River (Upper and Lower Morass), Cockpit/Martha Brae, Rio Bueno, Portland Bight (Rio Cobre), Swift River and Dolphin Head (Upper Cabarita watershed and Cabarita main-stem.) (Jane, 2006). Effective conservation of these areas would help Jamaica conserve at least 10% of the freshwater resources to as outlined under Jamaica's commitment to the CBD.

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). Atyidae and Palaemonidae are two families of freshwater shrimp found in Jamaica. Its survival within their freshwater ecosystems are threatened by alien invasive species, pollution and over-fishing.

Research on freshwater species continues at the University of the West Indies in addition to periodic assessments conducted by NEPA. 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 *Alpinia allughas* on the biodiversity of the Lower Black River Morass and on the regeneration of the swamp forest and determination of the most effective management treatment for the Paperbark Tree *Melaleuca quinquenervia* (NEPA, 2015). Of significance, is the inclusion of inland fisheries in the revised Fisheries Bill in 2011.

Jamaica under the CBD has committed to protect at least 10% of its aquatic systems in ecologically representative protected areas (terrestrial, freshwater and marine biodiversity). Protection of the biodiversity of these areas

primarily freshwater systems have been challenging based on the direct and indirect influences imposed upon them such as increasing demands on freshwater resources and sedimentation respectively.

Monitoring and assessment of freshwater systems and watershed areas have improved significantly with increased monitoring by NEPA's Pollution Monitoring and Assessment branch (The Stocktaking Report (2015)). 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 freshwater quality and its biodiversity.

The following aspects need to be considered for appropriate control (NEPA, 2015):

- Land use (watershed management)
- Control of users (both water abstraction and effluent disposal)
- Public awareness and education campaign to increase awareness on the importance of freshwater resources conservation and how it impacts biodiversity
- Adequate monitoring covering water quantity, quality and biodiversity.

### 3.2.2 Coastal and Marine Biodiversity

There are over 3,502 different plants and animals (not including bacteria, viruses and fungi) in the shallow, shore and shelf waters of the Jamaican marine environment that remain unchanged (State of the Environment Report, 2010). The highest numbers of marine species present are from the taxon Mollusca and the lowest species count is from Cephalochordata (Table 3.3) (Warner and Goodbody, 2005). The appearance of invasive alien species, including the lionfish and Green Mussel into Jamaica's marine waters, has changed the overall landscape of species diversity over the last ten years and continues to threaten the biodiversity of marine ecosystems. West Indian Manatee, dolphins and whales, as well as sea turtles and crocodiles are among the most important large

aquatic and marine-related animals within the Jamaican waters” (State of the Environment

Report, 2010).

**Table 3.3: Estimates of Marine Species in Jamaican Shallow, Shelf, or Shore Waters (Source: State of the Environment Report, 2010)**

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

Jamaica’s irregular coastline is 795 km long and has diverse ecosystems including sandy beaches, rocky shores, estuaries, wetlands, seagrass beds and coral reefs. The majority of 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.

The health of coastal and marine ecosystems (sea grass, coral reefs, wetlands and beaches) is steadily declining (NEPA, 2016). Various pressures compromise the integrity, health and stability of the areas. These include over-fishing, unplanned coastal development, pollution, tourism, species invasion and climate change (State of the Environment Report, 2010). Jamaica’s beaches and coastline are under threat from pollution, erosion and illegal sand mining; Wetlands (mangrove forests and salt marshes) have been steadily decreasing, with a corresponding decrease in fish and wildlife biodiversity and an increase in coastal erosion (NEPA, 2016) and extensive degradation of Jamaica’s coral reefs has occurred due to hurricanes, eutrophication and tourism activities (leading to decreases in fish catches).

Degradation of marine and coastal ecosystems does affect biodiversity as it can result in changes in species composition, distribution of species (usually leading to a net decline in faunal biomass and abundance) and indirectly affect other services such as the fisheries

sector. It is important that the appropriate conservation strategies be implemented to protect it.

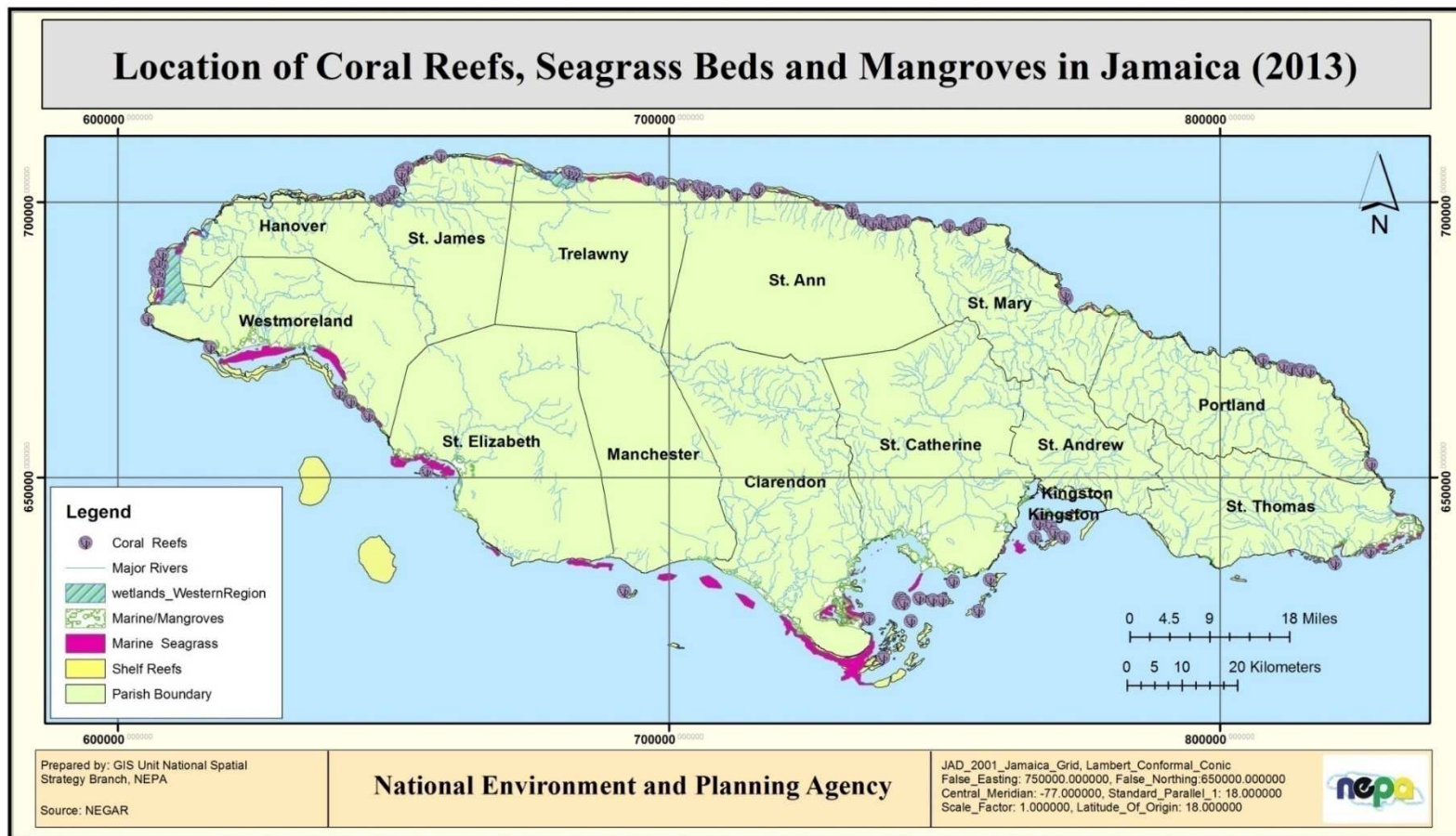
Three very important habitats within the Jamaican marine/coastal environment that supports a large percentage of biodiversity include coral reefs, wetlands and seagrass beds, see figure 3.2 below. These habitats are further discussed in greater detail below.

### 3.2.2.1 Seagrass/Marine Plants

Seagrasses are very important to Jamaica’s marine biodiversity and can be found throughout the Jamaican coastal areas. They provide protection, nesting and nursing grounds for many aquatic species. They are, however, more abundant on the south coast where the island shelf is broader (State of the Environment Report, 2010). Three species are predominantly found in Jamaican waters. These include: *Halodule wrightii* (Shoal Grass), *Thalassia testudinum* (Turtle Grass) and *Syringodium filiforme* (Manatee Grass). 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.

Warner and Goodbody's (2005) estimate of three thousand, five hundred and two (3,502) species of marine plants and animals (not including bacteria, viruses and fungi) remain unchanged. The appearance of invasive alien species, including the lionfish and Green Mussel into Jamaica's marine waters, has changed the overall landscape of species diversity over the last ten years. West Indian Manatee, dolphins and whales, as well as sea turtles and crocodiles are among the most important large aquatic and marine-related animals within the Jamaican waters. The state of seagrass bed and marine plants are declining as tourism, development and other anthropogenic activities dominate these area. As development in these areas continues, the decline in biodiversity will be evident.

Figure 3.2: Location of Coral Reefs, Seagrass Beds and Mangroves in Jamaica



Source: NEPA, 2015

### 3.2.2.2 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 role in Jamaica's socioeconomic 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 3.2). 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 at a critical 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 2012 (NEPA, 2015).

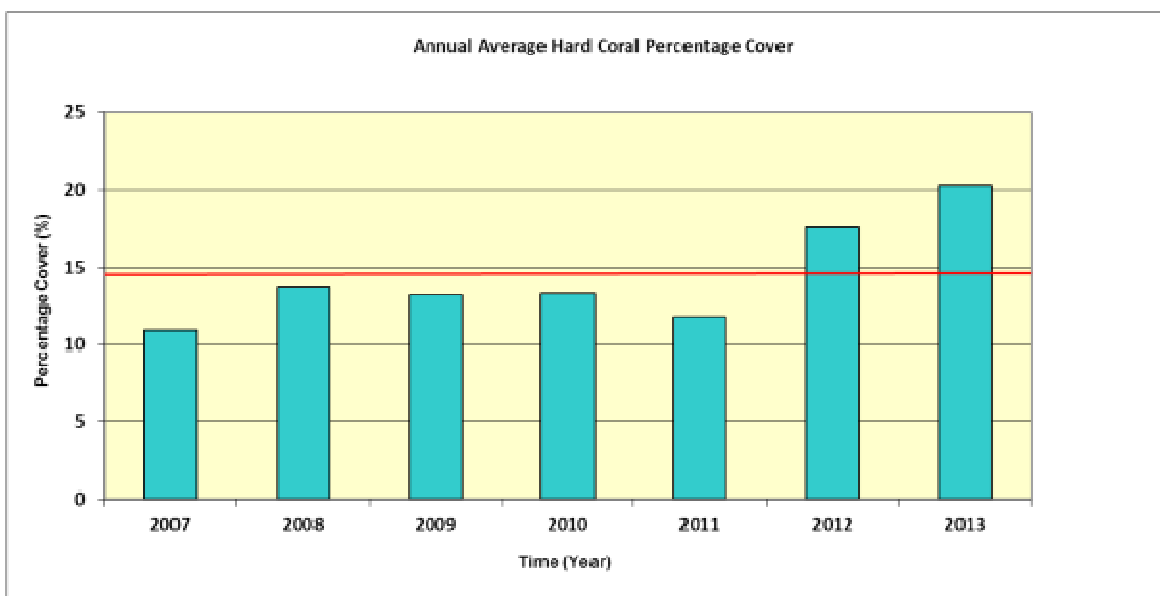


Figure 3.3: Average Coral Cover for 2007 – 2013 (Source, Fifth National Report, 2015)

Currently, pressures on coral reef ecosystems come mainly from human-based activities as

well as natural disturbances. These include over fishing, dredging, sewage discharge, increased

runoff from agricultural activities, marine-based activities, hurricanes and storms, climate change, and coastal development. As coral reefs serve as nurseries and habitats for many aquatic species, degradation to these marine ecosystems negatively impacts on the overall biodiversity of the ecosystem.

### 3.2.2.3 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). Wetlands support various species of birds, crabs, fish, shrimps, and the American crocodile. Snapper, snook, tarpon, jack, and several species of fresh and brackish water shrimps are important commercial species that wetlands support. Vast areas of wetlands in Jamaica are characterized by mangrove forests found along 290km of the coastline, with red and black mangroves being the more predominant

species (State of the Environment Report, 2010). Four Jamaican wetlands have been designated under the Ramsar Convention as 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 it provides 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). Table 3.4 below shows changes in wetland areas for 6 parishes. The results show that there is a decline in wetland cover in 4 of the 6 parishes.

**Table 3.4: Change in Wetland Areas in Six Parishes (Source: Statement of the Environment Report, 2010)**

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**

### 3.2.2.4 Conservation Issues

According to the Stocktaking Report (2015), many marine resources are over-utilized and several marine ecosystems are constantly being degraded. The report also states that the Fisheries Division continues to improve on efforts to maintain a sustainable fishing industry through collaborative enforcement efforts with the JDF Coastguard and JCF Marine Police, improved regulations, and public education. Many of the constraints outlined in the 4<sup>th</sup> National Report (2009) still remain, namely, limited public awareness, inconsistent

enforcement, and limited finances. The addition of a specialized enforcement unit should be considered for the Division in order to regularize efforts and achieve success.

In addition to the direct impact on coastal and marine biodiversity due to overharvesting, degradation from human impacts on the coasts and in the upper watersheds are also major factors. The negative externalities associated with the tourism industry (construction and operation) have been significant contributors to marine biodiversity loss. The Ministry of Tourism and related entities (TPDCo, UDC, TEF, and

Parish Councils) are important partners in mainstreaming biodiversity into the industry to address these issues.

The NBSAP (2003) established at least 8 Projects under the Goal "Conserve Biodiversity" that deal with specific issues pertaining to the Marine Environment. Their status of implementation, according to the Stocktaking Report (2015), shows that a great deal of effort has been concentrated to enhance marine biodiversity.

A series of consultations with relevant stakeholders revealed additional gaps and challenges pertaining to the condition of marine and coastal biodiversity. These include:

- Improved legislation
- Inadequate training and equipment
- lack of sufficient resources to hire personnel
- The need for a Sewage Master Plan
- The need for training on the subject of environmental services valuation
- The importance of working to identify alternative livelihoods, especially for fishermen
- The need to address the issue of squatting and the disposal of human waste
- The need to create incentives to promote conservation within private properties
- The inadequate measures in place to address poaching and illegal fishing
- The need for a review of the Natural Resources Conservation Act (NRCA) to increase fines
- The need to strengthen water quality monitoring and improve watersheds management (including erosion control)

Consultations held in June, 2016 involving the Fisheries Division from the Ministry of Industry, Commerce, Agriculture and Fisheries highlighted the following issues:

- The difficulties linked to the implementation of operational guidelines

- The need to improve people's perception on the importance of fisheries management
- The need to improve communications among decision makers
- The need for personnel and training
- Resource allocation issues
- The need to review the methods for allocation of assistance funds
- The lack of transparency (make reports available to the public)
- The gaps in technical knowledge for fisheries management
- The lack of sufficient enforcement
- The lack of minimum catch size for fish
- Food safety issues.

### 3.3 Threats to Biodiversity

Biodiversity in Jamaica is vulnerable to a variety of threats that tend to threaten their very existence. Terrestrial ecosystems are at significant risk; indicated by varying instances of habitat loss or degradation that face them, and associated services. This section looks at the various threats to biodiversity and the type of programs currently in place to deal with them.

There are a number of threats to biodiversity. These include:

- Habitat Loss and Degradation;
- Overexploitation;
- Invasive alien species;
- Charcoal burning
- Development
- Pollution; and
- Climate change

A summary of the drivers and economic sectors impacted by overexploitation are outline in the Fifth National Report 2010.

#### 3.3.1 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. Hillsides 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 coastal wetland ecosystems, as significant areas of wetlands are being reclaimed. 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.

### 3.3.2 Overexploitation

The unregulated harvesting of plants and animals by Jamaicans, particularly for food, is another significant pressure on the island's biodiversity (NEPA, 2015). This is particularly a problem in coastal and marine areas. 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>5</sup>

The Fisheries Division has declared approximately 11 areas as Special Fishery Conservation Areas (SCFA) /Fish Sanctuaries.<sup>6</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 has thereby assisted to promote increased biodiversity

One NGO group reported that fish biomass increased by over 500% from 2011-2013 (NEPA, 2015).

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<sup>5</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 threaten over 60%.

<sup>6</sup> Draft 2013 State of Environment Report. National Environment & Planning Agency



**Figure 3.4: Examples of Overexploited Species in Jamaica (NEPA, 2015)**

There is a high level of unemployment and a lack of 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.

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 international trade 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:

- Increased funding to support public awareness campaigns on biodiversity conservation.
- Examination of the institutional capacity building of the Fisheries Division 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.
- Finalization of the new Fisheries Policy and the new Fisheries Bill. The new Fisheries Policy has been drafted and seeks to address focused management and monitoring of fisheries industry. A new Fisheries Bill has also been drafted which proposed an increase in fines from a maximum of JA\$5,000 to JA\$3million, and also ensures that the Fisheries Division can take cases to the Supreme Court where there is no limit on fines.
- Improved direct consultations with the private sector and special interest groups when making decisions related to conservation of biodiversity.
- The need to declare additional fish sanctuaries. Local fisher folk has indicated that this strategy has proven successful and has resulted in increased fish stock wherever they are implemented.

### 3.3.3 Invasive Alien Species

Invasive species are responsible for 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 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 associated to trade products or transports. Shipping is a major vector for alien species, either associated to cargoes shipped or transported as biofouling communities and in ballast water.

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, 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 native 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 to include 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, 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. In Jamaica there are over 120 recorded invasive alien species. The Jamaica Invasive Species Database, managed through Jamaica the 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, only 60 have been inputted into the CHM invasive species database.

### 3.3.4 Pollution

Management of pollution particularly of water and soil contamination, has become increasingly difficult to control in Jamaica. Water pollution has direct impacts on biodiversity. Its effects may range from eradication of life at heavily

polluted areas to more subtle, but relevant impacts such as changes in freshwater and marine community structure and diversity. In addition, bioaccumulation of persistent contaminants, such as heavy metals and persistent organic compounds up the existing food chains, may compromise long-term survival of both freshwater and marine fauna, and it can also reach man through consumption of contaminated fisheries. An additional problem triggered by organic pollution is the onset of the eutrophication process, which changes aquatic community structure and affects water quality. Therefore, control of water pollution is of paramount importance to ensure protection of biodiversity and also human populations. Improving control of water pollution is therefore important to fulfil requirement of Aichi Targets, particularly Targets 2, 7, 8 (specific to control pollution), 10 and 14.

Some steps have been taken to improve control measure to preserve and prevent contamination of natural ecosystems. According to the Stocktaking Report (2015), major causes of water pollution in Jamaica include continued deforestation and the contamination of aquifers caused from commercial and domestic activities, seal level rise resulting in saline intrusion, contamination from agricultural activities, grazing and watering of livestock, untreated domestic discharge, and industrial effluents. Water pollution poses a serious threat to biodiversity and can severely affect the maintenance of a sustainable freshwater fishery. Constraints outlined include the lack of a policy to guide the utilization, management and protection of rivers.

The Mid-Term Framework Report 2015–2018 outlines priorities to improve the state of the natural environment. One of these priorities is to develop frameworks to address unregulated sources of pollution. To address this priority, a specific Sector Strategy entitled "Develop Framework for Non-Regulated Sources of Pollution" was implemented. This strategy unfolds into two different projects as follows:

- Undertake regulatory impact assessments of select non-regulated sources of pollution, and;
- Develop best practices guidelines for a least two non-regulated source categories.

Jamaica continues to strengthen its water quality monitoring regime through the implementation of controls to land-based sources of pollution. The NRCA Act (1996) requires the issuing of permits to dispose sewage and trade effluents. The existing Wastewater and Sludge Regulations (2013) provide a framework to control the issue of permits for sewage, trade effluents and sludge disposal. The existing licensing system also covers environmental licensing of new proposed developments through Environmental Impact Assessments. A licensing framework controlled by NEPA is responsible for the assessment of developer applications and the issuing of user specific permits. Standards exist for sewage, trade effluents and sludge, as well as ambient water quality (covering both freshwater and marine water) but monitoring needs to be increased.

Another significant source of both groundwater and surface water pollution is solid waste dumps. The accumulation of waste produces liquid effluent that flows down through the drainage system and infiltrates into the ground and groundwater aquifers. This liquid effluent is highly contaminated and organically enriched and represents a serious threat to water quality. The environmentally acceptable alternative would entail replacing unmanaged dumping areas for appropriately installed and managed landfills. These are sites designed to prevent the infiltration and run-off of waste effluent through the construction of a thick impermeable layer at the bottom of the dumping areas and in addition, adequate infrastructure for effluent collection and gas venting is used. The gas generated by organic waste is mostly methane (CH<sub>4</sub>) – very relevant as it promotes the greenhouse effect – and it can be adequately used for energy generation. In addition, waste effluent treatment facilities can be built to treat waste effluent adequately and render it harmless. At present, no regulations for the construction of landfills have been detected in Jamaica.

If the MTF recommendations are adequately implemented, the proposed measures would promote a significant reduction in water pollution in Jamaica and would also aid the conservation of existing biodiversity.

### 3.3.5 Climate Change

Climate change is a natural phenomenon which can also be induced by anthropogenic activities. Of note, international attention has focused on the impact of burning fossil fuels on the global atmospheric chemistry and temperatures. This influences the global energy budget and is leading to a global increase in temperatures and changes in global climatic conditions including rainfall and the frequency and intensity of extreme weather events. The projected changes on 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, 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). 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 aforementioned impacts from Climate Change are all expected to affect and influence Jamaica's biodiversity. As stated in previous section, Jamaica's biodiversity is already under serious stress from human impacts including land use change, pollution, invasive species, and over-harvesting of commercially valuable

species (Webber, PPT, n.d.). Climate change is an additional stress with expected profound impacts on the islands 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 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*).

(Source: Fifth National Report, 2015)

**Table 3.5: 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</li> </ul>

Impact	Threats to Biodiversity
	ecosystems in coastal areas. <ul style="list-style-type: none"> <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 oC), 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.)

Table 3.5 highlights the general impacts of climate on biodiversity in Jamaica. 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.

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 do we have before we need to take action? 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.

### 3.3.6 Biosafety

Biosafety is a term used to describe efforts to reduce and eliminate potential risks resulting from modern biotechnology and its products<sup>7</sup>.

The Cartagena Protocol on Biosafety is an international agreement which aims to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of Genetically Modified Organisms (GMOs), specifically focusing on transboundary movements through planned or accidental import/export. In June 2001, Jamaica signed the Cartagena Protocol on Biosafety, a supplementary agreement to the CBD (Draft

<sup>7</sup> Biosafety Brochure at <http://jamaicachm.org/im/~bch/>

Biosafety Policy, 2007). In Jamaica's preparation to ratify the Cartagena Protocol, the development of 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).

The policy document sets out objectives, strategies and implementation procedures for a range of state-led activities, which together create the framework for a national biosafety regime. The document addresses the safe use, transportation, storage and handling of Genetically Modified Organisms – including requirements for transboundary movement – and sets a policy framework for supporting research and public education on modern biotechnology (Draft Biosafety Policy, 2007). The policy is designed to meet not only international obligations, specifically those set out in the Cartagena Protocol on Biosafety, but also the peculiar needs and requirements of Jamaica as it seeks to benefit from the advantages of the technology (Draft Biosafety Policy, 2007).

The NBSAP referenced Article 19(3) recommends that parties consider the need for setting out appropriate procedures for the handling and use of living modified organisms that may have adverse effects on the conservation of biodiversity.

Threats to biodiversity from biotechnology in the Caribbean including Jamaica vary. However, those directly relating to biodiversity include the following:

1. Threats to the small, fragile ecosystems of the small island developing states (12 of the 15 regional countries)
2. Threats to large areas of rich biodiversity
3. Threats to sustainable livelihoods by agriculture and wildlife
4. Minimal capacity in biosafety
5. Inadequacy of immediate technical skills needed 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 the broader definition of biodiversity, it would appear that the Biosafety policy's treatment of this category is limited to safe handling and use of living modified organisms (LMOs). 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 necessary:

- Finalize the national biosafety and biotechnology policies, and develop domestic legislation for the safe handling, use and transboundary movement of 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.

### 3.4 Summary of Conservation Issues

Jamaica recognizes the significance of its biodiversity and the importance of conserving a comprehensive range of ecosystems to sustain biodiversity. However, there are many challenges hindering effective conservation measures. Sections 2.3.1 to 2.3.6 of the report outlined these issues for freshwater biodiversity, coastal and marine biodiversity, forest biodiversity, watersheds and specific species and their habitats including the challenges being faced in conserving them.

#### 3.4.1 Status of Endangered/Threatened Species

The Fifth National Report (2015) provides data outlining the comparison of the status of endangered species listed by the International Union for the Conservation of Nature (IUCN) for Jamaica between 2010 and 2013. Results show that some **mammals** (1) - such as the West Indian Manatee, birds (2) – such as the Yellow and Black-billed Parrots and **reptiles** (1) –such as the Jamaican Boa and Jamaican Iguana, have been listed as critically endangered while some **birds** (1), **amphibians** (2)- such as the Jamaican Snoring Tree frog and the Jamaican Yellow and Green Frog, and **plants** (1) have been categorized as endangered. Overall, the results indicate 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. The threats to these eight Critically Endangered

and Endangered species have been discussed in section 2.2 – Threats to Biodiversity.

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-World Conservation Union 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 auro-punctatus*) 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 2-6 below. There still exist some gaps in the site names of some of the AZE species

Table 3.6: 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 Pauraque
John Crow Mountains	<i>Pterodroma caribbaea</i>	Jamaica Petrel
Portland Bight and Ridge and surrounding areas	<i>Eleutherodactylus cavernicola</i>	

Source: Alliance for Zero Extinction, 2013

### 3.4.2 Protected Areas

“A protected area (PA) is an area of land and/or water that is managed for the protection and maintenance of its ecological, systems, biodiversity and/or specific natural, cultural or aesthetic resources,” (NEPA, 2016, p.1.). 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:

- 1) 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.
- 2) Provides genetic resources - for food and agriculture
- 3) Provides water - filter and supply fresh water for both rural and urban populations
- 4) Protects against natural hazards - mitigate the effects of natural hazards (for example, hurricanes, storms) by acting as barriers and buffer zones
- 5) Regulates climate – acts as natural carbon sinks and play a key role in global climate regulation

(NEPA, 2016)

System Master Plan 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. 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 responsibility of these PA does include 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, etc. that is protected to not only preserve the biodiversity of the area but protect other valuable aspects such as culture. Table 3.7 below highlights the types of protected areas in Jamaica with their respective number (2006 vs. 2010) and their enabling legislation.

Jamaica has commenced the development of a Protected Areas

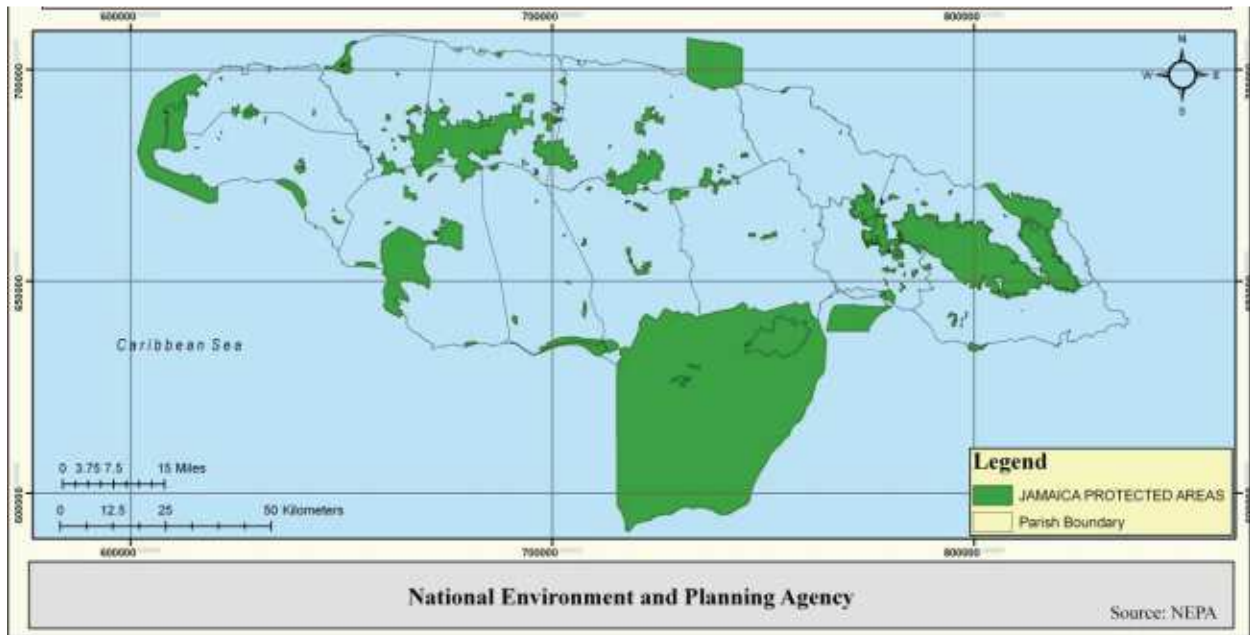
**Table 3.7: Types in Jamaica and numbers as of**

Type	Enabling Legislation	Number	
		2006	2010
National Parks	NRCA Act	1	1
Marine Parks	NRCA Act	3	3
Protected Areas	NRCA Act	4	4
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 Areas	NRCA Act	1	1
<b>TOTAL</b>		<b>226</b>	<b>244</b>

**of Protected areas their respective 2010**

Draft Natic

Source: NEPA, Forestry Department  
 \*Note that all 99 forest reserves also are game reserves  
 Note that in addition, 13,223 ha have been declared as Ramsar sites.



**Figure 3.5: 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 represents approximately 18% of Jamaica's total land area (200,000ha) while marine protected area account for approximately 15% (180,000ha) of the country's archipelagic waters (1.2% of Jamaica's total marine area (State of

the Environment Report, 2010). Figure 3.4 below 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 Marine Park, 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 Area Master Plan, 2012, 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

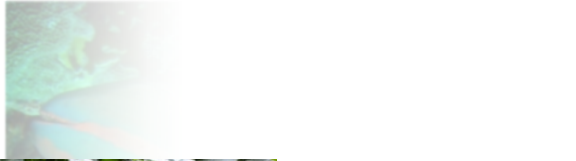
agencies responsible for different types of protected areas. Protected area policies and plans have since been developed for a number of areas including Mason River, Palisadoes/Port Royal, and the Blue and John Crow Mountains to name a few. One highlight was the 2015 Declaration at the United Nations of the Blue and John Crow Mountains National Park 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 pay for the management of all types of parks and protected areas remains to be developed. A National Park Trust Fund which was created has not generated adequate capital to provide funding for all parks and declared protected areas.

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 including National Park and Protected Area Strategies, Marine Parks, as well as several pieces of legislation or policies 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 and there is a lack of public awareness and political will to effect change.

## PART III – ASSESSMENT

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

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 of some species, pollution, and the spread of alien species. This is important for key sectors discussed in Section 4.1 to 4.11 below.

### 4.1 Drivers of Pressures on Biodiversity

#### 4.1.1 Socio-economic Factors

Historically, human activities have had a negative effect on biodiversity. This view is controversial, and in the case of Jamaica, needs closer examination.

#### 4.1.1.1 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).

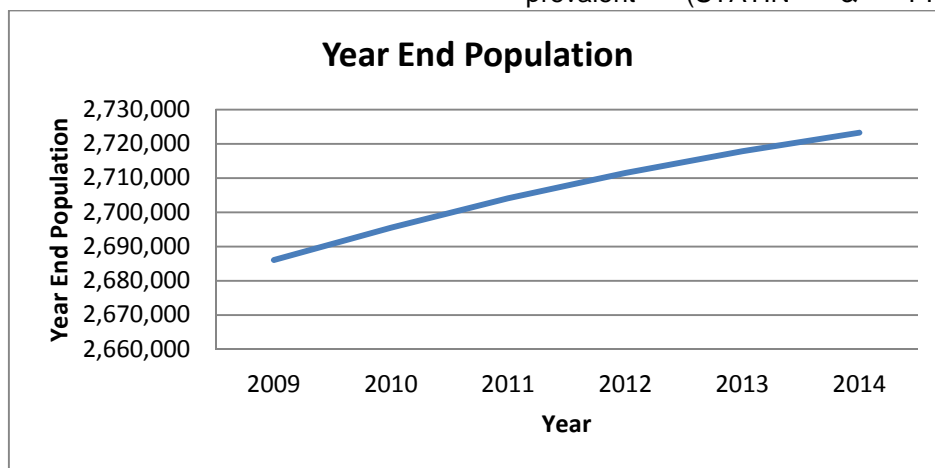


Figure 4.1: End of Year Population for Jamaica (Source: STATIN, 2016)

As at January 2016, approximately 13.3% of the Jamaica population (between ages 14 to 65) are reportedly unemployed (STATIN, 2016). Youth unemployment is most significant. Reports from the 2012 Jamaica Social and Living Conditions indicate that the Jamaican economy has continued to feel the lagged effects of the global economic recession. This recession has halted and reversed the progress that had initially led to

the historically low levels of poverty and high levels of real consumption recorded in 2007 (PIOJ & STATIN, 2014). Since the recession, unemployment has risen and analysis has revealed that poverty rose between 2010 and 2012, and has been rising subsequent to 2007 (PIOJ & STATIN, 2014).

#### **4.1.1.2 Lack of Capacity for Local Communities**

The Social Development Commission (SDC) and the Local Sustainable Development Plans (LSDP) are mechanisms designed to develop the capacity of people to participate fully and directly in the management and development of their local communities. LSDPs are prepared by the Parish Councils with the communities for the benefit of the communities.

Some Parish Councils have developed Local Development Plans for their respective parishes but implementation, in some cases, has proven challenging. Funding and human resource constraints have been significant.

In addition to work done by the Parish Council, there are other government agencies, such as the Rural Agricultural Development Agency (RADA) and Tourism Product Development Company (TPDCo), which also lead the charge to build the capacity of local communities. There are also independent groups that have led the charge to help build capacity in local communities through projects funded externally. The Women's Resource and Outreach Centre (WROC), which up to 2013 has had much emphasis on rural livelihoods development, is an example of these independent groups. Additionally, the Jamaica Social Investment Fund (JSIF), which plays a key role in poverty reduction in Jamaica, has had a very wide reach across Jamaica in building capacity for community groups that have established themselves as Friendly Societies or Co-operatives. As an ISO 14001 certified entity, JSIF has to build capacity based on Inter-American Development Bank and World Bank standards. Recipient beneficiary groups include farmers, fishers, community tourism groups, agro-processing and a host of others. There are also church groups, benevolent societies and other groups that have undergone projects in various communities to build local capacity.

#### **4.1.1.3 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 poor and vulnerable are defined as persons consuming below the poverty line, in addition to those consuming within 10.0 percent above it (PIOJ (2007)). The relationship between poverty and environmental degradation requires an integrated planning approach in order to achieve economic development and environmental sustainability. Addressing poverty leads to better environmental outcomes. 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 pressure on Jamaica's biodiversity resources one component is to address poverty that can lead to reductions in the dependency on natural resources.

The 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 in large part 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, 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.

#### 4.1.2 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** 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>8</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 he explored the feasibility of implementing a sustainable funding mechanism for ocean and coastal management in Jamaica. His 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 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.

#### **Carbon Pricing and Climate Mitigation**

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<sup>8</sup> International Institute for Environment and Development (2015) Markets and payments for ecosystem services <http://www.iied.org/markets-payments-for-environmental-services>

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.

### **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>9</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>10</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>11</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.

## **4.2 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 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

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<sup>9</sup> <https://www.wavespartnership.org/>

<sup>10</sup> <http://www-cif.climateinvestmentfunds.org>

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<sup>11</sup> <http://www.imf.org/external/np/fad/environ/>

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.

### **4.3 Public Awareness, Education, and Responsibility and Community 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) project which is currently being implemented by the Ecosystems Branch at NEPA. The project is being rolled out with joint efforts from NEPA's Ecosystems Branch and Public Awareness and Education Branch and the Forestry Department. It focuses on public awareness and capacity building over 6 Watershed areas including the Hope River, the Montego River, Rio Cobre, Rio Minho, the Yallahs River and the Black River.

Results so far have shown some positive change, but the road to change is a long one. 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.

In stakeholder consultations, NEPA has expressed the view that there are some gaps in studies needed, for example:

- Population studies for animals and plants that are being harvested so that a

- sustainable yield can be set to avoid depletion;
- Mapping of wetland areas including coral reefs;
- 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.
- 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.
- The CHM needs to be better publicised so that greater benefits can be garnered from the use of this website.

- The National Environment Education Committee needs to be reactivated.

#### 4.4 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) stocktaking report provided an updated account of the current actions that had been taken to address these gaps and status of implementation. Table 4.1 below presents the gaps and needs identified based on the assessment completed.

**Table 4.1: Policy and Legislative Gaps and Needs**

<b>Policy and Legislative Gaps and Challenges</b>	<b>Needs</b>
<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 Regs r16) or a Marine Park (Marine Park regs, r9)</p>	<p>Examine existing regulations for biological sampling and export of endemics. Link to Ministry of Agriculture, Veterinary Services Division. Cross-cutting with Biosafety</p>
<p>Develop legislation to address the commercial use of Living Modified Organisms (LMOs)</p>	<p>Restart National Biosafety Committee. Follow CBD guidelines for developing legislation. Cross-cutting with Sustainable Agriculture</p>

Policy and Legislative Gaps and Challenges	Needs
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.	The NRCA Act needs to be revised to increase fines etc. especially for hazardous waste.
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.	The NRCA Act needs to be revised to provide provisions relating to buffer zones. The Caste of Blue and John Crow Mountains National Park can be used to inform revision.
<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>Section 19 of the Beach Controls Act (1956) addresses coastal resources and the ability to sue for damage to these resources.</p>	Enforcement and funding to conduct baseline monitoring and as such enforcement and monitoring efforts should be improved.
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 or offshore cay.	Policy should be developed on the protection of rivers and caves or offshore cay.

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 other government agencies responsible for conserving biodiversity. This cross-cuts with the incorporation of Natural Capital and Environmental Benefits into National Accounts.

With regards 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.

## 4.5 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 achieve a more adequate Land Use Management in Jamaica.

Most 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 as 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;
- 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 Land Use Planning department has identified shortage or

human resources and technology to perform their 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. 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.

## 4.6 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;
- Increasing control over the importation of agricultural plants and animals to prevent the introduction of harmful alien species.

## 4.7 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 Forest (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;
- 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.

## 4.8 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 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 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;

- 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;
- Adequate assessment of biodiversity and other impacts.

## 4.9 National Security and Justice

Existing enforcement of biodiversity relevant laws are primarily through the government's environmental management agencies, namely, 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 Jamaica 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.

## 4.10 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. There are a number of relevant Aichi Targets (16 and 18) that 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 CHM and access and 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.



#### 4.11 Summary of Progress towards Achieving 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 results have been summarised in the Table 4.2 below. 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 the Strategy to conserve and preserve biodiversity. The Consultants have rated the progress based on the ability to achieve the targets by 2020 and is reflected in the last column and coded as follows:

Key	Colour Code
No real progress and not likely to meet target	Red
Partial progress	Yellow
On track to meet target	Green
Target already exceeded	Blue









Table 4.2: Summary of Jamaica's Progress towards Achieving the Aichi Targets



Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
<p>Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society</p>	<p>1.  By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.</p>	<ol style="list-style-type: none"> <li>1. Institute of Jamaica, Natural History Museum of Jamaica (IOJ-NHMJ) on-going outreach activities within schools and communities on biodiversity using museum specimens</li> <li>2. IOJ-NHMJ temporary exhibitions exploring themes including butterflies of Jamaica Orchids of Jamaica and other aspects of Jamaica's biodiversity and renovation of permanent exhibition space/display gallery to expand outreach to wider public.</li> <li>3. IOJ – NHMJ Annual Earth Day Essay, photo, poster and performing arts competition exploring annual themes through print media advertisements and announcements</li> <li>4. Jamaica Clearing House Mechanism Website (Ja.-CHM), promote and facilitate knowledge sharing and information exchange at national, regional and international levels on biodiversity and related activities. Also provides links to international databases that contain local species information. Recent Launch of National Invasive Alien Species database, open-source version.</li> <li>5. Various public awareness strategies and programmes under several grant funded projects to include; regional project on Mitigating the Threat of Invasive Alien Species in the Insular Caribbean (MTIASIC, 2010-2014), National Protected Areas System (NPAS) project 2010-2016,</li> <li>6. The Knowledge Attitudes and Practices (KAP) survey was completed under the Protected Areas Systems Master Plan, which identifies the status of the public's understanding of biodiversity.</li> <li>7. NEPA publications to include State of the Environment (SOE) reports (2010 and 2015) and quarterly IAS newsletters, print and electronic media advertisements, exhibitions and various public education activities, media interviews,</li> <li>8. Climate Change jingle done by Voices for Climate Change</li> <li>9. Several Government agencies, for example, NEPA, Forestry and RADA have Units/Branches that focus on Public Awareness activities that relate directly to Biodiversity.</li> <li>10. Forestry Dep't has also established several active Local Forest Management Committees (LFMCs).</li> <li>11. Some NGOs like JET, CCAM, have ongoing public awareness activities.</li> </ol>	<p>Partial progress</p>
	<p>2.  By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and</p>	<ol style="list-style-type: none"> <li>1. Government Officers trained in in Natural Resources Valuation (NRV) Techniques (2010-2013)</li> <li>2. Incorporation of Environmental Sciences in schools curricula at various levels</li> <li>3. Implementation of Environmental Impact Assessment within NRV project in 2010-2013 reporting period where Portland Bight Protected Area was selected for environmental assessment.</li> <li>4. Integration of biodiversity conservation into Goal 4 of Vision 2030, national development plan for Jamaica, that Jamaica has a healthy natural environment.</li> </ol>	<p>No real progress</p>


Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
	<p>planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.</p>	<p>The Plan is guided by: - Four (4) interrelated National Goals that identify what we want to achieve for the society, economy, environment and in governance - 15 National Outcomes that are linked to the relevant National Goals - 84 National Strategies that guide the steps of ministries, departments and agencies of government (MDAs), private sector, civil society from 2009 to 2030 - A Results-based Monitoring &amp; Evaluation framework - Indicators &amp; Targets at the national and sector levels.</p> <ol style="list-style-type: none"> <li>5. Vision 2030 detailed sector plan 2009-2030, Natural Resources and Environmental Management and Hazard Risk Reduction and Climate Change.</li> <li>6. The various Strategic Business Plans of the Government (2014-2017) have been aligned to the Vision 2030 National Development Plan as well as aspects of the Medium Term Socio-economic Framework 2015-2018. The Medium Term Framework as published by the Planning Institute of Jamaica (PIOJ) has incorporated the SDGs as indicated in Sections 1.4.2 and 1.5.2.</li> </ol>	
	<p>3.  By 2020, 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 international obligations, taking into account national socio economic conditions.</p>	<ol style="list-style-type: none"> <li>1. Forestry Department offers tax remissions to private land owners once land is declared a forest reserve as form of incentive for conservation and sustainable use of biodiversity.</li> <li>2. Conservation Easement Proposal under NPAS project</li> <li>3. Fee charges from incoming airline and cruise passengers contribute to the Tourism Enhancement Fund in place since 2005. Some of the TEF is used to fund environmental assessments that seek to promote environmental management in the tourism sector (e.g. carrying capacity studies).</li> </ol>	Partial progress
	<p>4.  By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have</p>	<ol style="list-style-type: none"> <li>1. Several steps to achieve sustainable production and consumption have been taken or plans for this purpose have been implemented</li> <li>2. In 2012, the Special Fishery Conservation Areas (SFCAs) Regulations came into force. This allowed for authorized fishing with conditions to take place in former "fish sanctuaries" and newly declared SFCAs for activities such as research or to remove invasive species. Generally, no fishing is allowed within the declared boundaries of SFCAs. The new regulations effectively recognized 14 areas (2</li> </ol>	Partial progress

Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
	<p>implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.</p>	<p>previously declared in 1979 and 1986) as SFCAs.</p> <ol style="list-style-type: none"> <li>3. The establishment of closed seasons for sharks, sea urchins and sea cucumbers in 2013</li> <li>4. Regular monitoring of fish quotas by the Veterinary Services Division and the Fisheries Division</li> <li>5. Implementation of sector strategy under the national socio-economic policy framework within Vision 2030, which includes taking steps to reverse unsustainable use of fisheries by enhancing monitoring, control, surveillance and enforcement of fisheries regulations.</li> <li>6. Revision of policies and legislation to include the development of management plans which will include co-managed arrangements and strategies, revised fines and offences, quality control e.g. New Fisheries Bill, Revised Forest Policy, The Quarries Control (Amendment) Act 2015.</li> <li>7. Implementation of sector strategy under Vision 2030 to: Promote the sustainable use of biological resources to include activities such as encouraging alternative livelihood ventures that have been supported in 5 marine communities inclusive of marine protected areas</li> <li>8. Forestry Department 2013 submission for the declaration of 13 additional forest reserves</li> <li>9. Forestry Department continued collaborations with Rural Agricultural Development Authority (RADA) ensure farmers are providing shade for crops with the use of trees</li> <li>10. Activities under the EU-CCA&amp;DRR project 2010-2013 include: <ul style="list-style-type: none"> <li>• The Forestry Department's Reforestation activities and Sustainable Livelihoods with Local Forest Management Committees</li> <li>• Increased community involvement to promote agro-forestry &amp; sustainable livelihoods</li> <li>• Sustainable land management and water security within the Yallahs River and Hope River Watershed Management Units</li> </ul> </li> <li>11. Ministry of Tourism and Entertainment in partnership with the National Environment and Planning Agency (NEPA) Ten Year Framework of Programmes on Sustainable Consumption and Production implemented to include tourism activities such as craft, the accommodation sector and attractions.</li> <li>12. Mines and Geology Division established a National Restoration Committee in 2009 with one of its objectives to develop guidelines and knowledge that will facilitate effective management of the restoration process focusing inter alia, on benchmarking, best practices, research and development.</li> <li>13. The impacts of use of natural resources with safe ecological limits</li> <li>14. Fishing quotas relevant to the Queen conch fishery where an annual National Quota is established for harvesting and is monitored by the Veterinary Services Division (VSD) and The fisheries Division</li> <li>15. Under the amended Quarrie Control Act 2015, a buffer zone of 15 metres between</li> </ol>	



Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
<p>Strategic Goal B:</p> <p>Reduce the direct pressures on biodiversity and promote sustainable use</p>	<p>5.  By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.</p>	<p>the land on which the quarry is located and the adjoining properties will be imposed.</p> <ol style="list-style-type: none"> <li>1. Establishment of reforestation activities under the EU-CCA&amp;DRR project 2010-2013 to include 405 ha reforested in the Yallahs River, Hope River, Buff Bay/Pencar and Rio Bueno River WMUs, by the Forestry Department.</li> <li>2. Artificial Reefs in sanctuaries</li> <li>3. Mangrove rehabilitation (UDC and UWI) The revised Forest Policy recommends that the protection and conservation of closed broadleaf forest types must be held in trust for the people of Jamaica. The protection allows for succession into the closed broadleaf forest type.</li> <li>4. Increased enforcement in Forested areas, fish sanctuaries and protected areas.</li> </ol>	Partial progress
	<p>6.  By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.</p>	<ol style="list-style-type: none"> <li>1. This will be addressed through the passing of a new Fishing Act slated for completion in 2016. This will be supported by a National Fisheries and Aquaculture Policy which is set to become a Green Paper through a Cabinet Submission. (Currently, significantly increased fines have been approved by Parliament to complement the new Act.)</li> <li>2. Representation of FD on the Ramsar Committee.</li> <li>3. The concept of Ridge to Reef is consistent through the development and execution of projects conducted during that time period &amp; supported in partnership with NEPA and other relevant stakeholders</li> </ol>	Partial progress
	<p>7.  By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.</p>	<p>Agriculture:</p> <ol style="list-style-type: none"> <li>1. Aquaculture will for the first time be governed by provisions under the revised Fishing industry Act.</li> </ol> <p>Forestry:</p> <ol style="list-style-type: none"> <li>2. Since 2010 the FD has developed and implemented Forest Management and Strategic Plans to include Forest Management Plan for the Cockpit Country Forest Reserve completed and approved in 2012.</li> <li>3. Forest Fire Management Plan was completed in 2013 to guide the Forestry</li> </ol>	Partial progress




Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
		<p>Department and other key stakeholders in the planning for, preventing and management of forest fires.</p> <ol style="list-style-type: none"> <li>4. FD reforestation activities to include over 400 hectares of degraded land since 2010</li> <li>5. Establishment of 13 Local Forest Management Committees (LFMCs) as of 2013</li> <li>6. Revision of the Forest Policy through series of consultations, drafts and reviews</li> </ol>	
	<p>8.  By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.</p>	<ol style="list-style-type: none"> <li>1. The Pollution Monitoring and Assessment Branch of NEPA implemented a National Water Quality Monitoring Programme in 2011 in an effort to sustainably manage the island's watersheds and coastal areas. The programme allows for NEPA and key stakeholders to closely monitor the trends in water quality and changes over the years.</li> <li>2. Kingston Harbour Environmental Management Programme (KHEMP) project was implemented in 2010 by the Pollution Prevention Branch (NEPA) for the regulation of companies that operate along the rim of the Kingston Harbour. This resulted in a reduction of the emission of effluent into the harbour thereby reducing pollution levels.</li> <li>3. Natural Resources Conservation Wastewater and Sludge Regulations passed in 2013 which allows for trade effluent to be monitored and utilises the polluter pays principle.</li> </ol>	Partial progress
	<p>9.  By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.</p>	<ol style="list-style-type: none"> <li>1. Implementation of the Regional Project on Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MTIASIC) implemented 2009-2014 to produce:</li> <li>2. Re-establishment of the National Invasive Alien Species Working Group, an interagency network for monitoring and overseeing IAS management in Jamaica.</li> <li>3. Development of Pet Trade Pathway Toolkit</li> <li>4. Development of a National Invasive Alien Species Strategy and Action Plan (NIASSAP)</li> <li>5. Ongoing monitoring of pilot projects beyond 2014 and implementation of control/eradication strategies</li> <li>6. Development of Lionfish Management Plan</li> <li>7. Jamaica Clearing House Mechanism (Ja-CHM) continued upgrading of IABIN Invasive Information Network (I3N) database to develop the National Invasive Alien Species database.</li> </ol>	Partial progress
	<p>10.  By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.</p>	<p>A multi-sectoral Action Plan for Corals and Reefs (APCAR) was developed in 2011 as a guide to enhance effective management of corals and reefs. APCAR contains nine conservation strategies under two main themes:</p> <ol style="list-style-type: none"> <li>1. Understanding Coral Reef Ecosystems <ul style="list-style-type: none"> <li>• Map Coral Reefs</li> <li>• Monitor, Inventory and Assess Reef Status</li> <li>• Conduct Strategic Research</li> </ul> </li> <li>2. Understanding the Human Dimension <ul style="list-style-type: none"> <li>• Reducing Anthropogenic impacts on the sea</li> </ul> </li> </ol>	Partial progress



Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
		<ul style="list-style-type: none"> <li>• Create an optimal network of Marine Protected Areas (MPAs)</li> <li>• Reduce pollution and habitat destruction and degradation</li> <li>• Restore Reefs</li> <li>• Create an informed public</li> <li>• Facilitate Alternate livelihoods</li> </ul> <ol style="list-style-type: none"> <li>3. Implementation of a coral reef health index report card in 2011 for monitoring the status of coral reefs through assessments.</li> <li>4. NEPA monitors a minimum of 20 reef sites annually.</li> <li>5. Data from assessments conducted between 2010 and 2013 reveal that the average coral cover per site was 18.1% while average algal cover was 32.2% compared to Average HC cover 2007-2009 = 12.9% (across 46 sites). Average NIA cover 2007 – 2009 = 33.2%</li> <li>6. Extensive reforestation of selected Watersheds (Hope and Yallahs) under EU-CCA&amp;DRR project under the concept of Ridge to Reef.</li> </ol>	
<p>Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity</p>	<p>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.</p>	<ol style="list-style-type: none"> <li>1. The declaration of New Fish Sanctuaries is to be undertaken under the new Fisheries Act.</li> <li>2. Caribbean Challenge: Jamaica's achievement way above the target where Protected Areas covered approximately 18% of the country's land area as well as 15% of its archipelagic waters.</li> <li>3. Submissions were made in 2013 for the declaration of 11 Forest Management Areas and 13 Forest Reserves.</li> <li>4. Development of Jamaica's Protected Areas System Master Plan (PASMP)</li> </ol>	On track to meet target
	<p>12.  By 2020 the extinction of known threatened species has been prevented and their</p>	<ol style="list-style-type: none"> <li>1. Funding through Small Grants Programme of the Global Environment Facility (GEF) has led to the development of a conservation zone at the Hope Zoo that holds the Jamaican Iguana head-start programme and animals in the National rescue programme.</li> <li>2. Implementation of the GEF funded regional project in Jamaica in 2009 included the terrestrial component that focused on recovering populations of the Jamaican</li> </ol>	Partial progress

Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
	<p>conservation status, particularly of those most in decline, has been improved and sustained.</p>	<p>Iguana, <i>Cyclura collei</i>, in its only remaining habitat in the Hellshire Hills. Primary objectives included:</p> <ul style="list-style-type: none"> <li>• IAS predator control</li> <li>• Protection and monitoring primary communal nesting sites</li> <li>• Head-start releases</li> <li>• At the close of the project in 2014, there was a 6-fold increase in the number of females nesting since 1991 and a 2-fold increase since 2010.</li> </ul> <p>3. Development of recovery/management plans for endangered and threatened species and reports on management activities for species including the American Crocodile, West Indian Manatee and Sea Turtles.</p> <p>4. Jamaica Environment Trust (JET) in collaboration with the Portland Environment Protection Association (PEPA), the Bluefields Bay Fishermen's Friendly Society, and the Treasure Beach Turtle Group sea turtle monitoring project<sup>12</sup> 2010-2011 in three parishes: Portland, St. Elizabeth and Westmoreland through funding from the Environmental Foundation of Jamaica and the Canada Fund.</p>	
	<p>13.  By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.</p>	<p>1. Development of Plant Conservation Strategy for Jamaica in 2013 and represents the country's commitment to conserving and protecting its high plant diversity and endemism for the environment and socio-economic well-being of its people.</p> <p>2. Jamaica's Scientific Research Council (SRC) maintains an in vitro gene bank that hosts plants of economical, medicinal and cultural importance and those endemic to Jamaica. This in vitro gene bank has approximately 135 different species of plants, which gives a total of more than 4000 plants in tubes and jars. These plants range from food crops (Yams, Bananas, cassava, ginger, sugarcane, jackfruit, pineapple, Irish potato etc.), ornamental plants (roses, orchids, Anthurium, African violet, Kalanchoe, Petunia, Caladium etc.) and medicinal, cultural and endemic plants (Guinea hen weed, turmeric, <i>Turnera camapaniflora</i> etc).</p> <p>3. SRC, Ministry of Agriculture and Fisheries and International Atomic Energy Agency (I.A.E.A.) collaborated on a plant breeding project in 2007-2011. The project was aimed at developing irradiated tissue culture ginger and sweet yam plants, that are resistant to ginger rhizome rot and anthracnose respectively. Currently, irradiated plants are being screened for resistance to mentioned pathogens under greenhouse conditions.</p> <p>4. The establishment of Forest Reserves to protect and preserve the genetic diversity that exists within those pre-defined areas. These areas are associated with the highest levels of genetic diversity.</p> <p>5. The Forest policy and Strategic Forest Management Plan are aimed at strengthening the enabling conditions to minimize genetic erosion while enhancing</p>	Partial progress

<sup>1212</sup> <http://www.jamentrust.org/conservation/jamaica-sea-turtle-project.html>

Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
		environmental safeguards.	
<p>Strategic Goal D:</p> <p>Enhance the benefits to all from biodiversity and ecosystem services</p>	<p>14.  By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.</p>	<ol style="list-style-type: none"> <li>1. Tourism Partnership activity through the Adaptation Fund where there is work in the Negril Area that involves a Disaster Risk Management with a focus on communities including women who are trained in Natural Resources Management. Development of a Climate Risk Atlas that maps vulnerable areas to disaster.</li> <li>2. 2013 Development and implementation of a community based water quality first responder programme in response to pollution incidents. Special areas targeted include RAMSAR sites such as the Black River Lower Morass among other protected areas including the Montego Bay Marine Park, and watershed areas.</li> <li>3. Watershed Areas Management (WAM) mechanism implemented with the aim of changing the behaviour of communities in the management of watershed areas.</li> <li>4. Increased freshwater quality monitoring in resort towns as well as several major river systems previously ranked as severely degraded in 1990.</li> <li>5. Community Based Resource Management (CBRM) mechanism</li> <li>6. Agriculture</li> <li>7. All reforestation activities conducted are aligned with forest-dependent community involvement; whereby gender equity is enforced to ensure that the social safeguards are addressed and respected Forestry</li> <li>8. Continued activities on the cross-sectoral RAMSAR committee towards the continued management Jamaica's wetland resources in keeping with the Convention's objectives and work plan</li> </ol>	Partial progress
	<p>15.  By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.</p>	<ol style="list-style-type: none"> <li>1. Reforestation activities led by the Forestry Department focused on re-establishing degraded sites with the emphasis of carbon stock conservation and enhancement.</li> <li>2. The on-going forest estate boundary demarcation and verification programmes are to ensure that public forested areas in FRs or FMAs are appropriately protected and conserved</li> <li>3. Mines and Geology Division of the Ministry of Energy and Mining established a National Restoration Committee in 2009 which is chaired by the Commissioner of Mines and includes representatives from main universities and relevant government agencies including the Ministry of Agriculture and Fisheries (MOAF), Forestry Department, etc. One of the objectives of the Committee is to develop the requisite guidelines and knowledge that will facilitate more effective management of the restoration process, focussing inter alia, on benchmarking, best practices, research and development.</li> <li>4. Current drafting of guidelines for the rehabilitation of lands mined out for the bauxite industry.</li> </ol>	Partial progress

Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
	<p>16.  By 2015, 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.</p>	<ol style="list-style-type: none"> <li>1. Jamaica has not yet ratified the Nagoya Protocol on ABS although some strides have been made to do so by the development of a technical interagency working group. The group includes the Jamaica Intellectual Property Office (JIPO), NEPA, the Environment Resource Management Division and the Attorney General Department. To date, a draft Roadmap has been developed for Jamaica and this is to be approved by the relevant agencies. A part of this Roadmap speaks to determining the legislative framework necessary before ratifying this Protocol.</li> <li>2. Jamaica has indicated to the IUCN that it would like to be a part of the Regional GEF ABS Project for the Caribbean and if successful, support would be available for assistance in developing local as well as regional legislation on ABS. NEPA would be the designated executing agency for Jamaica.</li> </ol>	Partial progress
<p>Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building</p>	<p>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.</p>	<ol style="list-style-type: none"> <li>1. Stocktaking exercise of current NBSAP 2003 complimented by stakeholder consultations on current biodiversity status and trends undertaken.</li> <li>2. Jamaica is preparing the revised NBSAP 2016 to 2021.</li> </ol>	On track to meet target
	<p>18.  By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation</p>	<ol style="list-style-type: none"> <li>1. The development of Local Forest Management Committees (LFMC) is to ensure that social and environmental safeguards are addressed and respected for the benefit of all. Up to 2013, 13 LFMCs existed.</li> <li>2. Jamaica has not legislated or made any plans to legislate the protection of any traditional knowledge, innovations and practices of local communities relevant for the conservation and sustainable use of biodiversity.</li> </ol>	Partial progress

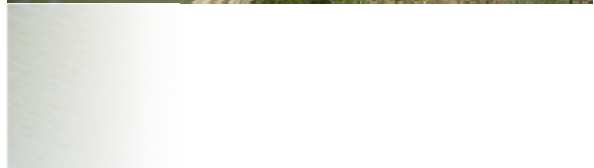
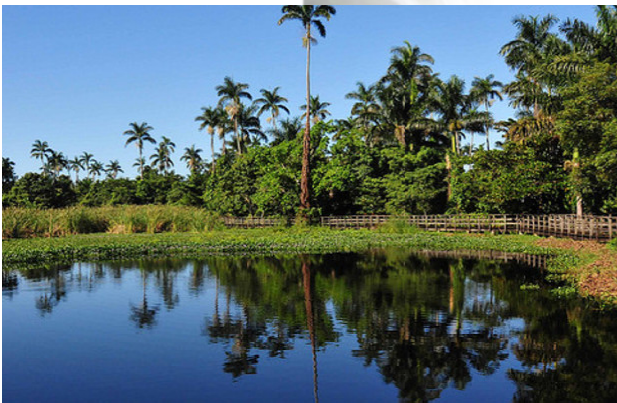
Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
	of indigenous and local communities, at all relevant levels.		
	 <p>19. By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.</p>	<ol style="list-style-type: none"> <li>1. Continued activities of the Jamaica Clearing House Mechanism, the National History Museum, Institute of Jamaica, NEPA and the Forestry Department through the guidance of the cross-sectoral CHM Steering committee, in sharing biodiversity and related information including current research projects, global species databases, national programmes and activities and CBD updates.</li> <li>2. Active participation of research institutions including the University of the West Indies on several biodiversity and related national committees where research updates are shared.</li> <li>3. Memoranda of Understanding between NEPA, and research agencies and institutions to include, the University of the West Indies, Institute of Jamaica and the Scientific Research Council.</li> </ol>	Partial progress
	 <p>20. By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.</p>	<p>The current NBSAP 2016 to 2021 will have an Action Plan supported by a resource mobilisation strategy.</p> <p><b>The Millennium Development Goals (MDGs)</b>  Several activities have been undertaken which illustrate how Jamaica is responding to MDGs of relevance to the CBD namely MDGs 1 and 7, which refer to linkages between biodiversity and progress towards the 2020 Aichi Biodiversity Targets.</p> <p><b>GOAL 1:  ERADICATE EXTREME POVERTY &amp; HUNGER</b></p> <p><b>Target 1.B:  Achieve full and productive employment and decent work for all, including women and young people</b></p> <p><b>NEPA funded C-CAM: Alternative Livelihood Project – 12012-2013</b></p> <ol style="list-style-type: none"> <li>1. The project entailed the provision of grants to a Bee farmer in Mitchell Town and C-CAM to implement projects which will provide alternative livelihoods that are less vulnerable to Climate Change. This included the training of young persons in bee farming and establishing 2 hives in Mitchell Town &amp; Salt River, Clarendon (C-CAM had administrative responsibilities for that project).</li> <li>2. Ministry of Agriculture and Fisheries Alternative livelihoods ventures have been supported in 5 marine communities inclusive of marine protected areas:- (Negril, Montego Bay, Portland Bight, Westmoreland, St. Thomas) 2012-2015. The activities</li> </ol>	Partial progress

Strategic Goals	Aichi Targets	Jamaica's Progress	Progress
		<p>promoted include: Apiary, Construction of Marker Buoys, Establishment of a Palm Nursery, Sea Moss farms, Eco-tourism activities<sup>13</sup>.</p> <p><b>4. GOAL 7: ENSURE ENVIRONMENTAL SUSTAINABILITY</b></p> <p><b>Targets</b></p> <p><b>Target 7.A:</b> <b>Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources (Aligned with Aichi Target 7)</b></p> <ol style="list-style-type: none"> <li>1. Since 2010 the FD has developed and implemented Forest Management and Strategic Plans to include Forest Management Plan for the Cockpit Country Forest Reserve completed and approved in 2012.</li> <li>2. Forest Fire Management Plan was completed in 2013 to guide the Forestry Department and other key stakeholders in the planning for, preventing and management of forest fires.</li> <li>3. Revision of the Forest Policy through series of consultations, drafts and reviews</li> <li>4. National Plant Conservation Strategy 2014</li> <li>5. National Invasive Alien Species Strategy and Action Plan (2104)</li> <li>6. Protected Areas System Master Plan (PASMP)</li> <li>7. Revised Fisheries Policy</li> </ol> <p><b>Target 7.B:</b> <b>Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss (Aligned with Aichi target 11)</b></p> <ul style="list-style-type: none"> <li>• Protected ecosystems covered 15.2 per cent of land and 8.4 per cent of coastal marine areas worldwide by 2014.</li> <li>• Caribbean Challenge resulted in Jamaica's achievement way above the target where Protected Areas covered approximately 18% of the country's land area as well as 15% of its archipelagic waters.</li> </ul>	

<sup>13</sup> Vision 2030 Medium Term Socio-Economic Policy Framework 2012 – 2015. Sector Strategy: *Promote sustainable use of biological resources*

## PART IV – THE BIODIVERSITY STRATEGY AND IMPLEMENTATION PLAN

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## 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.

## Goals

The Convention on Biological Diversity's (CBD) Strategic Plan 2011-2020 recognised that at the end of the last strategic period in 2010, that there were significant issues, including the recognition that biodiversity is the foundation of sustainable development and its rate of loss is still accelerating. In order for the threat to be properly addressed, a new CBD Strategic Plan was adopted at CoP-10 in 2010 in Nagoya, Japan. The 2010 Plan presented five Strategic Goals and Aichi Targets which the Government of Jamaica is embracing for the next 5 years starting 2016 and ending 2021. Stakeholder consultations lend to consensus that Jamaica adopts these goals because they are relevant and applicable to the Jamaican environment. The Strategic Goals are as follows:

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

Part IV of this NBSAP elaborates on the twenty Aichi Targets that Jamaica embraces to achieve the five goals listed above.

## Guiding Principles

The following principles were used to guide the development of the NBSAP 2016-2021 but are also intended to provide guidance to decision-makers, developers, and citizens in support of efforts to achieve the stated vision and Strategic Goals for biodiversity in Jamaica.

### **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 National Biodiversity Targets and Indicators

The National Biodiversity Targets and Indicators is a part of Jamaica's Strategy to conserve and preserve biodiversity. Section 6 then 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 themes namely, gender, climate change and disaster risk reduction. This will be supported by the resource mobilization strategy elaborated in Section 7. Section 8 then presents the Implementation Plan and Section 9 presents the monitoring to keep track of Jamaica's performance with respect to meeting the National Targets and Indicators presented in Section 5.1 below.

## 5.1 National Targets and Indicators

The Government of Jamaica is in the process of meeting the Convention on Biological Diversity's (CBD) Strategic Plan 2011-2020 and has embraced the Strategic goals and Aichi Targets outlined below. Section 6.2 presents the National Biodiversity Targets as modified for Jamaica and the supporting indicators and timelines for achieving each. CBD's Aichi Targets are already presented in Part 1 of this report. 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 6.1 below presents the modified targets and indicators that were developed through stakeholder consultations. The table presents the priority activities and indicators for each National Targets identified for Strategic Goals A–E. These represent the proposed priorities for 2016–2021. The reference number for each indicator has been developed based on the related Aichi Targets as outlined below:

1. T1/T2/T3 etc. represents the Aichi Target 1 or 2 or 3 accordingly
2. a, b, c, etc. is used to count the different indicators associated with each Aichi Target.
3. For example:
  - T1-a represents the first indicator under Target 1
  - T14-c represents the third indicator under Target 14

To support these National Targets and Indicators a description of both the qualitative and quantitative indicators will be used to guide the entities responsible for collecting the requisite data to be monitored.

Key to successful implementation of the national targets and indicators, presented below, is sustainable financing. Special attention to Aichi Target 20 at the national and international levels is therefore critical. This will require the facilitation of access to financial resources and must be accompanied by appropriate monitoring, reporting and review. Section 6 which follows this table outlines a resource mobilisation strategy, which a part of this national thrust.

The end result of successful implementation should result in Jamaica being able to seriously address the five major strategic goals. Addressing the underlying causes of biodiversity loss will require a focus on poverty alleviation and proper development that leads to a reduction in direct pressures on Jamaica's biodiversity. Safeguarding key ecosystems and preserving biodiversity should result in benefits to all Jamaicans. However, if there is a potential to generate additional benefits through products from harnessing genetic diversity, all Jamaican stakeholders and in particular, vulnerable communities dependent on the resources, should be included as part of a benefit-sharing system. This will require participation from a wide range of stakeholders who have the requisite capacity and to make sound decisions that benefit all Jamaicans.

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 below. It is recommended that the MTF Environment thematic group 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, 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>14</sup> survey completed (Categories: Not done, to some extent, great extent, Completed)	To some extent	Completed	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)	Not done	Completed	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)	Not done	Great extent	Develop the relevant educational curricula relating to aspects of biodiversity to be implemented in schools			Q4			GOAL A Target 1	NEPA, Ministry of 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		National projects	Extent to which TEEB and	0	1	Implementation of national				Q4		GOAL A	NEPA

<sup>14</sup> KAP means Knowledge Attitudes and Practices

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	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.	using TEEB and SEEA <sup>15</sup> approaches implemented	SEEA approaches developed. (Categories: Not done, to some extent, great extent, Completed)			projects using TEEB and SEEA approaches.						Target 2	
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, Fisheries, 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	3	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, Fisheries, Agriculture, MGD
T2-e		Inclusion of natural capital into national budgets and priorities	Value of natural capital for marine resources, and coastal protection reflected in the national budget	0%	20%	Include of natural capital into national budgets and priorities		Q4				GOAL A Target 2	Ministry of Finance, ERMD <sup>16</sup> , NEPA

<sup>15</sup> The Economics of Ecosystems and Biodiversity; System of Environmental-Economic Accounting

<sup>16</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		
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.	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, ERMD
T3-b		Ecological limits/footprint and carrying capacity assessments for key economic sectors completed	Number of Ecological Carrying Capacity studies completed	1	3	Use baseline information to conduct additional ecological limits/footprint and carrying capacity assessments for key economic sectors (such as tourism, bauxite, fisheries, sand mining and forestry) in terms of sustainable production and consumption				Q4		GOAL A Target 3	NEPA
T3-c		Increase in the number of conservation easements 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

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
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 data reflected in the SOE but many gaps exist.			Q4			GOAL A Target 4	NEPA
<b>STRATEGIC GOAL B – Reduce direct pressures on biodiversity loss and promote sustainable use</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		
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>Geocrapromis 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	% increase in the Area coverage (hectares) of forests and wetlands	40	50	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	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	Annual monitoring Report on fishing production	Tonnage produced 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	Tonnage produced of the 3	0	3	Monitor and report fishing				Q4		GOAL B	Fisheries

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	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.	Report on fishing production	most important invertebrate species disaggregated by fish species	(data not disaggregated as required)	(reports on 3 fish species)	production (tonnage produced/target species)						Target 6	Div.
T6-c		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		10 Year Plan for reducing destructive fishing practices  Increased number of fishing areas monitored	Number of destructive fishing cases prosecuted and recorded	0 recorded	3 recorded	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		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)	Not done	Completed	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

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-f		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	0 (Data currently not disaggregated)  0 (Data currently not disaggregated)	3 (At least three species reported)  3 (At least 3 species reported)	Monitor and report on extraction rates commercial fisheries species  Implement sustainable extraction practices as outlined in management plan.					Q3	GOAL B Target 6	Fisheries Div., NEPA
T7-a	By 2021, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	List of existing agriculture-dependent species <sup>17</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	To some extent  0  0	Completed  10	Assess and report the list of existing agriculture-dependent species <sup>18</sup> in production systems and highlight the 10 most relevant species.  Assess and report on the location and population status of at least 10	Q4			Q4		GOAL B Target 7	Ministry of Agriculture

<sup>17</sup> Agriculture-dependent species refers to those plant and animal species that Jamaica relies on for food.

<sup>18</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		
			abundance is determined		Abundance determined for the 10 most relevant	agriculture-dependent species							
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)	Not done	Completed	Define and adopt Maintenance and Sustainability Strategy for identify and assessing agriculture-dependent species <sup>19</sup> in production systems			Q4			GOAL B Target 7	Ministry of Agriculture
T7-c		Increasing areas where the sustainable agricultural practices are used.	Area coverage (hectares) of sustainable agricultural areas Number of farmers utilising sustainable practices	Baseline area to be determined 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	Ministry of Agriculture

<sup>19</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-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	Ministry of Agriculture
T7-e		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)	Not done  Not done	Draft Completed  Draft Completed	Promote and implement regulations to incentivise sustainable agricultural and forestry practices through the development of regulations and a supporting strategy			Q4	Q4		GOAL B Target 7	Ministry of 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	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.	Baseline to be determined  Baseline	Increase in numbers by at least 2 "in spec" location.  At least 2 additional	Monitor and report water quality in coastal waters and key freshwater resources based on National Water Quality Standards monitored.  Updated assessment yearly and make connections to land based			Q4	Q3		GOAL B Target 8	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		
	function and biodiversity.			to be determined	identified	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  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	Baseline to be determined  Baseline to be determined  Baseline to be determined  Baseline to be determined	At least 2 additional monitored  At least 2 additional monitored  At least 2 additional "in spec"  At least 2 additional "in spec"	Monitor and report the quality of industrial effluents from industries.	Q4	Q4	Q4	Q4		GOAL B Target 8	NEPA
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	Baseline to be determined	At least 2 additional monitored  At least 2	Yearly monitoring and report the quality of domestic effluents from existing wastewater treatment plants		Q4				GOAL B Target 8	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		
			plants sampled for effluent quality	Baseline to be determined	additional "in spec"								
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)	Not done	Draft Completed	Draft legislation for discharge, treatment and management of ballast water		Q4				GOAL B Target 9	NEPA, Maritime Authority of Jamaica
T9-b		Annual Monitoring report on existing invasive alien species potential hotspots.	Number of invasive alien species hotspots identified disaggregated by location  Population numbers for at least 3 known invasive alien species.	Baseline to be determined  0	Number of locations reduced by at least 2  3	Monitor and report on yearly existing invasive alien species potential hotspots (ports, marinas and harbours) using internationally recognized protocols.		Q4  Q4				GOAL B Target 9	NEPA
T9-c		Strategy and action plan for control and management of all known invasive alien species.	Extent to which the strategy and action plan developed. (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Develop strategy and action plan for control and management of all 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)	Not done	Draft Completed	Draft regulations to improve management of invasive alien species				Q4		GOAL B Target 9	NEPA
T10-a		By 2021, the multiple	Monitoring Report on coral coverage and	Coverage area (hectares) of key coral reefs surveyed	Baseline	No net loss or	Monitor and report on coral coverage and condition on					Q3	GOAL B Target 10

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	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.	condition on key coral reefs.	Percentage of coral recruitment in monitored areas  Percentage in macro-algal cover  Number of herbivorous fish in monitored areas  Number of commercial fish in monitored areas  Number of <i>Diadema</i> sp. in monitored areas	to be determined	increased coral coverage, coral recruitment, macro-algal cover, herbivorous and commercial fish, and <i>Diadema</i> sp. by 2%.	key coral reefs.  Link reef condition to specific management activities such as number of marine protected areas or implemented nutrient abatement projects.							
<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	Report on management effectiveness of existing network of protected areas	Extent to which Management Effectiveness Report has been completed (Categories: Not done, to some extent, great extent, Completed)	Not done	Completed	Assess and report on management effectiveness of existing network of protected areas		Q4				GOAL C Target 11	NEPA
T11-b	of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through	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)	Not done	Completed	Policy and legislation on Protected Area System (PAS) finalized		Q4				GOAL C Target 11	Ministry of Economic Growth and Job Creation, NEPA, Environment and Risk Management

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	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.												Division(ERMD)
T11-c		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	Ministry of Economic Growth and Job Creation (ERMD, Forestry) Ministry of Investment Commerce Agriculture and Fisheries (Agriculture), Ministry of Culture, Gender Entertainment and 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	Annual Population Assessments	Number of population assessments conducted on groups of endangered species.	0	At least 3 re-evaluated	Conduct population assessments of selected key endangered and				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		
	threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	Red listing re-evaluation of 3 groups of species.				vulnerable species. Update yearly.  Red listing process in place and evaluation of at least three groups of species conducted							
T12-b		At least two more species added to the headstart projects and rare and endemic plant propagation project.	Number of key endangered and vulnerable species mapped	0	2	Conduct and report on distribution assessments of selected key endangered and vulnerable species annually.  Continuation and expansion of head start projects (Iguana and crocodile) as well as the rare and endemic plant propagation project		Q4				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	0	2	Assess and correlate the distribution of selected key endangered and vulnerable species with the existing and proposed network of protected areas  Update report every three years		Q4				GOAL C Target 12	NEPA
T13-a	By 2021, the genetic diversity of cultivated	Assessment Report on genetic diversity of cultivated plants and	Extent to which genetic diversity of cultivated plants and farmed animals and their	To some extent	Completed	Assess and report genetic diversity of cultivated plants and farmed animals		Q2				GOAL C Target 13	Ministry of Agriculture

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	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.	farmed animals and their wild relatives completed	wild relatives have been identified. (Categories: Not done, to some extent, great extent, Completed)			and their wild relatives  Update assessment at three-year intervals							
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	Ministry of 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	Ministry of Agriculture
<b>STRATEGIC GOAL D – Enhance the benefits to all from biodiversity and ecosystem services</b>													
T14-a	By 2020, ecosystems that provide essential services, including services related to water, and contribute to	Conservation measures implemented and reflected in vulnerable/sensitive ecosystem areas restored  National	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

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, and local communities and the poor and vulnerable.	environmental management strategies											
T14-b		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)	Not done  0	Completed  5	Develop national strategies or policies for enhanced and equitable provision of and access to essential ecosystem services  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		Q2		Q4		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,	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	Not done	Completed	Develop and implement a National Plan for Ecosystem Restoration		Q1				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		
	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.		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
		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	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				
T15-c		Development of appropriate tools for ecosystem restoration by 2021	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 tools for ecosystem restoration		Q3				GOAL D Target 15	NEPA
		Training workshops on proper use and utilization of tools and	Number of training workshop held on proper use and utilization of tools and resources	0	At least 1	Host training workshop on proper use and utilization of tools and resources			Q3				

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
		resources relevant to sectors arranged and disseminated  Integration of ecosystem restoration into national adaptation strategies (including REDD-plus)	Number of national adaptation strategy Integrating ecosystem restoration	0	At least 1	relevant to sectors arranged and disseminated  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 from their Utilization is in force and operational consistent with national legislation.	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)  Study of ecological, social and economic impacts of ABS agreements for different products (ganja, marine products etc.)	Number of products for which the ecological, social and economic impacts have been identified  The extent to which the national access and benefit sharing plan has been developed (Categories: Not done, to some extent, great extent, Completed)  Number of academic institutions consulted for this study	0  Not done  0	At least 3  Completed  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)  Collaborate with academic institutions and produce study of ecological, social and economic impacts of ABS agreements for different products (ganja, marine products etc.)			Q4	Q4	Q4	GOAL D Target 16	NEPA
T16-b		Annual workshops	Number of workshops held on the status of the legal frameworks for governing	0	At least 2	Host Annual workshops				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		
		Legal framework for governing access to, and sharing the benefits of Jamaica's genetic resources	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, each party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	Updated NBSAP document accepted as a policy	Extent to which the NBSAP is implemented and targets are achieved  (Categories: Not done, to some extent, great extent, Completed)	Not done	Great extent	Designate the NBSAP Focal Point and oversight group for implementation		Q1  Q4				GOAL E Target 17	NEPA
T17-b		CHM Relaunched.  Increased traffic on website.  NBSAP integrated into agencies' work plans, of Key Ministries and	Relaunch of the CHM website  Numbers of hits on CHM website  Number of agencies that have incorporated NBSAP into their	0  Baseline to be defined  0	1 Launch held  Increase traffic by 10%  At least 5 agencies using	Relaunch CHM website with updated functionality including interactive sections, links to social media tools Track the numbers of hits on CHM website  Integrate NBSAP into agencies' work plans, namely, Forestry Dept., Fisheries Division, NEPA,		Q2  Q4		Q4		GOAL E Target 17	NEPA, IOJ (JA-CHM)  Forestry Dept., Fisheries Division, NEPA, Ministry of Tourism, Ministry of

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
		Agencies	workplan		NBSAP	Ministry of Tourism, Ministry of Science Energy and Technology, Ministry of Agriculture, Ministry of Economic Growth and Job Creation and Ministry of Finance							Science Energy and Technology, Ministry of Agriculture, Ministry of Economic Growth & Job Creation, & Ministry of Finance
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, Institute of Jamaica, Jamaica Intellectual Property Office
T18-b	and legislation and relevant international obligations, and	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)	Not done	Completed	Develop legislation and regulations that protect/govern traditional knowledge and cultural practices linked to biodiversity				Q4		GOAL E Target 18	NEPA, Institute of Jamaica, Jamaica Intellectual Property Office
T18-c		Report on the status of and trends of the practice of traditional occupations that	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				Q4		GOAL E Target 18	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		
	fully integrated and reflected in the implementation of the Convention with the full and effective participation of local communities, at all relevant levels.	depend on or impact biodiversity resources (e.g., wild honey harvesting, bussu/ganga harvesting)				on or impact biodiversity resources (e.g., wild honey harvesting, bussu/ganga harvesting)							
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	Mobilization of science-based biodiversity data and information for use across a wide variety of sectors	Proportion of stakeholders sensitized on national activities under the updated NBSAP  Extent to which the CHM website has been updated. (Categories: Not done, to some extent, great extent, Completed)  Number of projects/initiatives	Baseline to be identified  Baseline to be identified	Increase by 5%  Increase by 10%  At least 2 projects/in	Increase the use of the 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

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	consequences of its loss, are improved, widely shared and transferred and applied.		that create public access to previously unavailable or new data  Number of reported IAS are recorded in the Jamaica Invasive Species Database  Number of Public Awareness and Education Programmes on Science base and technologies relating to biodiversity executed.	Baseline to be identified	Initiatives  All 120 species recorded in the Database			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	National Strategy for Resource Mobilization is developed and implemented.	Extent to which the National Strategy for Resource Mobilization is developed. (Categories: Not done, to some extent, great extent, Completed)  Total National Budget available	Not done	Completed	Develop a National Strategy for Resource Mobilization		Q4				GOAL E Target 20	NEPA, Ministry of Finance, Planning Institute of Jamaica

Reference / Item #	National Target	Output/Result	National Indicators	Baseline	Target	Activities	TIMELINE					Related Strategic Goals/Aichi Targets	Responsible Party
							2017	2018	2019	2020	2021		
	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.		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  Number of international agreements with potential funding being utilised	2  1	4  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, Planning Institute of Jamaica



## 6 Mainstreaming National Biodiversity Strategy

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 themes namely, gender, climate change and disaster risk reduction.

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

In order to assess how biodiversity conservation and management issues have been addressed in Jamaica, it is important to understand the country's National Development Plan. By examining the plan's structure and strategies, it will be possible to assess whether conservation and the sustainable use of biodiversity have been adequately addressed. In addition, it will be useful to link the Plan to the recently updated biodiversity conservation targets, so as to identify potential areas where biodiversity mainstreaming should be intensified.

Jamaica's Vision 2030 Report (Planning Institute of Jamaica, 2009)<sup>20</sup> is the country's National Development Plan. Sustainability is deeply embedded within the plan, as demonstrated by the choice of the Plan's Guiding Principles, which include *Sustainability and Sustainable Urban and Rural Development*. In addition, the commitment to sustainable development is expressed by the adoption of a specific National Goal, which is Goal 4, *Jamaica has a Healthy Natural Environment*. In turn, this goal unfolds into National Outcomes and National Strategies. For Goal 4, Jamaica's National Outcomes include:

- National Outcome 13 – Sustainable Management and Use of Environmental and Natural Resources
- National Outcome 14 – Hazard Risk Reduction

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<sup>20</sup> Planning Institute of Jamaica. Vision 2030 Jamaica: National Development Plan. 2009.

- National Outcome 15 – Sustainable Urban and Rural Development.

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

Each of the above 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.

The progress of Jamaica's Vision 2030 is monitored regularly. Through regular monitoring, the strategies and action plans to achieve the Goals of the plan are constantly assessed and fine-tuned. The results of this assessment are published in the form of Mid Term Reports, and the last of these Reports was published in December, 2015 (PIOJ, 2015)<sup>21</sup>.

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

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<sup>21</sup> Planning Institute of Jamaica. Vision 2030 Jamaica: Medium Term Socio Economic Policy Framework 2015-2018. December, 2015.

Table 6.1: National Outcomes 13 to 15 and related National Strategies (Source: PIOJ, 2009)

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
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

For National Strategies 13.1 and 13.2, some 41 action plans have been created, demonstrating the amount of effort concentrated into the integration of environmental issues into economic and social decision-making policies and the development and implementation of mechanisms for biodiversity and ecosystem management. However, these 41 action plans are meant to be undertaken by few agencies, and a high degree of commitment is requested from the National Environment and Planning Agency (NEPA) - expected to be involved in 20 of the 41 action plans- , the Ministry of Water, Land, Environment and Climate Change (now integrated into the Ministry of Economic Growth and Job Creation)- expected to be involved in 18 of the 41 action - plans and the Forestry Department - involved in 16 of the 41 action plans. In addition, the deadline for the completion of all action plans is 2018, which appears to be a very short timeframe for the completion of them all. Such a concentration of effort will require a surge in professional staffing and financial resources.

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
- 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.

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.

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) and Draft National Policy and Programme on final documents slated for completion by the end of fiscal year 2015/2016.

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:

1. What are the existing gender inequalities?
2. Why do these inequalities exist?
3. What adjustments will have to be made by institutions and other actors in order to reduce these inequalities?
4. What opportunities and constraints exist in the larger environment to help reduce inequality?
5. 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

1. 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.
2. 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, forestry reserves, protected areas, other key areas for biodiversity, 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.

3. 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.
4. 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.
5. 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>22</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
- 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>23</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

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<sup>22</sup> FORESTRY DEPARTMENT. Forest Policy for Jamaica. Green Paper. 2015.

<sup>23</sup> FORESTRY DEPARTMENT. Strategic Forest Management Plan 2010-2014. 2009.

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.

#### **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>24</sup> and the CBD Ecosystem Approach (CBD, 2016)<sup>25</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

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III. 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/acnf15126-3annex3.htm>.

<sup>25</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.

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 these 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).

#### **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>26</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. 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.

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<sup>26</sup> GOVERNMENT OF JAMAICA. Vision 2030 Jamaica. Mining and Quarrying Sector Plan 2009-2030. Mining and Quarrying Task Force. Final Draft. 2009.

#### 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>27</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 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

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<sup>27</sup> GOVERNMENT OF JAMAICA. Jamaica Vision 2030: Tourism Sector Plan 2009-2030. Tourism Task Force. September, 2009.

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 National Targets Companion 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 in Jamaica**

#### **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 (JCDDT)
- 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
- Elimination, phasing out or reform of subsidies and other incentives that may negatively impact biodiversity
- Positive incentive measures, such as, payments for ecosystem services
- Taxes, user fees and other disincentives that apply the polluter-pays principle and internalize the costs associated with production or harvesting of biodiversity resources.

Nuns-hood Orchid (*Phius tancarvilleae*)

More details on the application of these tools can be found in the NBSAP Mainstreaming Tools Module. They 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.



## 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. We explain 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<sup>28</sup> 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 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 national parks and 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

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<sup>28</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

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;

1. Jamaica National Parks Trust Fund
2. Forest Conservation Fund
3. Environmental Foundation of Jamaica<sup>29</sup>
4. 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;

5. Fisheries and Marine Biodiversity Fund
6. 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

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<sup>29</sup> The Environmental Foundation of Jamaica was merged with the Forest Conservation Fund in 2015. The official name is the Environmental Foundation of Jamaica.

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 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>30</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. It is also highly recommend a review of how the current conch levy is implemented and managed. At present the rate (per kg) charged for exporting conch current seems to be arbitrary and not based on 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 to 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 (Paris Agreement) 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 Bank) more effectively. The coordination of other focal points (Marpol, Basel Convention etc.) with national planning agencies (PIOJ) can also access relevant funds which can in part be used to support other national biodiversity conservation goals for the island.

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<sup>30</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://stinapabonaire.org/nature-tags/>

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. It is recommended that NEPA revisit the Haas & Aukerman 2012 report and expand it beyond protected areas to a national fund that would be used to fund protected areas and areas and beyond. This would 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, we present the implementation plan below for Jamaica.



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## **8 Biodiversity Implementation Plan**

A National Biodiversity Implementation and Action Plan was developed 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. Numerous activities and strategies were proposed by stakeholders across different sectors. However, those that were not only critical for Jamaica but practical and feasible to accomplish by 2021 were also included. A monitoring 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.

**Table 8.1: National Biodiversity Implementation Plan**

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
<b>Legislation</b>	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 Constitution and hold stakeholder discussions on constitutional reform	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	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 MEGJC MICA MSET	TBD
	Develop legislation to address the commercial use of Living Modified Organisms (LMOs)	Restart National Biosafety Committee – renew membership and sign off by appropriate Minister.	1	2017-2018	MEGJB MICA	-

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		<p>Prepare mandate for Committee based on content of the Biosafety Policy</p> <p>Designation of Secretarial Support (National Commission on Science and Technology (NCST)) and set meeting schedule/intervals.</p> <p>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.</p>			<p>NEPA</p> <p>MSET<sup>31</sup> - National Commission on Science and Technology Plant Quarantine Division</p>	<p>-</p> <p>-</p> <p>10,000</p>
	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 (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	Hold 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 to facilitate cost recovery for remedial actions to repair environmental damages and other biodiversity related breaches	Create special environmental court or allocate a select period on the judicial calendar for hearings on environmental damages and other biodiversity related breaches.	3	2020-2022	MOJ AG NEPA MEGJC	TBD

<sup>31</sup> MSTEM - Ministry of Science Technology Energy and Mining

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
	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 in the forestry sector to garner baseline information to fully understand gender issues within the sector.	3	2018- 2020	MOE FD NEPA MLWECC Academia (UWI, UTECH, NCU) Bureau of Gender Affairs (BGA)	30,000
		Conduct gender analyses in the mining and quarrying sector to garner baseline information to fully understand the issues gender issues within the sector.				30,000
		Conduct gender analyses in the environmental sector to garner baseline information to fully understand the issues gender issues within the sector.				30,000
		Conduct gender analyses 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	Conduct gender analysis to determine gender specific issues and circumstances related to protected areas.  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	3	2018	MOE FD NEPA MEGJC Academia BGA	30,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		from these protected areas.				
	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 livelihoods, economic development and human well-being <ul style="list-style-type: none"> <li>- Design public education programme to improve the public's understanding of biodiversity</li> <li>- Execute a pilot run of materials</li> <li>- Fully implement programme</li> </ul>	1	2017-2019	MOE MEGJC FD NEPA Academia JIS PSOJ NGOs CBOs	150,000
	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</li> </ol>	2	2018-2020	HEART National Centre for Youth Development (NCYD) National Secondary	40,000  20,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		<p>Biodiversity awareness on the agenda and implement</p> <p>3. Create a conservation corps or complementary organization focused on youth - linkages with school and youth clubs and hold consultations on structure and mandate.</p> <p>4. Review and Integrate biodiversity awards as a part of the Youth Advocacy and Ambassador Training Program</p> <p>5. Incorporate biodiversity awareness into Youth information centres</p>			<p>School Council (NSSC) Youth Environmental Advocacy Programme IOJ (JA-CHM)</p>	<p>30,000</p> <p>5,000</p> <p>20,000</p>
<b>Land Use Planning</b>	Prevent uncontrolled or poorly planned human settlement and development activities	<p>Prepare the National Spatial Plan to guide and monitor development that is spatially appropriate</p> <ol style="list-style-type: none"> <li>1. Promote mapping and classification of high-risk biodiversity areas.</li> <li>2. NSP should take account of sites suitable for mining and quarrying, tourism, agriculture and other sectors.</li> <li>3. Promote private sector partnerships to facilitate inclusive execution of the National Spatial Plan (NSP)</li> <li>4. Hold discussions with CCD regarding access to funds from the Green Climate Fund. The NSP can help build Jamaica's</li> </ol>	1	2019-2024	<p>MEGJC NEPA Commissioner of Lands WRA FD CCD PSOJ Local Gov't - Parish Councils</p>	1,000,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		resilience to CC with better land management. 5. Establish Terms of Reference for NSP and contract service				
	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.	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 critical areas 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-private consultations on regulations to be modified or to facilitate enforcement of the National Spatial Plan and preparation of recommendations.	3	2020 and beyond	MEGJC Agriculture Land Management Division (ALMD) Local Gov't - Parish Councils	40,000
	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	Prepare a summary of all relevant regulations, guidelines and requirements for developers and present on the	1	2017	NEPA IOJ (JA-CHM)	-

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		Development Assistance Centre aspect of NEPA's website.				
	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
Agriculture	Engage key stakeholders and communicate NBSAP	Sensitize high school and tertiary level agriculture curricula on the NBSAP. 1. 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 (JA-CHM)	20,000
	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. 2. Ensure biodiversity protection is included in Good Agricultural Practices.  Certification schemes for Aquaculture 3. 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	1	2018	MICAF - RADA PSOJ Ja Chamber of Commerce Consumer Affairs Commission MSET – NCS SRC JIS IOJ (JA-CHM) Fisheries Division	70,000          60,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		decision making process <sup>32</sup> . Any certification programme should also take into consideration NEPA's 2015 regulatory requirements for aquaculture facilities.				
	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	<ol style="list-style-type: none"> <li>1. Develop an Urban Forest Plan (establishment of a policy and legislation in work plan)</li> <li>2. Continue preparation of Forest Management Plans and increase the number of Local Forest Management Committees</li> </ol>	3	2020-2022  2017 and beyond	FD NEPA NWC WRA	40,000
	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> </ol>	2	2018-2020	FD NWC WRA NEPA	TBD  40,000

1. <sup>32</sup> Certification schemes for consideration may include: Aquaculture Stewardship Council, Best Aquaculture Practices Certification

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
	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 MICAF	25,000
	Establish programmes for capacity building and application of environmental accounting to climate change mitigation through the forest sector.	<ul style="list-style-type: none"> <li>Conduct additional research on environmental accounting (economics)</li> <li>Develop and execute a capacity building programme for environmental resource accounting</li> </ul>	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 MICAF	60,000
<b>Fisheries</b>	Collect baseline information on the ecology of the target species and development of standards/code of conduct for exploitation of these target species.	1. Conduct baseline surveys needed for 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	1	2017-2019	MICAF - Fisheries Division Academia Local Fishery Groups/beaches Large Fisheries operators JDF – Coast	150,000  50,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		standards already developed) 2. Stakeholder awareness programme on the results of studies and hold consultations on the standards during and after their development.			Guard JCF-Marine Police Bureau of Standards	
	Comprehensive information on the number of fishers, their range of activity and gear types used in the fishery sector.	Survey and collect 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	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. Will include: 1. Conduct of ecological assessments and feasibility to enforce these additional MPAs or Fish Sanctuaries 2. GIS and spatial mapping work to determine boundaries for the two MPAs or Fish Sanctuaries 3. Contract legal specialist to develop regulations and legal documentation to support the	2	2019-2021	MLWECC NEPA UWI	100,000 100,000 100,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priority (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		two MPAs or Fish Sanctuaries. Establish enforcement arrangements for the two new Sanctuaries/Marine Parks.				
	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
Mining and Quarrying	Ensure biodiversity assessments are included as part of investigation for viability of mining and quarrying sites	<p>Conduct baseline assessments of fauna, flora, geophysical conditions, meteorology, water resources (surface and underground), the human environment for all mining and quarrying sites</p> <p>Ensure results are fully integrated into the planning process for mining and quarrying.</p>	1	2017 and ongoing	MGD NEPA	-
	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</li> </ol>	2	2018-2020	NEPA MGD	30,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		and quarrying sites, whether or not EIAs are required.  2. Develop specific guidelines to promote full implementation of Degraded Area Recovery Plans for mining projects.  3. Develop specific guidelines to cover the implementation of Biodiversity Management Plans for mining projects (existing and proposed).				
	Mandatory monitoring of air/water/groundwater/soil 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	Train local folk including fishermen to serve as guides for biodiversity appreciation	3	2019	TPDCo Fisherman Cooperation	5,000
	The use of sustainable techniques	Implement an educational conversation	2	2018	TPDCo	10,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
	for the construction and operation of resort installations (recycling of waste, effluent treatment, etc.) and foster sustainable certification schemes	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>			Jamaica Hotel and Tourism Association (JHTA) Parish council NEPA	
	Conduct carrying capacity assessment of sensitive ecosystems such as coral reefs, rivers, mangroves, forests and other sensitive natural ecosystems	<ol style="list-style-type: none"> <li>Implement existing plans for carrying capacity studies and integrate results into the tourism sector</li> <li>Complete Guidelines for Eco-Tourism</li> <li>Conduct carrying capacity studies and environmental assessments</li> </ol>	1	2017-2021	NEPA MOT TEF TPDCo River Rafting Authority	TBD
Conservation	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.	Establish funds 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 buffer zones	<ol style="list-style-type: none"> <li>Implement buffer zone in Protected Areas where none currently exist</li> <li>Map established buffer zones in Jamaica's National</li> </ol>	3	2019-2021	MEGJC NEPA FD NGOs	30,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		Spatial Plan 3. Define criteria for complementary land use activities inside the established buffer zones				
	Implement the Protected Areas Systems 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 through biodiversity protection	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.	3	2020	MEGJC NEPA NSWMA FD ALMD	70,000
		Implement plans for establishment of appropriate landfill sites.				
	Develop site remediation plans for existing waste disposal sites and implement at least one.					
	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</li> </ul>	2	2019	NEPA WRA NGOs CBOs Academia JSIF	50,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		<p>monitoring of freshwater resources;</p> <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 MICA 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
		Using supporting data on ecosystem service valuation information services, update legislation for marine pollution	2	2019	NEPA Academia	30,000

Sector/ Cross-cutting Theme	Strategies for Mainstreaming Biodiversity	Activities	Priorit y (1,2,3)	Time Frame	Responsible Entities	Indicative Budget (US\$)
		and environmental damage to increase fines and other punitive measures.				
Environmental Management - Wildlife Protection	Complete amendments to the Wildlife Protection Act to protect plants, invertebrates and micro-organisms	Complete amendments to the Wildlife Protection Act to include plants and invertebrates	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	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	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. This document satisfies a component of a key deliverable "*vii – Report outlining a set of straight-forward and feasible NBSAP implementation plans according to relevant sectors and a monitoring plan for the achievement of national targets by August 2016*". This suggested monitoring 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 monitoring plans suggested are organized by strategic goal. 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. The table below contains some suggested monitoring 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 Targets and Indicators Tables 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 these

suggested indicators in Tables 6.1. 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. We repeat here that biodiversity outcomes are distinct from process indicators such as number of workshops, community meetings and trainings. Instead monitoring 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 suggested monitoring activities were developed based on the national strategy and action plan. The national plan received input from key stakeholders as part of this consultancy. The monitoring activities are organized by Aichi Goals and Targets and may not be applicable to specific agencies or sectors. However, the table provides a template from which government agencies, private sector entities, NGOs and Civil Society can work to develop appropriate indicators that can then be incorporated into the measurable monitoring indicators and outcomes suggested here.

Table 9.1: Monitoring Plan for Achieving the National Targets

Goal	Relevant Aichi Targets	Suggested Monitoring Plans	Suggested Frequency	Key Agencies
A – Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.	Target 1	Changes in the level of awareness regarding biodiversity of the general public. National Survey of general public as well as key public and private sector entities. (Table 6.1)	Once every 5 years	NEPA, Min Education, JIS
	Target 2	Monitoring the successful incorporation of biodiversity values into poverty reduction and planning processes will require indicators such as implementation/revision of levies for extracted resources such as mining or fisheries. Ensuring that these levies are based on ecological data and corresponding ecosystem service values harvested and impacted species and habitats.  Monitoring the number of cases regarding enforcement of environmental breaches including fines through the court	Annual Reporting	NEPA, Min Finance, ERMD <sup>33</sup> , NEPA, Fisheries Division, Min Industry Commerce, Ministry of Transport and Mining  Ministry of Justice, Min Finance, NEPA, Fisheries Division
	Targets 3 &	Conduct socioecological	Match with the	Ministry of

<sup>33</sup> Environment and Risk Management Division

Goal	Relevant Aichi Targets	Suggested Monitoring Plans	Suggested Frequency	Key Agencies
	4	studies to track the impact of removal/reduction of subsidies on various key sectors (e.g. fishing, tourism and mining). This assessment should be included in a comprehensive State of the Environment Report (see Table 8.1 of Strategic Action Plan document)	frequency of the SOE Reports	Finance, PIOJ, NEPA, Fisheries Division
B – Reduce the direct pressures on biodiversity loss and promote sustainable use	Targets 5, 6 & 7	Monitoring report on the trends population, extent and area/range, ecological health and harvest rates of key ecosystems and flora and fauna. These reports should address key sectors (Table 6.1: T 5 a-c & T6 a-c). May require input from private sector entities. This report can be included as a special appendix to the SOE report  Monitor the number of Payment for Ecosystem Services and other economic incentive schemes developed and implemented.	Annually or Biennially	NEPA, Forestry  PIOJ
	Target 8 & 9	National report on water quality standards in major/important receiving water bodies (rivers and coastal areas). Reporting on effluent outfalls (Table	Annual	NEPA  NEPA,

Goal	Relevant Aichi Targets	Suggested Monitoring Plans	Suggested Frequency	Key Agencies
		6.1: T8a-c) Report on extent and range of invasive species (terrestrial and marine) including impact of control and management strategies (Table 6.1: T9a-d)		Customs, Min of Industry Commerce Agriculture and Fisheries
	Target 10	Report on the status and trends of major coastal ecosystems impacted by major terrestrial anthropogenic inputs. Based on baseline monitoring conducted by NEPA and other partners (UWI and JCRMN). Report should include socioeconomic monitoring component of coastal dependent communities and stakeholders	Every 4-5 years	NEPA
C – To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	Target 11	Report management effectiveness of national parks and protected areas.	Every 5 years	NEPA, JCDD
	Target 12	Report on status of endemic threatened species including management plans (Table 6.1: T12 a-c)	Every 3 years	NEPA
	Target 13	Produce a report that outlines genomic sequences for key flora and faunal species. Including both	Catalogue genomes of key species incrementally over time.	SRC, NEPA, Min Agriculture, Academia

Goal	Relevant Aichi Targets	Suggested Monitoring Plans	Suggested Frequency	Key Agencies
		agriculturally important as well as endemic species	Annual updated reports	
D – Enhance the benefits to all from biodiversity and ecosystem services	Target 14	Monitor the number of poverty reduction strategies directly linked to biodiversity resources. For example eco-tourism employment in protected areas, or sustainable use of forest products (e.g. wild honey)	Biennial Report	Ministry of Finance, SDC, Min of Tourism
	Target 15	Monitoring report of the areal coverage (hectares) of restored and conserved natural habitat (marine and terrestrial). Reporting should account for changes in the delivery of ecosystem services including flood regulation, provisioning (food, supplies) and carbon sequestration. Number of qualified restoration practitioners trained and employed could be an indicator. This should including reporting on the development and implementation of local or international carbon financing mechanisms to support restoration efforts	Every 3 years	NEPA, Forestry
	Target 16	Report on the development and implementation of the	Biennial Reports	Ministry of Finance, PIOJ, Min

Goal	Relevant Aichi Targets	Suggested Monitoring Plans	Suggested Frequency	Key Agencies
		number functioning benefit sharing agreements linked to biodiversity. For example for Medical Marijuana		Industry and Commerce, Agriculture and Fisheries
E – Enhance the implementation through participatory planning, knowledge management and capacity building	Target 18	Track the number of new legislation created for protecting traditional knowledge and use by indigenous and vulnerable communities (e.g. maroons, women and children). Produce a report on number, status and use and knowledge and awareness of biodiversity resources by these communities. (Cross Reference with national Survey - T1)	Every 3 years	NEPA, Min Justice, Attorney General's Office, SDC
	Target 19	Catalogue of publicly available databases and information resources supporting biodiversity conservation.	Annually	IOJ (JA-CHM), NHMJ
	Target 20	Monitor acquisition and use of funds from; natural resource levies (mining, fisheries), environmental taxes and fees (including TEF), carbon financing, environmental fines for breaches and international funding that is directed towards conservation activities including for	Annually	NEPA, Min of Finance, Min Tourism, Mining, Fisheries

Goal	Relevant Aichi Targets	Suggested Monitoring Plans	Suggested Frequency	Key Agencies
		biodiversity.		

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## Appendices

### Appendix I – Alignments of the NBSAP with the Vision 2030 and the Priority Sector Strategies

**Table 1: National Strategies and Priority Sector Strategies for National Outcomes 13 to 15. Source: JIOP (2009) Jamaica Vision 2030 – National Development Plan**

ID. NUMBER	NATIONAL STRATEGIES	PRIORITY SECTOR STRATEGIES
13.1	Integrate environmental issues into economic and social decision-making policies and processes	Create frameworks that will enable the integrated management and sustainable use of Jamaica's natural resources (e.g., guidelines for resource use, phased mining, etc.)
13.2	Develop and implement mechanisms for biodiversity and ecosystem management	<p>Adopt an ecosystems management approach which takes into account access to biological resources for benefit sharing by our population at large, sustainable use of biological resources safe transfer, handling and use of living modified organisms implementation of forestry management initiatives, establishment of terrestrial and marine protected areas, research to enhance scientific understanding of ecosystems, including their economic contributions to national development</p> <p>Develop a comprehensive framework to reverse loss of ecosystems and biological resources through restoration initiatives and protection from invasive species</p>
13.3	Develop efficient and effective governance structures for environmental management	<p>Establish institutional mechanisms to foster coordination and collaboration among resource management agencies of resource protection issues</p> <p>Create a dynamic and responsive regulatory environment including review and strengthening of relevant environmental legislation</p>
13.4	Manage all forms of waste effectively	Create an appropriate institutional framework for the integrated management of all types of waste, including the development of a comprehensive waste management policy and associated standards and regulations
14.1	Improve resilience against all forms of hazards	Create and strengthen national platforms and establish the foundation for hazard risk reduction by engaging in multi-stakeholder dialogue
14.3	Develop measures to adapt to climate change	<p>Create mechanisms to fully consider the impacts of climate change and 'climate proof' all national policies and plans</p> <p>Adopt best practices for climate change adaptation</p>
14.4	Develop mechanisms to	Lobby at the international level for high greenhouse

ID. NUMBER	NATIONAL STRATEGIES	PRIORITY SECTOR STRATEGIES
	influence the global rate of climate change	gas producing countries to become more energy and resource efficient
15.1	Create a comprehensive and efficient planning system	<p>Rationalize the roles and responsibilities of agencies and entities involved in planning</p> <p>Develop and adopt mechanisms for better integration of spatial models and tools for decision-making</p>
15.2	Create an appropriate framework for sustainability planning	<p>Ensure that development decisions are guided by a spatial planning framework (national physical plan)</p> <p>Accelerate development of strategic regional centres to ensure that they play a key role in balancing development</p> <p>Review existing land use patterns, zoning regulations, building codes and standards in the context of housing and urban development needs and formulate forward-looking land use and development policies for efficient and optimum utilization of land</p>
15.5	Ensure safe, sanitary and affordable shelter for all	Integrate national housing and urban development planning to enable access to adequate shelter and services to all

## Appendix II – Complete List of Stakeholders

	Stakeholder	Name
<b>Interviews (Skype, Phone, In-person)</b>		
1.	NEPA – Public Education and Corporate Communications Branch	Ms. Dionne Rose, Manager
2.	NEPA – Conservation and Protection Sub-division NEPA – Ecosystems Branch NEPA – Protected Areas Branch NEPA – Environmental Management Sub-division	<ul style="list-style-type: none"> <li>• Mr. Anthony McKenzie,</li> <li>• Yvette Strawn,</li> <li>• Paulette Kolbusch (Snr. Manager-Pollution Prevention Branch),</li> <li>• Ms. Carla Gordon (Protected Areas)</li> </ul>
3.	NEPA – Spatial Planning Division	<ul style="list-style-type: none"> <li>• Mr. Leonard Francis</li> </ul>
4.	NEPA – Applications Management Division	<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>• Carlton Wedderburn (Economic Planning Division)</li> <li>• Gillian Taylor-Ellis (Veterinary Services Division/ MICAFA)</li> <li>• Wintorph Marsden (Veterinary Services Division/ MICAFA)</li> <li>• Marina Young (Rural Agricultural Development Authority (RADA))</li> <li>• Carla Douglas (Research &amp; Development)</li> <li>• Tracey-Ann Wright (Policy &amp; Planning)</li> <li>• Fitzroy White (Plant Quarantine Branch)</li> <li>• Sanniel Wilson (Plant Quarantine Branch)</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 Plumber - 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>• Sandy Chung (TPDCO)</li> <li>• Opal Browning (TPDCO)</li> <li>• Althea Heron (MT)</li> <li>• Georgia Lumley (MT)</li> <li>• Elisha Myers (MT)</li> </ul>
8.	Fisheries and Aquaculture	<ul style="list-style-type: none"> <li>• Mr. Andre Kong (Director of Fisheries)</li> <li>• Ms. Shellene Berry (Fisheries Instructor),</li> <li>• Ms. Dionne Walker (Secretary),</li> <li>• Mr. Fabian Gordon (Fisheries Instructor).</li> </ul>
9.	Forestry Department	<ul style="list-style-type: none"> <li>• Mr. Jerome Smith</li> </ul>
10.	Ministry of Economic Growth and Job Creation – Climate Change Division	<ul style="list-style-type: none"> <li>• Mr. Gerald Lindo (Climate Change Division), Ms. Joni Jackson (Environment and Risk Management),</li> <li>• Mrs. Gillian Guthrie (Head of ERM),</li> <li>• Ms. Janet Hyde (Land Division),</li> <li>• Mr. Orville Gray (Climate Change Division)</li> <li>• Dr. Elaine Fisher (Retired)</li> </ul>

	Stakeholder	Name
11	Attorney General's Office	Mrs. Foster-Pusey - Solicitor general
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</li> <li>• Dr. Karl Aiken</li> </ul>
13	C-CAM	<ul style="list-style-type: none"> <li>• Mr. Brandon Hays</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>• Nardia McLaren</li> </ul>
16	United Nations Development Programme	<ul style="list-style-type: none"> <li>• Upul Ranaweera</li> </ul>
17	Office of Disaster Preparedness and Emergency Management	<ul style="list-style-type: none"> <li>• Leiska Powell</li> <li>• Michelle Edwards</li> </ul>
<b>Stakeholder Workshops**</b>		
18	Caribbean Maritime Institute (CMI)	<ul style="list-style-type: none"> <li>• Herman Shim</li> </ul>
19	Environmental Health Foundation (EHF)	<ul style="list-style-type: none"> <li>• Latoya Aquart-Foster</li> <li>• Allison McFarlene</li> </ul>
20	Forestry Department	<ul style="list-style-type: none"> <li>• Brahim Diop</li> </ul>
21	Trade Board	<ul style="list-style-type: none"> <li>• Douglas Webster</li> </ul>
22	Planning Institute of Jamaica	<ul style="list-style-type: none"> <li>• Le Anne Roper</li> </ul>
23	Institute of Jamaica	<ul style="list-style-type: none"> <li>• Dionne Newell</li> <li>• Keron Campbell</li> </ul>
24	Ministry of Economic Growth and Job Creation	<ul style="list-style-type: none"> <li>• Joni Jackson</li> </ul>
25	Jamaica Intellectual Property Office (JIPO)	<ul style="list-style-type: none"> <li>• Lilyclaire Bellamy</li> </ul>
26	C-CAM/BIOS Caribbean	<ul style="list-style-type: none"> <li>• Ann Sutton</li> </ul>
27	Ministry of Science, Energy and Technology (MSET)	<ul style="list-style-type: none"> <li>• Dr Betsy Bandy</li> <li>• Kimberly Nirine</li> </ul>
28	MTM	<ul style="list-style-type: none"> <li>• Monica Blake</li> </ul>
29	MLGCD	<ul style="list-style-type: none"> <li>• Joan Sampson</li> </ul>
30	Ministry of Industry, Investment and Commerce (MICAF)	<ul style="list-style-type: none"> <li>• Carla Douglas</li> </ul>
31	Global Environment Facility Small Grants Programme (GEF SGP)	<ul style="list-style-type: none"> <li>• Hyacinth Douglas</li> </ul>
32	Trade Board (TB)	<ul style="list-style-type: none"> <li>• Douglas Webster</li> </ul>
33	Environmental Foundation of Jamaica (EFJ)	<ul style="list-style-type: none"> <li>• Charmaine Webber</li> <li>• Mark Constable</li> </ul>
34	National Environment and Planning Agency (NEPA)	<ul style="list-style-type: none"> <li>• Frances Blair</li> <li>• Dionne Rose</li> <li>• Sheries Simpson</li> <li>• Yvette Strong</li> <li>• Vivienne Williams Thompson</li> <li>• Petricia Hamilton</li> </ul>
35	Water Resources Authority (WRA)	<ul style="list-style-type: none"> <li>• Nia Ramsoogoon</li> </ul>
36	Jamaica Conservation and Development Trust (JCDDT)	<ul style="list-style-type: none"> <li>• Gabrielle Watson</li> </ul>
37	Urban Development Corporation (UDC)	<ul style="list-style-type: none"> <li>• Damion Whyte</li> </ul>
38	National Solid Waste Management Authority	<ul style="list-style-type: none"> <li>• Stephney Duhaney</li> </ul>

	Stakeholder	Name
	(NSWMA)	

### THE CONSULTANCY TEAM FROM ENVIRONMENTAL SOLUTIONS LIMITED

Name	Role
Mrs. Eleanor Jones	Team Lead
Mrs. Annmarie Goulbourne	Natural Resource Management Specialist and Project Manager
Mr. Pablo Cotsifis	Biodiversity Specialist
Mr. Peter Edwards	Ecologist
Nalini Jagnarine	Environmental and Development Analyst

### MEMBERS OF THE TECHNICAL WORKING GROUP FOR THE NBSAP

Name	Organization
Yvette Strong (Chairperson)	National Environment & Planning Agency (NEPA)
Jerome Smith	Forestry Department
Dr. Elaine Fisher	CITES Authority
Dr. Betsy Bandy	Ministry of Science Technology Energy & Mining (MSTEM)
Dr. Susan Davis	Institute of Jamaica (IOJ)
Selvaneous Walters	Jamaica National Heritage Trust (JNHT)
Elecia Myers	Ministry of Tourism & Entertainment (MTE)
Vaughn Barnaby	Rural Agricultural Development Authority
Brahim Diop	Department of Forestry
Ian Jones	Ministry of Agriculture & Fisheries
Andrea Donaldson	NEPA
Paulette Kolbusch	NEPA
Marcus Goffe	Jamaica Intellectual Property Office (JIPO)
Dr. Paula Tennant	UWI Department of Life Sciences
Ann Sutton	Caribbean Coast Area Management (C-CAM)
Ms Joni Jackson	Ministry of Economic Growth and Job Creation
Frances Blair	NEPA

### MEMBERS OF BIODIVERSITY & GAMES BIRD COMMITTEE (BCRCC) 2016

Name	Organization
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Mr. Robert Woodstock	Harold Morrison + Robert Woodstock and Associates 15 Bedford Park, Kingston 10
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Ms. Leonie Barnaby NEPA's Advisory Board	---
Ms. Yvette Strong Senior Manager	Protected Area Management Branch NEPA
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
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

Name	Organization
Ms. Andrea Donaldson	Ecosystem Management Branch NEPA
Ms. Carla Gordon Manager	Protected Areas Management Branch NEPA
Mr. Richard Nelson Manager	Legal & Enforcement Division NEPA
Ms. Paulette Kolbush Manager	Pollution & Prevention Monitoring Branch
Ms. Dionne Rose Manager	Public Education & Community Development

### 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

## Glossary

**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).

**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).

**Habitat** means the place or type of site where an organism or population naturally occurs (CBD).

**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).

**Living modified organism** means any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology (CBD).

**Living organism** means any biological entity capable of transferring or replicating genetic material, including sterile organisms, viruses and viroids (CBD).

**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).

**Protected area** means a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives (CBD).

**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)