

CHEMONICS INTERNATIONAL INC.



SECTION 118/119
BIODIVERSITY AND TROPICAL FORESTRY ASSESSMENT
OF THE USAID/JAMAICA BILATERAL AND
CARIBBEAN REGIONAL PROGRAMS

BIOFOR IQC No. LAG-I-00-99-00014-00, Task Order #819

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USAID/Jamaica-Caribbean Regional Program

June 20, 2003

TABLE OF CONTENTS

Acronyms	i
Executive Summary	iv
PART I - INTRODUCTION AND RATIONALE	1
Introduction to the Assessment	1
Assessment Objectives	2
Methodology	2
PART II - USAID/JAMAICA BILATERAL PROGRAM	3
SECTION A PROGRAM CONTEXT	3
Background on the USAID/Jamaica Program	3
USAID/Jamaica's Strategic Plan FY 2000-2005	3
Current Programming Efforts	4
Preserving Natural Assets and Enhancing Rural Livelihoods	4
The Jamaican Context for Natural Resources Management	5
SECTION B LEGISLATIVE AND INSTITUTIONAL FRAMEWORK	7
Sector Policy and Legislation	7
Institutional Framework	8
Coordinating Mechanisms	12
Major Issues Regarding the Institutional Framework	13
SECTION C STATUS AND MANAGEMENT OF PROTECTED AREAS	14
Types of Protected Areas	14
Present List of Protected Areas in Jamaica	14
Management Models of Protected Areas	15
Future Directions	16
New Areas Being Proposed	16
The Evolution of the Protected Area System in Jamaica	16
SECTION D STATUS AND PROTECTION OF ENDANGERED SPECIES	17
Importance of Endemism	17
Extinct Species	17
Endangered and Threatened Species	17
Current Protection and Rehabilitation Activities	18
SECTION E STATUS AND PROTECTION OF FOREST RESOURCES	21
Forest Cover Data and Information	21
Factors Related to an Understanding of Forest Cover	23
Institutional Framework for Forest Management	25
Management Models/Mechanisms	25
SECTION F CONSERVATION OUTSIDE PROTECTED AREAS	27
Watersheds	27
Coastal and Marine Resources	29
Wetlands	33
Agricultural Systems	34
SECTION G OTHER CONSIDERATIONS	36
Impacts of Development Projects	36
Ex-Situ Conservation	36
Conservation of Economically Important Species and Germplasm	37
Alien Invasive Species	37

SECTION H	MAJOR ISSUES, OPPORTUNITIES AND ACTIONS	39
	Overall Findings	39
	Specific Issues, Opportunities and Actions	39
PART III - CARIBBEAN REGIONAL PROGRAM		44
SECTION A	PROGRAM CONTEXT	44
	Background on Caribbean Regional Program	44
	USAID/J-CAR's 2000-2004 Caribbean Regional Program	44
	Current Regional Programming Efforts	46
	The Regional Context for Natural Resources Management	46
SECTION B	LEGISLATIVE AND INSTITUTIONAL FRAMEWORK	48
	Policy and Legislative Setting	48
	Institutional Framework	50
SECTION C	STATUS AND MANAGEMENT OF PROTECTED AREAS	53
	Types of Protected Areas	53
	Present List	53
	Management Models/Mechanisms	54
	Future Directions	54
SECTION D	STATUS AND PROTECTION OF ENDANGERED SPECIES	55
	Importance of Endemism	55
	Current Protection and Rehabilitation Activities	57
SECTION E	STATUS AND PROTECTION OF FOREST RESOURCES	58
	Institutional and Action Framework for Forest Conservation in the OECS	58
SECTION F	CONSERVATION OUTSIDE PROTECTED AREAS	60
	Managed Natural Systems	60
	Watersheds	60
	Coastal and Marine Resources	61
	Wetlands	62
	Agricultural Systems	62
SECTION G	OTHER CONSIDERATIONS	66
	Impact of Development Projects	66
	Conservation of Economically Important Species and Germplasm	66
	Alien Invasive Species	67
SECTION H	MAJOR ISSUES, OPPORTUNITIES AND ACTIONS	68
	Overall Findings	68
	Specific Issues, Opportunities and Actions	68
ANNEXES		
	A- Scope of Work	
	B- Biosketches of Team Members	
	C- Bibliography	
	D- List of Persons Consulted	
	E- Sections 118/119 of the Foreign Assistance Act	
	F- Biogeographical Overview of the Caribbean Region	
	G- Map of Watershed Conditions	
	H- List of Protected Areas in the Caribbean Region	

ACRONYMS

ACS	Association of Caribbean States
AMEP	CEP Sub-Programme on Assessment and Management of Pollution
CaMPAM	Caribbean Marine Protected Areas Managers Network Caribbean Region
CARICAD	Caribbean Centre for Development Administration
CARICOM	Caribbean Community
CARIFORUM	Caribbean Forum
CAST	Caribbean Alliance for Sustainable Tourism
CBO	Community Based Organization
CCA	Caribbean Conservation Association
C-CAM	Caribbean Coastal Area Management
CDERA	Caribbean Disaster and Emergency Response Agency
CEHI	Caribbean Environmental Health Institute
CEPNET	CEP Sub-Programme on Information Systems for Management of Marine and Coastal Resources
CHEMI	Caribbean Hotel Environmental Management Initiative (aka EAST III)
CIDA	Canadian International Development Agency
CITES	Convention on International Trade in Endangered Species
CRP	Caribbean Regional Program (USAID)
CSP	Country Strategic Plan
CTO	Caribbean Tourism Organization
CWIP	Coastal Water Improvement Project
DFID	U.K. Department for International Development
EAST	Environmental Audits for Sustainable Tourism Project
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
EEZ	Exclusive Economic Zone
EFJ	Environmental Foundation of Jamaica
ENCORE	USAID-funded Environment and Coastal Resources Project
ETA	CEP Sub-Programme on Education, Training and Awareness
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FD	Forestry Department

FMCP	Forestry Management and Conservation Plan of 2001
FY	Fiscal Year
GOJ	Government of Jamaica
IDB	Inter-American Development Bank
IEE	Initial Environmental Examination
IFAD	International Fund for Agricultural Development
IOJ	Institute of Jamaica
IR	Intermediate Result
IRF	Island Resources Foundation
IUCN	International Union for the Conservation of Nature
JHTA	Jamaica Hotel and Tourist Association
JMA	Jamaica Manufacturers Association
LAC	Local Advisory Committee
LBSMP	Land Based Sources of Marine Pollution
LDUC	Land Development and Utilization Commission
LFMC	Local Forest Management Committee
LME	Local Management Entity
MEA	Multilateral Environmental Agreement
NBSAP	National Biodiversity Strategy and Action Plan
NCRPS	Negril Coral Reef Preservation Society
NEPA	National Environment and Planning Agency
NEPT	Negril Area Environmental Protection Trust
NGO	Non-Governmental Organization
NPFT	National Parks Forest Fund
NRCA	Natural Resources Conservation Authority
NRMU	OECS Natural Resources Management Unit (now Environmentally Sustainable Development Unit- ESDU)
OAS	Organization of American States
OECS	Organization of Eastern Caribbean States
PEPA	Portland Environmental Protection Association
PIOJ	Planning Institute of Jamaica
PiP	Parks in Peril Project
PREMT	Port Royal Environmental Management Trust
R2RW	Ridge to Reef Watershed Project
RADA	Rural Agricultural Development Authority

REIN	Regional Environmental Information Network
SIDS-POA	Small Island Developing States- Program of Action
SJD	Saint George's Declaration
SO	Strategic Objective
SOW	Scope of Work
SPAW	CEP Sub-Programme on Specially Protected Areas and Wildlife
STEA	Southern Trelawny Environmental Agency
STEP	Small Tourism Enterprises Program
TFCA	U.S. Tropical Forest Conservation Act
TNC	The Nature Conservancy
TPD	Town Planning Department
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP-CEP	United Nations Environment Programme- Caribbean Environment Programme
USAID	United States Agency for International Development
WFP	World Food Programme

Executive Summary

This is the required report of a Section 118/119 Assessment on Tropical Forestry and Biodiversity Conservation examining the new Strategic Plans (2005-2009) for the USAID/Jamaica Bilateral Program and the Caribbean Regional Program.

As part of its ongoing efforts to design and program a new assistance strategy for Jamaica for 2005-2009, USAID/Jamaica contracted the services of a tropical forestry/biodiversity assessment team under the BIOFOR IQC mechanism with Chemonics International Inc. The assessment is an early environmental review of the Mission's new multi-year strategy for the country aimed at ensuring that:

- Planned activities and investments are not likely to adversely affect tropical forestry and biodiversity.
- Opportunities for program synergy among the strategic objectives that can contribute to conservation and biodiversity are identified.
- Other issues and opportunities for USAID assistance that match the Mission's overall strategy are identified.

The New Strategy for the USAID/Jamaica Bilateral Program

USAID/Jamaica believes that the activities and investments under the current Strategic Plan provide a solid foundation on which to continue USAID assistance to the country. "The new strategy will involve adjustments that are more in the nature of course corrections, next steps and some reconfiguration of ongoing activities, rather than major changes in direction" (USAID 2002). The "Ideas Paper" presented in December 2002 and largely endorsed by USAID/Washington proposes focusing on five areas of strategic intervention:

- Competitive environment for the private sector
- Natural assets and rural livelihoods
- Healthy and productive lifestyles
- Better-educated population
- Legal and political reform.

The New Strategy for the Caribbean Regional Program

USAID/J-CAR will target seven Island Nations under the Caribbean Regional Environment Strategic Objective: six countries of the OECS—Antigua & Barbuda; Dominica; Grenada; St. Kitts & Nevis; St. Lucia; St. Vincent & the Grenadines—and Barbados. Their relative physiographic and socio-economic similarities and common environmental challenges and opportunities constitute an appropriate scenario for program synergies.

Major Findings of the USAID/Jamaica Bilateral Program

The team's findings support USAID strategies. First, the team has not detected any instances where the planned activities would be likely to adversely affect tropical forests or biodiversity in Jamaica. Second, because of the close links between the tropical forest and coastal marine environment, the "ridge to reef phenomenon," it would be fair to say that the new strategy will continue to contribute to conservation of the region's environmental assets. As a result of this study, the team recommends that USAID consider:

- Providing further support to an "environmental policy & economics" function within government, and ideally within NEPA
- Funding efforts to facilitate the further development of a capacity for a systematic approach to protected areas as part of its support of the unit responsible for these areas
- Continuing to promote an integrated watershed management approach, including uplands, forests, farms, cities, and the coast
- Linking governance efforts with the environment strategic objective by managing resources and community structures and capacity
- To promote agricultural development in the uplands, developing market-oriented production systems that are both financially and ecologically sustainable
- Devoting at least a portion of TFCA resources to working with the Forestry Department to improve the capacity for community-based natural forest management.

Major Findings of the USAID Caribbean Regional Strategy

The team did not detect any instances where the planned activities are likely to adversely affect tropical forests or biodiversity in the Eastern Caribbean Region. The team believes that the regional program will continue to contribute to the conservation of these assets and limits its more specific findings and action recommendations to the following issues and opportunities:

- The region shares resource management concerns for the quality of the environment on which their tourism industries are based, particularly the pervasive degradation of the upland watersheds and the critical human waste stream.
- A constituency for environmental management in the OECS is necessary. It is critical that societies develop governance structures and processes that foster community cohesion.
- There is a continuing need for institutional and human resource capacity-building.
- With regional institutions focusing on different, yet overlapping, agendas, and with many programs and projects driven by the priorities of bilateral institutions,

program integration within the OECS will continue to be an issue in the foreseeable future.

- Information management is one of the major limitations of natural resources management in the wider Caribbean region. As indicated by national, regional, and international publications, the information networks and data sources are not as useful as required.
- Fostering OECS initiative to develop Environmental Management Systems (EMS) in the member states is critical as countries attempt to monitor their progress in adopting the St. George's Declaration.

PART I- INTRODUCTION AND RATIONALE

Introduction to the Assessment

In 1987, the United States Congress amended the Foreign Assistance Act to add new requirements above USAID's environmental procedures codified under 22 CFR 216. The following are overviews of the specific requirements:

Section 118- Tropical Forests. Each country development strategy statement or other country plan prepared by USAID shall include an analysis of (1) the actions necessary to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by USAID meet the identified needs.

Section 119- Biodiversity. Each country development strategy statement or other country plan prepared by USAID shall include an analysis of: (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by USAID meet the needs thus identified.

Accordingly, as part of its ongoing efforts to design and program a new assistance strategy for Jamaica for 2005-2009, USAID/Jamaica has contracted the services of a tropical forestry/biodiversity assessment team under BIOFOR IQC with Chemonics International Inc.¹

It is important to note that the tropical forestry and biodiversity assessment exercise is not specifically a programming or sector-wise design effort. Rather, it is an early environmental review of the Mission's new multi-year strategy for the country aimed at ensuring that:

- Planned activities and investments are not likely to adversely affect tropical forestry and biodiversity.
- Opportunities for program synergy among the strategic objectives are identified that could contribute to conservation and biodiversity.
- Other issues and opportunities for USAID assistance that may match the Mission's overall strategy are identified.

¹Given the fact that USAID/Jamaica is the institutional home for both the Jamaica Bilateral Program and the Caribbean Regional Program and that strategy preparation is underway for both elements of the overall portfolio, the team has been charged with carrying out the tropical forestry and biodiversity assessment for both.

Assessment Objectives

Following the procedures customary with Section 118/119 Assessments, the overall findings and recommendations will be incorporated by the Mission in the ongoing development of its strategy. The complete parent document, *Tropical Forestry and Biodiversity Assessment*, will be in the master Mission CSP files and available on request. This assessment does not substitute for the Initial Environmental Examination (IEE) of activities identified in the new strategy. Each SO team will be responsible for ensuring that an IEE or a Request for Categorical Exclusion is conducted at the SO level for all activities funded by USAID.

Methodology

This assessment was conducted from April to June 2003 by a Team Leader/Natural Resources Management Specialist, a Biodiversity Specialist, and a Junior Natural Resources Management Specialist. The complete Scope of Work is in **Annex A**. Brief biographical sketches of the team members are in **Annex B**. The straightforward methodology for the assessment depended primarily on secondary sources of information, including a review of the existing literature (see **Annex C**), and interviews with persons in Jamaica and the region knowledgeable about tropical forests and biodiversity. (See **Annex D** for the List of Persons Consulted.) **Annex E** provides a synopsis of the official text of Sections 118/119 Amendments to the Foreign Assistance Act that generated the need for this Assessment.

PART II- USAID/JAMAICA BILATERAL PROGRAM

Section A. Program Context

Background on the USAID/Jamaica Program

Although Jamaica has received government aid from the United States since 1956, formal assistance began in 1962, the year of Jamaica's independence and one year after USAID was established. The United States has provided almost \$2 billion in assistance to the country, most recently guided by the 1997 Barbados Summit accords, which involved a commitment from the United States and the region to plans for promoting free trade and economic development, safeguarding the natural environment, and enhancing justice and security. At the Third Summit of the Americas in Quebec in 1992, President George Bush "outlined his vision for making this the Century of the Americas, including special attention to the Caribbean" (USAID 2002). In addition, the "Third Border Initiative" was launched to deepen cooperation between the United States and the Caribbean Nations.

USAID/Jamaica's Strategic Plan- FY2000-2005

The current strategy for the Jamaica Program for FY2000 - FY2005, involving funding of approximately \$14 million per year, has the following five strategic objectives and one special objective:

- Improve the business environment for developing small, medium and micro-enterprises
- Improve quality of key natural resources in selected areas that are both environmentally and economically significant
- Improve reproductive health of youth
- Increase literacy and numeracy among targeted Jamaican youth
- Improve citizen security and participation in democratic processes
- Improve economic and social conditions in targeted inner city communities (the special objective).

Assistance for the environment is a large part of the overall strategy for USAID. The natural resources management program encompasses three major projects, as follows:

Coastal Water Quality Improvement Project (CWIP). Begun in 1997, this project is a five-and-one-half-year, \$7 million initiative carried out in conjunction with the Government of Jamaica's National Environment and Planning Agency (NEPA). The project design is predicated on the recognition that land and coastal activities influence the quality of the coastal and marine resources on which Jamaica's tourism industry depends. The project has five related components targeting improved coastal zone management, waste water treatment and solid waste disposal in specific areas of the country (Ocho Rios, Negril, Montego Bay, and Portland). Since it was judged as useful, a programming exercise is currently underway

to consider “bridging” support for the project to continue until the end of the current strategy period.

Environmental Audits for Sustainable Tourism (EAST) Project. This project, implemented in 2000 and funded at \$1.5 million, is intended to encourage and assist the tourism and manufacturing industries to identify and adopt cost-savings and environmental mitigation measures. EAST works with the Jamaica Hotel and Tourist Association (JHTA) and the Jamaica Manufacturers Association (JMA). Initially targeted at Negril, the project has now extended its activities to Port Antonio and to the wider Caribbean Region, through USAID’s Caribbean Regional Program-CRP.

Ridge to Reef Watershed Project (R2RW). The newest project, begun in August 2000 as a five year \$8 million initiative with NEPA, is designed to improve the management of natural resources in targeted watersheds that are both environmentally and economically significant. Its activities and investments originally targeted the Great River watershed of St. James, but have now been expanded into the Rio Grande watershed in Portland. There are three interrelated components: working with local organizations to identify and promote sustainable environmental management practices; identifying incentives and constraints affecting the enforcement of existing environmental regulations; and enhancing the capacity of stakeholder organizations to implement effective watershed management programs.

Of more recent vintage is an ongoing design effort launched with the USDA Forest Service to identify the scope and potential for nature-oriented “Heritage Tourism.” This initiative, as yet unprogrammed, is considering enhancing the competitiveness of Jamaica’s “sun and surf” tourism by involving and drawing tourists into both marine and upland protected areas. The idea is to diversify and enhance the visitor experience and to generate income and employment opportunities for communities living near the protected areas, thereby increasing their support for conservation.

Current Programming Efforts

USAID/Jamaica believes that the activities and investments under the current Strategic Plan provide a solid foundation on which to continue USAID assistance to the country. “The new strategy will involve adjustments that are more in the nature of course corrections, next steps and some reconfiguration of ongoing activities, rather than major changes in direction.” (USAID 2002) The “Ideas Paper” presented in December 2002 and largely endorsed by USAID/Washington proposes focusing on five areas of strategic intervention:

- Competitive environment for the private sector
- Natural assets and rural livelihoods
- Healthy and productive lifestyles
- Better-educated population
- Legal and political reform.

Preserving Natural Assets and Enhancing Rural Livelihoods

USAID/Jamaica foresees continuing to enhance community capacity and environment-related economic activities, with special attention to watershed management and biodiversity. Similarly, the new program is planned to more comprehensively address the problems of the rural poor. The following paragraphs summarize the plan for USAID investments and

activities in the environment sector in three major focal areas (which in all likelihood will be converted into Intermediate Results as the Results Framework is further elaborated).

Environmentally Sound and Risk-Resistant Practices. Program activities under this area target the conservation of natural resources, including biodiversity, forest resources, parks and protected areas. Special attention will be devoted to watershed management and land-use planning to reduce natural resources degradation that makes the country more vulnerable to intense rainfall and climatic events (hurricanes), and leads to recurrent flooding, damage and loss of vital infrastructure, human suffering and loss of life, and carries heavy silt and sediment loads into the adjacent marine ecosystems. These matters will be addressed by promoting environmentally sound practices in the form of environmental management systems by both the public and private sector. Doing so is expected to provide Jamaica with enhanced competitiveness in an increasingly global marketplace. The activities will also include targeted public education.

Enhancing Rural Prosperity. These activities are intended to target natural resource-based and tourism and agriculture-related rural enterprises by fully exploiting the links between tourism and agriculture. It addresses the opportunities for greater community involvement in providing goods and services and in the development of tourist attractions. There is potential for the development of ecotourism, community tourism and heritage tourism that will help to broaden and diversify the tourism industry, making good use of natural and human capital while providing employment and alleviating rural poverty. Similarly, these activities will directly address the opportunities in the agriculture sector that are important to rural incomes and food security. Activities in the natural asset and rural livelihoods arena could include agribusiness-farmer alliances to promote specialized products such as environmentally friendly or certified products. USAID-supported rural livelihood activities will consider ways to support agriculture related economic activity in targeted areas.

Strengthening Rural Governance. These activities seek to build on the lesson that “acting locally” is an imperative of environmental management and development in general. They are expected to build capacity at the community level as a fundamental part of interventions in natural resources management and enhanced rural livelihoods. Local governance mechanisms should be strengthened to address local environmental problems such as lack of compliance with environmental regulations and poor solid waste and sanitation management. The local governance approach and activities are expected to broadly involve civil society groups including non-governmental organizations and community-based organizations, as well as the private sector and local government institutions. Capacity building for community-level management and public education will be important corollaries directly linked to more specific program activities described above.

The Jamaican Context for Natural Resources Management

Jamaica is the third largest island in the Caribbean with a total area of approximately 11 thousand square kilometers (1.1 million hectares), and a population of 2.6 million. Although the average population density is about 236 people per square kilometer, the majority of the island’s population is concentrated along the coastal areas because the interior is primarily mountainous. Agriculture is the second largest employer (after tourism), although the majority of the farm holdings (166,000 or 89 percent), are less than five hectares (Jamaica’s Environment 2001). Many of these small farms are marginally productive and are often the source of environmental degradation as a result of inappropriate farming practices on fragile

(steep) lands, and also as a result of the lack of access to inputs, credit and technology transfer.

From a biodiversity perspective, Jamaica's ecology is very niche-based, given the rugged topography. Similarly, that same topography results in very direct links between the uplands and the coastal marine environment, often characterized as the "ridge to reef" phenomenon. Environmental degradation in the upper watersheds is difficult to mitigate over the short river courses, and impacts are quickly felt in the adjacent marine areas into which they drain. The difficulties of farming and rural life in general in the highlands is stimulating rural migration, particularly among youth, thereby adding to the social burdens in the urban sector.

Jamaica's leaders perceive the future of the country in terms of "enhancement of global competitiveness," enabled by private sector growth (USAID/Jamaica 2002). From the environment perspective, that means eliminating and mitigating the adverse impacts on the coastal marine environment upon which Jamaica's "sun, sea and surf" oriented tourism is based, and providing the industrial sector with the options it needs to more sustainably produce for the global marketplace that increasingly demands certified products.

SECTION B- LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

Sector Policy and Legislation

The policy and legislative framework for forestry and biodiversity management in Jamaica consists of a number of policies, laws, and regulations. The main policies are:

- National Forest Management and Conservation Plan, 2001
- Watershed Policy, 1999
- National Biodiversity Strategy and Action Plan, 2001
- Ocean and Coastal Zone Management Policy, 2000
- Policy for Jamaica's System of Protected Areas, 1997
- National Policy and Strategy on Environmental Management Systems, 2001
- A number of draft policies on mangroves and coastal wetlands, coral reefs, seagrass protection, mariculture, orchids, and protected animals in captivity.

A number of the major policies are undergoing a revision toward their final form, the "White Paper." Gaps have been identified in the policy framework, and the National Environment and Planning Agency (NEPA) has initiated a process of gap analysis to identify not only the gaps in each policy, but also the gaps in overall coverage.

Jamaica's current environmental legislative framework includes approximately 52 pieces of legislation. The primary laws that directly deal with forestry and biodiversity are:

- Forest Act, 1996
- Beach Control Act, 1956
- Wild Life Protection Act, 1945
- Fishing Industry Act, 1975
- Watershed Protection Act, 1965
- Endangered Species (Protection, Conservation and Regulation of Trade) Act, 2000
- The Natural Resources Conservation Authority Act.

Much of the legislation is under review to update the current policy and legislative imperatives, including obligations imposed by international treaties. As signatory to more than 17 international and regional multilateral environmental agreements (MEAs), international agreements also influence the policies and programs at the national level. The major MEAs that affect forestry and biodiversity are:

- Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) – acceded April 23, 1997
- International Plant Protection Convention – acceded November 24, 1969
- Convention Concerning the Protection of the World Cultural and Natural Heritage – acceded March 22, 1991
- Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region – ratified May 1, 1987

- Convention on Biological Diversity – acceded January 6, 1995
- Convention on Wetlands of International Importance, especially as Waterfowl Habitats – acceded October 7, 1997.

These MEAs have varying levels of impact on national conservation programs, management activities, and enforcement actions. However, while it is difficult to determine the extent to which MEAs have influenced national legislation, there is general agreement that there is still a significant way to go in regard to the enactment of national legislation to implement MEA obligations.

Institutional Framework

The institutional framework for forestry and biodiversity in Jamaica includes Government of Jamaica (GOJ) agencies, national and local non-governmental organizations (NGOs), private voluntary organizations (PVOs), bilateral and multilateral institutions, international technical assistance institutions (FAO, UNDP, UNEP, etc.), regional governmental and non-governmental organizations, and international PVOs.

The primary GOJ institutions for forestry and biodiversity management are:

- National Environment and Planning Agency (NEPA) – functions as the lead agency for environmental management and land use planning
- Forestry Department – lead agency for forestry management, and plays a critical role in watershed management
- Fisheries Division – fisheries management
- Institute of Jamaica/Natural History Division – manages national collection on flora and fauna
- Ministry of Land and Environment – policy oversight for environment and land use planning.

The National Environment and Planning Agency (NEPA) is the lead institution responsible for environment and planning in Jamaica (<http://www.nepa.gov.jm>). NEPA is an Executive Agency, formed from the merger of the Natural Resources Conservation Authority (NRCA), the Town Planning Department (TPD), and the Land Development and Utilization Commission (LDUC). The new agency, which became operational on April 1, 2001, says its overall goal is to “integrate environmental, planning and sustainable development policies and programmes and improve customer service” (NEPA Corporate Plan 2003-2006).

NEPA pursues its mission through a number of functional units:

- The Policies, Programmes and Projects Coordination Division – develops, monitors, and evaluates policies, programmes, and projects to further NEPA’s mandate. This Division includes the Strategic Planning and Policies Branch, the Projects Branch, and the Secretariat of the Sustainable Development Council of Jamaica.

- The Information Technology Division – provides land use databases and mapping systems, based on GIS technology.
- The Regulatory Services Division – develops and services the various regulations, standards, guidelines, and oversees the permitting processes within NEPA. The Division consists of the Legal Services Branch and the Board Secretariat Branch.
- The Compliance and Regional Services Division – oversees the regional programming of NEPA, as well as its enforcement function. The Division comprises the three Regional Offices and the Enforcement Branch.
- The Conservation and Protection Division – focuses on the sustainable use of watersheds, coastal, marine, biodiversity, and agricultural resources. It is comprised of the Watersheds Branch, Biodiversity Branch, Protected Areas Branch, and the Coastal Zone Management Branch.
- The Environmental Management Division – addresses issues of pollution prevention and waste minimization; and is comprised of the Pollution Prevention and Control Branch, the Environmental Standards and Regulations Branch, and the Environmental Monitoring and Assessments Branch.
- The Planning and Development Division – deals with spatial planning, land use control, and development control; and consists of the National Spatial Planning Branch, the Land Use Branch, the Development Control Branch, and the Local Area Branch.
- Other units within NEPA deal with Corporate Services, Human Resources, Operations Management, Finance, and Public Education and Community Outreach.

In addition to its line units, NEPA hosts the Secretariats (or provides secretariat functions) for a number of national committees dealing with environment and sustainable development issues. These include:

- Sustainable Development Council of Jamaica
- National Environmental Education Committee
- National Integrated Watershed Management Council
- National Biodiversity Secretariat (for the National Biodiversity Committee).

Though a large number of institutions have responsibilities related to biodiversity management in Jamaica, NEPA is the lead agency for implementation of the Biodiversity Strategy and Action Plan. The Biodiversity Branch is mandated to regulate and develop action plans for protected and endangered species, and develop guidelines for the sustainable use and conservation of species (including permits and harvest limits for selected species). In addition to hosting the Biodiversity Secretariat, NEPA is currently expanding the priority project profiles into full project proposals. In this regard, a proposal on the expansion of the biodiversity clearing house mechanism has been completed, and a second proposal on invasive species is in draft form.

The Institute of Jamaica (IOJ) was first established in 1879 as a cultural and scientific organization (<http://www.instituteofjamaica.org.jm>). Its mandate was expanded by the Institute of Jamaica Act (1978), and is now comprised of six divisions:

- The Natural History Division
- The National Gallery of Jamaica
- The African Caribbean Institute of Jamaica/Jamaica Memory Bank
- The Museums Division
- The Junior Centres
- The Publications Division.

The biodiversity activities of the IOJ are undertaken mainly by the Natural History Division, which manages two wildlife sanctuaries, conducts research, collects and classifies wildlife species, and disseminate information on natural history. In addition to the Natural History Division, the Museums Division manages the national collection on flora and fauna. The IOJ is responsible for:

- Expansion and management of the National Focal Point for the Clearing-House Mechanism (www.jamaicachm.org.jm) for the Convention on Biological Diversity
- Creation of a Traditional Knowledge/Register
- Establishment of the Jamaica protected areas biological database (to incorporate the remnants of the Conservation Data Centre)
- Repatriation of indigenous biodiversity information.

To further the above responsibilities, the African Caribbean Institute is reviewing the role of Jamaican culture in biodiversity management. In addition to its role in biodiversity management, IOJ is the National Authority for Jamaica's implementation of the provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Numerous Jamaican NGOs conduct activities at both the national and local levels. These activities range from education and advocacy, through research, to management of protected areas. The activities of regional governmental and non-governmental institutions are normally carried out in conjunction with Jamaican NGOs or with government agencies. In 1999, the Association of Development Agencies (ADA) estimated that there were approximately 2,000 NGOs and community-based organizations (CBOs) operating across Jamaica, with more than 50 percent of them providing education, awareness, and training to their constituents, on a range of social, environmental and development issues (National Environmental Education Action Plan for Sustainable Development). More than 100 of these NGOs and CBOs fall under several national umbrella organizations, including:

- National Environmental Societies Trust (NEST)
- Association of Development Agencies (ADA)
- Council for Voluntary Social Services (CVSS)
- Association of Women's Organizations in Jamaica (AWOJA)
- United Way of Jamaica (UWJ)

- People's Action for Community Transformation (PACT)
- Professional Societies Association of Jamaica (PSAJ).

The major NGOs participating directly in forestry and biodiversity conservation are:

- Jamaica Conservation and Development Trust (JCDDT) – national (<http://greenjamaica.org>)
- Montego Bay Marine Park Trust – local (<http://www.montego-bay-jamaica.com/mbmp>)
- Negril Environmental Protection Trust (NEPT) – local
- Negril Coral Reef Protection Society – local (<http://www.ncrpsonline.org>)
- Caribbean Coastal Area Management Foundation (C-CAM) – local (<http://ccam.org.jm>)
- South Trelawny Environmental Association (STEA) – local
- Portland Environmental Protection Association (PEPA) – local (<http://pepa-jamaica.org>)
- Natural History Society of Jamaica (NSHJ) – national (<http://jamaicamanatee.freeservers.com>)
- Birdlife Jamaica – national (<http://www.birdlife.net/worldwide/national/jamaica>)
- National Environmental Societies Trust (NEST) – national umbrella organization (<http://jsdnp.org.jm/nestjamaica>)
- University of the West Indies – Caribbean-wide (<http://uwi.edu.jm>).

The major initiatives, such as those dealing with watershed management and the biodiversity action plan, utilize consultative mechanisms, primarily commissions and committees comprised of a large number of governmental and non-governmental organizations. These committees function as coordinating mechanisms, and include:

- Council on Ocean and Coastal Zone Management
- National Integrated Watershed Management Council
- Local watershed management committees
- Local advisory committees for protected areas
- Biodiversity Committee
- Parish Development Committees
- Sustainable Development Council (established to address all issues on sustainable development).

Increasingly, there are private sector initiatives focusing on environmental issues. The major initiatives are the annual Environmental Protection Award, presented by the Jamaica

Chamber of Commerce to its members and the Environmental Working Group of the Private Sector Organisations of Jamaica. No information is available to suggest the level of impact of the private sector environmental initiatives.

In addition to the national governmental and non-governmental organizations, the Environmental Foundation of Jamaica, Canada Green Fund, and the National Parks and Protected Areas Trust Fund, provide sources of funds to forest and biodiversity management, particularly through the management of protected areas and other critical ecosystems.

- Caribbean Conservation Association – amenity area development (<http://ccanet.net>)
- The Nature Conservancy – Parks in Peril initiative (<http://www.tnc.org>)
- The University of the West Indies – Caribbean Programme for Adaptation to Climate Change (<http://www.cpacc.org>).

International bilateral and multilateral organizations supporting forestry and biodiversity initiatives include:

- United States Agency for International Development (USAID) – Coastal Water Quality Improvement Project and Ridge to Reef (<http://www.usaid.gov>)
- Canadian International Development Agency (CIDA) – Trees for Tomorrow and Environmental Action (ENACT) projects (<http://www.dfiat-maeci.gc.ca/jamaica>)
- United Nations Development Programme (UNDP) – Support to the development of the biodiversity strategy and action plan, and the forestry plan (<http://www.undp.org/rblac/regional>)
- United Nations Environment Programme-Caribbean Environment Program (UNEP-CEP) – Regional Programme on Specially Protected Areas and Wildlife (<http://www.cep.unep.org>)
- Inter-American Development Bank (IDB) – support to the management of the Portland Bight conservation area (<http://www.iadb.org>).

Two international voluntary organizations provide a range of technical assistance support services to local organizations. Such services typically target civil society organizations, and may include activities aimed at environmental management generally, and biodiversity and forestry to a lesser degree. The two organizations are the United States Peace Corps and the CUSO (a Canadian organization coordinating the overseas volunteer program of several Canadian universities).

Coordinating Mechanisms

In addition to the coordinating mechanisms used by the environmental management agencies, the bilateral and multilateral institutions also share information by convening meetings of the international funding and technical assistance institutions to discuss sector issues. More recently, the Planning Institute of Jamaica (PIOJ), as the GOJ institution that is responsible for soliciting, negotiating, monitoring, and evaluating all donor projects in Jamaica, has taken a more proactive role in convening these meeting of the international funding institutions.

Reporting on the status of environmental management/sustainable development programming in Jamaica is in response to a number of national and international obligations. Reporting typically includes:

- Posting policies and reports on the websites of the various agencies (e.g. NEPA's website: <http://www.nepa.gov.jm>)
- Preparation of State of the Environment Reports (1995/96, 1997, 2001)
- Preparation of the Jamaica National Environmental Action Plan
- Biodiversity Clearing House Mechanism
- Reports to major international meetings, such as the World Conservation Congress and the World Summit on Sustainable Development
- Reports to the secretariats of international environmental agreements to which Jamaica is a signatory.

Major Issues Regarding the Institutional Framework

The major issues in terms of the legislative and institutional framework for environmental management in Jamaica are:

- The development of a large number of environmental policies now requiring harmonization of the policy framework. A gap analysis is being undertaken, but resources are lacking for translating policies into strategic initiatives, as well as for implementation of related programs.
- Inadequate financial resources to implement programs – in most cases the recurrent expenditures account for the greater part of the overall budget—up to 90 percent in some cases.
- Inadequate information and decision-making tools to support comprehensive policy and planning, program design, and development control.
- A significant degree of overlap in institutional responsibilities, despite inadequate institutional capacity. Mechanisms for increased inter-agency cooperation are being pursued.
- Inadequate enforcement capacity. Mechanisms are being considered for the purpose of increasing the coordination between the Honorary Game Wardens, the Environmental Wardens, and the field personnel in the various government departments.

There is a significant degree of experimentation with regard to governance in natural resources management, particularly in the area of protected area management. However, more rigorous analyses of the roles, responsibilities, and capabilities of the relevant government and civil society institutions need to be undertaken as the sector evolves.

SECTION C- STATUS AND MANAGEMENT OF PROTECTED AREAS

The concept of protecting Jamaica's natural resources dates back almost 100 years, when the first protected area was established by the Morant and Pedro Cays Act. A protected area was most recently defined in the NRCA Act of 1991 as "an area of land or water that is managed for the protection and maintenance of its ecological systems, biodiversity, and/or specific natural, cultural, or aesthetic resources." Over 10 percent of Jamaica's land area is now legally protected, in addition to the vast marine areas declared as parks and protected areas (Jamaica's Environment 2001).

Types of Protected Areas

As an island nation, Jamaica has many different types of protected areas. There are various government agencies and legislation governing each type. NEPA oversees the national system of protected areas, including National Parks, Protected Areas (declared under the NCRA Act of 1991), Marine Parks and Environmental Protection Areas. Other national government agencies manage the Fish Sanctuaries (2), Forest Reserves (96), Protected National Heritage Sites (7), Game Reserves (13), Game Sanctuaries (5), and National Monuments (92). Local governments manage some public beaches and open space reserves. Other areas are managed by public and private organizations, including Petroleum Corporation of Jamaica's Royal Palm and Font Hill Reserves and the Schwallenburgh Orchid Sanctuary in St. Ann, among others (NRCA 2000, PA Chapter Reprint).

Jamaica based the six categories of protected areas found in the *Policy for Jamaica's System of Protected Areas* on IUCN's system of classification, including: National Nature Reserve/Wilderness Area; National Park/Marine Park; National Landmark/National Monument; Habitat/Species Management Area; National Protected Landscape, and/or Seascape; and Managed Resource Protected Area (Jamaica's Environment 2001).

Present List of Protected Areas in Jamaica

The current list of protected areas as defined by the 1991 NRCA Act and the 1997 Policy for Jamaica's System of Protected Areas includes one national park (Blue and John Crow Mountains), three protected areas (Palisadoes-Port Royal, Coral Spring/Mountain Spring and Portland Bight), three marine parks (Montego Bay, Negril and Ochos Rios) and one environmental protection area (Negril and Green Island Watersheds).

The Blue and John Crow Mountains National Park was established in 1993 as the first, and to-date only, national park in Jamaica. The two mountain ranges, separated by the Rio Grande valley, consist of different topography. The Blue Mountains are of volcanic origin and have high elevations, and the John Crow Mountains are of limestone origin and half as high. Forty percent of the land in the park is thought to be natural and undisturbed.

Palisadoes-Port Royal Protected Area was declared in 1998 and consists of 800 hectares of land and 6,000 hectares of marine area. The protected area conserves coral reef, sand dunes, mangrove forests, archaeological sites, beaches and thorn-cactus scrub.

Coral Spring/Mountain Spring Protected Area, also declared in 1998, consists of the largest remaining intact dry limestone forest in Jamaica at 170 hectares. It is considered to be an ideal location for research, education and tourism activities.

Portland Bight Protected Area is Jamaica's largest protected area with 55,000 hectares of land and 142,300 hectares of marine area. The protected area, declared in 1999, includes the largest continuous strands of mangrove remaining in Jamaica, as well as dry limestone forest, coral reef, beaches and a productive fishery.

Montego Bay Marine Park was the first protected area to be declared in 1992. In addition to being an important tourist area, the park conserves 1,400 hectares of coral reefs, sea grass beds, lagoons and mangrove islands.

Negril Marine Park, declared in 1998, is another area influenced by large numbers of tourists. It consists of 18,500 hectares of marine area, including coral reefs, sea grass beds, mangroves and fish nursery areas.

Ochos Rios Marine Park protects coral reefs and sea grass beds and was declared in 1999.

Negril and Green Island Watersheds Environmental Protection Area was declared in 1997 as the first Environmental Protection Area.

Management Models of Protected Areas

Every park and protected area under the National Protected Area System outlined in the NRCA Act is officially governed by NEPA. NEPA has formed partnerships with other public organizations, private companies, local NGOs and communities to help manage each protected area. They establish policy framework and guidelines, coordinate the participation of organizations in the management of parks, and approve the management, operations and financial plans for each park and managing areas where no local capacity exists.

This co-management approach relies on local organizations, including Local Management Entities (LMEs), and Local Advisory Committees (LACs), as well as local stakeholders. The LMEs can be a single or group of organizations. They are responsible for coordinating all aspects of park management. The LACs should be comprised of representatives of all local stakeholders, including local government, businesses, landowners and traditional resource user groups.

In 1996 NEPA (then NRCA) delegated authority to two NGOs to manage two different parks for a period of three years. The Montego Bay Marine Park Trust took over the park management for the Montego Bay Marine Park and the Jamaica Conservation, and the Development Trust assumed responsibility for the Blue and John Crow National Park. These agreements are currently being revised.

Other NGOs have expressed interest in assuming management responsibility of specific protected areas and parks, including: C-CAM with the Portland Bight Protected Area; NEPT and NCRPS with the Negril Marine Park; PEPA with the proposed Port Antonio Marine Park; PREMT with the Palisadoes-Port Royal Protected Area; and STEA with the proposed Cockpit Country.

Since 1997, the official protected areas policy and the foundation for the system can be found in the *Policy for Jamaica's System of Protected Areas*. One of the key goals found in this policy is financial sustainability. In order to achieve this goal, the policy states that the parks

should have multiple funding mechanisms: “the national system of protected areas will be sustained by the GOJ, the Jamaican National Parks Trust Fund (NPTF), local trust funds established for local protected areas, special fund-raising campaigns, user fees and concession licenses, and any other mechanisms that may be developed from time to time” (Policy 6.1). The policy also states that each protected area needs to look to local, national and international funding sources (Policy 6.2).

Future Directions

Over the last 10 years funding to support Jamaica’s protected areas has come largely from donor grants, NEPA and local contributions (NRCA 2000, PA Chapter Reprint). In order for the current protected areas to become financially sustainable, additional methods of fund-raising must be developed. User fees, concessions and merchandising are dependable ways to meet basic operational needs. The LMEs have a difficult task ahead of them in identifying local, national and international funding sources.

New Areas Being Proposed

Four areas are currently considered by NEPA for inclusion in the National Protected Areas system. In 1995, the Portland Environmental Protection Association (PEPA) submitted the Port Antonio Marine Park and Forest Corridor Protected Area Plan, focusing on coral reef, mangroves and the last remaining lowland rainforest in Jamaica. Port Antonio is a priority area under study for declaration as a marine park, while the land areas need further review.

Cockpit Country is a unique ecosystem consisting of the largest limestone forest, underground rivers and caves, large deposits of bauxite ore and the only remaining communities of Windward Maroons. Designated as a Forest Reserve in 1950, the area is under study for inclusion in the national system and is also part of the USAID/LAC-funded Parks in Peril Project, being implemented by The Nature Conservancy (TNC) and due for consolidation in 2006.

The Black River Lower Morass was formally recognized as a Wetland of International Importance under the Ramsar Convention in 1998. A year later, the management plan for the Black River Morass as a Managed Resource Protected Area was submitted. The projected Black River protected area includes an existing Forest Reserve, four game sanctuaries, Protected National Heritage sites and private conservation areas.

Canoe Valley is best known for the presence of manatees in Alligator Hole River. It also is the home to other endangered species, recreational attractions and unique natural features.

The Evolution of the Protected Area System in Jamaica

Until NEPA and other governing institutions set up a viable and financially sustainable plan to manage areas currently designated as protected, no new areas should be declared. Cost recovery schemes are being examined, but additional funds must be sought to maintain the parks and protected areas.

Partnerships must continue to be formed between national and local government, private companies and land owners and local communities to halt the further destruction of potential protected areas. CBOs and NGOs will take on an increasingly important role in providing leadership for the protection and management of vulnerable ecosystems.

SECTION D- STATUS AND PROTECTION OF ENDANGERED SPECIES

Importance of Endemism

Jamaica has a high rate of endemism, as could be expected for an island nation. All of the country's 22 species of amphibians and 89 of the 194 vertebrate species are endemic. Jamaica has more endemic plants and birds per square kilometer than any other Caribbean island. Fourteen animal endemic species and over 200 plant endemic species are classified as critically imperiled or especially vulnerable to extinction.

Jamaica has five natural biodiversity hotspots or "centers," chosen on the basis of their size, low level of human disturbance, and impressive numbers of native plant and animal species. They are: coral reefs and marine ecosystems; Blue and John Crow Mountains; Cockpit Country; Portland Bight and Hellshire Hills; and the Black River Morass.

Extinct Species

Island species are particularly vulnerable to extinction, as there is a smaller geographical area and population base as well as subjectivity to natural disasters, predators and introduced diseases. Since the 1600s, eleven species in Jamaica are thought to have become extinct. These eleven species include: the West Indian Monk Seal; Greater Antillian Fruit Bat; Round-eared Bat; Jamaican Rice Rat; possibly a monkey (*Xenothrix mcgregori*); Jamaican Pauraque; Jamaican Petrel; Red Rail; a possible species of Macaw (*Ara* spp.); Giant Yellow Galliwasp (lizard); and Black Racer (snake). The Jamaican iguana was thought to be extinct until a small population was discovered in the Hellshire Hills in 1990.

Endangered and Threatened Species

The most accepted reasons for species endangerment are unsustainable land-use and degradation, habitat loss due to development, introduction of alien species and human activities polluting the environment (air pollution, waste-water, solid-waste management, etc.). The following is a list of the species in Jamaica thought to have a status of vulnerable or endangered:

Threatened Mammals. West Indian Manatee (vulnerable), Jamaican Hutia or Coney (vulnerable), Macleay's Mustached Bat (vulnerable), Jamaican Fig-eating Bat (vulnerable) and Jamaican Flower Bat (endangered)

Threatened Birds. Jamaican Petrel (critically endangered), West Indian Whistling Duck (vulnerable), Piping Plover (vulnerable), Ring-tailed Pigeon (critically endangered), Plain Pigeon (endangered), Black-billed Amazon (vulnerable) and Jamaican Pauraque (critically endangered)

Threatened Amphibians and Reptiles. American Crocodile (vulnerable), Jamaican Iguana (critically endangered), Jamaican Yellow Boa (vulnerable), Black racer (critically endangered), Loggerhead Turtle (endangered), Green Turtle (endangered), Hawksbill Turtle (critically endangered), Jamaican Slider (vulnerable), and four types of tree frogs (all vulnerable)

Land Invertebrate Animals. Jamaican Kite (vulnerable), Giant Swallowtail Butterfly (endangered), and three other species with no common name (*Hypolestes clara*- endangered, *Macroperipatus insularis*- endangered and *Speleoperipatus spelaeus*- critically endangered)

Terrestrial Plants. Disocactus species, Tree Fern, Aloes, West Indian Mahogany, Orchids, Lignum Vitae, Cactus species and Zamia

The IUCN Red List of Endangered Species can be found at: <http://www.iucn.org>.

Current Protection and Rehabilitation Activities

The most important legislation protecting Jamaica's biological resources are the Wild Life Protection Act of 1945, the NRCA Act of 1991, the Forest Act of 1996, and the Endangered Species Act of 2000. These policies regulate the capture, killing and trading of select vulnerable and endangered species. The following are current management and research activities conducted in Jamaica:

- Sea Turtle Recovery Action Plan.
- Manatee Species Recovery and Management Plan.
- Giant Swallowtail Butterfly Recovery Plan.
- Jamaican Iguana Conservation Strategy: The recovery program, captive breeding program and habitat management in protected areas have resulted in signs of recovery for the iguana. The population is estimated at 80-100 individuals in the wild and over 100 in the breeding program at the Hope Zoo (Jamaica's Environment 2001).
- Sooty Tern Nesting Season Program.
- The Jamaican Parrot Project.
- Crocodile Action Plan.
- Orchid Management.
- C-CAM monitoring programs for Portland Bight Protected Area for land birds in wetlands.
- Marshall's Pen bird monitoring.
- West Indian Whistling Duck research.
- National Arboretum Foundation's planting program of native and endemic species at the Plant Conservation Centre (Royal Botanic Gardens and Hope Zoo) (Jamaica Country Environmental Profile, Biological Resources Chapter Reprint, 2000).

Many initiatives respond to the perception that environmental quality is continuing to deteriorate. The 2001 State of the Environment Report for Jamaica provides the following information:

- “Natural and environmental resources are deteriorating, partly due to main contributors to the economy such as tourism, agriculture, manufacturing and mining and quarrying.”
- Deforestation and watershed deterioration remain issues; when valuable land is ruined there is loss of wildlife habitat and biodiversity.
- Large natural areas are lost to open pit mining.
- Poor agricultural practices create high erosion levels and fires.
- Destruction of wetland and coral reef resources continues.
- Introduction of alien species of wildlife that contribute to pressures on native species continues.
- Coastal resources and habitats are under threat from pollution, development impact, over-harvesting (timber, eggs, fisheries, etc.), predation, hurricanes, and many other factors.
- Protected areas listed as priority sites are still not established.
- Jamaican waters are said to be the most overfished in the CARICOM region.

The deterioration outlined above continues because, while policies and plans are being developed, resources for implementation remain scarce. There is significant need for policing and enforcement. Compliance and enforcement is conducted by four organizations:

- The Jamaica Combined Constabulary Force (JCCF), which is responsible for preventing all infractions of the laws. These (regular) police are more concerned about major crime, and routinely treat environmental infractions as minor nuisances. Their input is greatest in short, focused actions. The activities of the marine police in fisheries regulation are much more consistent. The Jamaica Coast Guard also assists with fisheries enforcement and other conservation programs, particularly when activities take place on the offshore cays and/or fishing banks.
- The Island Special Constabulary Force (ISCF) was recently given environmental enforcement duties. The Environmental Warden Service was terminated at the end of April 2003, and some of the personnel and resources were integrated into the ISCF. This new initiative of the ISCF is in the start-up phase, and all the operational teething pains have not been overcome.
- Wardens and Enforcement Officers are employed directly by the Fisheries Division, Forestry Department, and NEPA. The officers from the Forestry Department and NEPA are stationed in each parish, and are responsible for policing and enforcement

in that parish. These officers collaborate with personnel from the other environmental management agencies, as well as personnel from the Department of Health, the Parish Council, the police, and other agencies are required. In the case of NEPA, such officers are supported by the technical officers from Kingston when laboratory services or more complicated support is required.

- Honorary Game Wardens are volunteers legally authorized to enforce hunting and other restrictions of the Wildlife Act. During the authorized hunting seasons, the wardens conduct patrols and other policing functions with regular enforcement officers and the police.

There are signs of hope, as signaled by the following:

- Increased use of soil conservation measures by small farmers
- Use of agrochemicals has decreased, though there is no obvious positive impact on environmental resources
- As a result of targeted recovery programmes, populations of American Crocodile and Jamaican Iguana showing signs of recovery.

The evidence suggests that the current activity is not enough to generate a recovery in the resource base. Outstanding needs include:

- Increased policing and enforcement
- More complete baseline on biological resources
- More effective management
- More training.

SECTION E- STATUS AND PROTECTION OF FOREST RESOURCES

The general edaphic conditions of Jamaica favor forest growth and historical records suggest that the island was once almost entirely covered by trees. The exceptions were certain types of swamps and wetlands except mangroves, and of course, water areas, which amounted to slightly more than one percent of total area, according to present land-use data.² Indeed, the name Jamaica is thought to have been derived from the language of the country's original indigenous people who called it "Xaymaca," meaning "Land of Wood and Water" (NEPA 2001). According to the most current study of the forest resources, only about 336,000 hectares, or approximately 30 percent of the total land area, is still forested. Many countries with as high an average population density as Jamaica (see above), would consider 30 percent forest cover a reasonable amount. More analysis is, however, required to understand the status of forest resources in the country, and this section of the report attempts such an assessment.

Forest Cover Data and Information

The National Forest Management and Conservation Plan (Forestry Department 2001) notes that the present macro land-use breakdown for Jamaica is as follows: 31 percent forest (of which 8 percent is closed forest and 23 percent other); 30 percent is a mixture of forest and cultivation; and 39 percent is non-forest. The following tables break down these figures for the purpose of further analysis and understanding.

Table No. E.1- Land-Use Cover Statistics (hectares)

Sub-Class	Forest Reserve	Forest Reserve w/i NP	Other Protected	Total Protected	Proposed Protected	Not Protected	Grand Total
Forest Land-Use Types							
Closed Broadleaf	36,248	27,592	1,010	64,849	501	22,880	88,231
Disturbed Broadleaf	7,760	7,511	2,536	17,807	2,821	157,997	178,625
Bamboo	...	297	...	297	92	2,591	2,979
Tall Open Dry	6,581	...	13,742	20,322	944	20,732	41,998
Short Open Dry	782	...	4,522	5,304	501	6,299	12,104
Swamp	40	...	1,176	1,215	227	805	2,247
Mangrove	1,354	...	5,414	6,678	747	2,215	9,731
Total Forest	52,765	35,400	28,398	116,563	5,833	213,519	335,915

²Much of the information in this section on forest resources is drawn from the very useful and comprehensive report prepared by the Forestry Department in 2001 entitled *National Forest Management and Conservation Plan*.

Mixed Forest-Agriculture/Other Land-Use Types							
Sub-Class	Forest Reserve	Forest Reserve w/i NP	Other Protected	Total Protected	Proposed Protected	Not Protected	Grand Total
Fields & Disturbed Broadleaf Forest	1,670	3,046	3,488	8,203	1,430	108,333	117,966
Disturbed Broadleaf Forest & Field	3,632	3,609	4,130	11,371	3,028	151,554	165,954
Bamboo & Disturbed Broadleaf Forest	45	670	...	716	...	11,972	12,687
Bamboo & Fields	6	2,367	1,223	3,597	61	25,389	29,047
Pine Plantations/ Other	57	2,697	...	2,755	...	1,532	4,287
Bauxite & Disturbed Broadleaf Forest	7	109	...	117	...	2,844	2,960
Mixed Total	5,418	12,499	8,841	26,758	4,519	301,624	332,901
Non-Forest Land-Use Types							
Plantations	141	...	6,766	6,907	2,169	73,265	82,341
Fields	1,917	1,625	13,305	16,846	6,708	250,925	274,479
Herbaceous Wetlands	...	...	9,655	9,655	755	504	10,914
Water	18	...	173	190	779	617	1,586
Bare Rock	524	...	...	524	197	213	934
Small Islands	...	...	164	164	...	...	164
Bauxite	...	...	...	...	...	4,922	4,922
Buildings/Other Infrastructure	921	...	2,996	3,916	740	47,604	52,260
Non-Forest Total	3,520	1,625	33,057	38,202	11,347	378,050	427,600
Grand Total	61,703	49,524	70,296	181,523	21,700	893,193	1,096,416

Source: Forestry Department 2001- National Forest Management and Conservation Plan

The Forestry Department is currently responsible for the management of 109,514 hectares, of which 98,962 hectares are in forest reserves and another 10,552 hectares are Crown Lands (Forestry Department 2001).³

Factors Related to an Understanding of Forest Cover

Any analysis of the forest cover of a country must necessarily be tempered by an understanding of a number of other factors, including land capability data, current deforestation rates and present and projected harvest of forest products.

Land Capability Data. The most salient basis for understanding forest cover is comparing it with land capability data and information that indicates the productive potential of the land. Such data is normally derived from measurements of slope, soil quality and soil depth. A comparison of land capability with actual land-use leads to a more pragmatic assessment of the challenges to sustainable land use. In fact, natural resources management is perhaps best defined as efforts to match land-use to land capability. While it is possible to change the potential land-use on the more fragile sites through the application of soil and water conservation and agroforestry technologies, this typically entails higher management costs, particularly for labor, associated with the farming or forestry system.

A comprehensive table of land capability data for the whole of Jamaica could not be located during this assessment exercise and may not actually have been prepared. However, it is known that there is only limited land (three percent) that is thought to be suitable for agriculture without limitations (see Table F.2 below). Another 63 percent of the land is classified as either land not suitable for agriculture, or as having severe limitations. This suggests considerable needs, in terms of forest cover or a land-use option that features perennial crops—given that the present forest cover is approximately 31 percent.

Current Deforestation Rates. Forest cover is rarely static and it is the degree or rate at which it is disappearing that provides one of the most useful indicators of the need for protection and management interventions. International estimates of the deforestation rate are typically calibrated in percent of forest cover loss per annum. There have been a number of studies of the deforestation rate in Jamaica, which projected losses ranging from 0.1 to 11.3 percent. A more recent study of the data carried out by the Forestry Department and the Trees for Tomorrow Project has estimated the deforestation trends from 1989 to 1998, by using up-to-date Landsat imagery and careful analysis (Evelyn & Camirand 2000). Their conclusions estimate that total deforestation (loss of forest cover in fully stocked forest stands) over the period, was approximately 3,000 hectares or 0.91 percent of the total forest area in 1989. This amounts to a very modest deforestation rate for the period of 0.1 percent per annum.

It is also important to recognize that deforestation is usually the result of conversion of forested land to another land-use category, such as clearing it for agriculture or for settlement purposes. Logging or over-use of forest resources, for whatever purposes, rarely leads to deforestation, although a forest degraded by timber and fuelwood exploitation may be more

³ There are some minor discrepancies between the amount of land cited in the *Jamaica Gazette* as managed by the Forestry Department and that which appears in the table above. This is due to surveying and plotting inaccuracies that are now being resolved through a more careful boundary survey. Crown Lands are lands owned by the Government; Forest Reserves are a special designation of Crown Lands set aside by the Government.

easily converted into another land-use type, or more difficult to defend on the basis of its inherent value as forest. Inappropriate deforestation—that is clearing forest land for another use that is incompatible with the basic land capability—is usually the symptom of a larger land-use issue, e.g., land tenure uncertainties, demographic pressure, inappropriate agricultural practices which drive small farmers on to new lands, after their farms have become exhausted, market externalities and demand, etc. Reforestation may be both necessary and called for to rehabilitate lands that have been deforested—but will not usually address the causes of deforestation.

Present and Future Forest Product Harvest. The status of forest resources must also be seen and analyzed on the basis of the need for and use of the forest to meet the demand for wood and non-wood products. Jamaica is by far a net importer of forest products, which cost the country significant amounts of vital foreign currency reserves. It has been estimated that the annual demand for lumber in Jamaica is about 200,000 cubic meters (120,000 cubic meters of softwood and 80,000 of hardwood), of which approximately 140,000 cubic meters are imported (120,000 of softwoods and 20,000 of hardwoods). These imports (roughly 68 percent of total lumber demand) were valued at approximately CIF J \$1.538 billion in 1999 (Forestry Department 2001).

In addition to the wood being imported and that harvested locally for lumber, Jamaica's forests are providing significant quantities of fuelwood, charcoal and yam sticks, and also doubtless a wide variety of roundwood products used at the rural household level. The estimates of annual production according to the Forestry Department are as follows: charcoal: 37 to 60 thousand tons (the equivalent of an estimated 500,000 cubic meters); fuelwood: 300 thousand cubic meters; and yam sticks: 15 million (the equivalent to 150 thousand cubic meters) (Forestry Department 2001).⁴

Table No. E.2- Estimates of annual production

Forest Product Type	Annual Offtake (units)	Equiv. Total Volume (m3)	Forest Cover Type	Average Volume/hectare (m3/ha)	Existing Total Area (ha)
Charcoal (thousand tons)	37-60	500,000	Closed Broadleaf	195	88,231
Fuelwood (cubic meters)	300,000	300,000	Disturbed Broadleaf	155	178,625
			Open Dry	60	54,102
Yam Sticks (units)	15 million	150,000	Swamps & Mangroves	135	11,978
			Disturbed Broadleaf & Fields	95	165,954
Timber (cubic meters)	60,000	60,000	Pine Plantation	165	4,287
			Hardwood Plantation	185	3,900

Although these products are not harvested through clear-cutting, a comparison of the total extraction versus probable levels of standing volume gives an indication of the importance of the future pressure on the forest resource base in meeting these needs. The table above

⁴ Some explanation of these figures should be noted here. Charcoal has been converted following the data in Annex VIII of the Forestry Management and Conservation Plan, i.e., 6.25 tonnes of wood per tonne of charcoal and 700 kilograms of air-dry wood per cubic meter. Yam sticks are poles harvested to use in supporting yam plants growing in fields. There are said to be typically 3-4 meters in length with a diameter of 6-8 centimeters.

provides a calculation of these amounts of wood products and standing volume extracted, and contrasts it with the estimated volumes on particular types of forests in Jamaica, taken from the information in the Forestry Management and Conservation Plan (Forestry Department 2001). If the annual harvest of roundwood is over 1 million cubic meters of wood per year, and the average standing volume is 150 cubic meters per hectare, then the equivalent of over 6500 hectares are being harvested annually to meet national demands for roundwood based products. In short, there is a pervasive and apparently widespread thinning of the tree canopy across the country that combined with the inevitable site disturbance it entails, is leading to a lowering of the protective function of the forest cover and the degradation of the all-important watershed function.

Institutional Framework for Forest Management

The Forestry Department (FD) of the Ministry of Agriculture is the principal implementing agency for the forestry sector, and a similar role has also been identified for it as concerns watershed management in Jamaica (Forestry Department 2001). Budgetary constraints typical of the land-use oriented agencies of Government has limited its capacity to implement the Forestry Management and Conservation Plan (FMCP) of 2001, now seen as the comprehensive blueprint for sector actions in the country. According to the FMCP, a skewed budget (approximately 90 percent for recurrent staff costs and only 10 percent for investments) has left a number of approved staff positions unfilled and left FD dependent on donor funding for the implementation of field activities.

Field oriented extension activities throughout Jamaica are the responsibility of the extension agents of the Rural Agricultural Development Authority (RADA). The Forestry Department collaborates with RADA by providing technical forestry information and occasional training for their extensionists on forestry activities.

The Forestry Department has had support from the donor community over the years. At present, the CIDA-funded Trees for Tomorrow Project, a Canadian \$10 million effort that will complete its work in 2004, has been working to enhance the planning and implementation capacities of the Forestry Department. The United Nations Development Program (UNDP) also funded a recently completed Forestry Capacity (Bridging) Project aimed at promoting participatory approaches to forest sector planning and management.

Management Models/Mechanisms

The Forestry Management and Conservation Plan provides a comprehensive overview of the challenges and opportunities required to allow the forestry sector to play its role in the sustainable development of Jamaica in the years to come. It lists the following elements as part of its implementation strategy:

- *Community Participation.* The Forest Act of 1996 allows for the establishment of working relationships between the Forestry Department and local communities, in the form of Local Forest Management Committees (LFMCs). One such plan, for the Buff Bay/Pencar pilot area, is in an advanced stage of preparation, and plans are in place to include eight additional areas.
- *Public Education.* The Forestry Department is convinced that there is a need to build a more robust and better informed public constituency for sustainable forest

management and utilization. They plan to work with the Ministry of Education to develop a strong environmental awareness component, including support to education on forestry in the public school curriculum.

- *Forestry Research.* A forestry research program is under preparation, focused on providing data, information and guidelines for efficient forest management and conservation strategies, reforestation planning, agroforestry, and social/participatory forestry activities.
- *Forest Protection.* One of the priorities of the FMCP is forest protection based on the urgent need in specific areas for containing the present threats to the remaining forest cover. Guidelines for forest land-use have been prepared. Also prioritized is the need to protect Jamaica's unique biodiversity from further encroachment, by gazetting new areas as forest reserves. Finally, regulation of permissible activities in forest reserves will be managed by the FD, in accordance with the mandate of the Forest Act.
- *Forest Production Program.* An expanded forest production program is foreseen, with special emphasis on reforestation to reduce the pressure on natural forests. The FMCP proposes a plantation target of 4,750 hectares for the period 2001 to 2005.
- *Investments and Incentives.* The Forestry Department is very cognizant of the need to create further economic stimulus measures to promote forest management and conservation. A number of alternatives are being examined. Prominent among them is the creation of a Jamaica Forest Management and Conservation Fund. One option being considered is using finances expected to become available under a planned US-funded Tropical Forest Conservation Act agreement between the Governments of Jamaica and the United States.

The major near-term challenge for the Forestry Department and the forestry sector is to find the resources to implement the FMCP. Tentative estimates of the implementation plan call for "a minimum annual operating budget of approximately J\$120 million plus a minimum 5-year development budget of approximately J\$375 million" (Forestry Department 2001). It should be noted that this is incremental funding over and above the current levels of budgetary support for the Department (J\$66 million). The likelihood of this level of resources becoming available is unknown and clearly part of the challenge will be to prioritize within the FMCP to decide what can and should be done on a strategic basis.

SECTION F. CONSERVATION OUTSIDE PROTECTED AREAS

Although Jamaica has about 150 areas under some form of protection, there is also great scope for conservation under managed natural resource-based systems, which constitute the bulk of the country's land-use patterns. This section examines the status of these different systems—watersheds, coastal and marine resources, wetlands (including mangroves), and agricultural systems—and their implications vis-à-vis the conservation of tropical forests and biodiversity.

Watersheds

Jamaica has long been concerned about the condition of its watersheds, as indeed it must given the predominance of steep lands in the physiognomy of the country.

An Overview of the Watershed Situation. The integrity of Jamaica's watersheds has been heavily affected by inappropriate land-use and related problems, which degrade the condition of the watersheds altering the hydrological cycle and reducing water quality. Annex G is a map of the country showing watershed conditions, originally presented as part of the 1997 State of the Environment Report. Farming practices by the country's estimated 170,000 plus small farmers on almost one quarter of the national territory (245,000 hectares), are thought to be responsible for widespread land clearing, increased run-off and soil erosion that contributes to high sediment loads in the streams and rivers and downstream sedimentation and damaging floods. In addition to farming, uncontrolled and unsustainable use of the forest and woodland cover exposes soil on fragile steep sites and causes the same kinds of erosion and run-off problems.

Surface water quality is also adversely affected by point source pollution emanating from industrial discharges into the water courses, or by seepage from holding ponds into the sub-surface aquifers underlying the limestone formations, so typical of much of the island, thereby contaminating groundwater. Non-point source contamination from the use of agricultural chemicals (fertilizers and pesticides) also has a cumulative adverse effect on water quality. This situation is further exacerbated by the lack of adequate solid waste disposal systems, which results in local people dumping their garbage in gullies and along river banks. These materials find their way into the water courses and eventually are deposited into the coastal waters.

Jamaica, like many small island nations, is acutely affected by watershed degradation. The short run of many rivers, typically less than 100 kilometers and frequently much less, make it difficult for natural processes to dissolve contaminants or settle out sediments. These natural circumstances mean that the coastal waters on which Jamaica's "sun, sand and surf" tourism depends, are encountering significant problems of water quality degradation and nutrient, sediment and contaminant loads that threaten the near shore marine ecosystems. Rivers, beaches and the near shore marine environment has been polluted, and the coral reef ecosystems badly degraded.

This situation has been aptly characterized as the "ridge to reef" phenomenon, and there is a growing recognition of the fact that what happens in the uplands is an important challenge to sustainable management of coastal areas. Jamaica is also adversely affected by watershed degradation, because of the occurrence of catastrophic climate events in the form of hurricanes, whose intense rainfall leads to even greater erosion and siltation, and damaging

and life threatening downstream floods that destroy homes and infrastructure—costing the state millions of Jamaican dollars for rehabilitation and repair from an already stressed national budget. In short, the degradation of the country’s watersheds is increasing the torrentiality of its river system, leading to higher highs during the rainy season and downstream flooding, and to lower lows during the dry season when water resources are scarce.

Watershed Management Efforts. Even before independence, the problem of watershed degradation was recognized and efforts were underway to address it, for example, in the form of the Yallahs Valley and Christiana Area land authorities established in the early 1950s. These authorities were set up to address land rehabilitation needs, control erosion and improve farming (NRCA 1999). Since then, there has been no shortage of efforts, projects and institutional arrangements, over the years, to address the watershed problem in Jamaica. Both government and donors have made successive attempts to counter the prevailing trend of watershed degradation.

The Watershed Protection Act of 1963 established a Watershed Protection Commission to regulate land use and to undertake improvement schemes (NRCA 1999). Many donors have also been involved, including the World Food Program (WFP), the Food and Agriculture Organization of the United Nations (FAO), USAID, the International Fund for Agricultural Development (IFAD) and the United Nations Development Programme (UNDP). Although a full report on these many efforts is beyond the scope of the present report, they were characterized by activities setting up demonstration projects on soil and water conservation and improved farming practices, training staff and watershed management planning.

One of the outcomes of these efforts was the designation of “watershed management units,” which resulted in the delineation of 26 such units that cover the entire territory of the country. These units have subsequently become the focus of intensified efforts to address the watershed management needs of the countries and in many cases, on-going projects are intentionally organized and implemented to attempt to deal with the watershed management needs in an integrated fashion within targeted watersheds. Three on-going donor funded environmental management projects—the USAID-funded Coastal Waters Improvement Project (CWIP) and the Ridge to Reef Watershed Project (R2RW) and the CIDA-funded Trees for Tomorrow Project, all explicitly direct their activities and investments to specific watersheds, mainly along the north coast.

However, despite their watershed orientation, none of these past projects actually addressed the full spectrum of watershed degradation problems in their targeted watersheds, opting instead to focus their activities and investments on their comparative advantages: CWIP on the coastal environment, R2RW on the uplands and their natural resources management challenges, and Trees for Tomorrow on the forest management responsibilities of their counterpart agency, the Forestry Department. According to USAID, the R2RW Project is expected to be “a pilot test of integrated watershed management,” which is an excellent step in the right direction especially if the watersheds in which the project works also include attention to the issues affecting the lower end of the watershed as it nears the coast (pollution and contamination which threaten the near-shore marine ecosystems).

On the Jamaican government side, the newly established National Environment and Planning Agency (NEPA) has taken over responsibilities for watershed and coastal zone management

within its organizational framework in the form of the Sustainable Watersheds Branch and the Coastal Zone Management Branch.⁵

In addition to these two units with major responsibilities and engagement in watershed related issues, and as would be expected given the overarching nature of the watershed paradigm as a development model so appropriate to an island nation like Jamaica, many other governmental organizations have a role to play in this area. They include: the Forestry Department (see the section above); the Ministry of Transportation and Works (administers the Flood Water Control Act and is responsible for land and stream bank integrity, “river training” and roads and drainage); the Rural Agricultural Development Authority (responsible for extension services promoting rural development and environmentally sound farming); the Water Resources Authority (monitors and regulates the use of surface and groundwater); the National Water Commission (responsible for potable water supply and water quality monitoring); the Lands Department (charged with implementation of watershed activities on Crown Lands); and the Parish Councils and Parish Development Committees (both are also invested with the responsibility for watershed management).

Significant challenges, however, remain to overcome the issues that characterized earlier efforts and to find the wherewithal to replicate the lessons learned over the years. Because of the holistic nature of the problem, exacerbated by the fact that this small island nation must live with its ridge to reef reality, and the widespread understanding of the many aspects of the watershed degradation dilemma, the main challenge is to know where to apply most effectively the presently limited staff and financial resources available, and how to increase the budgetary resources from both government and the donor community to address this most compelling issue of the land-use equation in Jamaica.

The situation is best summed up by the statement in the Integrated Water Resources/Watershed Management Sector Position Paper prepared for the current USAID Strategic Planning exercise, as follows: “Because of overlapping/gaps in jurisdiction and legislation covering watershed and forest management, resources are often wasted, and certain activities ‘fall through the cracks.’ At least 14 government offices, ministries, departments, authorities, commissions and boards have statutory interests in forest management (and watersheds) and often these conflict. GOJ entities have yet to reach agreement on a common and comprehensive system of land use zoning; there are limited formal cooperative management arrangements among implementing agencies; and political will to resolve inter-agency conflicts is lacking” (USAID 2002).

Coastal and Marine Resources

Jamaica is approximately 10,990 square kilometers, of which 10,830 square kilometers is said to be land and 160 square kilometers is water (World Factbook). However, that space is within the 12-mile territorial seas, and its total marine space (exclusive economic zone) is estimated to be more than 24 times its land area (State of the Environment Report 1997). The coastline is estimated to be 1,009 kilometers long (State of the Environment Report 2001), of which 48 percent is considered to be usable coastline. Public recreational space accounts for 2.5 percent of total coastline and fishing beaches accounts for 1.3 percent of total coastline.

⁵ The National Environment and Planning Agency was created as part of the Public Sector Modernization Project through the merger of the staff and responsibilities of the Natural Resources Conservation Authority (NRCA), the Town Planning Department (TPD) and the Land Development and Utilization Commission (LDUC).

The main coastal ecosystems are being constantly degraded from a variety of natural and anthropogenic sources. These include:

- Coral reefs – threatened by pollution
- Wetlands – threatened by improper solid waste disposal, over-harvesting, and habitat destruction
- Seagrass beds – threatened by removal for recreational activities, damage by fishing gear and boating activities, and land reclamation
- Rocky shore – main threat is from improper solid waste disposal
- Benthos – degraded by dredging, damage from recreational users, and installation of structures
- Bays and estuaries – threatened by surface runoff, land-based sources of pollution, and habitat destruction.

The “living” ocean and coastal resources “consist of marine mammals including manatees, dolphins and whales; sea birds; reptiles such as crocodiles; finfish and shellfish including commercial fish species, conch and lobster; coral reefs and associated invertebrates and vertebrates such as sea turtles; mangroves and associated fauna such as shrimp and oysters; seagrass beds and associated fauna such as invertebrates; and other wildlife” (Proceedings of the Coastal Conference 2000).

The decline of the coastal resources has resulted from the following factors:

- Resource over-exploitation (Jamaican waters are said to be the most overfished in the CARICOM area, even though Jamaica is still listed as the world’s largest exporter of Queen Conch).
- Water quality degradation.
- Improper harvesting practices.
- Illegal collection and trade of protected species.
- Habitat destruction.
- Impact of natural and man-made hazards (including oil-spills).
- Inadequate enforcement.
- Inadequate institutional capacity.
- Rapid urbanization (two-thirds of the 2.59 million Jamaicans live in coastal towns).

Despite these pressures, coastal resources provide a major underpinning to the Jamaican economy. Tourism in Jamaica is still mainly a “sand and sea” product, and as such, much of the rooms, infrastructure, and recreational activities take place in the coastal zone.

The competing issues, uses, pressures, and complex interactions in the coastal zone make integrated coastal management imperative. The traditional approaches to management include establishment of protected areas (marine parks, marine reserves, and fish sanctuaries); closed season for some fisheries (conch and lobster), designation of endangered

and protected species, and the establishment of appropriate policies and legislation. However, gaps were identified in the policy and legislative framework, particularly with respect to:

- Exclusive Economic Zone (EEZ) – Jamaica’s marine resources include offshore fishing banks, and thus the delineation of an EEZ require negotiation with other Caribbean countries, particularly since poaching by fishermen from other countries is an ongoing problem.
- Management of Cays – There is a large number of nearshore cays (especially on the south coast) that are used for recreational purposes and commercial fishing. There is no clear policy or strategy for management of those cays, and social conflict and legal problems have developed from attempts to manage some of the cays (notably Lime Cay in Kingston and Booby Cay in Negril).

The importance of these issues resulted in the decision by the cabinet in 1998 to establish the Council on Ocean and Coastal Zone Management. This was followed in 2000, when the National Coastal Conference led to the preparation of the Ocean and Coastal Zone Management Policy. In addition to defining the policy and institutional framework for implementation, the policy enumerates a number of strategic initiatives in response to critical issues identified on a parish (local) level.

Institutional Arrangements for Coastal Resources Management

The lead institution with responsibility for coastal zone management in Jamaica is NEPA. First, the Beach Control Act (1956) vests management responsibility for the coastal zone in the Beach Control Authority (later subsumed into the Natural Resources Conservation Authority, which in 2001 was merged with two institutions to form NEPA). Second, with the Town Planning Department now a part of NEPA, the agency also has responsibility for land use planning and development control. As such, in addition to the relevant environmental laws and regulations, NEPA prepares development orders and development plans for all coastal areas. In addition to NEPA, twenty eight (28) other government agencies have been identified as having mandates or functions related to coastal zone management. Of these, the main agencies are:

- Local Planning Authorities are responsible for development control within the parishes, and support NEPA and the Town and Country Planning Authority (Board of the Town Planning Department) in the preparation of development plans and orders. In most cases the local planning authority is the relevant parish council. Exceptions exist in specially designated planning areas, such as the Negril Green Island Area, areas designated under the Urban Development Corporation Act as special development zones, and areas designated as special housing zones under the Housing Act.
- The Urban Development Corporation (UDC) is a public corporation charged with stimulating development in specially-designated areas. Such areas include the centre of the town of Ocho Rios, part of the Montego Bay waterfront, part of Rose Hall in St. James, the Oracabesa waterfront in St. Mary, Hellshire Hills in St. Catherine, and the eastern portion of the coastline in Westmoreland. In these areas, the UDC is the local planning authority, charged with development of development plans and stimulating

private sector investment in such areas. The UDC also has responsibility for management of public recreational facilities within its designated areas.

- The Port Authority of Jamaica develops and manages ports and other related facilities. The institution also designates harbors and sets the rules for shipping and other maritime activities in such harbors as necessary.
- The Maritime Authority of Jamaica regulates maritime transport
- The Fisheries Division is responsible for fisheries management, including the designation of fish sanctuaries.
- The Environmental Control Division (ECD) is a Ministry of Health agency responsible for water quality monitoring and testing.
- The Jamaica Tourist Board (JTB) develops and regulates standards for tourism activities and facilities. In designated tourism zones, the JTD can regulate tourism-related activities.
- The Planning Institute of Jamaica (PIOJ) coordinates planning for economic, social, and physical development.

In addition to the government agencies, a range of non-government organizations (NGOs) participate in coastal zone management, primarily through the management of marine protected areas, conducting community-based initiatives, or education and outreach.

To address the range of issues in coastal zone management, the Council on Ocean and Coastal Zone Management was formed in 1998. The Council is a multi-disciplinary, interagency, advisory body whose main functions are to define national policy and facilitate coordinate activities that support coastal zone management. Implementation remains with the line Ministries and agencies. The Council also ensures that Jamaica complies with the relevant multilateral environmental agreements.

The primary issues affecting the institutional framework for coastal zone management in Jamaica are:

- Fragmented legislation, giving incomplete coverage of relevant issues
- Shortage of human resources/expertise to address all the issues
- Inadequate financial resources to implement activities.

Current Coastal Area Management Initiatives

A range of policies relevant to coastal zone management (such as the Mariculture Draft Policy and Regulation, 1996 and the Mangrove and Coastal Wetlands Protection Draft Policy and Regulation, 1997) were developed prior to the establishment of the Council and the development of the Ocean and Coastal Zone Management Policy. Ongoing initiatives that seek to improve the quality of coastal resources include:

- Participation in the Caribbean Blue Flag initiative

- Conducting surveys of critical resources (such as the periodic surveys of Queen Conch prior to allocating licenses to harvest)
- Undertaking a number of donor-supported projects (such as the Coastal Water Improvement Project, the Ridge to Reef project, the UNEP project on cleanup of heavily contaminated bays, and the Caribbean Programme for Adaptation to Climate Change).

The most far-reaching initiative is the development of the 5-year National Action Plan on ocean and coastal zone management. The action plan is a product of the Ocean and Coastal Zone Management Policy, and defines 24 projects within 8 program areas. The program areas are:

- Strengthening the role of the Council
- Program preparation, project identification and mobilization of financial and technical resources
- Consolidation of legal, administrative and enforcement framework
- Human resources and institutional capacity building
- Research and information related on coastal management issues
- Public awareness and education
- Strategies for sustainable use of coastal resources
- Monitoring, evaluation and reporting on the implementation of Program Areas 1 to 7.

This National Action Plan on ocean and coastal zone management sets the stage for development of integrated coastal area management in Jamaica.

Wetlands

Wetlands provide an invaluable source of habitat for wildlife and shoreline protection from erosion and flooding. At one time they were thought to have covered 2 percent of Jamaica's total surface area. Despite the official data showing no loss in area covered, Jamaica's wetlands are currently impacted by port, harbor, housing and other commercial development. Mangroves in particular are stressed by land-use issues from settlements and tourism, and their use for charcoal and construction materials—and yet show only a 0.2 percent loss since 1989.

The most common types of mangroves found in Jamaica are red mangrove and black mangrove, and the less common white mangrove and buttonwood. Mangroves occur along the south coast and in some spots along the north coast, covering 97 square kilometers or 29 percent of the coastline. The most extensive remaining area is in Portland Bight, now a protected area.

Wetlands can be classified as either swamps or marshes in Jamaica. Swamps are broken down into saline, composed mainly of mangroves, and freshwater, which are swamp forest or palm swamps. Marshes include both saline and freshwater marshes. The largest wetlands can be found in the Black River Upper and Lower Morasses, St Thomas Great Morass, West Harbour and the Negril Morass. The Great River Lower Morass was declared a wetland of

international importance under the Ramsar Convention in 1998 (Jamaica National Biodiversity Strategy and Action Plan, 2001).

Agricultural Systems

Agriculture in Jamaica utilizes approximately 37 percent of the land (in 1998), down from 60 percent in 1968 (State of the Environment Report 2001). In 1996, total agricultural land was 449,500 hectares, of which 177,600 hectares (45 percent of farm lands) was in crops (Table F.1).

The sector has been declining in both output and contribution to the economy. However, the sector still contributed an average of 7.0 percent annually to GDP during the period 1996-2000. That made the sector one of the leading earners of foreign exchange, with total agricultural exports in 2000 worth \$260.1 million. When added to the outputs from food processing, beverages, and tobacco, the sector contribution to GDP rose to 16 percent.

Table F.1-Total Agricultural Land 1968-1996 (hectares)

Type of Land	1968	1978	1996
Active Farm Land	365,400	311,600	273,200
• Crops	235,300	230,800	177,600
• Pasture	130,100	80,800	95,600
Inactive Farm Land	103,600	112,500	115,300
• Ruinate and fallow on farms	-----	-----	87,400
• Ruinate not on farms	-----	-----	27,900
Woodland and other land on farms	133,700	109,700	48,900
Land identified to be farming, but no information reported	-----	-----	14,100
Total Agricultural Land	602,700	533,800	449,500

Source: State of the Environment Report 2001, credited to the Census of Agriculture 1996

The declines were most significant in the traditional export crops (from 285,442 metric tons in 1996 to 235,586 tons in 2000), though the domestic food crops also declined (from 695,050 tons in 1996 to 450,530 tons in 2000). The only sub-sector that experienced a slight increase was the meat, fish, and dairy sub-sector.

Sugar continues to be the main export crop, accounting for 41 percent of permanent crops, 30 percent of all crops, 35.7 percent of agricultural export, and 8.1 percent of all domestic export in 1996. Related earnings fell from US\$109.2 million in 1996 to US\$83.8 million in 2000. The second largest export crop is bananas, accounting for 15 percent of agricultural exports and 3.3 percent of all domestic exports in 1996. As with sugar, earnings declined from US\$45.2 million in 1996 to US\$22.9 million in 2000.

Agriculture remains one of the largest employers of labor, with approximately 195,000 persons (20 percent of labor force) employed in the sector in 2000. It accounts for approximately 351,400 persons (40 percent) employed in the goods producing sectors, and supports approximately 187,000 rural families.

Challenges for the Agriculture Sector in Jamaica

The sector faces a number of major challenges:

- Land suitability is a major issue, with almost all the lands having problems that limit full agricultural use (Table F.2). In addition to problems with soil, climate, and water availability, more than 75 percent of Jamaica's topography has slopes over 10 percent.
- The land distribution pattern/land tenure contributes to be a problem. Farmers with less than 2 hectares comprise 82 percent of total farmers, but operate 16 percent of the land farmed (Medium Term Agricultural Production Plan 2002-2004). Such small farmers dominate the Domestic Food Crop sub-sector, but are forced to farm higher in the watersheds, where farming is highly fragmented on steep slopes. This contributes to the poor farming practices and degradation of the watersheds.

Table F.2- Land Suitability for Agriculture

Land Suitability	Percentage
Land not suitable for agriculture	53
Agriculture with no limitation	3
Agriculture with moderate limitation	11
Agriculture with strong limitation	23
Agriculture with severe limitation	10

Source: Medium Term Agricultural Production Plan 2002-2004

- Hurricanes and flooding continue to be major sources of damage to crops, particularly permanent crops.
- Praedial larceny is a major disincentive to many farmers, especially when taken with other problems, such as the high cost of farm inputs and poor road conditions.
- Diseases continue to devastate a number of crops (e.g. lethal yellowing and coconut), reducing production to a significant degree.
- A major challenge to the agricultural sector is competition from cheap imports. The sub-sector hit particularly hard from this source is the dairy and poultry sub-sector.

SECTION G- OTHER CONSIDERATIONS

Impacts of Development Projects

The GOJ has recognized that before permitting can be effective, there is a need for sound land-use and development planning. Faced with a number of overlapping jurisdictions, a draft discussion paper on “Modernizing the Planning Framework for Jamaica” has been prepared. Similarly, within the reorganization of the environment sector agencies, the National Environment and Planning Agency has been given the authority for processing and approval of applications for environmental permits and licenses. This role is shared by the Regulatory and Legal Services Division and the Environmental Management Division of NEPA.

At present, proponents of development activities are required to comply with the environmental review and permitting processes laid out by law. Normally, for larger projects such as industrial development, the proponents can hire consultants to prepare the necessary studies and paperwork required to comply with the laws and procedures. NEPA, however, by its own account is hard pressed to check on the accurateness of these studies. The Institute of Jamaica (IOJ) has established a Clearinghouse Mechanism for Biodiversity and, among other things, is expected to consider the implications of development plans on endangered species, checking to see if particular projects could adversely impact known areas of biodiversity assets.

Ex-Situ Conservation

Ex-situ conservation in Jamaica is conducted through the establishment and management of a number of botanical gardens, and one formal zoo. The sites include:

- Plant Conservation Centre, Royal Botanic Gardens/Hope Gardens – planting program for native and endemic species by the National Arboretum Foundation
- Hope Zoo
- Cinchona Botanical Gardens, St. Andrews
- Castleton Gardens, St. Mary
- Bath Garden, St. Thomas
- Canoe Valley, Clarendon – captive manatees managed by NEPA
- Swamp Safari, Falmouth, Trelawny – established originally as an attraction, the site also focuses on crocodile conservation.

The above efforts are complemented by the flora and fauna collections at the University of the West Indies-Faculty of Life Sciences (Mona Campus) and the Institute of Jamaica-Natural History Division. The Department of Forestry also maintains a seed bank used in reforestation efforts.

Conservation of Economically Important Species and Germplasm

In addition to the many recovery and rehabilitation programs for threatened animal and plant species, Jamaica is working towards developing economically viable crops and cattle. Agriculture species with the most economic value today are the traditional crops of sugar, bananas, coffee, cocoa and citrus, and the non-traditional crops of tubers (most importantly yams), herbs, spices, fruits, vegetables and horticultural crops. Most of these crops are not endemic to Jamaica.

Livestock also plays an important role in Jamaica's economy. Currently, the Jamaican Hope cattle are being groomed for better production of milk and the Jamaican Brahman, Jamaican Black and Jamaican Red for meat. Improved breeding methods for goats and pigs are helping them become a stronger force in local markets.

To safeguard species that are considered rare, endangered, or economically important, the World Bank and OAS funded the establishment of a tissue culture unit at the Scientific Research Council in 1982. The unit was also set up with the intention of distributing high quality, disease free planting material to local farmers.

The tissue culture unit houses one of the largest in-vitro germplasm collections of banana in the Western Hemisphere. It also contains collections of Anthurium, African violet, orchids and other ornamentals.

In addition to preservation, much research is being conducted on species endemic to Jamaica. The island is home to important species currently being researched for medicinal purposes, including the Rosy Periwinkle and Sea Urchin, which are being tested as anti-cancer drugs, Red Nickel, which is found in a commercial drug, and the Mustered Bat whose ultrasound capabilities are being studied so that we may better understand hearing loss in humans.

There also exists an as-yet untapped traditional knowledge of local resources. Some products have begun to make their way to local markets, but many remain unknown to the general public. There are two concerns surrounding this topic: the preservation of knowledge, so that the species are not lost, and regulation, so that access and benefits can be monitored by local communities (Jamaica National Biodiversity Strategy and Action Plan).

Alien Invasive Species

The Jamaican National Biodiversity Strategy and Action Plan (NBSAP) views dealing with the issue of alien invasive species as one of the seven "high priority" action projects it identifies. As in other countries, a number of exotic species have been brought to the country, escaped and spread. This issue of alien species is perhaps more acute in small island nations. Among the species listed as being of concern are the following: White-tailed Deer (*Odocoileus virginianus*); Indian mongoose (*Herpestes puntata*), feral pigs, two cultured shellfish species, the Freshwater Prawn (*Macrobrachium rosenbergii*) and the Red-Claw (*Cherax quadricarinatus*), Mock Orange (*Pittosporum undulatum*) and Wynne Grass (*Melinis minutifolia*).

The NBSAP also identifies gaps and challenges associated with this threat, including inadequate information on the biology, distribution and ecological and economic impacts of these species and increasing the capacity to implement control programs. Logically then, the

Action Project to address the alien invasive species issue in Jamaica under the NBSAP is the “preparation of an Alien Invasive Species Management Strategy” (National Strategy and Action Plan on Biological Diversity in Jamaica, February 2003). The team must note, however, that despite the profile given to this issue in the national biodiversity strategy, controlling alien invasive species is an extremely difficult and costly enterprise, in particular for all of the species mentioned above whose habits allow them to occupy a wide range of ecological settings.

An example of the situation in nearby Puerto Rico is illustrative of the dilemma facing managers dealing with invasive species. The Caribbean National Forest, an 11,500 hectare tract, was declared a UNESCO Man and the Biosphere Reserve in 1976 “because of its cultural and biological legacy” (Blundell et al 2003). As there is no forest industry in Puerto Rico and human degradation is minimal, the US Forest Service goal is the maintenance of the forest in a natural condition and the restoration of the endangered Puerto Rican Parrot (*Amazona vittata*). Invasive species were ranked high among the threats to the Caribbean National Forest. Among them are mongoose, rats, feral dogs and cats and non-native plants, the later currently accounting for about 10 percent of all plant species. It was noted, however, that “most exotics are not expanding their range, nor are they known to be detrimental to forest resources, with two exceptions” (Blundell et al 2003).

Managers of the Caribbean National Forest are concerned with the colonization by Africanized honeybees (*Apis mellifera*) and bamboo (*Bambusa spp.*). Both species have been studied to determine their impacts on the forest. The bamboo does not appear to be spreading beyond its preferred riparian habitat and the managers have chosen to continue monitoring it rather than make more proactive efforts to eliminate it. The honeybees, however, typically occupy tree cavities, thereby competing with the endangered parrots for nesting sites. Although complete eradication of this invasive honeybee species is considered impossible, efforts are now underway to attract bee swarms in critical parrot habitat with pheromones and destroy them.

SECTION H- MAJOR ISSUES, OPPORTUNITIES AND ACTIONS

As the introduction to this report mentions, the team has carried out its assessment of the new USAID/Jamaica Strategic Plan (2005-2009) with three targets of review in mind: to identify the possibility of adverse impacts on tropical forests and biodiversity resulting from the activities foreseen under the CSP; to consider the possibility of synergistic support for tropical forests and biodiversity within the overall portfolio of activities; and to identify issues and opportunities that USAID may wish to consider, adding to the activities that could enhance its support for the conservation of tropical forests and biodiversity. The remainder of this report documents the findings of the team.

Overall Finding

First, the team can report that it has not detected any instances where the planned activities, as they have been so far designed and described, would be likely to have an adverse environmental impact on tropical forests or on biodiversity in Jamaica. Second, because of the intimate linkages between tropical forestry and biodiversity with the Mission's ongoing appreciation and actions/investments on the coastal marine environment and the watersheds ("the ridge to reef phenomenon"), it would be fair to say that the new Strategy will continue to contribute to the conservation of these assets. Indeed, because of existing program activities, the Mission and its contractors were able to inform the team of the challenges and constraints facing Jamaica and its people in conserving tropical forestry and biodiversity despite other pressing social and economic needs. Finally, the team can limit its findings and action recommendations to issues and opportunities related to synergy within the overall program and make suggestions for qualitatively incremental actions.

Specific Issues, Opportunities and Actions

The following section presents the issues and opportunities and recommended courses of action:

Financial sustainability, strategic planning and the economics of environmental management. There is an impressive array of comprehensive and analytical policy working documents, as well as existing policies, legislation and regulation related to environmental management in Jamaica. In effect, they present a huge and compelling sector-wide development agenda. However, government budgetary resources for the sector have been declining, and most government agencies have a rather distorted budget where the bulk of the resources are for recurring costs (90 percent), leaving little for investments and field actions (10 percent). The result has been an inability to implement the policies and regulations.

This presents a multiple challenge, including the following principal issues:

- How to use the existing budgetary and donor resources most effectively
- How to generate additional resources for environmental management
- How to ensure that budgetary decision-making will better reflect the importance of the sector to sustainable economic growth and ecological stability.

Action Response - Focus Area—Building Greater Capacity for Environmental Economics

It is important to strengthen governmental institutional capacity in the area of environmental economics as one of the keys to also strengthening capacity for sector-oriented strategic planning. It makes very little sense to continue to develop high-minded and serious sector plans or new laws, regulations and institutional arrangements if the resources are not there to see them implemented. This effort to strengthen strategic planning and advocacy capacity among the GOJ institutions in charge of the sector should also focus on the values of environmental services—and not just on operational costs—to ensure that the contribution of the sector to sustainable economic growth and the risks associated with environmental degradation are well understood. This suggests the need for an “environmental policy & economics” function within government, and ideally within NEPA.

Securing Sustainable Financing for the Protected Area System. The existence, protection and management of a protected area system represent a societal decision to find and allocate the necessary financial resources. Protected areas are rarely if ever economically self-sustaining. Directly related to the issue noted above is the reality that the decision must be based on the values associated with these areas: the provision of environmental services such as water resources, disaster prevention and mitigation associated with catastrophic climatic events, nature and outdoor recreation oriented tourism, the direct and very tangible relationship between the upland and marine environment, and the amenity values for an increasingly urbanized population.

Action Response - Focus Area—Strengthening Capacity for a Protected Areas System

There are already a number of initiatives to deal with the protection and management of individual protected areas. While quite laudable in intent, they do not address the need for a more coordinated and strategic approach to the opportunities and needs. One could even argue that they increase the cost per unit area of protected and managed areas, while failing to find a solution to the issue that will allow the country to scale up its efforts. What is required in the near to medium-term is a “minimalist” response that secures the integrity of the areas in the system.

Such an approach must be based on a “threats analysis” of the areas already in the system, while avoiding a tendency to over-develop facilities and infrastructure, which adds to the recurrent costs of the system and limits the possibility of expanding the number of areas within it. The present approach to protected area management being out-sourced to the NGO community is not a “write-off” solution, especially in the upland areas where these organizations are not really local. They logically have a vested interest in continually doing more for protection and management and thereby inadvertently increase the costs of the system. USAID may wish to consider funding efforts to facilitate the further development of a capacity for a systematic approach to protected areas as part of its support of the unit responsible for these areas within NEPA. USAID should also ask TNC to be sure that the lessons learned under PiP are being shared with those responsible for the system.

Watershed Management Approach. The present territorial orientation to working in the watersheds is generating important lessons. However, it is a principle of watershed management that in order to be fully effective, it is often necessary to treat the entire watershed from top to bottom, that is, an integrated watershed management approach such as the pilot watersheds under the R2RW Project. While not everything can be done, there is a need to achieve a reasonable amount of improvement to reach a threshold of palpable impact on erosion, stabilizing the hydrological regime and dealing with pollution issues. Deciding

what to do is a matter of choices that calls for a participatory dimension to watershed management planning—wherein the stakeholders, both those causing the problems and those affected by them, have a voice in deciding the priorities that should be addressed. It is also fundamental to start at the top of the watershed, because negative impacts are cumulative downstream—and resolving downstream issues become more costly if the upland source is not first treated.

Action Response - Focus Area—Promoting Integrated Watershed Management

The sequel to CWIP and R2RW should be a more integrated watershed management planning and implementation project that seeks to develop a model(s) for entire watersheds. Individual and entire watersheds and not the existing watershed management planning units would be the preferable territorial focus of these efforts because the latter are simply too large in many cases. The ideal model watersheds for USAID support should logically include as full an array of the issues and opportunities for environmental management typical of Jamaica, including an upland protected area, a forest management area, an area for addressing the improvement of small farmer production and income practices, a downstream urban area and a coastal management and tourism area.

Linking Governance Efforts with the Environment SO. This team endorses the notion in the USAID “Ideas Paper” for the new strategy that “the natural assets and rural livelihoods area addresses governance both in the aspect of managing resources and community structures and capacity.” Governance has also been identified in the development of the environment strategic objective as a cross-cutting issue. Many of the most compelling governance issues that can and should be addressed at the local level are related to environment cum quality of life; they include the provision of potable water and sanitation services and the management of solid wastes. These issues are invariably dealt with on the local level in the United States and in other countries, and receive high priority among the local population (after health and education services). Addressing them constitutes a prima facie case of local governance.

Action Response - Focus Area—Environmental Services as Part of the Local Governance Program

Brokering the arrangements for the provisions of such services should be supported as a cross-cutting issue where possible under the governance strategic objective, particularly in small rural communities. CWIP has laid the foundation for such efforts, and it is likely that a relatively simple and transparent model would be applicable in many communities.

Agricultural Development in the Uplands—An Unfinished Agenda. Given the inherent constraints of land capability in the uplands of Jamaica, an innovative and enterprise-oriented solution to small farmer needs and impacts is required. Great caution, however, must be used to avoid simplistic solutions that in effect maintain the status quo, or lead to institutionalizing subsistence agriculture. Soil and water conservation and agroforestry oriented approaches to unsustainable and destructive farming practices may have limited applicability in Jamaica because they inevitably increase the labor requirements for the farm household. More attention is needed for market-oriented production systems that are financially and ecologically sustainable and target farmers with better lands and more opportunities to participate in the economy. Despite equity and food security concerns, the harsh reality is that some farm families would be better off if they could get out of the hills and find gainful employment in the industry, tourism and service sectors of the national economy.

Action Response - Focus Area—Upland Agriculture as a Development Opportunity

USAID has indicated its intention to devote some resources to agriculture. It has been suggested that these initiatives will target linking farmers to agribusiness opportunities through alliances that produce and market “specialized products, including environmentally friendly or other certified product.” The team suggests that there is some scope for more basic agricultural production and farming systems linked to horticulture (perhaps under irrigated conditions linked to stable water supplies from protected watershed areas)—to provide quality vegetables for the domestic and tourism market and/or perennial fruit tree crops that are better suited to more fragile land capability categories (modeled after the successful “mini-riego” developments that USAID helped to pioneer in Guatemala). The latter in particular represents a solution for farm families that are reluctant to abandon their land entirely, while members of the household search for off-farm employment opportunities. Such an approach would be pertinent for the CWIP/R2RW sequel.

More Attention to the Forestry Sector. USAID’s intentions for the new strategy period do not include any attention to the potential role of the forestry sector in Jamaica, other than the likelihood that agroforestry and tree planting could be a part of the future work in ecosystem management—identified as an intermediate results in the new strategic objectives framework. There are, however, plans underway to include Jamaica among the countries benefiting from the Tropical Forestry Conservation Act.

Action Response - Focus Area—Community-based Natural Forest Management

The team recommends that at least a portion of TFCA resources be devoted to working with the Forestry Department to improve the capacity for community-based natural forest management. Considerable quantities (estimated at 1 million cubic meters) of timber are still being produced in the hill forests of the country to meet local needs for these products. Sustainable natural forest management can be an example of proactive conservation which, although different from strict protection, could be a viable and productive option applicable to the mosaic of land-use options ultimately required for sustainable development. The existing and extensive forest reserves under the administration of the Forestry Department are an opportunity waiting to be addressed. TFCA resources should therefore not go only to protected areas. This would be in addition to ongoing efforts at promoting agroforestry and farm-based reforestation which are already part of the watershed rehabilitation efforts in projects like R2RW and Trees for Tomorrow.

Other Opportunities (idea stage only for discussion within USAID)

As Section A explains, these exercises are not specifically seen as “sector programming exercises,” something that is well beyond the scope and resources available for them. The team, however, would be derelict in its duties to the USAID Mission if it did not point out other emerging themes and opportunities for USAID activities and investments that emerged that are consonant with USAID sector goals, program capabilities and experiences in other countries with similar problems. The following ideas for focal areas for USAID investments are tendered with that in mind:

Set up a "learning network." Assemble a body of knowledge about the lessons learned under the many demonstration projects and pilots, in particular about best management practices and field-oriented solutions to existing issues.

Promote the development of an apex NGO organization. The present example, NEST, is now not very operational, while there remains an abiding need and opportunity to provide services at economies of scale for the environmental NGO community (training in technical areas and organizational development, publications production, procurement, audio-visual and computer services, financial management advice, etc.) and to bring together the NGO community to enhance their voice in policy dialogue with government (a concerted advocacy role).

Consolidate sector grant-making capabilities. Promote the consolidation of the present external financial mechanisms for grant-making in the environment sector (EFJ, Parks Trust fund, the Forest Fund, the future TFCA endowment), to limit overhead, better coordinate program and national priorities, continue to develop the administrative effectiveness of these mechanisms, and encourage the sharing of information on lessons learned.

Sector coordination. Continue to encourage, fully participate in, and provide modest support for a Jamaican-led donor coordination group for the environment sector. The sector specialists within PIOJ mentioned their interest in pursuing such an effort but may require some support to make this fully effective. Such a group could also help to lobby for and attract the badly needed incremental funding for the environment sector from both the GOJ and other donors not presently active in the sector.

Work on political awareness of environment. Create an awareness-raising and/or informal training program on the environment for those involved in the policy-making processes in the country. It can, perhaps in association with the Parliament and organized around sector-oriented policy dialogue and strategic planning, create a larger constituency for environment.

Sister Cities Program. Foster a program of Sister Cities (modeled after the very useful program between Sarasota, Florida and Chetumal, Quintana Roo, Mexico that USAID/Mexico facilitated) as a training and idea-sharing opportunity for senior and mid-career leadership of environment sector agencies and organizations, as a means of addressing the growing issues of the urban environment.

Youth Conservation Corps. Promote the revitalization of the Youth Conservation Corps as part of the follow-up to the strategic objective on urban youth. Such a program would work with young people to train them for roles in the environment sector while providing stimulus for building character and improving lifestyles.

PART III- CARIBBEAN REGIONAL PROGRAM

SECTION A- PROGRAM CONTEXT

Background on the Regional Caribbean Program

In the early seventies, USAID established a Regional Caribbean Program providing assistance to the Commonwealth Caribbean Countries (Antigua, Dominica, Grenada, St. Kitts-Nevis, St. Lucia and St. Vincent). The Regional Development Office for the Caribbean (RDO/C) was established in 1978 as a full USAID Mission and subsequently closed in 1996. Over that period, USAID contributed US\$685 million to five core portfolios—infrastructure, private sector, agriculture, training and human resource development and health and population services—and was by far the region’s most generous bilateral donor (Datex 1996).

As a result of the 1997 Bridgetown Barbados Summit agreement committing the United States and signatory Caribbean Nations committed to implement a new series of action plans focused on free trade and economic development, safeguarding the natural environment, and enhancing justice and security. A fourth component to the Caribbean Regional Program was subsequently added to address the HIV/AIDS epidemic in the Region. The United States views the Caribbean as its “Third Border” given its proximity, the large number of immigrants to the United States, its importance as a tourist destination and the menace of the international drug trade. Similarly, the Caribbean is expected to be part of the Free Trade Area of the Americas process expected to be in place by 2005 (USAID/Jamaica-CAR 1999).

USAID/J-CAR’s 2000-2004 Caribbean Regional Program

USAID’s present strategy in the Caribbean Region focuses on four regional strategic objectives over the five year period 2000-2004, as follows:

- RS01- Improved business environment to meet international standards
- RS02- Improved environmental management by public and private entities
- RS03- Increased efficiency and fairness of legal systems
- RS04- Enhanced Caribbean response to the HIV/AIDS crisis in target countries.

The development challenge in the region has been seriously affected by a convergence of several adverse factors. After years of dependence on preferential trade agreements for commodity exports (in particular, sugar and bananas), the removal of these trade agreements and increasing globalization is taking its toll. There is growing concern that the Caribbean region will not be able to compete in the Free Trade Area of the America or the World Trade Organization because of an inability to meet standards and requirements. Furthermore, there is a significant backlog of criminal and civil cases pending in virtually all of the Caribbean countries. The natural environment on which the region depends on for economic growth and tourism is threatened by poor and unsustainable environmental management practices. The problems associated with an inadequately trained labor force are exacerbated by the loss of many trained people to immigration, recruitment by overseas agencies, and a growing HIV/AIDS epidemic second only to that of Sub-Saharan Africa (USAID/J-CAR n.d.).

The present range of USAID’s support for a regional environment program “reflects the region’s priority concern for sustainable livelihoods.” The current program, aimed at achieving the strategic objective of “Improved Environmental Management by Public and Private Entities,” works with both the public and private sector to promote the use of best environmental management practices, define and reinforce sustainable tourism policies and complementary compliance measures, and strengthen the private sector’s capacity to access financing for environmental programs (USAID/J-CAR n.d). Activities under the program now include:

Small Tourism Enterprise Program (STEP). Working through a grant agreement with the Organization of American States (OAS) Intersectoral Unit for Tourism, USAID is supporting the expansion of the capacities of small hotels to enhance their environmental management practices. More specifically, the program includes: “developing coaching toolkits which provide information on lessons learned and best practices in sustainable tourism and environmental management; establishing Walk-In Centers which house hotel resource materials for the small tourism enterprise sector; developing a marketing strategy with emphasis on hotels developing sound environmental practices; and establishing a capital fund to be available to small hoteliers requiring environmental improvements” (USAID/J-CAR n.d).

Environmental Audits for Sustainable Tourism (EAST III or CHEMI). This project is built upon the successful experience of EAST in Jamaica and is targeting the small hotels in the Eastern Caribbean. “The activity encourages hoteliers and related industries to both think and act ‘green’ and develop tourism as an eco-conscious business that protects the environment on which it ultimately depends. The environmental audits are identifying businesses’ environmental and managerial weaknesses, and helping to promote greater understanding of environmental issues in the industry by demonstrating the benefits of environmentally friendly practices” (USAID/J-CAR n.d). USAID works with the Caribbean Alliance for Sustainable Tourism (CAST) to implement this activity.

Dominica Green Globe Ecotourism Destination. USAID will assist Dominica to become the region’s first internationally recognized ecotourism destination. This will include activities for participating in STEP and EAST III. Working with the OECS Natural Resources Management Unit (now the Environmentally Sustainable Development Unit-ESDU), and other donors including the EU, DFID and UNDP, USAID is assisting the country to develop an environmental strategy geared to this Ecotourism Destination Plan. Assistance is foreseen for strengthening Dominica’s Hotel and Tourism Association and initiating community-based tourism activities (USAID/J-CAR n.d).

In addition, USAID support for sound environmental management practices involves two other activity streams—strengthening environmental reporting and communications, and providing technical assistance to regional and national environmental and tourism organizations to strengthen environmental compliance, including meeting coastal water quality standards and standardizing environmental impact assessment procedures in the Region. These activities are being implemented in association with the Caribbean Environmental Health Institute (CEHI), the OECS Environmentally Sustainable Development Unit (ESDU) and the Caribbean Tourism Organization (CTO) (USAID/J-CAR n.d).

Current Regional Programming Efforts

Recent efforts in May 2003 led to the establishment of a new environment SO for the sector: More Effective Environmental Management for Sustainable Economic Growth.

To reach this SO, activities are planned in three intermediate results areas:

- IR1- Access to environmental management best practices increased
- IR 2- Capacity to access finance increased
- IR 3- Key environmental policy and standards implemented.

In addition, interest in pursuing the development of alternative energy activities, once foreseen as part of the environment SO, have been included under SO 1—Regional Economic Growth. In that regard, as part of its ongoing activities, the Caribbean Regional Program has just bought into a PASA arrangement funded out of USAID/Washington with Oakridge National Laboratories to carry out an assessment of the prospects for renewable energy in the eastern Caribbean. This short-term initiative (18 months) is also expected to generate additional inputs for consideration of USAID/J-CAR's support to alternative energy in the Region.⁶

The Regional Context for Natural Resources Management

USAID/J-CAR will target seven Island Nations under the Caribbean Regional Environment SO: six countries of the OECS—Antigua & Barbuda; Dominica; Grenada; St. Kitts & Nevis; St. Lucia; St. Vincent & the Grenadines—and Barbados. Their relative physiographic and socio-economic similarities and common principal environmental challenges and opportunities constitute an appropriate scenario for program synergies. From an environmental perspective, the major differences are associated with rainfall. In the Leeward Islands, which include Antigua & Barbuda and St. Kitts & Nevis, rainfall averages less than 2500mm per year. In the typically higher and steeper Windward Islands, rainfall exceeds 2500mm and can reach up to 4000mm in the highest reaches because of the orographic influences. Both portions of the island receive most of their rainfall from July to December which also includes the hurricane season when rainfall intensities can exceed 125 mm/hour leading to serious run-off, erosion and downstream flooding with catastrophic consequences including the loss of human life (Madramootoo 2000).

In the main, the environmental challenges and opportunities facing the island nations of the OECS and Barbados include: point and non-point source pollution and inappropriate disposal of household wastes with their impact on the coastal and marine environment on which their tourism industry depends; watershed degradation as a result of incipient deforestation and agricultural practices on steep slopes leading to high sediment loads and flooding, particularly during hurricanes and inappropriate development in the uplands thereby also affecting the coastal environment and water supply; and an abiding need to maintain the competitiveness of their tourism enterprises against the backdrop of an increasingly global economy.

⁶ There have been a number of other written discussions of the future Strategy for the Caribbean Regional Program, including: an Ideas paper submitted to USAID/Washington in December 2002 (USAID/J-CAR 2002) and a Draft Strategy RSO2—Environmental Management strategy paper prepared by P. Wiesel (Wiesel 2003). This latest iteration of the Regional Environment SO builds on both of these.

There is also, however, ample opportunity to learn together and thereby enhance the contributions from USAID's modest capabilities by linking these efforts with the emerging consensus among the nations, as typified by the activities and convictions of the OECS Environmentally Sustainable Development Unit, and by coordinating investments with other interested donors.

SECTION B- LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

The brief provided by USAID delineates the area for the environment strategic objective (SO-2) as the Organization of Eastern Caribbean States (OECS) sub-region, which includes six independent countries, these being; Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Barbados. The assessment will therefore focus on the OECS sub-region.

Policy and Legislative Setting

There are a number of policy initiatives influencing the regional and national policy positions and regional program design. The main policy directions are stated within the following:

Small Islands Developing States – Program of Action (SIDS-POA)

The SIDS-POA was developed out of the 1994 conference on SIDS. The Program of Action identified the following 14 priority areas for implementation:

1. Climate change and sea level rise
2. Natural and environmental disasters
3. Management of wastes
4. Coastal and marine resources
5. Freshwater resources
6. Land resources
7. Energy resources
8. Tourism resources
9. Biodiversity resources
10. National institutions and administrative capacity
11. Regional institutions and technical cooperation
12. Transport and communication
13. Science and technology
14. Human resource development.

In the Caribbean, the intergovernmental organizations identified a coordinating mechanism for implementation of the SIDS-POA that involves joint coordination between the UN Economic Commission for Latin America and the Caribbean (ECLAC) and CARICOM. Although the coordinators maintain a database of projects implemented in the Caribbean that fit (somewhat loosely) under the 14 priority areas, there is no attempt to determine regional programming priority or to coordinate regional programming efforts.

Information sharing and support for the SIDS Network (SIDS-NET) (<http://www.sidsnet.org>) has been developed by the United Nations Development Program (UNDP). The 10-year review conference for the SIDS program will take place in mid-2004.

United Nations Environment Program-Caribbean Environment Program (UNEP-CEP)

The Caribbean Environment Program was developed in 1981 by 33 governments of the Wider Caribbean Region to promote the integration of environmental considerations into development planning. The program, which covers the Wider Caribbean Region, is also based on a regional environmental convention, the Convention for the Protection and

Development of the Marine Environment in the Wider Caribbean Region (Cartagena Convention). The CEP now consists of four sub-programs:

- Assessment and Management of Environmental Pollution (AMEP)
- Specially Protected Areas and Wildlife (SPAW)
- Information Systems for the Management of Marine and Coastal Resources (CEPNET)
- Education, Training and Awareness (ETA).

St. George's Declaration of Principles for Environmental Sustainability in the OECS.

The St. George's Declaration of Principles for Environmental Sustainability in the OECS was developed by the OECS-Natural Resources Management Unit (now the Environment and Sustainable Development Unit) as a blueprint for guiding the actions of OECS member states in pursuit of sustainable development. The Declaration, which was signed by OECS Ministers in April 2001, contains 21 principles. The Declaration also functions as the framework for the OECS Environmental Management Strategy, a 5-year strategy developed in 2002.

In addition to the above policy frameworks, Caribbean regional environmental programming is influenced by multilateral environmental agreements (MEAs) and one regional environmental agreement, the Cartagena Convention. A review conducted by the Caribbean Law Institute in 1998 found that more than 100 international conventions are of relevance to the Caribbean. The most important of these for natural resources management were:

- Convention concerning the Protection of the World Cultural and Natural Heritage
- United Nations Convention on the Law of the Sea (UNCLOS)
- United Nations Convention on Biological Diversity
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The Cartagena Convention is supported by three protocols:

- The Oil Spills Protocol concerns cooperation among countries in the region in combating oil spills and the preparation and updating of contingency plans.
- The Specially Protected Areas and Wildlife (SPAW) Protocol deals with conservation measures to protect, preserve, and manage sensitive marine areas, as well as threatened or endangered species of flora and fauna.
- The Land-Based Sources of Marine Pollution (LBSMP) Protocol deals with environmental pollution reaching the marine environment from land-based sources and activities.

Institutional Framework

Inter-Governmental Organizations

The Caribbean is organized into a number of geo-political groups, several of which overlap in terms of spatial coverage, membership, and programming. The main groups are:

- Association of Caribbean States (ACS) – 25 Member States and 11 Associate Members established for consultation, cooperation and concerted action, and focused on trade, transport, sustainable tourism, and natural disasters;
- Caribbean Community (CARICOM) – 15 member states, with Anguilla, British Virgin Islands, Cayman Islands, and Turks & Caicos Islands as Associate Members;
- Caribbean Forum (CARIFORUM) – 12 CARICOM countries and Suriname, organized to issues under the Africa, Pacific, and Caribbean arrangement with the European Union; and
- Organization of Eastern Caribbean States (OECS) – 6 independent countries of the eastern Caribbean, and Anguilla, British Virgin Islands, and Montserrat as associated members.

Each group is served by a Secretariat, with units established for dealing with environment issues. The ACS has not developed an environmental program, though it has adopted a Social Partnership Program, which focuses on involving regional non-governmental organizations (NGOs) in the inter-governmental process. The environmental program of CARIFORUM is the Caribbean Regional Environmental Program (CREP), designed as a 4-year project, and currently implemented by the Caribbean Conservation Association (CCA). CARICOM has established a number of regional organizations to implement its specialized programs. These include tourism, coordinated by the Caribbean Tourism Organization (CTO); disaster management, coordinated by the Caribbean Disaster and Emergency Response Agency (CDERA); capacity building, coordinated by the Caribbean Centre for Development Administration (CARICAD); and environmental health, coordinated by the Caribbean Environmental Health Institute (CEHI).

The OECS established the Natural Resources Management Unit, recently renamed the Environment and Sustainable Development Unit (ESDU), to coordinate environmental policy development within the OECS sub-region, and to provide technical assistance to the relevant departments of its member countries.

The ESDU coordinates regional environmental programs for the OECS sub-region, including responsibility for the OECS regional environmental strategy. It is responsible for monitoring the adherence of the member states to the St. George's Declaration; and has been mandated by its member states to coordinate and negotiate with international funding institutions for regional environmental projects.

In addition to the institutional arrangements supporting the regional geo-political arrangements, the United Nations Environment Program-Caribbean Environment Program (UNEP-CEP) is coordinated by a regional coordinating unit (UNEP-CAR/RCU).

Regional Non-Governmental Organizations

A number of regional non-governmental organizations (NGOs) also participate in the environmental programs, as well as the inter-governmental decision-making process. The main regional environmental NGOs are the Caribbean Conservation Association (CCA), Island Resources Foundation (IRF), and Caribbean Natural Resources Institute (CANARI).

The CCA has been implementing a range of environmental programs in the Caribbean for more than 30 years. Currently, it is implementing the CARIFOCUM CREP project, which involves environmental awareness, regional environmental networking, and amenity area/protected area demonstration activities.

IRF has a long history of environmental programming in the Caribbean, with projects and activities ranging from environmental assessments, capacity development for NGOs, to preparation of environmental profiles for the OECS countries.

CANARI's main focus over the past 10 years has been on training in sustainable forestry and concept development and training in the area of collaborative management of natural resources.

International conservation organizations that are increasingly active in the Caribbean are The Nature Conservancy, The Ocean Conservancy, World Wide Fund for Nature, and Conservation International.

Bilateral and Multilateral Organizations

A range of bilateral and multilateral institutions have supported environmental activities in the Caribbean. A summary of regional programs on environment in the Eastern Caribbean prepared by the ESDU identifies a number of international organizations as active in the OECS sub-region, including:

- Canadian International Development Agency (CIDA)
- The World Bank
- United Nations Environment Program (UNEP)
- U.K. Department for International Development in the Caribbean (DFID)
- Organization of American States (OAS).

It should be noted that the EU and the Inter-American Development Bank (IDB) have environmental initiatives in the OECS, but these are not coordinated through the ESDU.

Coordinating Mechanisms

The various groupings and regional programs have a number of coordinating mechanisms, and some routinely participate in the coordinating mechanisms of the others.

- ACS works through its Meetings of Ministers, but the Secretary General of the other geopolitical groups participate in such meetings. The ACS has also established the Social Partnership Program, which allows regional NGOs to participate in the ACS process.

- CARICOM coordinates programs through its various Meetings of Ministers. Its technical assistance agencies report to those meetings, and program coordination is done through the Secretariat. The various agencies also work directly with OECS member countries, all of which are CARICOM members.
- CCA has a Joint Executive Committee for the implementation of the CREP, comprised of a number of CARIFOCUM member countries, the CARIFORUM Secretariat, the EU, and a number of regional NGOs. Additionally, CCA participates in the Technical Advisory Committee for the OECS-ESDU, the Social Partnership Program of ACS, and the Scientific and Technical Advisory Committee of the Protocol on Specially Protected Areas and Wildlife (SPAW).
- UNEP-CEP, the Caribbean Environment Program, is jointly operated as a UNEP Regional Seas Program and the implementing mechanism for the Cartagena Convention. The SPAW Program is coordinated by the UNEP-CAR/RCU, and its decision-making bodies are the Conference of the Parties and the Scientific and Technical Advisory Committee. All groups are ultimately answerable to the Inter-governmental Meetings, the Conference of Parties to the Cartagena Convention. International and regional NGOs and non-member countries to SPAW are allowed to participate as Observers, and participate fully in program implementation.
- OECS. The ESDU works with a Technical Advisory Committee, comprised of member countries and a number of regional NGOs. It reports to an Environmental Policy Committee, the OECS Council of Ministers for the Environment.

In addition to the regional institutions and coordinating mechanisms, a number of regional environmental information networks are active. An assessment of regional information networks in 2002 identified more than 40 networks or environmental information providers (Caribbean Media Consultants 2002). These networks involved a range of private, public, national, regional, and international institutions, and were both traditional and internet-based in nature. The assessment found that a substantial of work was required to reduce duplication, improve network integration, and strengthen existing networks.

SECTION C- STATUS AND MANAGEMENT OF PROTECTED AREAS

Types of Protected Areas

While there are many regions of protected areas throughout the Caribbean, few are officially designated as parks. Coastal areas of small island states are thought to include the island land mass in addition to the marine area it controls. The chain of islands is therefore looked upon as a collection of interconnected systems (OECS 2002). The following table illustrates the categories of protected areas in each country and the equivalent category in the IUCN system (CANARI 2001).

Table C.1- Designation of the Management Categories Used in the Wider Caribbean Region and Their Equivalence with the IUCN System

Country	Designation of Protected Area Categories	Equivalence with IUCN Category System
Antigua and Barbuda	National Park	II
	Marine National Park	II
Dominica	National Park	II
	Forest Reserve	VI
	Protected Forest	VI
Grenada	Forest Reserve	VI
St. Kitts and Nevis	National Park	II
St. Vincent and The Grenadines	Marine Reserve	IV
	Reserve	IV
St. Lucia	Nature Reserve	IV
	Reserve	VI
	Sanctuary	IV
	Forest Reserve	VI

Present List

In the Caribbean islands, the size of protected areas varies between less than 100 to 50,000 hectares (1 square kilometer to 50 square kilometers). Deficiencies in existing forestry and wildlife policy, legislation and regulations are recognized as inhibiting proper protection and management of forest resources.

Nelson's Dockyard National Park is the only official national park in Antigua and Barbuda. It is managed primarily for tourism, including well-preserved historic and archaeological sites. Wallings Conservation Area demonstrates some of the last remaining forests in Antigua and is one of the main terrestrial ecotourism sites.

The Offshore Islands of the North Sound in Antigua protect the remaining Racer snake, seabirds and many species of plants. Guiana Island in particular is the site of a turtle monitoring program that links tourism and nature conservation. Codrington Lagoon in Barbuda takes up almost the entire western coastline. The mangroves and pink-sand beaches are important sources of tourism and economic gain. The area is a productive fishing area and nesting habitat for frigate birds.

Dominica has one of the larger systems of protected areas in the Caribbean as the island is lush with many different ecosystems including volcanoes, rain forests, mountain ranges, waterfalls and coral reef. The protected areas include: two national parks (Cabrits National

Park and Morne Diablotin-Trois Pitons National Park), two forest reserves (Northern Forest Reserve and Central Forest Reserve) and two marine protected areas (Soufriere and Scotts Head Marine Reserves) (NBSAP, Dominica).

The Etang Forest Reserve in Grenada is 1256 hectares of cloud forest, rain forest, and lower montane rain forest and plantations. Grenada also has national parks at Levera, Mt. Hartman and Perseverance Estate and a forest reserve at High North (NBSAP Grenada).

St. Kitts and Nevis, St. Vincent and the Grenadines and St. Lucia all have protected areas, mostly designated as reserves and not official parks.

Management Models/Mechanisms

The small size of the protected areas and lack of financial means make for a fragmented system of management of protected areas in the Caribbean. The authority over the protected areas lies within the respective ministries of each island state (typically the Ministry of Tourism and Environment, the Ministry of Agriculture, Forestry and Fisheries or some combination).

The ministry is responsible for overseeing legislation, conducting environmental impact assessments and the design and implementation of projects. The respective ministries also establish forest reserves, marine parks and protected areas, oversee the use of forest resources, and implement soil and water conservation programs. With the scarcity of financial and human resources, community groups and NGOs are encouraged to participate in the planning and management of associated programs and projects.

Future Directions

There are areas of environmental interest that each country would like to conserve if it was able to assemble viable financial and management plans. For example, an integrated forestry and coastal resource management regime is currently planned for the south-western forested areas of Antigua and Barbuda and three forest reserves are planned in Morne Gazo, Annandale and Mt. St. Catherine in Grenada, bringing the total of the island's forests under protection to approximately one third. Grenada also intends to legally designate Clarks Court/Woburn Bay and Molinière/Beauséjour Bay as Coastal Protected Areas. In all countries, it is not a matter of understanding, but of finances.

Given the size of the region, similarity of problems between countries, scarcity of finances, and shortage of technical skills, more emphasis should be placed on regional collaboration, especially in sharing of knowledge and expertise, exchange of information, and policy development. The region has discussed the formation of a regional network of marine and terrestrial protected areas. Currently there is collaboration between nations in designating important coastal and marine protection areas.

SECTION D- STATUS AND PROTECTION OF ENDANGERED SPECIES

Importance of Endemism

The rates of endemism in the Caribbean islands vary with the topography on each island. In island states, species are especially vulnerable to natural disasters, land-use change and invasive species. Data can be found on the status of species for most of the islands, some in greater detail than others. In some cases information is gathered on a regional scale. For example, there are over 400 fish species listed in Caribbean fish guides, although no exact data is known for individual countries.

The Eastern Caribbean is known to serve as an important link in the seasonal migrations of numerous birds. The Blackpoll Warbler is a unique example of migrating birds in the Caribbean as most of its total world population is believed to use this area for stop-over sites during autumn. Several species of thrushes, vireos, cuckoos and warblers also migrate through the Eastern Caribbean in large numbers at this time of year (IRF 1998). The Caribbean also contains significant breeding sites for approximately 25 species of seabirds, many of which are endemic species or sub-species (IRF 1998).

Dominica has a high level of endemism due to its tremendous terrestrial and marine biodiversity, high level of forest cover, and unique ecosystems including eight active volcanoes and the only boiling lake in the Western Hemisphere. Several plant species are endemic to the island, including Bwa Kwaib (*Sabinea carinalis*), Dominica's national flower.

Dominica has the most diverse amount of wildlife remaining in the Eastern Caribbean. The island is home to two birds endemic to Dominica and nine birds endemic to the region. The two endemic parrot species, the imperial parrot or "Sisserou" and the red-necked parrot or "Jaco," are both considered threatened under the IUCN Red List and are "specially protected" birds under Dominican law.

None of the eighteen species of mammals on Dominica are endemic to the island; however, four of the twelve bat species found are endemic to the region. Of the nineteen species of reptiles, ten are lizards, of which two (ground and tree lizard) are endemic to Dominica. The Lesser Antillean Iguana is endemic to the region. Of the four species of snakes found on the island, one is endemic to Dominica and one to the region.

Of the four amphibian species found in Dominica, two are regionally endemic and two are endemic to Dominica. Invertebrates and fish need more studying to determine their status. None of the crustaceans are endemic to the island and of the fifty-five butterflies found on Dominica, two are endemic to the island and seven to the region.

Table D.1- Conservation Status and Biological Distinctiveness for Nine Eco-regions in the Eastern Caribbean (IRF 1998)

Country	Windward Moist Forest	Leeward Dry Forest	Windward Dry Forest	Leeward Dry Forest	Windward Xeric Scrub	Leeward Xeric Scrub	Lesser Antilles Mangroves	Coastal Coral Reefs	Offshore Grass & Reef Complexes
Antigua & Barbuda	na	na	na	Critical Important	na	Critical Outstanding	Critical Significant	Critical Important	Endangered Outstanding
St. Kitts & Nevis	na	Critical Important	na	Vulnerable Important	na	Vulnerable Important	Critical Significant	Critical Important	Vulnerable Important
Dominica	Stable Outstanding	na	Critical Significant	na	na	na	Endangered Significant	Critical Significant	na
St. Lucia	Endangered Significant	Na	Endangered Important	na	Critical Important	na	Critical Important	Critical Significant	Endangered Significant
St. Vincent & Grenadines	Vulnerable Important	Na	Critical Important	na	Vulnerable Important	na	Endangered Significant	Endangered Important	Vulnerable Outstanding
Barbados	na	Na	Critical Important	na	Critical Significant	na	Critical Significant	Critical Important	Critical Significant
Grenada	Endangered Important	Na	Endangered Important	na	Vulnerable Significant	na	Endangered Important	Critical Important	Vulnerable Important

Source: IRF 1998.

The indigenous vegetation of Antigua was largely wiped out by the sugar plantations, with few remaining areas of original vegetation cover. Barbuda on the other hand has retained most of its original forest cover and is comprised of evergreen bush land (mixture of white cedar, loblolly, cinnamon, bearded fig and shrub species). Sixteen out of 54 of the vegetation areas are considered rare or endangered. Over 190 species of flowering plants are worthy of “special conservation concern” (Antigua and Barbuda NBSAP 2001) and 22 of these species are endemic to the Lesser Antilles (one of which may be endemic to Barbuda). An additional 73 species are considered rare, some of which are thought to have become extinct.

Amphibians found in Antigua and Barbuda include the Tree Frog, endemic to the Lesser Antilles and now can be found throughout the Caribbean and the Marine Toad, which was introduced and is now widespread. The only reptile endemic to Antigua and Barbuda is the ground lizard. There are 26 species of marine mammals found in the Caribbean, seven of which can be found in Antigua and Barbuda. These include: humpback whales, pilot whales, minke whales, sperm whales, bottlenose dolphins and Atlantic spotted dolphins.

Grenada has three species of endemic plants: the Grand Etang Fern, the Cabbage Palm and one endemic tree species, although no information is known on the status of endangered or threatened plant species. Experts are slightly more confident in the status of Grenada’s terrestrial wildlife, although there is still little hard data on the number of species, distribution and status. The wildlife is thought to consist of 4 species of amphibians, 8 species of lizard, 5 species of snake, 150 species of birds (18 of which are thought to be endangered or threatened), 4 native species of terrestrial mammals and 11 native species of bats. Several species have gone extinct in Grenada over the past 200 years, including the manatee, the Grenada parrot, agouti, Neuweid’s Moon Snake, Shaw’s Racer and the Morocoy Tortoise (NBSAP Grenada 2001).

In St. Kitts and Nevis the forests, grasslands and wetlands are only known in general terms. There is no inventory of flora or fauna (FAO, St. Kitts and Nevis). For a more inclusive list of the status of species in the Eastern Caribbean, see Annex H.

Current Protection and Rehabilitation Activities

All of the islands support activities that conserve species found outside of protected areas. Most of these programs focus on endangered or ecologically important species. For example, on Long Beach in Antigua conservation and monitoring projects are being carried out for turtle species thought to be threatened. Other species are not given the same attention despite the same threat provided by increased coastal development.

The introduced Indian mongoose is thought to be responsible for the extinction of the Racer snake on the mainland of Antigua as well as to have reduced the numbers and changed the behavior of several native bird species. The Antigua Racer Snake Conservation Project in Barbuda is working to protect the remaining snakes found on Great Bird Island.

The Eastern Caribbean islands serve as an integral link for the seasonal migration of birds. Codrington lagoon in Barbuda has become a research station for studying nesting colonies of Frigate birds. Twenty of the 60 resident birds in Antigua and Barbuda are endemic to the West Indies sub-region, some of which are found only in the Lesser Antilles.

SECTION E- STATUS AND PROTECTION OF FOREST RESOURCES

With the exception of Dominica, forest cover in all of the Island Nations has been significantly reduced as a result of clearing for agriculture or for development purposes. The following table provides a summary of the forest cover situation in the Eastern Caribbean.

Table No. E.1- Forest Cover and Area Change in the Eastern Caribbean

Country	Land Area ('000 ha)	Total Forest ('000 ha)	% of Land Area	Area per Capita (ha)	Forest Plantations ('000 ha)	Annual Change ('000 ha)	Annual Rate of Change (%)
Antigua & Barbuda	44	9	20.5	0.1	0	n.s.	n.s.
Dominica	75	46	61.3	0.6	n.s.	n.s.	n.s.
Grenada	34	5	14.7	0.1	n.s.	n.s.	0.9
Saint Kitts & Nevis	36	4	11.1	0.1	0	n.s.	-0.6
Saint Lucia	61	9	14.8	0.1	1	-1	-4.9
Saint Vincent/ Grenadine	39	6	15.4	0.1	0	n.s.	-1.4
Barbados	43	2	4.7	n.s.	0	n.s.	n.s.
U.S. Virgin Islands	34	14	41.2	0.1	—	n.s.	n.s.

Source: FAO State of the World's Forests, 2003

According to the source of the above table, recent statistics on production, trade and consumption of forest products show that most of the Island Nations in question are heavily dependent on imports for meeting their local wood needs.

Most of the countries of the Eastern Caribbean have higher income levels and thus their people are not so dependent on wood products harvested from the local forests (either wood fuels or roundwood for homestead needs). In most countries, there are modest but active programs to restore and rehabilitate forests, particularly after damage by hurricanes. Similarly, much of the activities of those involved in forestry in the OECS countries is directly related to the important conservation imperatives of watershed management and biodiversity protection. Indeed, the major concerns related to the conservation of forest cover in the Eastern Caribbean are seen as being associated with land-use issues and inappropriate agricultural practices and land development which is eating away at vital forest cover and leading to a general decline in the quality of the watershed function (see discussion below on watershed management).

Institutional and Action Framework for Forest Conservation in the OECS

Most of the Island Nations of the OECS have specific agencies, typically but not exclusively Forestry Divisions of the Ministry of Agriculture, that are tasked with the development, management and monitoring of forest cover. In a number of countries, a Tropical Forestry Action Plan was developed as a guide to sector development efforts. In recent years, there has been a growing recognition of the importance of a more community-oriented and

participatory thrust to forestry development activities, linked to improved integration with the larger issues of land-use planning, watershed management and biodiversity conservation, the latter mainly through the implementation of Forestry Division responsibilities for protected areas.

In the 1990s, an OECS Forestry Network (OECS FORNET) was established under the aegis of the Natural Resources Management Unit for the purpose of providing a common ground for sharing information and promoting discussion about the forestry sector in the Region. In 1996, the first edition of the OECS Forester was published with support from the USAID-funded Environment and Coastal Resources (ENCORE) Project managed by the World Wildlife Fund and working with the OECS NMRU. With the closure of the ENCORE Project, this initiative seems to have disappeared and the forestry activities subsumed under the wider scope of the newly established Environmentally Sustainable Development Unit of the OECS.

Since 2001, the activities of the ESDU have focused on the implementation of the Principles of the St. George's Declaration under which forestry, natural resources management and watershed conservation although not specifically mentioned, are expected to play their appropriate role. Under the OECS Environmental Management Strategy, indicative actions to achieve the desired results of Principle 11 of the St. George's Declaration "Ensure the Sustainable Use of Natural Resources" include: "Develop and implement national natural resource management plans, including mechanisms for monitoring and evaluation, to obtain sustainable productivity. Particular focus should be given to integrated water, coastal areas management, and fisheries and forestry management plans" (OECS 2002).

SECTION F- CONSERVATION OUTSIDE PROTECTED AREAS

Managed Natural Systems

While there is an emerging and expanding network of areas under some form of protection in the Eastern Caribbean Region, there is reason to believe that considerable challenges remain in addressing the need for conservation under managed natural resource-based systems which are far more extensive than the protected areas. This section examines the status of these different systems—watersheds, coastal and marine resources, wetlands (including mangroves), and agricultural systems—and their implications vis-à-vis the conservation of tropical forests and biodiversity.

Watersheds

All the island nations under consideration here have reason to be concerned about the condition of their watersheds. With the exception of Dominica, the other countries have seen their forest cover extensively reduced, against a backdrop of steep lands and fragile soils formed rather recently as the result of volcanic action and/or coral deposition, both types being highly erodible. The steepness of the terrain is exacerbated by intensive rainfall events, made all the worse by the propensity for annual hurricanes. Erosion rates as high as 133 tons/hectare/year have been measured on unprotected agricultural fields in the region. The continuing tendency to move higher in the watersheds, for either farming or home building is also contributing to the problems, and some countries have already experienced shortages of potable water supplies during the dry season, presumably as a result of decreased infiltration of rainwater and dropping aquifers (Madramootoo 2000).

There are few real soil and water conservation measures being promoted on the Islands, compounded by the problem of unclear tenure which discourages farmers from investing in land improvements. Point and non-point source pollution, from both agrochemical use and improper disposal of industrial and municipal waste adds to the water resources problems. The impacts on adjacent coastal and marine resources are already being noted, compounded by high levels of recreational boat traffic for which few dumping stations for their holding tanks exist.

Unfortunately, land and water resource management in the vital watershed areas of the Caribbean Islands is still a matter that is generally treated in a haphazard and fragmented fashion. Typically, several country agencies have overlapping responsibilities for addressing watershed issues against a backdrop of very limited financial resources with which to do so. Governments recognize the issues, particularly the need to develop and enforce land zoning, in particular as concerns the urban infrastructure planning process. None of the islands, however, have sufficient sewage treatment facilities to properly dispose of household waste which is often vented in the adjacent coastal environment. Over the medium-term, there is a considerable likelihood that contaminated run-off from the hillsides of these islands will undermine the attractiveness of the nearshore coastal resources on which their extensive tourism industry is based.

The Natural Resources Management Unit of the OECS convened a Regional Policy Dialogue Meeting on Watershed Management in Small Island States, held in St. Kitts in February 2002. The intention of the workshop was to “guide the OECS in the formulation of a common watershed management policy” (OECS/NRMU 2002). As noted above, however,

the matter of watershed management is, in the opinion of this assessment team, somewhat buried in the principles of the St. George's Declaration and deserves a much higher profile and support.

Coastal and Marine Resources

The biodiversity assessment of the Eastern Caribbean conducted by Island Resources Foundation in 1998 made the following statement about marine biodiversity, "We believe that the marine biodiversity of the Eastern Caribbean is a valuable global resource whose conservation warrants the concern and assistance of the international community" (IRF 1998).

Detailed information on the various coastal resources in the OECS is very sparse, even for coral reefs, for which the best and most recent information exist. The 2002 report on status of coral reefs of the world indicates that the coral reefs in the OECS countries vary widely from country to country in terms of extent, levels of impact, use, and status. Generally, little is known about the reef systems, even though there are monitoring programs in place in many countries. The report also notes that these coral reef systems are threatened by:

- Sedimentation and pollution from coastal development
- Anchor and diver damage from tourism
- Overfishing due to increased demand
- Coral bleaching
- Increasingly frequent and severe storms.

Regional initiatives to address coastal resources management include:

- Ecosystem management activities within the SPAW Program of the Caribbean Environment Program. The SPAW Program itself has a major focus on species and protected area management.
- Mapping and information management for coastal zone resources under the CEP-Net project of the Caribbean Environment Program.
- The Caribbean Project for Adaptation to Climate Change implemented by the University of the West Indies for the Organisation of American States. The project has just entered Phase 2, and is now called Mainstreaming Adaptation to Climate Change (MACC).
- Integrated Watershed and Coastal Management Project under development by the Caribbean Environmental Health Institute. The site activities will focus on "hot spots," and will thus address some of the most critical issues facing watersheds in the 16 target countries.
- The Caribbean Regional Environmental Program has a component that focuses on amenity areas and associated livelihoods to local communities. Demonstration activities are planned for seven (CARIFORUM) countries, with support activities in the other six countries.

- The Nature Conservancy has initiated an eco-regional planning initiative, focusing on two main areas within the Caribbean, the Bahamas islands sub-region and the Eastern Caribbean sub-region.

Wetlands

The biggest threat to wetlands, particularly mangroves, in the Caribbean is improper solid waste disposal and the clearing of land for commercial development purposes. Sediment and chemicals in rivers also pose a threat to these coastal ecosystems. The mangroves act as a breeding ground for aquatic life and avifauna as well as habitat for marine and terrestrial wildlife. They are used for recreation and the production of charcoal in most islands.

The Cabrits Freshwater wetland in Dominica has been destroyed as a result of hotel development to meet increasing demands of tourism. The Indian River wetland is another noteworthy area for protection in Dominica.

The most dominant species of mangrove is the red mangrove, with the black and white being fairly common. The button mangrove can be found occasionally on the islands. Thirty-six mangrove sites are known to exist in Antigua and Barbuda, 21 in Grenada and countless throughout the remaining islands.

Agricultural Systems

Caribbean economies are traditionally agrarian economies. The existence of preferential access to markets in Europe for Caribbean agricultural products, primarily banana and sugar, has been challenged by the United States. Additionally, low yields in some crops, difficulties in accessing some markets (primarily the United States), and inability to compete (internationally and nationally) with large-scale producers from large countries has resulted in a decline in the income from agriculture over the last decade. This decline has been exacerbated by the open economies of the Caribbean, structural adjustment programs, and conditionalities of bilateral trade agreements.

The continuing decline in the agricultural sector has forced government in the sub-region to rethink agriculture. In addition to diversification, new initiatives focus on niche markets in the metropolises (particularly the United States), organic farming, and links to tourism through eco and agro tourism. Increasingly, agriculture is being replaced by tourism and offshore financial services as the main earners of foreign exchange.

Regional initiatives to address some of the problems in agriculture include: the Regional Transformation Programme (RTP) of CARICOM; the OECS Agricultural Diversification Programme (ADP); and the OECS Land Use Planning and Agricultural Production Zoning project.

Issues in Agriculture

In the OECS countries, agriculture is mainly carried out by small farmers, occupying land holdings of one hectare or less. As such, land tenure and inappropriate and inefficient farming and land management practices contribute to land deterioration and decline in the sector. Additional issues for agriculture in the OECS countries are (see also Table F.1):

- Agriculture contributes to land erosion and overuse of water and pesticides.
- Economic pressures to increase export crop production, exacerbated by expansion in other sectors such as tourism and housing, have accelerated the clearing of forests and the establishment of agricultural areas on steep hillsides which are highly susceptible to erosion. This deforestation has also led to a significant loss of wildlife habitat and the subsequent reduction of species diversity.
- Population increase and economic expansion have placed extreme pressure on agriculture to compete for scarce natural resources.

Regional Institutional Arrangements for Agriculture

The institutions that support research and development activities in the agricultural sector in the OECS include:

- Caribbean Agricultural and Research Development Institute (CARDI)
- FAO
- Caribbean Development Bank
- CARICOM
- Inter-American Institute for Cooperation on Agriculture (IICA)
- Technical Centre for Agricultural and Rural Cooperation (CTA).

Additionally, networks in land management and agriculture have been established. These include:

- The Caribbean Agricultural Science and Technology Networking System (PROCICARIBE) is designed to provide an institutional framework by which the region can design and implement strategies for the integration and coordination of agricultural research at the national and regional levels, with linkages to international organizations (<http://www.procicaribe.org>).
- The Land and Water Resources Information Systems (LWRIS) Network promotes the use of land and water resources information systems in the assessment, mapping, and monitoring of land and water resources in the Caribbean.
- The Caribbean Land and Water Resources Network (CLAWRENET) promotes information sharing and national reporting on the state of land, water and plant nutrition resources, using FAO guidelines.

Table F.1- Summary of Agriculture-related Issues in the OECS

Country	Agricultural Economic Indicators	Main Issues	Initiatives
Antigua and Barbuda		<p>Population increase and economic expansion increases pressure on agriculture to compete for scarce natural resources.</p> <p>Idle agricultural lands are being lost to other interests.</p> <p>Overlap and conflicts within institutions responsible for land management.</p> <p>Unregulated topsoil and sand mining in streambeds is impinging on farm lands, causing erosion.</p> <p>Critical coastal habitats are cleared for agricultural development.</p> <p>Housing is encroaching on good quality agricultural lands.</p> <p>Poor land management and farming practices result in serious degradation and decreased productivity.</p>	Agriculture Sector Plan being formulated
British Virgin Islands	<p>0.2% of the labor force is in agriculture.</p> <p>Annual food importation is valued at approx. US\$36 million.</p> <p>Annual domestic agricultural production is approx. US\$2.25 million, 6% of food consumption.</p>	<p>Islands are mountainous, and soils generally shallow.</p> <p>There is a major move from agriculture to tourism and offshore financial services.</p> <p>Attempts at agro-forestry and reforestation met with limited success.</p> <p>Soil conservation is expensive.</p>	<p>Agricultural census should have been undertaken in 2001.</p> <p>Land Information System & GIS for Department of Agriculture.</p> <p>LIS & GIS to be used for landuse planning, land capability mapping, and soil maps.</p>
Grenada	<p>44% of the population is in the rural and agricultural areas (1997).</p> <p>Agricultural output grew by 2.4% in 1998.</p> <p>Contribution to GDP decreased to 9.1%.</p> <p>Main export crops are nutmeg and cocoa.</p>	<p>Role of agriculture declining, but sector is still important.</p> <p>Inhibitory factors include decreasing productivity, use of undesirable and insufficient inputs, pests, and diseases.</p> <p>Steady decline in banana industry since 1988.</p> <p>Soils reasonable fertile, but productivity constrained by steep slopes and soil erosion.</p> <p>Loss of arable lands to non-agricultural use, land degradation.</p> <p>Decline in traditional agriculture.</p> <p>Lack of national land policy, insufficient land management legislation.</p>	<p>Adoption of integrated approach to watershed management.</p> <p>Reforestation to reduce soil erosion and improve soil fertility.</p> <p>Computer-based LIS established in 1995 being used for land management decision making.</p>
St. Kitts-Nevis	<p>1 company (St. Kitts Manufacturing Corporation) controls approx. 29% of arable land, most of which is held in</p>	<p>No control of agro-chemicals.</p> <p>No monitoring of impacts on soil and environment.</p>	<p>Establishment in 1997 of multi-purpose lab by the Department of Agriculture.</p>

	sugar cane.	Increase in agricultural activity resulting from return of management of two farming settlements to the Department of Agriculture. Data on land resources are not current. No inventory of flora and fauna.	Consultations regarding reduction in size of sugar industry.
St. Lucia	Only 28% of land suitable for agriculture. 15,784 ha under cultivation (1996), with 13,945 ha under permanent crops. Contributed 13% of GDP and 13% of exports during 1985-1995. Banana is the main export crop, accounting for 30% of export earnings in 1995.	Soil fertile, but the topography is a constraint. Loss of preferential markets for banana resulted in decline in the agriculture sector. No land management policy, uncoordinated approach to land management, land use planning and zoning ineffective and inefficient. Land use and land tenure issues contribute significantly to land degradation. Agricultural laws target small farm holdings. Land Conservation Board constituted under Department of Agriculture not functioning, and supporting regulations are lacking. High level of erosion in rainy season, silt deposits in streambeds contribute to drainage problems in major agricultural valleys. Widespread use of agro-chemicals creates concerns for water quality, human health, and loss of biodiversity.	Land policy under development.
St. Vincent & the Grenadines	11,000 ha under cultivation, 7,000 ha under permanent crops. Contributed 12.8% of GDP (1998) Banana is the main source of export earnings, approx. US\$20.4 million (1995). Root crops, fruits, and vegetables of growing importance, earned US\$12.6 million (1998).	Soils fertile, but topography restricts agriculture. Prime agricultural lands being rapidly sub-divided for housing. Land use conflicts created by squatter settlements on crown lands reserved for forests. Inappropriate cultivation and tillage practices result in soil and gully erosion.	Diversification of agriculture sector. New land reform policy, provides access roads to small farmers. Strengthening of extension and other support services. Optimization of scarce arable land through land reform and use of GIS.

Source: Compiled from national reports submitted to the Workshop on Land Resources Information Systems in the Caribbean, Barbados, 2000, as contained in the workshop proceedings.

SECTION G- OTHER CONSIDERATIONS

Impact of Development Projects

One of the fundamental precepts of the St. George's Declaration of Principles for Environmental Sustainability in the OECS is the need for a more integrated approach to development. This has been translated into a principle (No. 2) that binds the Member States to: "Formulate, promote and implement integrated development policies, plans and programs to ensure that environmental management is treated as an integral component of planning processes in pursuit of sustainable development" (OECS 2001). This principle is expected to be the basis for continuing to promote and develop the capabilities for environmental assessment of development projects throughout the region by member governments.

Similarly, from the regional perspective, the St. George's Declaration elevates the issue of the relationships between trade and environment to the status of a full principle (No. 14), advocating a series of basic measures to ensure that globalization of world markets does not become the source of additional environmental degradation in the region. To-date, however, as the OECS-ESDU has noted, there have been no specific programs or projects from the donor community to support the implementation of this key principle related to trade and environment.

Conservation of Economically Important Species and Germplasm

The importance of conserving native crop species is often understated. In the Caribbean new species are introduced and cross-fertilized frequently, often at the expense of wild and endemic species. Recently more attention has been given to biodiversity as it pertains to genetic resources, food (wild fruit, agricultural products, fish, etc.) and local medicines as both a means of sustenance and intellectual property rights. More islands are recognizing the need to conduct additional germplasm research and development. Some plan to strengthen links with the FAO and its Global System on Plant Genetic Resources, the Caribbean Seed and Germplasm Resources Information Network (CSEFRIN) and other organizations (NBSAP, Grenada 2001).

Many farmers in Antigua and Barbuda have left traditional crops for more high-yielding ones. Wild relatives of these species are being lost as a result of the development of natural habitat. "The genes of wild relatives and old strains of domesticated species will be needed in the future in order to develop the qualities and characteristics that can help cultivated species withstand new pests and disease outbreaks, and adapt to environmental changes and other challenges that might lie ahead" (NBSAP Antigua and Barbuda). The Department of Agriculture would like to survey the traditional crops and livestock found on the islands and expand and restore seed storage facilities. The importation and use of pesticides remains largely untracked.

Locally grown fruit trees that produce large quantities of good quality fruit are tracked as a resource for distribution to farmers in Grenada. Tissue culture is not common, but cutting, grafting, layering and budding are typical methods for producing stock. Grenada plans to establish a national herbarium to house all research on local plant species.

In St. Kitts and Nevis the Department of Agriculture established a laboratory to study soil content, plant pathology, and water quality with the hope that it will contribute to the

management of the plant nutrient resource (FAO, St. Kitts and Nevis). In order to research and monitor one of the most important crops in the Caribbean, St. Vincent and the Grenadines plan to expand the Banana Tissue Culture Laboratory (FAO, St. Vincent and the Grenadines).

Alien Invasive Species

The threat of invasive species can be more acute in small island nations and accordingly, the topic is one of the concerns expressed under the St. George's Declaration. Under Principle 13, "Protect and Conserve Biological Diversity," the Declaration enjoins the signatory Member States to "take necessary precautionary measures to avoid or minimize, the intentional or accidental introduction or escape, into or from the environment, of alien or modified organisms," and "take appropriate measures to control or eradicate alien or modified organisms having the potential to impact adversely on other organisms, the environment or human health" (OECS 2001).

SECTION H- MAJOR ISSUES, OPPORTUNITIES AND ACTIONS

The team carried out its assessment of the new USAID/J-CAR's Caribbean Regional Strategic Plan (2005-2009) with three targets in mind:

- To identify the possibility of CSP activities adversely affecting tropical forests and biodiversity
- To consider the possibility of synergistic support for tropical forests and biodiversity within the overall portfolio of activities
- To identify issues and opportunities that USAID may wish to consider adding to the activities to enhance its support for the conservation of tropical forests and biodiversity.

The remainder of this report documents the findings of the team.

Overall Findings

The Tropical Forestry and Biodiversity Assessment Team has not detected any instances where the planned activities as they have been so far designed and described would be likely to have adversely environmental impact on tropical forests or biodiversity in the Eastern Caribbean Region. The team believes that the CRP Strategic Plan for the period 2005-2009 will continue to contribute to the conservation of these assets. Therefore, the team limits its more specific findings and action recommendations to issues and opportunities related to synergy within the overall program and suggestions for qualitatively incremental actions.

Specific Issues, Opportunities and Actions

The following section presents the issues and opportunities and recommended courses of action:

Commonality of Resource Management Concerns. Many, if not all of the OECS countries and Barbados, share resource management concerns for the quality of the environment on which their tourism industries are based. They include pervasive degradation of the upland watersheds from inappropriate land-use and/or unplanned development which leads to run-off and sedimentation that affects the coastal marine ecosystems. Similarly, there is a palpable need for much more attention to the critical human waste stream (sewage treatment and disposal, non-point source pollution, industrial effluents, recreational boating waste, urban solid waste) which if left unattended ultimately reaches the near-shore environment. Both sets of issues are affecting the already threatened biodiversity within the region, terrestrial and marine.

Creating a Constituency for Environmental Management in the OECS. The apathy of citizens is linked inextricably to the decision-making processes governing resource allocation. In the small societies of the Caribbean, where much of the economic base depends on natural resources, it is critical that societies develop governance structures and processes that foster community cohesion. Most Caribbean countries face a major challenge of linking community action to the formal decision-making process. At the regional and sub-regional levels, that need translates to linking communities and civil society to the inter-governmental processes.

The Social Partnership Program of ACS is a step in the right direction, though the level of input is by necessity limited. The CREP project implemented by the CCA has possibilities in this regard, but requires clearer direction and design. Major efforts should be made to chart and learn from the ongoing attempts to address this issue.

Continuing Need for Institutional and Human Resource Capacity Building. The capacity to undertake a range of functions from negotiating multilateral environmental agreements through policy and planning to program/project implementation is inadequate in the public and civil society sectors, at both the national and regional levels. A significant amount of effort and resources have been directed towards the resolution of this problem in the past two decades, without much apparent progress. While this problem is partially resource-dependent, there is also the matter of capability of the human resources. More consistent programs of workforce development need to be established. Certainly, at the level of the OECS sub-region, much of the training can be conducted on a subregional basis.

Coordination for Concerted Action within the OECS Region. Program coordination continues to be problem, even though regional governments have requested more program harmonization. With different regional institutions focusing on different, yet overlapping agendas, and with many programs and projects driven by the priorities of bilateral institutions, program integration will continue to be an issue in the foreseeable future. At the very minimum, structures should be established to facilitate more information sharing and synergies. The SIDS process in the Caribbean attempted to facilitate that approach, but the effort was short-lived.

Accelerating the Learning cum Action Curve in the OECS. Information management is one of the major limitations of natural resources management in the Wider Caribbean Region. As indicated by national, regional, and international publications, the information networks and data sources are not as useful as required. The Regional Environmental Information Network (REIN) component of the CREP project speaks to this need. However, so does the CEP-NET Program of the Caribbean Environment Program. Attempts to develop regional metadata and data management systems under the CPACC project have also not been as successful as the project team had anticipated. If progress in the status of the natural resources and the implementation of programs needs to be tracked, information management has to be a higher priority on national and regional agendas.

OECS initiative to develop Environmental Management Systems (EMS) in the member states. OECS countries do not report on the state of the environment. . However, as the countries attempt to monitor their progress in adopting the St. George's Declaration, the issue of benchmarking and reporting become more critical. As such, more attention is being paid to state of the environment reporting. Dominica has developed an EMS process, one is under development for St. Vincent and the Grenadines, and St. Lucia has initiated preparation of their State of the Environment Report. Given the lack of experience, support should be provided. More important, the monitoring, data collection, and information management processes across many national institutions can be complicated and time-consuming. However, state of the environment reporting, if properly designed, provides the mechanism and opportunity to chart progress in environmental decision making and interventions.

Action Response. The above described issues cum opportunities suggest the need and place for a major USAID-funded project to work in support of the OECS Environmentally Sustainable Development Unit with an approach and level of effort similar to that once

approved under ENCORE. The project would emphasize action responses to the many well known issues and would be organized to take advantage of comparative advantages. OECS Member States and Barbados would be encouraged to take the lead on specific topics to be developed and later shared with their regional neighbors. There would be only limited scope for further “process oriented activities” for which there already seems to be adequate support in the Region.

The intent would be to facilitate the implementation of best management practices in a wide range of problem areas and to work for the application and enforcement of existing policies, standards and regulations. Ideally, it could be carried out by an institutional contractor who would assign one or two long-term advisors, one “green side” and one “brown side,” and have funds available for a significant contribution of short-term specialists drawn internationally and from the region as consultants, and the funds for both a grants program with local organizations and activity implementation. These advisors might also be able to provide services geared to preparing the investment level initiatives that will be required for upgrading and expanding the facilities to manage and mitigate the adverse impacts of the human waste stream.

Continuing and Enhanced Support for Environmentally Friendly Tourism Industry and Beyond. The Assessment Team fully endorses USAID/CRP’s intentions to continue providing support (ala the CHEMI Program) to the tourism sector in the region to ensure that they are mitigating their impact on the environment. They believe, however, that this proactive approach and advocacy for environmental management must be accompanied by a much fuller commitment to developing infrastructure that will enable each country to manage and mitigate the consequences of its human waste stream. USAID initiatives, in this regard, will have more resonance if they are accompanied by a capability among the governments of the Region to install the facilities and programs they need to deal with the larger dimensions of the waste stream. As mentioned above, the public works infrastructure for waste management is decidedly an investment level decision that will require millions of dollars of resources to address and even more millions to mitigate if it continues unchecked and contaminates the near-shore environment on which tourism is based. USAID may not be in a position to directly fund a wholesale campaign for treatment infrastructure. United States’ comparative advantages in this arena, however, are well known and a good deal of expertise is available to advise the countries of the region on the best course of action to make the investments required to safeguard the environment that is the basis of their economies.

Integrated Watershed and Coastal Management Project under development by CEHI. The project has completed 13 country reports, as well as a regional synthesis, and is currently at the design stage. Approximately US\$11 million has been identified through the Global Environment Facility, but another US\$12 million is required. The project will focus on regional watershed issues, as well as national demonstration sites targeting “hotspots.” USAID/J-CAR may wish to consider funding some of the action-oriented dimensions of this program.

Protected Areas Programming. Provides an opportunity for USAID to address a number of the above issues as it focuses on more effective environmental management and livelihoods. Any such focus should increase synergies in protected area management; and could include:

- Support to the amenity area initiative being developed by the CCA as CREP 2. This could focus on biodiversity hotspots in the selected countries.

- Provision to the secretariat function of the protected areas and/or biodiversity network(s) (Caribbean Marine Protected Areas Managers and Island Resources Foundation respectively).
- Development of sustainable financing mechanisms for protected area activities.
- Support to ongoing attempts to develop a protected area resource center for the Caribbean, focusing as appropriate on technical support services, information management, and training. (Examples include the Caribbean Protected Areas Advisory Service initiative and the World Commission on Protected Areas protected areas resource centre initiative.)

ANNEXES

- A. Scope of Work for the Tropical Forestry/Biodiversity Assessment Team
- B. Biosketches of Team Members
- C. Bibliography
- D. List of Persons Consulted
- E. Sections 118/119 of the Foreign Assistance Act
- F. Biogeographical Overview of the Caribbean Region
- G. Map of Watershed Conditions
- H. List of Protected Areas in the Caribbean

ANNEX A

Scope of Work

The contractor will provide relevant technical services to support USAID/Jamaica-CAR's preparation of new strategies for both the Jamaica bilateral and Caribbean Regional programs. In undertaking this SOW (or Scope of Work), the contractor will complete the following tasks. This assignment will be carried out from Jamaica and will include one visit to the Caribbean region to meet stakeholders and gather information.

Tasks

- Identify and review relevant background documentation on Tropical Forest and Biodiversity Status and management in Jamaica and the relevant Caribbean Region, as well as documentation on USAID/J-Car's present Environmental Strategic Objective Framework and upcoming plans and policies. See Section 4.0 for a preliminary list of reference documents.
- Interview relevant stakeholders on Tropical Forest and Biodiversity Status and management in Jamaica and the relevant Caribbean Region, including but not limited to USAID, Jamaican and Caribbean Environmental Regulators and managers and applicable Non-Governmental Organizations; See Section 4.0 for a preliminary list of stakeholders.
- Conduct detailed assessments of the biological resources, evaluate their status, identify pressures affecting those resources, and propose cost effective and implementable actions which can be taken to assure the sustainable use of those resources within the Mission's geographical scope. The assessment should include parenthetical references to the sources of all information and a bibliography. (Section 5.0 outlines the topics to be addressed in the report);
- In consultation with USAID, prepare a report of the findings of the assessment, based on the guidance provided, that meets the requirements outlined in the FAA. The report should be no more than 30 pages for the Bilateral Strategy and no more than 50 pages for the Caribbean Regional Strategy; and
- Prepare and deliver a debriefing on assessments to USAID.

Reference Documents

The reference reading list for this assignment includes, but is not limited to the following documents:

- Jamaica State of the Environment Reports
- Towards a National Strategy and Action Plan on Biological Diversity in Jamaica
- National Forest Management and Conservation Plan (Jamaica)
- National Watersheds Policy (Jamaica)
- OECS Environmental Review
- Reports of the Caribbean Biodiversity Program (Island Resources Foundation)

- Building capacity for participatory forest management in the Caribbean (EU)
- Trends and Challenges in Agriculture, Forestry and Fisheries in the Caribbean (FAO)
- USAID FAA 118/9 reports from other missions.

Stakeholders

The following organizations (among others) should be consulted as part of this exercise:

- USAID—Jamaica and Barbados Offices
- National Environment and Planning Agency (NEPA)—Jamaica
- Ministry of Land and Environment (MOLE)—Jamaica
- Environment and Sustainable Development Unit—St. Lucia
- Caribbean Conservation Association—Barbados
- Caribbean Environmental Health Institute—St. Lucia.

Deliverables

The expected deliverables from this assignment include the following:

- A schedule of proposed actions
- A draft report outlining the findings of the assessment in the form of a presentation to the Mission
- A final report of no more than 30 pages for the Bilateral Strategy and no more than 50 pages for the Caribbean Regional Strategy. The report will contain the findings, including but not limited to the following sections (USAID’s detailed guidance on each section is provided in Attachment B):

Executive Summary

Table of Contents

List of Annexes

Section A. Introduction

Section B. Legislative and institutional structure affecting biological resources

- Government of host country
- Nongovernmental organizations
- International organizations

Section C. Status and management of protected areas

Section D. Status and protection of endangered species

Section E. Conservation outside of protected areas

- Managed natural systems
- Impacts of development projects
- Ex-situ conservation (eg: zoos, seed banks)

Section F. Conservation of economically important species and germplasm (including land races and wild relatives of agriculturally important crops and livestock)

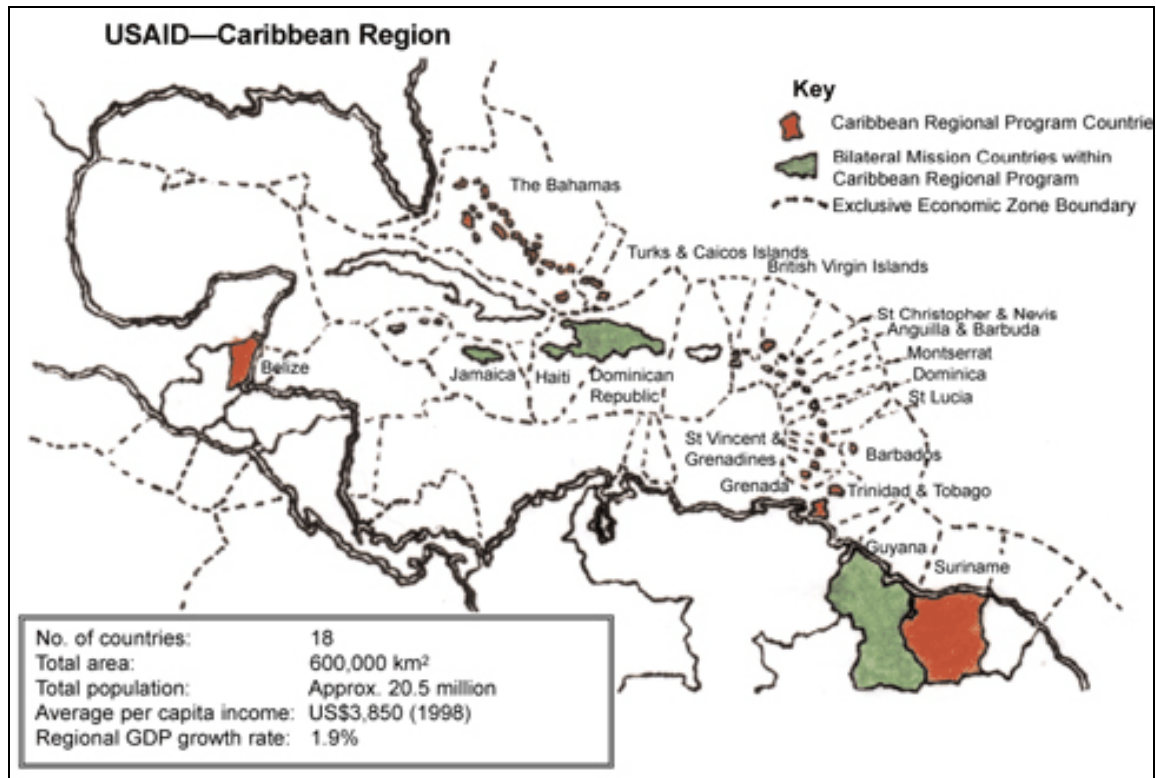
Section G. Major issues in biological diversity and tropical forest conservation

Section H. Recommendations and proposed actions

Section I. Annexes

- Bibliography
- Biodata sketch of team members
- List of persons contacted
- Other annexes as appropriate.

Attachment A:



Caribbean Regional Program Countries:

- Jamaica
- Suriname
- Trinidad & Tobago
- Grenada
- Barbados
- St. Vincent & Grenadines
- St. Lucia
- Dominica
- Montserrat
- Antigua & Barbuda
- St Kitts & Nevis
- British Virgin Islands
- Turks & Caicos Islands
- The Bahamas
- Belize

Attachment B: USAID Guidance: Details of Sections of Assessment Report

(NB: References to “Host Country” refer to Jamaica and the Caribbean Region as defined in Attachment A)

A. INTRODUCTION

THIS SECTION OF THE ASSESSMENT WILL PROVIDE AN OVERVIEW OF THE INFORMATION AVAILABLE AND USED IN THE ASSESSMENT. IT SHOULD IDENTIFY SIGNIFICANT GAPS IN INFORMATION ON THE STATUS AND MANAGEMENT OF BIOLOGICAL DIVERSITY AND TROPICAL FOREST RESOURCES IN THE HOST COUNTRY.

B. LEGISLATIVE AND INSTITUTIONAL STRUCTURE

THE BACKGROUND ASSESSMENT SHOULD INCLUDE A REVIEW OF THE CURRENT LEGISLATIVE INSTITUTIONAL STRUCTURE FOR THE MANAGEMENT OF BIOLOGICAL DIVERSITY AND TROPICAL FORESTS. THIS REVIEW SHOULD INCLUDE A DESCRIPTION OF MAJOR ORGANIZATIONS, BOTH PUBLIC AND PRIVATE, WHICH HAVE A ROLE IN THIS PROCESS.

(1) HOST-COUNTRY GOVERNMENT

THE BACKGROUND ASSESSMENT SHOULD INCLUDE A REVIEW OF THE LEGISLATIVE BASIS, BOTH NATIONAL AND LOCAL, FOR THE PROTECTION AND MANAGEMENT OF BIOLOGICAL RESOURCES, INCLUDING TROPICAL FORESTS, IN THE HOST COUNTRY. THIS SHOULD INCLUDE A REVIEW OF INTERNATIONAL TREATIES AND AGREEMENTS, WHICH HAVE BEEN RATIFIED BY HCG (CITES, RAMSAR, ETC.), AND THE EFFECTIVENESS OF NATIONAL IMPLEMENTATION. A DESCRIPTION SHOULD BE PROVIDED OF THE INSTITUTIONS RESPONSIBLE FOR BIOLOGICAL DIVERSITY AND TROPICAL FOREST ISSUES, AND MANAGEMENT OF ALL NATURAL RESOURCES, WITHIN THE HCG. IT SHOULD ASSESS THE INTEREST AND COMMITMENT OF THE GOVERNMENT TO THE CONSERVATION OF BIOLOGICAL DIVERSITY AND TROPICAL FORESTS, AND SUMMARIZE HCG WHETHER ENVIRONMENTAL PROFILES OR NATIONAL CONSERVATION STRATEGIES HAVE BEEN PRODUCED OR ARE CURRENTLY UNDERWAY.

(2) NONGOVERNMENTAL ORGANIZATIONS

THIS SECTION SHOULD INCLUDE A DESCRIPTION OF MAJOR ORGANIZATIONS, BOTH PUBLIC AND PRIVATE, WHICH HAVE A ROLE IN CONSERVING BIOLOGICAL DIVERSITY AND TROPICAL FORESTS AND THE LEVELS OF FUNDING THEY CONTRIBUTE TOWARD THIS ISSUE.

(3) AID, OTHER DONORS AND INTERNATIONAL ORGANIZATIONS

THIS SECTION SHOULD INCLUDE A DESCRIPTION OF OTHER DONORS AND INTERNATIONAL ORGANIZATIONS, BOTH INDIGENOUS AND EXTERNAL, WHICH HAVE A ROLE IN CONSERVING BIOLOGICAL DIVERSITY (INCLUDING

TROPICAL FORESTS) AND THE LEVELS OF FUNDING THEY RECEIVE OR CONTRIBUTE TOWARD THIS ISSUE. THEIR RELATIONSHIP WITH THE GOVERNMENT, MEMBERSHIP, AND PRINCIPAL PROGRAMS SHOULD BE IDENTIFIED.

C. STATUS AND MANAGEMENT OF PROTECTED AREAS

THIS SECTION SHOULD INCLUDE AN INVENTORY OF DECLARED AND PROPOSED NATIONAL PARKS, WILDLIFE REFUGES, FOREST RESERVES, SANCTUARIES HUNTING PRESERVES AND OTHER

PROTECTED AREAS. THE GOVERNMENT AGENCY OR NONGOVERNMENTAL ORGANIZATION CONTROLLING EACH OF THE TYPES OF PROTECTED AREA SHOULD BE IDENTIFIED. A COUNTRY MAP WITH THE LOCATION OF ALL EXISTING AND PROPOSED PROTECTED AREAS SHOULD BE USEFUL. AN ASSESSMENT SHOULD BE MADE OF THE EFFECTIVENESS OF THESE AREAS IN PROTECTING PLANT AND ANIMAL RESOURCES, AND OF THEIR IMPORTANCE TO HOST-COUNTRY'S ECONOMY (E.G. FOR PROVIDING TOURIST OPPORTUNITIES OR FOR PROTECTING IMPORTANT WATERSHEDS). AN ANALYSIS OF THE MANAGEMENT EFFECTIVENESS IN THESE AREAS SHOULD BE INCLUDED.

D. STATUS AND PROTECTION OF ENDANGERED SPECIES

THIS SECTION SHOULD INCLUDE AN INVENTORY OF RARE AND ENDANGERED SPECIES FOUND IN HOST-COUNTRY AND ITS TERRITORIAL WATERS. IT SHOULD IDENTIFY THEIR CRITICAL HABITATS AND EVALUATE PRESSURES ON THESE HABITATS. IT SHOULD REVIEW EFFORTS WHICH HAVE BEEN ACCEPTED FOR PROTECTION OF THESE SPECIES AND THEIR HABITATS AND ASSESS THEIR EFFECTIVENESS.

E. CONSERVATION OUTSIDE OF PROTECTED AREAS

THIS SECTION SHOULD INCLUDE A DESCRIPTION OF CONSERVATION ACTIVITIES IN HOST-COUNTRY WHICH ARE BEING UNDERTAKEN OUTSIDE DESIGNATED PROTECTED AREAS.

THIS SHOULD INCLUDE, BUT NOT BE LIMITED TO REVIEW OF THE FOLLOWING ITEMS:

(1.) MANAGED NATURAL ECOSYSTEMS

THIS SECTION SHOULD INCLUDE A DESCRIPTION OF THE MAJOR ECOSYSTEMS OF HOST COUNTRY AND AN ANALYSIS OF THEIR PRESENT CONSERVATION STATUS. A COUNTRY MAP (TO THE SAME SCALE AS THE PROTECTED AREA MAP) OF THE NATURAL VEGETATION OR HABITAT TYPES WOULD BE USEFUL. THE TEXT SHOULD REVIEW THE STATUS OF MANAGED NATURAL ECOSYSTEMS INCLUDING BUT NOT LIMITED TO:

FOREST RESOURCES
 RANGELAND RESOURCES
 COASTAL AND MARINE RESOURCES
 WETLANDS
 AGRICULTURAL SYSTEMS

THE TEXT SHOULD INCLUDE A DISCUSSION OF THE ECONOMIC, ECOLOGICAL AND SOCIAL IMPORTANCE OF THESE ECOSYSTEMS TO HOST COUNTRY, IT SHOULD ADDRESS THEIR ROLE IN THE REGULATION OF EROSION, MANAGEMENT OF WATER FLOW, AND THE MAINTENANCE OF PRODUCTIVE SOILS. THE ASSESSMENT SHOULD PLACE SPECIAL EMPHASIS AND WETLANDS OF HOST-COUNTRY AND DESCRIBE THEIR STATUS AND CURRENT THREATS. THE RELATIONSHIP BETWEEN LAND OWNERSHIP PATTERNS AND EFFECTIVE CONSERVATION SHOULD BE ADDRESSED.

(2.) IMPACTS OF DEVELOPMENT PROJECTS

THE TEXT SHOULD INCLUDE A REVIEW, BY MAJOR ECOSYSTEM, OF THE IMPACTS OF INTERNATIONALLY AND LOCALLY FUNDED MAJOR DEVELOPMENT PROJECTS ON BIOLOGICAL DIVERSITY AND TROPICAL FOREST RESOURCES. THE TEXT SHOULD REVIEW THE REGULATORY FRAMEWORK CONCERNING THE IMPLEMENTATION OF DEVELOPMENT PROJECTS AS THEY AFFECT

BIOLOGICAL DIVERSITY INCLUDING TROPICAL FORESTS. THE TEXT SHOULD SPECIFY THE ENVIRONMENTAL REVIEW AND PERMITTING REQUIREMENTS OF THE HOST-COUNTRY GOVERNMENT AS THEY CONCERN MAJOR PROJECTS.

(3.) EX-SITU CONSERVATION

THIS SUBSECTION SHOULD PROVIDE A DESCRIPTION OF EX-SITU SPECIES CONSERVATION EFFORTS BEING UNDERTAKEN AND/OR PLANNED IN HOST-COUNTRY, IT SHOULD REVIEW THE PROGRAMS OF NATURAL HISTORY MUSEUMS, BOTANICAL GARDENS, ZOOS, AND CAPTIVE BREEDING PROGRAMS AND INCLUDE A SUMMARY OF ANY EXISTING CONSERVATION AND DATA BASES.

F. CONSERVATION OF ECONOMICALLY IMPORTANT SPECIES AND GERMPLASM

THIS SECTION SHOULD PROVIDE A DESCRIPTION OF THE ACTIVITIES BEING UNDERTAKEN IN HOST COUNTRY FOR THE CONSERVATION OF ECONOMICALLY IMPORTANT SPECIES AND GERMPLASM. IT SHOULD REVIEW THE STATUS OF GENE BANKS FOR CROP AND LIVESTOCK SPECIES, NATIVE SEED SELECTION, AND ACTIVITIES BEING UNDERTAKEN TO SUPPORT THE SUSTAINED PRODUCTION OF COMMERCIALY IMPORTANT WILD PLANT AND ANIMAL SPECIES (E.G. FOR FORESTRY PRODUCTION, HUNTING, FISHING OR COMMERCIAL TRADE), AND IN-SITU CONSERVATION OF LAND RACES AND WILD RELATIVES OF IMPORTANT CROPS.

G. MAJOR ISSUES IN BIOLOGICAL DIVERSITY AND TROPICAL FOREST CONSERVATION

THIS SECTION OF THE ASSESSMENT SHOULD PROVIDE A SUMMARY OF THE MAJOR ISSUES REQUIRING ATTENTION IN ORDER TO IMPROVE THE CONSERVATION OF BIOLOGICAL DIVERSITY AND FOREST RESOURCES. THE PRESENT AND FUTURE REQUIREMENTS FOR THE DEVELOPMENT OF LOCAL INSTITUTIONS AND TRAINING, BOTH GOVERNMENT AND NONGOVERNMENTAL, SHOULD BE ADDRESSED. ISSUES CONCERNING THE MANAGEMENT OF PROTECTED AREAS SHOULD BE REVIEWED. SPECIAL ATTENTION SHOULD BE GIVEN TO THE PROBLEMS OF ASSURING ADEQUATE PROTECTION OF WETLANDS, COASTAL, AND MARINE ENVIRONMENTS (E.G. DO EXISTING PROTECTED AREAS ENCOMPASS MOST SIGNIFICANT BIOLOGICAL RESOURCES). AN ATTEMPT SHOULD BE MADE TO PRIORITIZE ISSUES NEEDING MOST IMMEDIATE ATTENTION.

H. RECOMMENDATIONS FOR PROPOSED ACTIONS

THIS SECTION SHOULD PROVIDE A REVIEW OF PROPOSED ACTIONS TO ADDRESS ISSUES CONCERNING BIOLOGICAL DIVERSITY AND TROPICAL FORESTS WHICH MAYBE IMPLEMENTED, WITH SUPPORT FROM AID, THE HCG, INTERNATIONAL DEVELOPMENT ORGANIZATIONS, AND LOCAL AND INTERNATIONAL NONGOVERNMENTAL ORGANIZATIONS.

RECOMMENDATIONS SHOULD BE IDENTIFIED WITH REGARD TO THEIR RELATIVE PRIORITY AND LENGTH OF IMPLEMENTATION PERIOD. IF AVAILABLE, PROPOSED ACTIONS SHALL INCLUDE A BRIEF DESCRIPTION OF THEIR OBJECTIVE AND ANTICIPATED BENEFITS. THIS SHALL INCLUDE A CONCISE ANALYSIS OF COST (FOREIGN AND LOCAL CURRENCY), IDENTIFICATION OF THE APPROPRIATE INSTITUTION (S) FOR IMPLEMENTATION, ESTIMATED IMPLEMENTATION PERIOD, AND OUTLINE REQUIREMENTS FOR INSTITUTIONAL DEVELOPMENT AND TRAINING TO ASSURE THE SUSTAINABILITY OF THE PROPOSED PROGRAM.

THIS SECTION SHOULD ALSO INCLUDE THE IDENTIFICATION AND ASSESSMENT OF THE HCG AND NGO INSTITUTIONAL AND EDUCATION AND TRAINING PROGRAMS TO PRESERVE AND AUGMENT BIOLOGICAL DIVERSITY AND TROPICAL FORESTS, ESPECIALLY WHERE ENDANGERED SPECIES ARE APPARENT. THE ASSESSMENT WILL ADDRESS PROGRAM CONSTRAINTS, INCLUDING THE NEED TO CONSIDER CONDITIONING CERTAIN ASSISTANCE UPON HCG LEGISLATIVE OR ADMINISTRATIVE ACTION IN ORDER TO OFFICIALLY DESIGNATE AID STRENGTHEN HCG COMMITMENTS FOR PROTECTED AREAS, AND FOREST CONSERVATION.

I. APPENDICES

THE ASSESSMENT SHOULD INCLUDE, BUT NOT LIMITED TO THE FOLLOWING APPENDICES:

- (1) BIBLIOGRAPHY AND A LIST OF RELEVANT GOVERNMENT AGENCIES AND NGOS
- (2) BIODATA SKETCH OF TEAM MEMBERS
- (3) LIST OF PERSONS AND INSTITUTIONS CONTACTED

OTHER APPENDICES MAY BE ADDED AS APPROPRIATE TO THE OBJECTIVE OF THE BIOLOGICAL DIVERSITY/TROPICAL FOREST ASSESSMENT.

ANNEX B

Biosketches of Team Members

Thomas M. Catterson (M.Sc.) has more than 30 years of experience in community-oriented forestry and natural resources management. Beginning as a Peace Corps Volunteer in the late 60s (Chile '67), he has also worked for FAO (Community Forestry Officer at FAO HQ in Rome), USAID (Senior Forestry Advisor for the Africa Bureau) and a development consulting company. Since 1991, he has worked as an independent international consultant dealing with technical issues related to community management of forests and natural resources and with policy, institutional development and environmental review issues. His work has taken him to more than 70 countries in Latin America, Africa, Asia, and the Middle East where his clients have included a wide range of the major bilateral and multilateral development agencies, the private consulting sector and the international NGO/PVO community.

Lloyd Gardner (M.Sc.) is an environmental planner who has been involved in environmental management in Jamaica and the Caribbean for more than 20 years. Mr. Gardner's experience spans both the public and private sectors, starting with the Government of Jamaica in 1982, where as a Director in the Natural Resources Conservation Authority (1988-1991), he was responsible for policy development and program planning in coastal zone management, national parks, and development control. Additionally, Mr. Gardner served on the Board of Directors and Advisory Committees of several planning agencies. Since joining the private sector as a business consultant in 1992, Mr. Gardner has provided environmental consulting services to a wide range of regional and international private, intergovernmental, civil society, bilateral, and multilateral organizations. Mr. Gardner maintains active involvement in Jamaican, Caribbean, and international nongovernmental organizations, primarily with IUCN, The World Conservation Union, where he serves on the Commission on Environmental, Economic and Social Policy, and the World Commission on Protected Areas.

Megan Huth is an environmental project administrator with six years of experience in project management, community development and environmental management. Ms. Huth's experience includes administering USAID-funded projects in Africa, Asia, Latin America, Eastern Europe, and the Middle East, managing all project elements including finance and accounting, recruitment, fielding, backstopping of long- and short-term personnel, and contract compliance with USAID and other donors. She has successfully backstopped six biodiversity assessments conducted under the BIOFOR IQC. Ms. Huth's background includes research, education and project planning. As a Peace Corps volunteer she organized and implemented successful environmental and educational projects in West Africa.

ANNEX C

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ANNEX D

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ANNEX E

Sections 118 and 119 of the Foreign Assistance Act

Foreign Assistance Act, Part I, Section 117 - Environment and Natural Resources

Sec. 117 ⁷¹ Environment and Natural Resources.--

(a) The Congress finds that if current trends in the degradation of natural resources in developing countries continue, they will severely undermine the best efforts to meet basic human needs, to achieve sustained economic growth, and to prevent international tension and conflict. The Congress also finds that the world faces enormous, urgent, and complex problems with respect to natural resources, which require new forms of cooperation between the United States and developing countries to prevent such problems from becoming unmanageable. It is, therefore, in the economic and security interests of the United States to provide leadership both in thoroughly reassessing policies relating to natural resources and the environment, and in cooperating extensively with developing countries in order to achieve environmentally sound development.

⁷¹ 22 U.S.C. 2151p. Sec. 117 was redesignated from being sec. 118 by sec. 301(1) of Public Law 99-529, resulting in the creation of two sections 117. Sec. 301(2) of Public Law 99-529 (100 Stat. 3014) further deleted subsec. (d) of that section, which dealt with tropical forests, and then sec. 301(3) of Public Law 99-529 added a new section 118 entitled "Tropical Forests." This section, as added by sec. 113 of Public Law 95-88 (91 Stat. 537) and amended by sec. 110 of Public Law 95-424 (92 Stat. 948) and sec. 122 of Public Law 96-53 (93 Stat. 948), was further amended and restated by sec. 307 of the International Security and Development Cooperation Act of 1981 (Public Law 97-113; 95 Stat. 1533). This section previously read as follows: "Sec. 118. Environment and Natural Resources--

(a) The President is authorized to furnish assistance under this part for developing and strengthening the capacity of less developed countries to protect and manage their environment and natural resources. Special efforts shall be made to maintain and where possible restore the land, vegetation, water, wildlife and other resources upon which depend economic growth and human well-being, especially that of the poor.

(b) In carrying out programs under this chapter, the President shall take into consideration the environmental consequence of development actions. See also sec. 534 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1228), as amended, relating to "Global Warming Initiative." See also sec. 533 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1991 (Public Law 101-513; 104 Stat. 2013), as amended, relating to "Environment and Global Warming." See also sec. 532 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1993 (Public Law 102-391; 106 Stat. 1666), relating to "Environment."

(b) In order to address the serious problems described in subsection (a), the President is authorized to furnish assistance under this part for developing and strengthening the capacity of developing countries to protect and manage their environment and natural resources. Special efforts shall be made to maintain and where possible to restore the land, vegetation,

water, wildlife, and other resources upon which depend economic growth and human well-being, especially of the poor.

(c)(1) The President, in implementing programs and projects under this chapter and chapter 10 of this part⁷² shall take fully into account the impact of such programs and projects upon the environment and natural resources of developing countries. Subject to such procedures as the President considers appropriate, the President shall require all agencies and officials responsible for programs or projects under this chapter—

⁷² Sec. 562 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1991 (Public Law 101-513; 104 Stat. 2026), added a new chapter 10 to part I of this Act, providing for long-term development in sub-Saharan Africa, and made a conforming amendment by inserting “and chapter 10 of this part” here.

(A) to prepare and take fully into account an environmental impact statement for any program or project under this chapter significantly affecting the environment of the global commons outside the jurisdiction of any country, the environment of the United States, or other aspects of the environment which the President may specify; and

(B) to prepare and take fully into account an environmental assessment of any proposed program or project under this chapter significantly affecting the environment of any foreign country. Such agencies and officials should, where appropriate, use local technical resources in preparing environmental impact statements and environmental assessments pursuant to this subsection.

(2) The President may establish exceptions from the requirements of this subsection for emergency conditions and for cases in which compliance with those requirements would be seriously detrimental to the foreign policy interests of the United States.

Foreign Assistance Act, Part I, Section 119 - Endangered Species

Sec. 119⁷⁵ Endangered Species--

(a) The Congress finds the survival of many animal and plant species is endangered by overhunting, by the presence of toxic chemicals in water, air and soil, and by the destruction of habitats. The Congress further finds that the extinction of animal and plant species is an irreparable loss with potentially serious environmental and economic consequences for developing and developed countries alike. Accordingly, the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems, and through the protection of wildlife habitats should be an important objective of the United States development assistance.

⁷⁵22 U.S.C. 2151q. Sec. 119, pars. (a) and (b) were added by sec. 702 of the International Environment Protection Act of 1983 (title VII of the Department of State Authorization Act, Fiscal Years 1984 and 1985, Public Law 98-164; 97 Stat. 1045).

(b) ⁷⁵ In order to preserve biological diversity, the President is authorized to furnish assistance under this part, notwithstanding section 660,⁷⁶ to assist countries in protecting and maintaining wildlife habitats and in developing sound wildlife management and plant conservation programs. Special efforts should be made to establish and maintain wildlife sanctuaries, reserves, and parks; to enact and enforce anti-poaching measures; and to identify, study, and catalog animal and plant species, especially in tropical environments.

⁷⁶ Section 533(d) (4) (A) of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1227), added “notwithstanding section 660” at this point.

(c) ⁷⁷ Funding Level.--For fiscal year 1987, not less than \$2,500,000 of the funds available to carry out this part (excluding funds made available to carry out section 104(c)(2), relating to the Child Survival Fund) shall be allocated for assistance pursuant to subsection (b) for activities which were not funded prior to fiscal year 1987. In addition, the Agency for International Development shall, to the fullest extent possible, continue and increase assistance pursuant to subsection (b) for activities for which assistance was provided in fiscal years prior to fiscal year 1987.

⁷⁷ Pars. (c) Through (h) were added by sec. 302 of Public Law 99- 529 (100 Stat. 3017).

(d) ⁷⁷ Country Analysis Requirements—Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of:

- (1) The actions necessary in that country to conserve biological diversity, and
- (2) The extent to which the actions proposed for support by the Agency meet the needs thus identified.

(e) ⁷⁷ Local Involvement. To the fullest extent possible, projects supported under this section shall include close consultation with and involvement of local people at all stages of design and implementation.

(f) ⁷⁷ PVOs and Other Nongovernmental Organizations. Whenever feasible, the objectives of this section shall be accomplished through projects managed by appropriate private and voluntary organizations, or international, regional, or national nongovernmental organizations, which are active in the region or country where the project is located.

(g)⁷⁷ Actions by AID. The Administrator of the Agency for International Development shall:

- (1) cooperate with appropriate international organizations, both governmental and nongovernmental;
- (2) look to the World Conservation Strategy as an overall guide for actions to conserve biological diversity;
- (3) engage in dialogues and exchanges of information with recipient countries which stress the importance of conserving biological diversity for the long-term economic benefit of those countries and which identify and focus on policies of those countries which directly or indirectly contribute to loss of biological diversity;
- (4) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity;
- (5) whenever possible, enter into long-term agreements in which the recipient country agrees to protect ecosystems or other wildlife habitats recommended for protection by relevant governmental or nongovernmental organizations or as a result of activities undertaken pursuant to this paragraph, and the United States agrees to provide, subject to obtaining the necessary appropriations, additional assistance necessary for the establishment and maintenance of such protected areas;
- (6) support, as necessary and in cooperation with the appropriate governmental and nongovernmental organizations, efforts to identify and survey ecosystems in recipient countries worthy of protection;
- (7) cooperate with and support the relevant efforts of other agencies of the United States Government, including the United States Fish and Wildlife Service, the National Park Service, the Forest Service, and the Peace Corps;
- (8) review the Agency's environmental regulations and revise them as necessary to ensure that ongoing and proposed actions by the Agency do not inadvertently endanger wildlife species or their critical habitats, harm protected areas, or have other adverse impacts on biological diversity (and shall report to the Congress within a year after the date of enactment of this paragraph on the actions taken pursuant to this paragraph);
- (9) ensure that environmental profiles sponsored by the Agency include information needed for conservation of biological diversity; and
- (10) deny any direct or indirect assistance under this chapter for actions which significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas.

(h)⁷⁷ Annual Reports. Each annual report required by section 634(a) of this Act shall include, in a separate volume, a report on the implementation of this section.

ANNEX F

Biogeographical Overview of the Caribbean Region

	General	Antigua-Barbuda	St. Kitts-Nevis	Dominica	St. Lucia	St. Vincent and the Grenadines	Grenada	Trinidad-Tobago	Barbados
Ecological Features		<i>Antigua:</i> Mainly coral-based and low-lying with undulating hills of volcanic origin in the south; coastline deeply indented with many natural harbors; white sand beaches, sea grass beds, fringing reefs <i>Barbuda:</i> Low limestone island; to the north and west is an area of lagoons and ponds separated by beach ridges and mangrove swamps; extensive reefs on eastern coast	<i>St. Kitts:</i> High volcanic island with a central mountain range; golden sandy beaches surround the southeast peninsula, although most island beaches are of gray to brown volcanic sand; narrow coastal shelf <i>Nevis:</i> Volcanic origin, dominated by a central peak; no bays, inlets or cays of significance but long stretches of sandy beaches; many wetlands along leeward coast	High volcanic mountains rising in the south to 1,424 m and in the north to 1,730 m; rain forests, lakes, waterfalls and numerous rivers; little flat land apart from the Portsmouth area which has two swamps	High volcanic island with rugged interior displaying fertile valleys indented by rain-forest-covered mountains; white sand beaches, sea grass beds, coral reefs	<i>St. Vincent:</i> rugged volcanic mountains in the interior with deeply dissected ridges and valleys; rain forests, numerous rivers, and black sand beaches <i>Grenadines:</i> 32 small islands and cays that are lower and drier than St. Vincent, with extensive reefs, numerous protected bays and white coral sand beaches	Volcanic island with some limestone in the north; mountainous and thickly wooded with numerous streams and rivers; beaches, sea grass beds, mangroves	Tropical forests, swamps, reefs, beaches	Low flat volcanic island, narrow submarine shelves, sand beaches, mangroves, sea grass beds, coral reefs
Forest Cover In Hectares and (% of Total Land Area)		9,000 (20.5)	5,000 (19.2)	41,000 (54.6)	8,000 (13)	12,000 (30.8)	5,000 (14.5)	208,000 (43)	negligible
Area of Coral Reefs		25 km ² of reef, mostly fringing (WCMC data)	Bank barrier reefs occur along much of the coast of both islands	Limited reef development, mainly on west coast	Widespread reefs that are generally small and not well developed	Scattered fringing reefs with most extensive, well-developed coverage around Tobago Cays in the Grenadines	<i>Grenada:</i> patchy reefs around all but west coast <i>Carriacou:</i> large barrier reef on windward side	<i>Trinidad:</i> only small patches of coral <i>Tobago:</i> important but not extensive reefs	Fringing reefs, generally poorly developed, around west side of island

Species Lists:									
Mammals	44 mammals (excluding cetaceans) are known from the LA (4 are believed to be extinct); 24 are bat spp., 7 of which are endemic to the LA (29%); within the LA, only Grenada has native terrestrial mammals (Jones, 1989; Woods, 1989). 26 cetacean spp (Gricks, 1994)	2 LA endemic bat species: <i>Monophyllus plethodon</i> , <i>Brachyphylla cavernarum</i> , and 1 Caribbean? regional <i>Artibeus jamaicensis</i> (Horwith & Lindsay, 1997; CEP) Introduced terrestrial mammals include a sub-species, <i>Dama dama dama</i> (Horwith & Lindsay, 1997; CEP)	5 regional endemic bat species: <i>Monophyllus plethodon</i> , <i>Ardops nichollsi</i> , <i>Brachyphylla cavernarum</i> , <i>Myotis dominicensis</i> , <i>Artibeus jamaicensis</i> (CEP) Introduced mammals include <i>Cercopithecus aethiops</i> , <i>Odocoileus virginianus</i> (CEP)	4 of 12 bat spp are regional endemics: <i>Monophyllus plethodon</i> , <i>Ardops nichollsi</i> , <i>Brachyphylla cavernarum</i> , <i>Myotis dominicensis</i> (Johnson, 1988)	3 regional endemic bat spp: <i>Monophyllus plethodon</i> , <i>Ardops nichollsi</i> , <i>Brachyphylla cavernarum</i> (Johnson, 1988)	3 regional endemic bat spp: <i>Monophyllus plethodon</i> , <i>Ardops nichollsi</i> , <i>Brachyphylla cavernarum</i> (Johnson, 1988)	None of the 11 bat species are single or regional endemics (Johnson, 1988) 4 native terrestrial species: <i>Dasypus novemcinctus</i> , <i>Marmosa fuscata carri</i> , <i>M. robinsoni chapmani</i> , <i>Dasyprocta albida</i> (CEP)	1 of the 100 spp is endemic (WRI, 1996)	

	General	Antigua-Barbuda	St. Kitts-Nevis	Dominica	St. Lucia	St. Vincent and the Grenadines	Grenada	Trinidad-Tobago	Barbados
Birds	Of the approximately 200 species that occur in the LA, about 100 are resident; estimates of endemism range from 24 species (Birdlife International, 1998) to 35 species and sub-species (Hunter, pers comm., U.S. Fish & Wildlife Service; other key references are Evans, 1990; Bond, 1980)	8 LA endemics: <i>Dendroica adelaidae</i> sub-species (Barbuda, St. Lucia), <i>Eulampis jugularis</i> , <i>Myiarchus oberi</i> , <i>Margarops fuscus</i> , <i>Loxigilla noctis</i> , <i>Dendroica petechia bartholemica</i> , <i>Cinlocerthia ruficauda</i> , <i>Buteo platypterus</i> sub-sp (Hunter, pers comm., U.S. Fish & Wildlife Service)	1 single-island endemic, <i>Loxigilla portoricensis grandis</i> , maybe extinct; 6 LA endemics: <i>Eulampis jugularis</i> , <i>Myiarchus oberi</i> , <i>Margarops fuscus</i> , <i>Loxigilla noctis</i> , <i>Dendroica petechia bartholemica</i> , <i>Cinlocerthia ruficauda</i> (Hunter, pers comm., U.S. Fish & Wildlife Service)	2 single-island endemics: <i>Amazona arausiaca</i> , <i>A. imperialis</i> ; 13 LA endemics: <i>Chaetura martinica</i> , <i>Eulampis jugularis</i> , <i>Cyanophaia bicolor</i> (Dom, Mart), <i>Myiarchus oberi</i> , <i>Cichlherminia lherminieri</i> , <i>Cinlocerthia ruficauda</i> , <i>Margarops fuscus</i> , <i>Loxigilla noctis</i> , <i>Dendroica plumbea</i> (Dom, Guad), <i>Dendroica petechiamelanoptera</i> (Dom, Guad), <i>Saltator albicollis</i> sub-sp, <i>Buteo platypterus</i> sub-sp, <i>Troglodytes aedon martinicensis</i> (Johnson, 1988; Hunter, pers comm., U.S. Fish & Wildlife Service)	6 single-island endemics: <i>Amazona versicolor</i> , <i>Melanospiza richardsoni</i> , <i>Leucopeza semperi</i> (maybe extinct), <i>Icterus laudabilis</i> , <i>Caprimulgus otiosus</i> sub-sp, <i>Dendroica petechia babad</i> ; 12 LA endemics: <i>Dendroica adelaidae</i> sub-species (endemic to Barbuda and St. Lucia), <i>Chaetura martinica</i> , <i>Eulampis jugularis</i> , <i>Myiarchus oberi</i> , <i>Cichlherminia lherminieri</i> , <i>Cinlocerthia ruficauda</i> , <i>Ramphocinclus brachyurus</i> , <i>Margarops fuscus</i> , <i>Loxigilla noctis</i> , <i>Saltator albicollis</i> sub-sp, <i>Buteo platypterus</i> sub-sp, <i>Troglodytes aedon martinicensis</i> (Johnson, 1988; Hunter, pers comm., U.S. Fish & Wildlife Service)	3 single-island endemics: <i>Amazona guildingii</i> , <i>Catharopeza bishopi</i> , <i>Dendroica petechia alsiosa</i> ; 9 LA endemics: <i>Chaetura martinica</i> , <i>Eulampis jugularis</i> , <i>Myiarchus nugator</i> , <i>Cinlocerthia ruficauda</i> , <i>Margarops fuscus</i> , <i>Loxigilla noctis</i> , <i>Tangara cucullata</i> (SVG, Gre), <i>Buteo platypterus</i> sub-sp, <i>Troglodytes aedon martinicensis</i> (Johnson, 1988; Hunter, pers comm., U.S. Fish & Wildlife Service)	1 single-island endemic: <i>Leptotila wellsii</i> ; 6 LA endemics: <i>Myiarchus nugator</i> , <i>Margarops fuscus</i> , <i>Loxigilla noctis</i> , <i>Tangara cucullata</i> (SVG, Gre), <i>Troglodytes aedon martinicensis</i> , <i>Buteo platypterus</i> sub-sp (Johnson, 1988; Hunter, pers comm., U.S. Fish & Wildlife Service)	1 of 420 species is endemic (T&T:IFNR, 1997?)	1 single-island sub-species endemic: <i>Dendroica petechia petechia</i> ; 2 LA endemics: <i>Margarops fuscus</i> , <i>Loxigilla noctis</i> (Hunter, pers comm., U.S. Fish & Wildlife Service)

	General	Antigua-Barbuda	St. Kitts-Nevis	Dominica	St. Lucia	St. Vincent and the Grenadines	Grenada	Trinidad-Tobago	Barbados
Reptiles	<p>36 of the 45 lizard spp. in the LA are endemic (80%); 16 of the 20 snake spp. in the LA are endemic (80%) (Schwartz & Henderson, 1991)</p> <p>Marine turtles: <i>Caretta caretta</i>, <i>Chelonia mydas</i>, <i>Dermochelys coriacea</i> and <i>Eretmochelys imbricata</i> nest throughout (Widecast, 1992)</p>	1 single-island endemic: <i>Alsophis antiguae</i> (Horwith and Lindsay, 1998)	No endemics	<p>2 single-island endemics: <i>Ameiva fuscata</i>, <i>Anolis oculatus</i>; 6 regional endemics: <i>Sphaerodactylus fantasticus</i>, <i>S. vincenti</i>, <i>Iguana delicatissima</i>, <i>Alsophis antillensis</i>, <i>Liophis (Dromiscus) juliae</i>, <i>Typhlops dominicana</i> (Johnson, 1988)</p>	<p>5 of 18 species are single-island endemics: <i>Anolis luciae</i>, <i>Sphaerodactylus microlepis</i>, <i>Cnemidophorus vanzoi</i>, <i>Liophis (Dromicus) ornatus</i>, <i>Bothrops caribbaeus</i>; 4 are regional endemics: <i>Sphaerodactylus vincenti</i>, <i>Anolis watti</i>, <i>Gymnophthalmus pleei</i>, <i>Leptotyphlops bilineata</i> (Johnson, 1988)</p>	<p>3 single-island endemics: <i>Anolis griseus</i>, <i>A. trinitatus</i>, <i>Chironius vincenti</i>; 3 regional endemics: <i>Gymnophthalmus underwoodi</i>, <i>Sphaerodactylus vincenti</i>, <i>Mastigodryas bruesi</i> (Johnson, 1988)</p>	<p>Single-island species (2): <i>Typhlops tasymicris</i>, <i>Clelia clelia groomei</i> (sub-species); regional endemics (3): <i>Anolis aeneus</i>, <i>A. richardi</i>, <i>Mastigodryas bruesi</i></p> <p>Marine turtles: <i>Caretta caretta</i>, <i>Chelonia mydas</i>, <i>Dermochelys coriacea</i> and <i>Eretmochelys imbricata</i> nest throughout (Johnson, 1988)</p>	2 of the 70 species are endemic (WRI, 1996)	

	General	Antigua-Barbuda	St. Kitts-Nevis	Dominica	St. Lucia	St. Vincent and the Grenadines	Grenada	Trinidad-Tobago	Barbados
Amphibians	8 of the 14 spp. in the LA are endemic (57%)	1 of the 2 species is an LA endemic: <i>Eleutherodactylus johnstonei</i>	1 LA endemic: <i>Eleutherodactylus johnstonei</i> (CEP)	2 regional endemics: <i>Eleutherodactylus martinicensis</i> , <i>Leptodactylus fallax</i> (Johnson, 1988)		1 single-island endemic sub-species: <i>Eleutherodactylus urichi shrevei</i> (Johnson, 1988)	4 species, 1 endemic sub-species: <i>Eleutherodactylus urichi euphronides</i> (Johnson, 1988)	2 of the 26 species are endemic (WRI, 1996)	
Freshwater Fishes	Although the freshwater fish fauna of the Antilles consists of 71 "mostly endemic" species (primarily in Cuba and Hispaniola), the Lesser Antilles apparently has only 1 endemic species, <i>Rivulus cryptocallus</i> , from Martinique (Burgess and Franz, 1989); Lee <i>et al.</i> (1983) list 5 native species, but Burgess and Franz (1989) think that 3 of these— <i>Poecilia vivipara</i> , <i>P. reticulata</i> and <i>Synbranchus marmoratus</i> —are introduced							76 known species--no data on endemism (WRI, 1996).	
Plants		3 threatened, 1 endemic (WCMC); A-B is one of the few countries with a recorded flora: 4 species of gymnosperms in 3 families; 1109 species of Angiosperms in 141 families (Lindsay and Horwith, 1997)	3 threatened, 0 endemics (WCMC)	59 threatened, 97 endemic (WCMC)	9 threatened, 3 endemic (WCMC)	8 threatened, 4 endemic (WCMC)	5 threatened, 4 endemic (WCMC)	16 threatened, 27 endemic (WCMC) WRI (1996) lists 236 of 1,982 flowering plants as endemic T&T:IFNR (1997?) lists 110 of 2160 species as endemic	3 threatened, 2 endemic (WCMC)

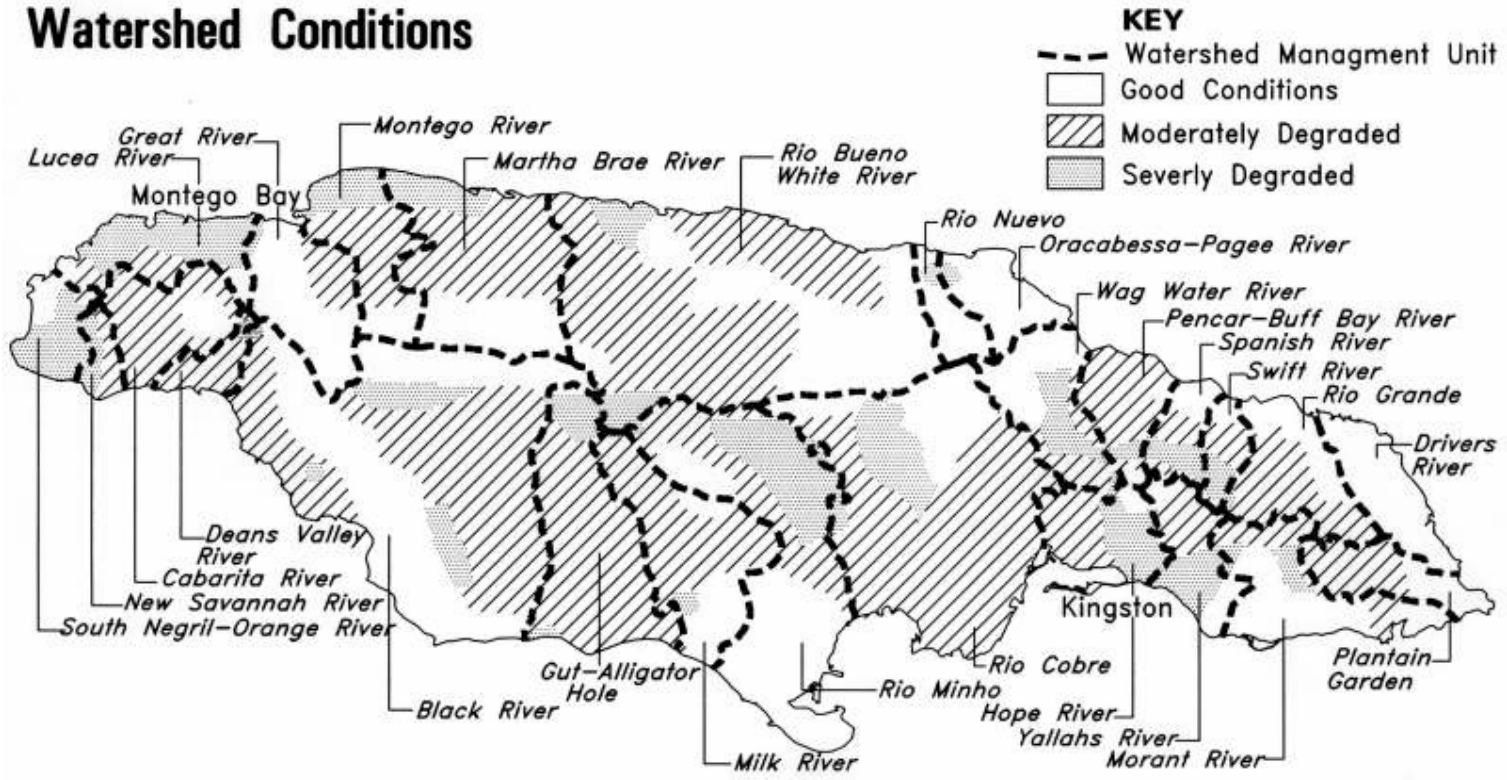
	General	Antigua-Barbuda	St. Kitts-Nevis	Dominica	St. Lucia	St. Vincent and the Grenadines	Grenada	Trinidad-Tobago	Barbados
Pteridophytes	In the LA: 323 species in 68 genera and 11 families; 46 taxa, or 14%, endemic. (Howard)	45 species of ferns and fern-allies in 5 families (Lindsay and Horwith, 1997), an addition of 17 spp (60%) to Howard's total of 28 for these islands	SK:129; N:79 (Howard)	194 (Howard)	116 (Howard)	SV:162; G:3 (Howard)	151 (Howard); 1 single-island endemic: <i>Danaea</i> sp (Johnson, 1988)		30 (Howard)
Orchids and Other Monocots	In the LA: 141 species of orchids in 44 genera, 4 endemic (Howard)			1 endemic orchid, <i>Epidendrum discoidale</i> (Howard)		2 endemic orchids, <i>Chloraea ulantha</i> , <i>Cyrtopodium andersonii</i> (Howard)	1 endemic orchid, <i>Oreodoxa oleracea</i> (Johnson, 1988)		
Protected Area Coverage: size in hectares & (number) & [% total land area protected]		6,628 (3) [15.1] <i>Antigua</i> ● Nelson's Dockyard National Park, 4,128 ha ● Diamond Reef Marine Park, 2,000 ha <i>Barbuda</i> ● Palester Reef Marine Park, 500 ha	94 (1) [<1] <i>St. Kitts</i> ● Brimstone Hill National Park <i>Nevis</i> None	7,403 (2) [9.86] ● Morne Trois Pitons National Park, 6,872 ha ● Cabrits National Park, 531 ha	2,026 (4) [3.29] ● Central Forest Parrot Sanctuary, 1,494 ha ● Maria Islands Marine and Nature Reserve, 12 ha ● Pigeon Island Natl. Park, 20 ha ● Savannes Bay Mangrove Area (marine & nature reserve), 500 ha + 22 additional marine reserves, estimated 80 ha (CEP, WCMC data)	8,284 (2) [21.3] ● Parrot Reserve, 4,399 ha ● Tobago Cays National Park, 3,885 ha	None A system of national parks and protected areas was proposed in 1988, including 27 areas in Grenada and 16 in Carriacou, representing 4,458 ha [13% of land area] + several marine areas (CEP); there may have been recent action on establishment of Levera National Park and Mt. Hartman Bird Sanctuary (pers comm., Vincent, OAS)	15,728 (6) [3.07]	230 (1) [<1] ● Barbados Marine Reserve

Note: References to "CEP" in the above table refer to the "Country Environmental Profiles" published in 1991 by Caribbean Conservation Association and Island Resources Foundation. Profiles were prepared for the following target countries: Antigua-Barbuda, Dominica, Grenada, St. Kitts-Nevis, St. Lucia, and St. Vincent and the Grenadines.

Source: Island Resources Foundation, *Biodiversity Assessment of the Eastern Caribbean*, Prepared for the UNDP, 1998.

ANNEX G

Watershed Conditions



Data: NRCA'S Watershed Protection Branch. 1997

ANNEX H

List of Protected Areas in the Caribbean Region

Country	Type of Protected Area	Name	IUCN Category	Size (hectares)	Year Designated
Antigua and Barbuda	Marine National Park	Palaster Reef	II	500	1973
		Salt Fish Tail Reef (Diamond Reef)	II	2000	1973
	National Park	Betty's Hope	II	0	
		Half Moon Bay	II	0	
		Nelson's Dockyard	II	4128	1984
	Peat land Reserve	Darkwood	V	0	
		Devil's Bridge	IV	0	
		Ffryes Bay	V	0	
		Fort James	V	0	1993
		Green Island Reefs	IV	0	
		Northeast Archipelago	IV	0	
Dominica	Forest Reserve	Central	VI	410	1952
		Northern	VI	8814	1977
	National Park	Cabrits	II	531	1986
		Morne Trois Pitons	II	6872	1975
		Sulphur Spring	II	102	
	Preserve	Syndicate Parrot	IV	83	1989
Protected Forest	Stewart Hall Water Catchment	VI	318	1975	
Grenada	Forest Reserve	Grand Etang	VI	618	1910
Saint Kitts and Nevis	National Park	Brimstone Hill Fortress	II	15	1985
		Southeast Peninsula	II	2610	

Country	Type of Protected Area	Name	IUCN Category	Size (hectares)	Year Designated
Saint Lucia	Forest Reserve	Addition to Central FoR B	VI	121	
		Barre-de-L'Isle North	VI	231	
		Barre-de-L'Isle South	VI	724	
		Castries Waterworks	VI	1392	1916
		Central A	VI	1631	
		Central B	VI	1474	
		Crown Estate Pelouze	VI	0	
		Dennery Ridge	VI	71	
		Dennery Waterworks	VI	145	1946
		Forestiere	VI	12	
		Marquis Estate Parcel M-1	VI	134	
		Marquis Estate Parcel M-2	VI	35	
		Marquis Estate Parcel M-3-6	VI	19	
		Quillesse	VI	1400	1946
	Saltibus Grand Magazin	VI	107		
	Marine Reserve	Anse Chastanet Reefs	IV	0	1990
		Anse Cochon artificial reef	IV	0	1990
		Anse Galet-Anse Cochon reefs	IV	0	1990
		Anse L'Ivrogne Reef	IV	0	1986
		Anse Mamin Reef	IV	0	1986
Anse Pointe Sable-Man Kote Mangroves		IV	0	1986	
	Bois D'Orange Mangroves	IV	80	1986	
	Caesar Point to Mathurin Point reefs	IV	0	1990	

Country	Type of Protected Area	Name	IUCN Category	Size (hectares)	Year Designated
		Cas-en-Bas Mangroves	IV	0	1986
		Choc Bay Artificial Reef	IV	0	1990
		Choc Bay Mangroves	IV	80	1986
		Esperance Harbour Mangroves	IV	0	1986
		Fond D'Or Beach	IV	0	1986
		Grand Anse Beach and Mangrove	IV	80	1986
		Louvet Mangroves	IV	80	1986
		Marigot Bay Mangroves	IV	0	1986
		Marquis Mangroves	IV	0	1986
		Moule-a-Chique artificial reef	IV	0	1990
		Praslin Mangroves	IV	0	1986
		Reef Between Grand Caille and Rchette Point	IV	0	1986
		Reef at Anse de Pitons	IV	0	1986
		Reef at Malgritoute	IV	0	1986
		Rodney Bay Artificial Reefs	IV	0	1986
		Savannes Bay Mangrove Area	IV	500	1986
		Vigie Beach Artificial Reef	IV	0	1990
	National Park	Canaries	II	0	
	Nature Reserve	Fregate Islands	IV	6	1989
		Maria Islands	IV	12	1982
	Other Area	Pigeon Island	III	20	1978
	Reserve	Marigot	Ib	13	1987
	Sanctuary	Parrot Sanctuary (Central FoR)	IV	1494	1980

Country	Type of Protected Area	Name	IUCN Category	Size (hectares)	Year Designated
Saint Vincent and the Grenadines	Forest Reserve	Cumberland	IV	0	1992
		Tobago Cays	IV	0	1992
	Reserve	St. Vincent Parrot Reserve	IV	4399	1987
		Wildlife Reserve	All Awash Island	IV	0	1987
		Battowia Island	IV	0	1987
		Big Cay	IV	0	1987
		Catholic Rocks	IV	0	1987
		Chateaubelair Islet	IV	0	1987
		Falls of Baleine	IV	0	1987
		Frigate Rock	IV	0	1987
		Government House Grounds	IV	0	1987
		Isle de Quatre	IV	0	1987
		King's Hill	IV	0	1987
		La Paz Island	IV	0	1987
		Milligan Cay	IV	0	1987
		Northern end of Bequia	IV	0	1987
		Petit Canouan	IV	0	1987
		Petit St. Vincent	IV	0	1987
		Pigeon (Ramier) Island	IV	0	1987
		Prune (Palm) Island	IV	0	1987
	Sail Rock	IV	0	1987	
	Savan Islands	IV	0	1987	
	Tobago Cays	IV	3885	1987	
	West Cay	IV	0	1987	
	Young Island	IV	0	1987	

Source: UNEP World Conservation Monitoring Centre Protected Areas Database (http://www.unep-wcmc.org/protected_areas/data/nat2.htm)