

PART II: STRATEGY



4. NATIONAL BIODIVERSITY STRATEGY

4.1 Biodiversity and Jamaica's Future

Jamaica's rich biological resources have supported families and communities for generations. These resources continue to provide a foundation for economic growth and stability by supporting agriculture, tourism, fishing, craft manufacturing and a host of other activities.

The country's diverse ecosystems perform ecological functions including the production of soil; prevention or reduction of soil erosion; absorption and breakdown of pollutants such as organic waste and pesticides; and storage and recycling of elements essential for life, such as carbon, nitrogen and oxygen.

The conservation and sustainable use of Jamaica's biodiversity will require commitment by, and collaboration between the private sector, civil society, the Government, community-based and environmental organisations. The following vision statements, principles, goals and strategic directions are intended to provide a framework to obtain the necessary commitment, and to provide a basis for cooperation and collaboration.

4.2 A Biodiversity Vision for the People of Jamaica

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

4.3 Principles to Guide the Implementation of the NBSAP in Jamaica

The principles are intended to provide guidance to decision-makers, developers, and citizens in support of efforts to achieve the stated vision for biodiversity in Jamaica.

To fulfil the requirements of the CBD and to ensure that current and future generations of Jamaicans have biological and other resources available to meet their needs and aspirations, the Government of Jamaica, NGOs, business interests, private sector

companies, communities and individual citizens will uphold the following principles:

- ***Principle I - Transparency***

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

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

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

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

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

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

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

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

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

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

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

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

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

biodiversity and the sustainable use of biological resources.

• **Principle VIII - Sectoral integration**

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

Principle 15, Rio Declaration 1992

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

4.4 Goals of the NBSAP

- 1) Conserve Jamaica's biodiversity.
- 2) Promote sustainable use of biological resources.
- 3) Facilitate access to biological resources to promote developments in biotechnology and to ensure benefit sharing.
- 4) Ensure safe transfer, handling and use of Living Modified Organisms (LMOs).
- 5) Enhance resource management capacity.
- 6) Promote public awareness and education and community empowerment.
- 7) Promote regional and international co-operation and collaboration in support of the implementation of the CBD.



Blue-faced Booby (*Sula dactylatra*) on the Pedro Cays

4.5 Goals and Strategic Directions

4.5.1 Goal 1: Conserve Biodiversity

An integrated management approach will be required to conserve Jamaica's biodiversity. The following conservation measures are proposed for *in-situ* and *ex-situ* conservation.

4.5.1.1 *In-situ* Conservation

4.5.1.1.1 Establish and Manage Protected Areas

Article 8(a)

Establish systems of protected areas or areas where special measures need to be taken to conserve biological diversity.

Article 8(b)

Develop, where necessary, guidelines for the selection, establishment and management of protected areas where special measures need to be taken to conserve biological diversity.

The Convention states that *in-situ* conservation, that is, conservation within natural habitats, is a fundamental requirement for the conservation of biodiversity. The establishment and management of protected areas is an important element in the conservation of biodiversity conservation in Jamaica. Areas to be conserved include unique or vulnerable ecosystems and critical habitats for rare, threatened, endangered and endemic species, as well as species and genetic resources that are of economic or scientific interest. To advance the establishment of protected areas, the following strategic directions are proposed:

Strategic Directions

- Expand the system of protected areas to ensure that it encompasses the country's diversity of natural resources, landscapes and seascapes. Priority areas for conservation include the Mason River Reserve, Cockpit Country, Dolphin Head Mountains, and offshore cays.
- Finalise and implement guidelines for the establishment and management of protected areas.
- Increase the investment in the Jamaica National Parks Trust Fund.
- Continue to support and promote partnerships between government and local and indigenous communities, property owners and private corporations for the voluntary allocation of land for conservation purposes using a variety of conservation mechanisms including easements and covenants.
- Implement interim protection measures to ensure that candidate protected areas are not compromised by proposed developments while their establishment is being considered.

- Continue to decentralise the management of protected areas using local environmental NGOs or community-based organisations.



Caribbean Spiny Lobster (*Panulirus argus*)
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4.5.1.1.2 Rehabilitate Degraded Ecosystems and Promote Recovery of Threatened Species

Article 8(f)

Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, *inter alia* through the development and implementation of plans or other management strategies.

To meet the obligations of the Convention, rehabilitation in some areas may be necessary, as well as the recovery of threatened species. The proposed strategic directions for rehabilitation of ecosystems and the recovery of threatened species are:

Strategic Directions

- Evaluate progress and continue to implement ecosystem rehabilitation programmes for degraded areas, including forests, species habitats, watersheds, and coastal and marine areas.
- Implement education and awareness programmes to reduce or prevent further ecosystem degradation resulting from human activities.
- Develop and implement recovery plans for threatened plant and animal species using multi-disciplinary teams, and ensure that recovery plans are prepared using transparent processes that provide opportunities for the involvement of stakeholders.
- Examine the need to compensate landowners and resource developers in order to conserve critically endangered components of Jamaica's biodiversity.

- Promote research to establish best management practices for rehabilitation efforts and species recovery; restore degraded ecosystems; and ensure the recovery of populations of over-harvested species.
- Strengthen measures to reduce and eliminate the release of harmful substances that degrade ecosystems and destroy wildlife.

4.5.1.1.3 Manage and Maintain Wild Species and Their Habitat

Article 8(d)

Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.

The following strategic directions to enhance the management of wild species and their habitat are proposed:

Strategic Directions

- Promote research and inventory programmes to increase knowledge of species diversity; understanding their biology and ecology; and the impacts of human activities on species and their habitats.
- Implement identification and monitoring programmes to determine and establish sustainable harvest levels for wild flora and fauna and establish threshold levels which, when exceeded, result in remedial actions.
- Develop guidelines for species re-introduction and for removal of species from the wild.
- Ensure that both ecological and economic objectives are considered when designating pests and implementing pest management strategies.

4.5.1.1.4 Control and/or Eradicate Invasive Introduced Species

Article 8(h)

Prevent the introduction of, control and/or eradicate those alien species which threaten ecosystems, habitats, or species.

Recognising the severe impacts that have, and can result from introductions of alien species on ecosystems, habitats and native species, the following strategic directions are proposed:

Strategic Directions

- Undertake research and assessments of introduced species that now threaten Jamaica's biodiversity,

with a view to identifying appropriate measures to reduce further impacts.

- Develop guidelines for the eradication and monitoring of alien invasive species.
- Require risk assessment of species prior to granting an import permit and institute management assessments for importation.
- Improve management and strengthen enforcement capacity to implement quarantine control measures in order to control unintentional introductions at ports of entry.
- Develop contingency plans and action programmes to ensure rapid eradication of newly established and undesirable alien species.

4.5.1.2 *Ex-situ* Conservation

Article 9(a)

Adopt measures for *ex-situ* conservation of biological diversity, preferably in the country of origin of such components.

Article 9(b)

Establish and maintain facilities for *ex-situ* conservation of and research on plants, animals and micro-organisms, preferably in the country of origin of genetic resources.

Article 9(c)

Adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats under appropriate conditions.

Article 9(d)

Regulate and manage collection of biological resources from natural habitats for *ex-situ* conservation purposes so as not to threaten ecosystems and *in-situ* populations of species, except where special temporary *ex-situ* measures are required under sub-paragraph (c) above.

Ex-situ conservation means the conservation of components of biodiversity outside their natural habitats in institutions such as gene banks, botanical gardens, zoos, museums and herbaria. These types of institutions make a valuable contribution to the conservation of biodiversity and also increase public awareness of biodiversity issues. Research is often conducted at *ex-situ* facilities increasing understanding of the biology of species. Recognising the important contribution of *ex-situ* conservation, the following strategic directions are proposed:

Strategic Directions

- Conduct research to identify, inventory and document the genetic resources of Jamaica

and store this information in a national database.

- Prepare a national *ex-situ* conservation plan involving Government agencies, *ex-situ* experts, researchers, representatives of conservation organisations, private sector groups, and other stakeholders to identify priorities, resource requirements and opportunities for national and regional collaboration and action, taking into account the need for various types of gene banks and rescue centres.
- As part of the national *ex-situ* conservation plan, determine national requirements for *ex-situ* facilities, and identify financial resources for the management of existing facilities and the development of new facilities.
- Ensure the inclusion of *ex-situ* conservation experts in the development of recovery plans for endangered species where appropriate and in the preparation of biodiversity policies and programmes.
- Provide, develop and use appropriate incentives as a means of promoting cultivation of local varieties of food crops and locally adapted breeds of livestock and undertake artificial propagation and captive breeding of threatened species.

4.5.2 Goal 2: Sustainable Use of Biological Resources

Article 10(a)

Integrate consideration for conservation and sustainable use of biological resources into national decision-making.

Article 10(b)

Adopt measures relating to the use of biological resources to avoid or minimise adverse impacts on biological diversity.

Article 10(c)

Protect and encourage customary use of biological resources with cultural practices that are compatible with conservation and sustainable requirements.

Article 10(d)

Support local populations to develop and implement remedial action in degraded areas where biodiversity has been reduced.

Article 10(e)

Encourage co-operation between government authorities and the private sector in developing methods for the sustainable use of biological resources.

The CBD defines "*sustainable use*" as "the use of components of biological diversity in a way and at a rate that does not lead to long term decline of

biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations”.

The sustainable use of biological resources and ecosystems is essential to the well being of present and future members of society. The concept of sustainable use and development, as applied in this strategy, is that the basic living standards of the people of Jamaica should be improved without depleting renewable natural resources and degrading the environment.

The practice of sustainable use of biological resources is difficult to achieve in developing countries such as Jamaica where poverty remains an underlying cause of unsustainable land use practices and utilisation of natural resources. Lack of access to suitable land for housing and farming results in communities settling and farming on forest lands. Without the capacity to access alternative sources for energy, the poor will continue to utilise forest resources for fuelwood and charcoal.

Achieving the sustainable use of Jamaica's biological resources and its diverse ecosystems will require the development and implementation of a broad range of management practices. The following overall strategic directions are proposed:

Strategic Directions

- Develop a baseline biological inventory and monitor harvested species to determine sustainable harvest levels.
- Prepare, implement and enforce harvesting quotas and guidelines.
- Develop codes of practice and provide incentives to ensure resource use occurs at sustainable rates.
- Improve education and training for resource harvesters.
- Promote mechanisms to better assess the value of biological resources.

4.5.2.1 Sustainable Agriculture

The transition to sustainable agriculture production is essential if food security is to be achieved ensuring long-term economic and social benefits. To achieve the integration of sustainable agriculture

production and conservation of biodiversity, the following strategic directions are proposed:

Strategic Directions

- Review current agricultural policies to determine any impediments to sustainability.
- Review existing agricultural extension services, increase training, and initiate education and awareness campaigns on the need for conservation and sustainable use of biological resources.
- Explore the benefits of maintaining and using locally developed crops and livestock breeds.
- Establish and enforce land zoning and control measures to prevent expansion of agriculture into inappropriate areas thereby protecting watersheds, forests and other relevant areas.
- Strengthen national agricultural research to support efforts to address agricultural sustainability and to reduce negative impacts of agriculture on biodiversity.
- Promote better communication, co-ordination and information sharing among research and development agencies both locally and regionally.
- Provide incentives for farmers to conserve and sustainably use biological resources in nearby ecosystems and to implement *ex-situ* conservation measures where necessary.
- Encourage the adoption of integrated pest management approaches emphasising the benefits of natural fertilisers/composting and biological control methods while avoiding the introduction of fertile non-native species.
- Integrate biodiversity conservation into programmes of agro-forestry, watershed rehabilitation and soil conservation.

4.5.2.2 Sustainable Use of Marine Resources

Given the importance of marine resources to biodiversity and the economy, the following strategic directions are proposed:

Strategic Directions

- Increase understanding of fishermen and others involved in the harvesting of marine resources of the need for sustainable use of marine

resources, through extension services, education, training and technology transfer.

- Develop and implement codes of conduct and guidelines for sustainable use of marine resources.
- Investigate further options in the area of mariculture as alternatives to traditional fishing.
- Conduct a management audit of the Fisheries Division, to assess its management capacity with a view to determining and implementing the necessary reforms to overcome gaps and deficiencies.
- Institute an Integrated Coastal Zone Management Programme through relevant agencies, local communities and conservation organisations.
- Enhance the work of the Jamaica Coral Reef Action Plan Committee to identify and implement measures to prevent damage to sensitive marine resources including reefs, mangroves, lagoons, wetlands, and seagrass beds.
- Implement pollution mitigation measures to reduce pollution from ships and land-based activities taking into consideration existing initiatives.
- Increase efforts to monitor and prevent the introduction of alien species into the marine ecosystem.
- Promote training opportunities for managers of marine protected areas.
- Secure the involvement of local communities and individuals who possess traditional knowledge in the effective management of marine resources.
- Strengthen local and regional collaboration to ensure effective monitoring and enforcement of fisheries conservation rules and management programmes.
- Participate in regional and global initiatives on the management of marine biological resources and seek financial and technical assistance to increase capacity to manage these resources.
- Promote awareness of the impacts of collecting or damaging marine resources, particularly to tourism operators and beach users.
- Promote and raise awareness of the impact of land-based activities on marine biodiversity.



The flowers of the Dogwood (*Piscidia piscipula*)

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4.5.2.3 Sustainable Use and Management of Forest Resources

Forests are one of the main repositories for Jamaica's biodiversity. To ensure their viability to maintain this function the following strategic directions are proposed:

Strategic Directions

- Implement the National Forest Management and Conservation Plan as required under the Forest Act, with stakeholder participation, to ensure that loss of forest biodiversity is reversed.
- Continue to update the inventory and description of forest lands, including inventories of non-timber resources and forest biodiversity.
- Assess the potential ecological impacts of fast growing alien/exotic trees species before they are introduced and after introduction.
- Strengthen enforcement to better control illegal harvesting of timber and other forest products and to prevent the illegal conversion of forested areas to non-forest use.
- Investigate ways and means to add value to forest resources after they have been harvested.
- Use EIA, where appropriate, to assess and mitigate adverse impacts from proposed development projects and policies affecting forest lands.
- Improve and expand programmes to rehabilitate degraded forest areas and ensure the implementation of an effective system of reforestation.

4.5.2.4 Ecologically Sustainable Tourism

Tourism has become the largest sector of Jamaica's economy. The rapid growth of the sector highlights

the need to prevent and/or reduce the effects on biodiversity resulting from tourism activities. The following strategic directions are proposed:

Strategic Directions

- Determine eco-tourism opportunities available in Jamaica.
- Ensure that sustainable use of biodiversity is incorporated in the draft Sustainable Tourism Master Plan.
- Continue the development and implementation of guidelines and codes of conduct for eco-tourism attractions and the “greening” of the tourism industry.
- Explore ways and means to obtain financial assistance and economic instruments needed to implement corrective measures to address pollution resulting from tourism activities.

4.5.2.5 Regulating Collection and Harvesting of Wild Flora and Fauna

Unregulated harvesting and collection of wild flora and fauna will have severe consequences to the long-term sustainability of Jamaica’s biodiversity, therefore, the following strategic directions are proposed:

Strategic Directions

- Develop and implement guidelines for the ecologically sustainable use of species and genetic resources, taking into consideration the needs of different socio-economic groups.
- Apply the precautionary approach to harvesting and collecting biological resources.
- Explore ways and means to provide alternative sources of income for communities who depend on wild flora and fauna for their livelihoods.
- Encourage bioprospecting to better utilise or develop new uses for Jamaica’s biological resources.
- Formulate policy and draft regulations to facilitate controlled access to biological resources and genetic material which take into account intellectual property rights.
- Determine the most appropriate quota system for regulating the harvesting of wild species for domestic and export purposes.

4.5.2.6 Sustainable Land Use and Development

4.5.2.6.1 Land Use Planning

Recognising the importance of effective land use planning in achieving sustainable use of biological resources and ecosystems, the following strategic directions are proposed:

Strategic Directions

- Continue efforts to improve land and resource mapping capabilities to support the establishment of land and resource zoning schemes.
- Renew efforts to prevent uncontrolled urban sprawl, ribbon development, squatting and agriculture development, especially in ecologically sensitive areas such as wetlands, watersheds and steep slopes.
- Secure a commitment to sustainable development by ensuring the participation of CBO’s, parish authorities, local communities, private sector groups and NGOs in land use planning and monitoring processes.
- Ensure proper zoning of land to ensure only those most suitable for agriculture is so utilised.
- Ensure that land settlement programmes address environmental concerns, including impacts of public transportation and utilities infrastructure on wildlife habitats and ecosystems.
- Ensure that the construction of new roads and highways address the impacts on wildlife habitats and ecosystems.

4.5.2.6.2 Mining and Quarrying

Considering the economic importance of this sector and the environmental impacts that can result from mining and associated activities, the following strategic directions are proposed:

Strategic Directions

- Develop clear guidelines for the conservation of biodiversity and the sustainable use of biological resources in the mining sector and strengthen monitoring and enforcement activities.
- Ensure pre-mining impact assessment studies and inventories of flora and fauna are conducted in proposed mining and quarrying areas.

- Commit funding for the development and adoption of new and improved mining methods and technologies which reduce adverse impacts from mining and mineral processing.
- Increase efforts to prevent and reduce air and water pollution resulting from mining and quarrying activities and mineral processing.
- Increase efforts to control and prevent illegal mining activities and enforce regulations and conditions of mining permits.
- Establish and test emergency plans and response measures at sites where accidents associated with mining and the shipping of these products could pose significant threats to biodiversity, such as at marine ports.
- Formalise quarrying activities in traditional problem areas for greater control, monitor and maintain buffer zones around mining and quarry areas.
- Institute site-specific approval for blasting.

4.5.3 **Goal 3: Facilitate Access to Biological Resources to Promote Developments in Biotechnology and Benefit Sharing**

Article 15(2)

Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.

Article 15(5)

Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.

Article 15(6)

Each Contracting Party shall endeavour to develop and carry out scientific research based on genetic resources provided by other Contracting Parties with the full participation of, and where possible in, such Contracting Parties.

4.5.3.1 Access to Genetic Resources

The following strategic directions are proposed:

Strategic Directions

- Declare a national focal point and a national authority to deal with matters relating to access to genetic resources.
- Develop mechanisms for stakeholder participation in all access and benefit sharing discussions to

address concerns and establish policies and legislation governing access.

- Identify existing legal, policy and administrative measures and institutional constraints that could impede the establishment of an appropriate access and benefit-sharing regime for Jamaica, including intellectual property rights regimes to address ownership issues.
- Continue to develop Material Transfer Agreements for commercial and scientific research to facilitate access to genetic resources whilst ensuring equitable sharing of any benefits which may arise.



Jamaican Harlequin (*Atlantea pantoni*) in the Cockpit Country

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4.5.3.2 Access to and Transfer of Technology

Article 16(2)

Access to and transfer of technology referred to in paragraph 1 of this Article to developing countries shall be provided and/or facilitated under fair and most favourable terms, including concessional and preferential terms where mutually agreed, and, where necessary, in accordance with the financial mechanism established by Articles 20 and 21. In the case of technology subject to patents and other intellectual property rights, such access and transfer shall be provided on terms which recognise and are consistent with the adequate and effective protection of intellectual property rights.

Strategic Directions

- Increase capacity to use and develop appropriate technologies that will assist in implementing the requirements of the Convention.

4.5.4 **Goal 4: Ensure Safe Transfer, Handling and Use of Living Modified Organisms (LMOs)**

Article 19(3)

The Parties shall consider the need for and modalities of a protocol setting out appropriate procedures including, in particular, advance informed agreement, in the field of the safe transfer, handling and use of any living modified organism resulting from biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity.

This Article establishes the framework for a Biosafety Protocol.

Recognising the impact of biotechnology on the world to date, and the increasing role of LMOs in the agriculture, health, and food sectors, it is prudent that Jamaica minimises possible accompanying risks through the development of a domestic biosafety policy and legislation, while optimising benefits that can be accrued from the technology.

The following strategic directions are proposed:

Strategic Directions

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

4.5.5 Goal 5: Enhance Resource Management Capacity

4.5.5.1 Data Management and Information Exchange

Effective management of biological data and information is an urgent priority for Jamaica. Despite efforts to improve the management of data and information relevant to the conservation and sustainable use of biological resources, many barriers to access and use data and information still remain among Government agencies and scientific institutes.

The establishment by The Nature Conservancy of the now defunct Conservation Data Centre at, and with co-operation of, the University of the West Indies (UWI) was one attempt to collect biological data and information.

A national Clearing-House Mechanism (CHM) has been established at the Natural History Division of the Institute of Jamaica.

Strategic Directions

- Expand the CHM to accommodate national needs in the area of information sharing and to facilitate partnerships in the area of technology transfer.
- Establish a National Clearing-House Committee, including representatives from Government, non-government and academic environments, to improve collaboration and data sharing.
- Promote the creation of biological databases to facilitate use of Geographic Information System (GIS).

4.5.5.2 Identification and Monitoring

Article 7(a)

Identify components of biological diversity important for its conservation and sustainable use having regards to indicative list of categories set down in Annex 1.

Article 7(b)

Monitor through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use.

Article 7(d)

Maintain and organise by any mechanism, data derived from identification and monitoring activities.

To ensure the proper identification and monitoring of components of Jamaica's biological diversity the following strategic directions are proposed:

Strategic Directions

- Strengthen institutional capacities to undertake inventories.
- Design a comprehensive biodiversity monitoring programme, which should include standards, methodologies and monitoring intervals.
- Promote collaboration with national, regional and international institutions involved with biodiversity identification and monitoring.

4.5.5.3 Incentive Measures

Article 11

Each Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity.

Incentive measures can be extremely effective in achieving biodiversity conservation and sustainable use objectives, therefore the following strategic directions are proposed:

Strategic Directions

- Develop a policy on economic incentives for the conservation of biodiversity.
- Incorporate economic values of ecological services provided by biological resources into planning processes.
- Provide incentives to communities to promote biodiversity monitoring, conservation, and sustainable use activities.
- Encourage private sector participation in the conservation and sustainable use of biological resources by developing economic incentive schemes.
- Promote the adoption of the Government-wide Environmental Stewardship Strategy, developed under the Canadian International Development Agency (CIDA) funded Environmental Stewardship of Government Operations Project, for national stewardship, conservation and sustainable use.

4.5.5.4 Research and Training

Article 12(a)

Establish and maintain programmes for scientific and technical education and training in measures for the identification, conservation and sustainable use of biological diversity and its components, and provide support for such education and training for the specific needs of developing countries.

Article 12(c)

Promote and cooperate in the use of scientific advances in biological diversity research in developing methods for conservation and sustainable use of biological resources.

Research and training are essential to develop technical capacity in the various areas of resource management in order to achieve the requirements of the CBD, therefore, the following strategic directions are proposed:

Strategic Directions

- Encourage collaboration among education institutions, resource management agencies, and the private sector to improve training programmes in monitoring, ecological and resource management, biophysical inventory,

data management, multidisciplinary research, environmental education, management of protected planning.

- Seek local and/or international collaboration in identifying training opportunities.
- Expand the use of resource management technologies, especially GIS, to assist in the conservation and sustainable use of biological resources, for example, in mapping and monitoring.

4.5.5.5 Environmental Impact and Risk Assessment

Article 14(a)

Introduce appropriate procedures requiring environmental impact assessments of its proposed projects that are likely to have significant adverse effects on biological diversity, with a view to avoiding or minimising such effects and, where appropriate, allowing for public participation in such procedures.

Article 14(b)

Introduce appropriate arrangements to ensure that the environmental consequences of the programmes and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account.

Article 14(e)

Promote national arrangements for emergency responses to activities or events, whether caused naturally or otherwise, which present a grave and imminent danger to biological diversity, and encourage international cooperation to supplement such national efforts and, where appropriate and agreed by the States or regional economic integration organisations concerned, to establish joint contingency plans.

To strengthen Jamaica's capacity to conduct EIAs and to promote national arrangements for emergency responses, the following strategic directions are proposed:

Strategic Directions

- Increase capacity and human and capital resources to prepare, evaluate and implement environmental impact and risk assessments.
- Develop a comprehensive disaster prevention and emergency response plan for biodiversity, in collaboration with other states where necessary.



Flamingo tongue (*Cyphoma gibbosum*)

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4.5.6 **Goal 6: Public Awareness and Education and Community Empowerment**

Article 13(a)

Promote and encourage understanding of the importance of, and the measures required for, the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in education programmes.

Article 13(b)

Cooperate, as appropriate, with other States and international organisations in developing educational and public awareness programmes with respect to conservation and sustainable use of biological diversity.

Promoting awareness and understanding of the roles and values of Jamaica's biodiversity issues and desired public actions are essential to achieve the effective implementation of the CBD and NBSAP, and therefore the following are proposed:

Strategic Directions

- Secure adequate funding to properly implement the National Environmental Education Action Plan for sustainable development island wide.
- Promote the inclusion of conservation and sustainable use of biological resources issues in the educational curricula at all levels of the education system.
- Promote understanding of the need to conserve biodiversity to increase public support for enforcement of legislation.
- Promote and support informal environmental education initiatives to increase community awareness of the roles and value of biodiversity and conservation and sustainable use issues, using a variety of means including media announcements and public displays at local libraries, botanical gardens, national parks, community centres, museums and other locations.
- Develop specific biodiversity education and awareness messages for personnel in the major economic sectors.
- Continue to document and publish knowledge (including traditional knowledge and practices) which promotes sustainable use of biological resources, taking into account the need for compensation of the owners of traditional knowledge.

- Strengthen existing co-ordinating mechanisms in order to facilitate a "network approach" to environmental education and public awareness.



One of Jamaica's Anolis species (*Anolis garmani*)

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4.5.7 **Goal 7: Promote Local and Regional Co-operation and Collaboration in Implementing the CBD and the NBSAP**

4.5.7.1 Exchange of Information

Article 17(1)

The Contracting Parties shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries.

Article 17(2)

Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialised knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information.

Sharing among Parties to the CBD of data and information is essential in supporting efforts to implement the provisions of the Convention. Clearing-House Mechanisms (CHM) are an essential means for the exchange of information.

To enhance the exchange of data and information, the following strategic directions are proposed:

Strategic Directions

- Institute an information deposition agreement between researchers and/or organisations that have been granted permission to conduct research on biodiversity within the region.
- Maintain links among regional organisations and institutions that collect information on biodiversity using national CHM.

- Continue participation in regional initiatives such as Inter American Biodiversity Information Network (IABIN) to increase sharing of data and information.
- Identify priorities for technology transfer and financial assistance.
- Support the development of a meta-database of biological data within the CBD Clearing-House Mechanism.

4.5.7.2 Technical and Scientific Co-operation

Article 18(1)

The Contracting Parties shall promote international technical and scientific cooperation in the field of conservation and sustainable use of biological diversity, where necessary, through the appropriate international and national institutions.

Article 18(5)

The Contracting Parties shall, subject to mutual agreement, promote the establishment of joint research programmes and joint ventures for the development of technologies relevant to the objectives of this Convention.

Regional collaboration can be a cost-effective way to implement training programmes, implement some aspects of monitoring, research and inventory management, protect transboundary endangered species, establish sustainable harvest quotas and to control or prevent the spread of alien species.

The CBD recognises the need for co-operation and collaboration among countries. The Convention states that countries should collaborate in areas of mutual interest (Article 5) and also states the need to co-operate in sharing resources, including financial resources and expertise, for example, co-operation in developing public education and awareness programmes (Article 13); arrangements for emergency responses to events that pose threats to biodiversity beyond national boundaries; access to genetic resources; and the transfer of technology.

Given the importance of regional collaboration to implement the CBD, the following are proposed:

Strategic Directions

- Working with other countries of the region, prepare a regional plan that outlines regional priorities and needs for research, inventory, and monitoring, and seek donor support for these activities.
- Increase regional activities and programmes to ensure that the sustainable harvest of common species is not exceeded.
- Investigate the potential for the establishment of a regional network of protected areas to conserve marine and other transboundary species.
- Increase activities to conserve transboundary endangered and threatened species, including preparation of regional species recovery plans.
- Continue efforts to develop regional responses to emergencies, such as oil spills.
- Increase efforts to address problems associated with transboundary pollutants and hazardous maritime traffic.
- Continue to develop a national biosafety policy and procedures and establish linkages with regional and international biotechnology committees to initiate a regional approach to the safe transfer, handling and use of living modified organisms resulting from modern biotechnology.
- Promote ecologically sustainable tourism in the region, including developing regional codes of conduct for tour operators, and convening appropriate training courses through the Caribbean Tourism Action Plan.
- Promote regional collaboration in the training of personnel, and the movement of personnel throughout the region to strengthen the regional planning capacity in all aspects related to implementation of the CBD.



Gungo Pea Stem Cutter, (*Oncideres canidia*)

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PART III: ACTION PLAN



5. ACTION PLAN

5.1 Introduction

In order to implement the strategic directions to achieve the goals of the National Biodiversity Strategy a number of specific projects are being recommended. A total of 37 projects have been identified, however the list is by no means exhaustive. The projects were designed to address the seven goals outlined in the Strategy. Seventeen projects have been identified for priority implementation within the next 5 to 7 years. Eight of the seventeen projects have been designated the highest priority for implementation within next two years (Appendix IV). A summary of the projects, categorised under the relevant goal, is shown in Section 5.7. The criteria used to prioritise project implementation are as follows:

- Projects/initiatives listed in existing national policies;
- Projects which have already been given some level of national or international exposure;
- Projects that address rehabilitation of degraded resources;
- Projects that undertake education and public awareness;
- Projects that fulfil Jamaica's requirements under international conventions;
- Projects that increase national capacity for implementation; and
- Projects that address the sustainable use of economic species.

5.2 Actions, Schedules and Budget

Each project outlines information on specific activities and/or policies required for implementation; partner organisations, institutions or agencies recommended for participation in the project; supporting Government agencies and other partners; the project's lead agency; and a timetable of outputs. The proposed duration of each project is given and represents the minimum time required to initiate implementation or, in some cases, to complete projects of short duration (see Appendix V). Some projects will require additional implementation time, particularly those under the portfolio of sustainable use which are long-term projects, the results of which may not be visible for several years.

5.3 Monitoring and Evaluation

Measures will be put in place for monitoring and on-going evaluation to ensure the success of the projects. These will also include monitoring changes in the economy, the environment and within the society to determine the impacts and implications of the projects. Monitoring and evaluation of all projects will be conducted by a body appointed by the project's Steering Committee working in collaboration with the National Biodiversity Secretariat (to be established). Project and evaluation reports will be made available to the public through the National Clearing-House Mechanism, as well as libraries and/or web sites of relevant partner organisations.

A review of the implementation of all projects will be carried out every two years and a National Evaluation Report of the Action Plan will be submitted to Cabinet every two years.

Overall success of the Action Plan will be measured by the following factors:

- Number of projects successfully developed for submission to funding agencies;
- Number of project applications which attract international/regional/local funding;
- Timely implementation of projects;
- Timely completion of projects; and
- Successful implementation of each project based on objectives and outputs achieved.

Changes in the environment will be measured by indicators based on international guidelines which include environmental, social and economic factors. Criteria for selecting these indicators include:

- Baseline data already exists;
- Collection of new data is not prohibitive in cost; and
- Allow for comparison with regional and/ or international data.

The components of project implementation such as project management, project approach and targets, public success and goal achievement will be measured by the criteria listed below.

5.3.1 Project Management

- Capacity of the lead agency, supporting agencies and other partners;

- Duration and levels of Government and local community support; and
- Rate of project implementation.

5.3.2 Project Approach

- Community-based and stakeholders (forestry, fisheries, wildlife) involvement;
- Government extension services;
- *In-situ* conservation (e.g. protected areas);
- *Ex-situ* conservation (e.g. plant propagation);
- Sustainable use of resources;
- Data gathering and research;
- Training and education;
- Public education and awareness; and
- Co-management.

5.3.3 Project Targets

- Internal deadlines;
- External deadlines;
- Submission of reports;
- Monthly or bi-monthly achievement; and
- Annual achievement.

5.3.4 Public Success

- Public awareness;
- Public participation; and
- Public acceptance.

5.3.5 Goal Achievement

- Conservation of biodiversity;
- Sustainable use of biological resources;
- Facilitation of access to biological resources to promote developments in biotechnology and benefit sharing;
- Safe transfer, handling and use of living modified organisms;
- Enhancement of resources management capacity;
- Public awareness and education and community empowerment; and
- Promotion of local and regional co-operation and collaboration in implementing the CBD and the NBSAP.

5.4 Funding and Promotion

Financial resources will need to be secured to implement the project concepts outlined in Section 5.8. It is envisaged that the body

responsible for co-ordinating and implementing the National Biodiversity Strategy and Action Plan, the proposed National Biodiversity Secretariat (see the first project on page 51), will have financial sustainability as one of its fundamental goals. In support of this, the staff list for the proposed Secretariat includes two persons trained in financial resource identification and negotiation, who will be responsible for identifying and securing funding for implementation of projects in the Action Plan.

Potential funding sources include the Global Environment Facility; United States Agency for International Development; European Union Inter-American Development Bank; Caribbean Development Bank; World Bank, Swedish International Development Agency; Canadian International Development Agency; United Nations Development Bank; Department for International Development (U.K.); United Nations Environment Programme; United Nations Food and Agricultural Organisation; philanthropic groups; national donor agencies (e.g. Environmental Foundation of Jamaica); private sector companies; and the Government of Jamaica. In addition to financial and technical assistance, in-kind contributions will also be solicited (e.g. personnel sharing, office allocations).

Some projects already are under negotiation for funding and these are indicated within the project description.

5.5 Project Planning

The Action Plan provides the project concepts that are to be developed into project proposals by the lead agencies. Where there are areas for amalgamation, the lead agencies will collaborate in the project formulation and implementation.

5.6 Agencies

For each project a lead agency has been identified. This is a government body that will take responsibility for co-ordination and implementation of the project, in collaboration with the proposed National Biodiversity Secretariat. Supporting agencies have also been identified which include Government agencies, statutory bodies or educational institutions that will assist by giving logistical and implementation support. Partner organisations will assist in project implementation through co-management arrangements where appropriate. A list of the relevant agencies is given in Appendix VI.

5.7 List of Suggested Projects

GOAL	PROJECT TITLE	LEAD AGENCY	DURATION	PAGE
Conserve Biodiversity	**Establishment of the National Biodiversity Secretariat as a Supporting Mechanism to Implement and Monitor the NBSAP	NEPA	3 years	51
	*Financial Sustainability of Protected Areas	MLE	5 years	52
	Involvement of Private Landowners in Protected Area Management	NEPA	2 years	53
	**Preparation for the Declaration of Protected areas: Black River, Mason River, Port Antonio, Dolphin Head, Cockpit Country, and Rozelle/Rozelle Falls	NEPA	4 years	54
	Declaration of Forest Reserves	Forestry Department	3 years	55
	*Rehabilitation of Degraded Forests	Forestry Department	5 years	56
	**Rehabilitation of Coral Reef Ecosystems	NEPA	10 years	57
	Regulation of Collection and Harvesting of Wild Fauna and Flora	NEPA	2 years	58
	**Reduction of Pollutants in Freshwater and Marine Environments	NEPA	2 years	59
	Establishment of Three Plant Rescue Centres	Ministry of Agriculture-Royal Botanical Gardens	2 years	60
	**Preparation of an Alien Invasive Species Management Strategy	NEPA	3 years	61
	Implementation of the Ocho Rios Marine Park Management Plan	FOS	2 years	63
	**Implementation/preparation of recovery strategies for critically endangered species	NEPA	5 years	64
Sustainable Use of Biological Resources	Development and Implementation of Criteria for Sustainable Use of Resources	NEPA	3 years	65
	*Development of Sustainable Fisheries	Fisheries Division	5 years	66
	*Development of Sustainable Forestry	Forestry Department	3 years	67
	Sustainable Management of Game Bird Populations	NEPA	2 years	68
	Sustainable Management of Bat and Dolphin Species	NEPA	4 years	69
	*Preparation of Ecological Zonation Plan and Land Use Plans for Declared Protected Areas	NEPA	3 years	70
	Promotion of Sustainable Tourism Practices	Ministry of Industry & Tourism	2 years	71
	Development of a Sustainable, Community Based Management Plan for the Yallahs Lagoon Ecosystem	SRC	2 years	72

* = Priority Projects

** = Highest Priority Projects

GOAL	PROJECT TITLE	LEAD AGENCY	DURATION	PAGE
Facilitate Access to Biological Resources to Promote Developments in Biotechnology and Benefit Sharing	*Development of Natural Products Industry, Sustainable Use of Medicinal and Aromatic Plants and the Establishment of <i>In-situ</i> and <i>Ex-situ</i> Collections	SRC	5 years	73
	**Preparation of Policies and Legislation to Facilitate Access to Biological Resources and Equitable Benefit Sharing	NEPA	3 years	74
	Protection of Traditional Knowledge and Creation of a Traditional Knowledge Register/Library	IOJ	3 years	75
Safe Transfer, Handling and Use of the Living Modified Organisms	Public Education on the Safe Handling and Use of Living Modified Organisms (LMOs)	NBC	3 years	76
	Institutional Capacity Building for Risk Assessment and Management of Living Modified Organisms (LMOs)	JBS	3 years	77
	*Development of Regulatory and Administrative Measures to Control the Safe Handling and Use of Living Modified Organisms (LMOs)	NCST	2 years	78
Enhance Resource Management Capacity	Human Resources Development in Identification, Conservation and Sustainable Use of Genetic Resources	UWI, NCU, CASE UTECH	3 years	79
	*Expansion of the National Clearing-House Mechanism	IOJ	3 years	80
	Establishment of the Jamaica Protected Areas Biological Database	IOJ	2 years	81
	Repatriation of Indigenous Biodiversity Information	IOJ	4 years	82
	*Development of Increased Resource Management Capacity	UWI	2 years	83
Public Awareness and Education and Community Empowerment	Protected Areas Public Education/Information Programme	NEPA	2 years	84
	**Sensitisation of the Judiciary and Training for Customs and Immigration Officers and the Constabulary	NEPA	2 years	85
	Develop and Expand Existing Environment Education Programmes and Exhibits in the Royal Botanical Gardens, including the Hope Zoo	Hope Zoo Royal Botanical Gardens (Public Gardens Division)	4 years	86
Promote Local and Regional Co-operation and Collaboration in Implementing the CBD and the NBSAP	Build on Existing Regional Data and Information Exchange Mechanism	IOJ	2 years	87
	Promotion of a Mechanism for Regional Technical and Scientific Co-operation	NEPA	2 year	88

* = Priority Projects

** = Highest Priority Project

5.8 Project Concepts

Goal 1 Conserve Biodiversity

Title: Establishment of the National Biodiversity Secretariat as a Supporting Mechanism to Implement and Monitor the National Biodiversity Strategy and Action Plan (NBSAP)

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Land and Environment, Forestry Department, Fisheries Division, Institute of Jamaica, Ministry of Foreign Affairs and Foreign Trade, Ministry of Mining and Energy, National Water Commission, Scientific Research Council, National Commission on Science and Technology, Planning Institute of Jamaica, Ministry of Agriculture

Other Partners: National Environmental Societies Trust, Private Sector Organisation of Jamaica

Duration: Three years

High Priority

Objective: To establish a support mechanism for the NBSAP to ensure that projects outlined are implemented and monitored, thereby achieving the goals of the NBSAP.

Rationale: This project will enable the establishment of a support mechanism to ensure the successful implementation of the National Biodiversity Strategy and Action Plan. This mechanism will be in the form of a Secretariat housed at the National Environment and Planning Agency. The existing NBSAP Steering Committee (see Appendix I for a list of members) will be maintained to guide the Secretariat.

Specific Activities: The main functions of the Secretariat will be co-ordination of project implementation, provision of technical inputs, development of in-country skills in long-term project and programme development and implementation, as well as strategic planning and policy development. This will include training, establishment of project management information systems and promotion of co-management strategies. The National Biodiversity Strategy and Action Plan Steering Committee will be an integral part of this mechanism based on the experience of the members in the development of the process. The Secretariat will have dedicated personnel to identify, source and negotiate for funding to implement the projects outlined.

Requirements: The Secretariat will initially require five persons; the head will be a Programme Coordinator with skills in project management, environmental planning and policy development. The second member of staff will have skills in administration, communication, training and networking. Two persons are proposed with experience in financial resource identification and negotiation to secure funding for project implementation. The fifth person would provide technical and administrative assistance to the Secretariat as required. It is expected that nationals will fill all posts. Required specialised skills can be brought in for the short term, particularly in the area of project monitoring and evaluation.

OUTPUT	Year 1	Year 2	Year 3
Secretariat office established	X	X	X
Secretariat staff hired	X	X	X
Project management information established	X	X	X
Financial resources identified and negotiated	X	X	X
36 profiles for projects developed	X	X	X

Goal 1 Conserve Biodiversity**Title:** Financial Sustainability of Protected Areas**Lead Agency:** Ministry of Land and Environment**Supporting Government Agencies:** National Environment and Planning Agency, Ministry of Finance and Planning, Ministry of Agriculture, Forestry Department, Fisheries Division, Tourism Product Development Company, Jamaica Tourist Board, Ministry of Industry and Tourism**Other Partners:** Jamaica Conservation and Development Trust, Jamaica Protected Areas Network, Chief Parliamentary Counsel, United Nations Environment Programme/Regional Coordinating Unit, Attorney General's Department, Planning Institute of Jamaica**Duration:** Five years**Priority**

Objectives: To identify and secure funding for the establishment and operation of protected areas; to develop and implement methods of revenue generation to assist in operational costs; and to develop an economic incentive scheme to encourage private sector/individual support for conservation of lands within protected areas as well as the protection of private lands.

Rationale: A number of protected areas are being managed by non-governmental organisations with little or no support from Government. The cost of establishing and operating such protected areas is very high and cannot be met without significant capital investment. Fiscal mechanisms such as user fees, taxes, levies and surcharges can only be supplemental. Some protected areas include private land holdings, as such, fiscal incentives will encourage private landowners to protect their properties.

Specific Activities: An aggressive campaign will be launched to identify potential sources of national and international funding. This could be effected through the National Biodiversity Secretariat, if established. The focus could be on increasing the investment in the existing Jamaica National Parks Trust Fund (JNPTF), and consequently increasing the number of areas currently served by the Fund. Specific activities include a critical evaluation of the mandate of the JNPTF; implementation of a Jamaica National Park Strategic Fundraising Plan; research on economic incentives; discussions with the Ministry of Finance and Planning regarding financial resources; preparation of a Cabinet submission on an economic incentive scheme; and development of recommendations regarding amendments to legislation to incorporate incentives.

OUTPUT	Year 1	Year 2
Mandate of JNPTF evaluated	X	--
Jamaica National Park Strategic Fundraising Plan implemented	--	X
Guidelines for the management of protected areas completed	X	--
User fee system implemented	--	X
Economic incentive schemes implemented	X	X
Protected Areas System Plan revised	X	--
Workshop conducted	--	X

Goal 1 Conserve Biodiversity**Title:** Involvement of Private Landowners in Protected Area Management**Lead Agency:** National Environment and Planning Agency**Supporting Government Agencies:** Chief Parliamentary Counsel, Attorney General's Department, Ministry of Land and Environment, Ministry of Agriculture, Forestry Department**Other Partners:** Private Landowners**Duration:** Two Years**Objective:** To explore mechanisms for the voluntary involvement of private landowners in agreements related to conservation of lands in protected areas.**Rationale:** The first protected area declared under the Natural Resources Conservation Authority Act of 1991, consisted primarily of Government owned lands. More recently, however, protected areas declared have included significant parcels of privately owned land and this has highlighted the need to develop agreements with private owners and organisations.**Specific Activities:** Identification and mapping of lands; research regional and international voluntary mechanisms; and development of agreements and recommendations for amendments to existing legislation.

OUTPUT	Year 1	Year 2
Legal instruments prepared	X	--
Workshops conducted	X	X
Two agreements with landowners executed	--	X
Lands to establish easement and agreement surveyed	--	X
Private lands mapped	X	--

Goal 1 Conserve Biodiversity

Title: Preparation for the Declaration of Protected Areas: Black River, Mason River, Port Antonio, Dolphin Head, Cockpit Country and Rozelle/Rozelle Falls

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Land and Environment, Forestry Department, Fisheries Division, Institute of Jamaica, Petroleum Corporation of Jamaica

Other Partners: St. Elizabeth Environmental Protection Association, St. Elizabeth Homecoming Foundation, Parish Development Committees, University of the West Indies, Portland Environmental Protection Association, Dolphin Head Trust

Duration: Four years

High Priority

Objectives: To continue the process of declaring four priority sites listed in the Policy for Jamaica's System of Protected Areas (1997) as well as two areas of significant biodiversity and to commence the management of these areas.

Rationale: The key management objectives for these areas include ecosystem protection, sustainable resource use, recreation and tourism and the protection of natural or cultural areas/features and endangered plants and animals.

The Black River Lower Morass has been recognised both locally and internationally as a site of ecological importance and was designated a Ramsar Site in 1998. Mason River, comprising an area of over 80 hectares, has for many years been recognised as a site of significant scientific and educational interest. The Institute of Jamaica, Natural History Division has managed this site for over twenty-five years as a scientific reserve. Declaration of the Port Antonio marine area is vital to conservation efforts for the marine biodiversity of the area, and also provides an opportunity for developing sustainable use projects. Dolphin Head consists of approximately 120 hectares of mesic limestone forest ecosystem and is considered to be of regional and global biodiversity significance because of its high level of plant endemism. Over 32 percent of plant species in Dolphin Head are endemic. The Cockpit Country is well known for its tropical karst geomorphology and is home to a relatively high percentage of endemic species of flora and fauna. Plant endemism is particularly high. Rozelle is the only known natural habitat for the endemic Blue Swallowtail Butterfly (*Protographium marcellinus*). Another endemic butterfly, *Heraclides therites*, can also be seen in the area. The scenic beauty of Rozelle Falls contributes to the aesthetic value of the area.

Specific Activities: Preparation of legal instruments for the declaration of the areas; identification of suitable organisations to manage the areas; preparation of co-management agreements with relevant stakeholders and preparation and review of the draft management plans for the protected areas.

OUTPUT	Year 1	Year 2	Year 3	Year 4
Land ownership assessed	X	X	X	--
Biological/socio-economic studies completed	X	X	--	X
Community consultations held	X	X	X	X
Existing management plan reviewed	--	X	X	X
Ecological zonation and land use plan developed	X	X	X	X
Management plans prepared	--	--	X	X
Legal instruments prepared	--	--	X	X
Protected areas declared	--	--	X	X
Socio-economic study for Rozelle conducted	--	X	--	X

Goal 1 Conserve Biodiversity

Title: Declaration of Forest Reserves

Lead Agency: Forestry Department

Supporting Government Agencies: Ministry of Agriculture, Ministry of Land and Environment, National Environment and Planning Agency

Other Partners: Suitable organisations in civil society

Duration: Three years

Objective: To declare as forest reserves all outstanding areas of Crown Lands not yet declared, and privately owned lands as appropriate.

Rationale: There are forest areas that are Crown Lands, currently managed by the Forestry Department, which have not yet been declared as forest reserves. The CBD states that *in-situ* conservation is a fundamental requirement for the conservation of biodiversity. Establishment of protected areas is a priority and the establishment of forest reserves will assist the conservation of essential forest resources by providing regulatory control over its use and development.

Specific Activities: Specific activities are required in sequence: identification of Crown Lands not yet declared forest reserves; assessment of areas to be declared as protected; assessment of privately owned unprotected natural forests; survey and demarcation of these areas; declaration of outstanding forested Crown Lands as forest reserves; declaration of privately owned natural forests, as appropriate; preparation of guidelines for declaring forest protected areas; identification of suitable partner organisations; preparation and signing of co-management agreements.

OUTPUT	Year 1	Year 2	Year 3
Crown lands and private forests reviewed	X	X	--
Lands surveyed and demarcated	X	X	--
Outstanding areas declared	X	X	X
Legal instruments prepared	--	--	X
Co-management agreements prepared	--	X	X
Guidelines for declaring forest protected areas developed	--	X	--

Goal 1 Conserve Biodiversity**Title:** Rehabilitation of Degraded Forests**Lead Agency:** Forestry Department**Supporting Government Agencies:** National Environment and Planning Agency, Rural Agriculture Development Authority, National Irrigation Commission, National Water Commission, Fire Department**Other Partners:** Suitable organisations in civil society, environmental non-governmental organisations, landowners groups and committees**Duration:** Five years**Priority****Objective:** To rehabilitate existing degraded forests including reserves.**Rationale:** Many forest reserves have suffered from the effects of illegal settlement, clearing for small-scale agriculture, and unsustainable harvesting practices. It is essential that these areas are identified and an effective reforestation/rehabilitation programme be put in place to prevent further degradation of these areas.**Specific Activities:** Identification of degraded areas; survey and assessment of degraded areas; prioritisation of degraded areas; preparation of a rehabilitative programme for degraded areas; systematic implementation of rehabilitative programmes.

OUTPUT	Year 1	Year 2	Year 3	Year 4	Year 5
Survey, assessment, identification and prioritisation of degraded areas	x	x	x	x	x
Community consultation held	--	x	x	x	--
Rehabilitative programme developed and implemented	--	--	x	x	x

Goal 1 Conserve Biodiversity**Title:** Rehabilitation of Coral Reef Ecosystems**Lead Agency:** National Environment and Planning Agency**Supporting Government Agencies:** Ministry of Land and Environment, Fisheries Division, Ministry of Agriculture**Other Partners:** Negril Coral Reef Preservation Society, University of the West Indies (Centre for Marine Sciences, Discovery Bay Marine Laboratory, Port Royal Marine Laboratory), Caribbean Planning for the Adaptation to Global Climate Change (CPACC), Jamaica Coral Reef Action Plan Steering Committee, Jamaica Hotel and Tourist Association, Tourism Products Development Company**Duration:** Ten years**High Priority**

Objectives: To establish a rehabilitation programme for Jamaica's coral reefs and continue implementation of the mooring buoy, visitor awareness, tourism industry training programmes and reduction of coastal pollution and sedimentation programmes.

Rationale: Coral reefs are rich in biodiversity. They offer physical protection for the coastline, generate sand for beaches and provide one of the key resources on which our tourism industry is based. The percentage of living coral reef around Jamaica has declined to less than 10% of the reef structure. Causes of degradation include anchor damage, snorkel/diver damage, algal overgrowth due to high nutrient levels from sewage discharge and fertiliser residue runoff and high turbidity levels from increased sedimentation. The Negril Coral Reef Preservation Society has implemented a successful mooring buoy programme in an effort to reduce physical damage caused by anchors. An island-wide programme to halt physical and chemical damage to reefs needs to be put in place.

Specific Activities: Specific activities include an assessment of living coral on all reef systems in Jamaica; identification of sites where mooring buoys are required; installation of mooring buoys at new sites as required; reduction of pollution and sedimentation due to terrestrial run-off (this activity will tie in with the project to reduce pollutants to the freshwater and marine environment page 73); monitoring of water-sports activities; continued awareness programmes in hotels; and specific training for hotel staff.

OUTPUT	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-10
Assessment of reef systems undertaken	X	--	X	--	X	X
Priority sites identified	--	X	--	--	--	--
Installation of mooring buoys continued	--	--	X	X	--	--
Training for hotel staff	--	--	X	X	--	--
Rehabilitation of coral reef continued	--	--	--	--	X	X
Areas for water-sports activity identified and designated	X	--	X	X	--	--
User fee system for mooring bouys developed and established	X	X	--	--	--	--
Public education campaign implemented	--	X	--	--	--	--

Goal 1 Conserve Biodiversity

Title: Regulation of Collection and Harvesting of Wild Fauna and Flora

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Agriculture, Fisheries Division, Forestry Department, Ministry of Land and Environment

Other Partners: University of the West Indies, civil society

Duration: Two years

Objective: To reduce the current rate of unchecked harvesting of wild flora and fauna in order to conserve Jamaica's biodiversity.

Rationale: Jamaica has a high level of endemism in flora and fauna. Many species are valuable as collector items and are sold by poachers to nationals and visitors who take the items overseas. Highly sought after species include those protected by law such as the endemic Black-billed and Yellow-billed parrots, black coral, and sea turtle shells. Other popular items include bromeliads and orchids. Given the potential threat of harvesting and collecting to species survival, a programme must be developed to regulate and monitor all aspects of species trade.

Specific Activities: Specific activities include the development and implementation of guidelines for the ecologically sustainable use of species and genetic resources; application of the precautionary approach to harvesting and collection of biological resources; formulation of a policy and regulations to facilitate controlled access to biological resources; increased enforcement efforts and monitoring of collection; and launch a public education campaign.

OUTPUT	Year 1	Year 2
Guidelines prepared	X	--
Policy prepared	--	X
Regulatory framework established	--	X
Effective enforcement system in place		X
Public education campaign conducted	--	X

Goal 1 Conserve Biodiversity

Title: Reduction of Pollutants in Freshwater and Marine Environments	
Lead Agency: National Environment and Planning Agency	
Supporting Government Agencies: Ministry of Land and Environment, National Water Commission, Ministry of Health, Urban Development Corporation	
Other Partners: Ministry of Agriculture, Water Resources Authority, community-based organisations, University of the West Indies	
Duration: Two years	High Priority

Objective: To reduce the current level of pollution in streams and rivers and the near-shore marine environment, by reduction and control of agricultural run-off and deliberate discharge of industrial waste, domestic waste (sewage) and other waste into these environments.

Rationale: High levels of agro-chemical residues; waste from agro-industries; discharge from shore-based industries and sewage disposal, all contribute to degradation of the aquatic environment and reduction of habitat quality for the organisms that live in these systems. In addition persons who depend on these systems for potable water sources are affected. Pollutants are introduced from terrestrial run-off or direct discharge into the marine environment, rivers or sinkholes. Discharges must be regulated and all effluent disposers licensed and monitored. This project builds on initiatives already in place which address the problem of polluted coastal waters, i.e., The Natural Resources Conservation Authority (NRCA) Coastal Water Quality Improvement Programme (CWIP), the Kingston Harbour Rehabilitation Project and the NRCA Permit and License System.

Specific Activities: Specific activities will include chemical analysis of selected rivers and streams and near-shore sites; licensing of all effluent disposers; regulation of disposal methods, sites and quantities; biomonitoring; preparation of a monitoring programme for chemical levels in conjunction with analysis of biological effects; and increased penalties and fines for offenders.

OUTPUT	Year 1	Year 2
Survey and analysis of rivers, streams and coastal sites conducted	X	--
Effluent disposers surveyed and licensed	--	X
Current disposal regulations reviewed, including establishment of increased penalties and fines for offenders	X	--
Monitoring programme developed and established	--	X
Disposal practices monitored	--	X
Major sources of pollution identified and assessed	X	--
Impacts of agro-chemical pollution identified	X	--

Goal 1 Conserve Biodiversity

Title: Establishment of Three Plant Rescue Centres

Lead Agency: Ministry of Agriculture-Royal Botanical Gardens

Supporting Government Agencies: Ministry of Land and Environment, Institute of Jamaica, Forestry Department

Other Partners: National Arboretum Foundation, Jamaica Horticultural Society

Duration: Two years

Objective: To establish three centres, at existing gardens, where threatened, endangered and endemic plant species can be relocated and rehabilitated as required.

Rationale: Jamaica has a high level of plant endemism. Habitat destruction/degradation due to development activities and illegal harvesting, threaten many of these plant species. The establishment of Plant Rescue Centres will provide a mechanism to prevent the loss of rare and/or endemic species. The Rescue Centres will be responsible for accommodation, rehabilitation and eventual repatriation of specimens as required. These specimens include plants confiscated from illegal harvesting and export, specimens identified on development sites for removal for their protection, and specimens damaged by construction site activities. Plant Rescue Centres are essential to assist in the conservation of Jamaica's threatened endemic flora. The Centres may also be able to generate income from private plant owners requiring flora rehabilitation services.

Specific Activities: Establishment of a Centre at three sites (Cinchona Botanical Gardens, Hope Botanical Gardens and Mason River Scientific Reserve) where rescued plants can be housed and treated; training of staff in plant rehabilitation techniques; and marketing of the Centres to increase public awareness of their existence, function and purpose.

OUTPUT	Year 1	Year 2
Plant rescue centre at Cinchona Botanical Gardens established	X	--
Plant rescue centre at Hope Botanical Gardens established	--	X
Plant rescue centre at Mason River Scientific Reserve established	X	--
Staff trained in plant rehabilitation	--	X
Marketing of centres commenced	--	X

Goal 1 Conserve Biodiversity

Title: Preparation of an Alien Invasive Species Management Strategy	
Lead Agency: National Environment and Planning Agency	
Supporting Government Agencies: Forestry Department, Fisheries Division, University of the West Indies, Institute of Jamaica, National Commission on Science and Technology, Plant Quarantine Division, Veterinary Division, Customs and Immigration Division, Hope Zoo, Institute of Jamaica	
Other Partners: Protected Areas management organisations, Jamaica Horticultural Society, Bird Life Jamaica, importers of animals and plants, non-governmental organisations responsible for managing the Blue and John Crow Mountains National Park, management organisation for the Portland Bight Protected Area, Jamaican Iguana Research and Conservation Group	
Duration: Three years	High Priority

Objectives: To conduct a pilot project on the impact of the White-tailed Deer, the effectiveness of the eradication of alien invasive species on Goat Island and the re-establishment of natural ecosystems in gaps overgrown on selected sites of two protected areas, with a view to developing an Alien Invasive Species Management Strategy.

Rationale: Jamaica's ecosystems are greatly threatened by alien invasive plants which have long been recognised as a major threat to the island's biodiversity. The most aggressive species include Wild Ginger (*Hedychium gardneranum*), Red Bush (*Polygonum chinense*) and several ferns. The control of these plants is challenging and management options need to be evaluated in pilot projects.

The apparent extinction of five vertebrate species, and the decline of several others over the last 150 years have been linked to the introduction of the Indian Mongoose. However, the impacts of alien invasive species in Jamaica remain poorly understood (e.g., the White-tailed Deer [*Odocoileus virginianus*]) and with few exceptions, no attempts have been made to control them. Presently, Jamaica's legislation does not address the threats to native species posed by these species.

Jamaica's dry forests harbour a number of rare and endangered species such as the Jamaican Iguana that are severely threatened by alien/exotic predators including mongooses, cats, dogs and rats. The complete eradication of predators on Great Goat Island will provide ideal conditions for the creation of a wildlife sanctuary for the Jamaican Iguana and other rare and endangered species.

Specific Activities: Specific activities will include an in-depth review, based on existing knowledge, of all introduced species currently in Jamaica's ecosystems, i.e., density, reproductive output, habitat use, potential effects of these species on native biodiversity and options for their control. Past and current experiences of their control in Jamaica and elsewhere will be evaluated. Alien/exotic vertebrates will be completely eradicated on Great Goat Island using techniques that have been effective on similar tropical cays in order to prepare it as a wildlife sanctuary. Based on local and international experience, the most promising methods of re-establishing natural ecosystems in areas overgrown by invasive plants will be identified. The effectiveness of these methods will be evaluated with field experiments in selected areas such as the Blue Mountains, Port Royal Mountains, Cockpit Country and Mason River. Negative side effects of control measures will be considered carefully. The economic costs of implementing control measures on a large scale will be estimated. Current legislation on import and internal trade of introduced species will be examined and legislative gaps facilitating their spread identified. The enforcement of existing legislation will also be evaluated. Based on a review of the pilot projects and best practices, a management strategy will be formulated addressing needs and priorities for research, education, legislation, pilot projects and long-term control measures.

OUTPUT	Year 1	Year 2	Year 3
Existing knowledge on alien invasive species and their potential impacts on native species and ecosystems reviewed	x	--	--
Trade in alien invasive species evaluated	x	--	--
Legislation and enforcement evaluated	x	--	--
Management options evaluated	x	--	--
Management strategy prepared	x	--	--
White-tailed deer			
Management options for control identified	x	x	--

OUTPUT	Year 1	Year 2	Year 3
Density and reproductive output estimated	X	X	--
Impact on native ecosystem evaluated	X	X	--
<i>Eradication of alien species – Hellshire Hills, Goat Island, etc.</i>			
Action plan prepared	X	X	--
Equipment, vehicle and boat prepared	X	--	--
Field camps and trapping system established	X	--	--
Alien invasive species removed and native species monitored	X	X	X
<i>Gap Rehabilitation</i>			
Management options identified	X	--	--
Management options in field trials evaluated	X	X	X
Action plan to manage alien invasive plants prepared	--	--	--

Goal 1 Conserve Biodiversity

Title: Implementation of the Ocho Rios Marine Park Management Plan

Lead Agency: Friends of the Sea

Supporting Government Agencies: National Environment and Planning Agency

Other Partners: Non-governmental organisations, community based organisations, University of the West Indies, Jamaica Protected Areas Network, OREAG, AMC, Fisheries Division, Maritime Authority, Tourism Product Development Company, Jamaica Tourist Board, Jamaica Hotel and Tourism Association, Scientific Research Council, National Council for Ocean and Coastal Zone Management, Discovery Bay Marine Laboratory

Duration: Two years

Objective: To implement the management plan developed by the local stakeholders and community.

Rationale: The boundaries of the marine park were declared in November 1999 and the management plan has been developed in accordance with NEPA draft guidelines in a fully participatory manner over the last two years.

Specific Activities: Implementing a permanent mooring system; initiating a comprehensive community and business education programme; training wardens and/or stewards for enforcement functions; zoning the area in accordance with community needs; continuing the schools education programme; monitoring water quality; implementing the Blue Flag initiative; establishing financial sustainability; disseminating information through brochures, newsletters and the media; organising community awareness and fund raising events; and promotion of merchandise.

OUTPUT	Year 1	Year 2
Area mapped and mooring sites identified	X	--
Moorings established	--	X
Marine Park zoned	X	
Wardens trained in enforcement functions		X
Training workshops for users conducted	X	X
Merchandising identified	--	X
Newsletters, brochures, posters produced	X	X
Community education conducted	X	X
Media networking	X	X
Water quality monitoring programme established	X	--
Fisheries management programme established	--	X
Fisheries data collected	X	X
Resource centre established	--	X

Goal 1 Conserve Biodiversity

Title: Implementation/preparation of recovery strategies for critically endangered species

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Land and Environment, Ministry of Agriculture, Hope Zoo

Other Partners: Sea Turtle Recovery Network, University of the West Indies, Jamaican Iguana Research and Conservation Group, American Zoo Association-Lizard Advisory Group, The World Conservation Union (IUCN), West Indies Iguana Specialist Group

Duration: Five years

High Priority

Objective: To implement and prepare recovery strategies for critically endangered species and habitats.

Rationale: While there is qualitative information, limited quantitative data are available on the number of individuals, habitat status and movements of Jamaica's sea turtle population. While studies (genetic and nutritional) have been conducted on the Jamaican Iguana and twenty-six head start animals have been released into the Hellshire Hills, their natural habitat, the species has not been successfully bred in captivity. The head-start enclosure at the Hope Zoo needs to be improved and further biological research, including incubation mechanisms is needed. Finally, it is anticipated that other wild flora and fauna will be classified as endangered and as such strategies will need to be developed.

Specific Activities: Annual surveys will be conducted on the Hawksbill Turtle (*Eretmochelys imbricata*), Jamaica Iguana (*Cyclura collei*) and targeted plant and animal species. The activities for the sea turtles will include surveys, mapping of records and primary quantitative and qualitative data, monitoring of nesting beaches and expanding the public awareness programme. The Jamaican Iguana programme will seek to improve the existing breeding enclosures with a view to foster research and stimulate mating and reproduction of the captive population. The remaining endangered flora and fauna species will be determined based on secondary/primary scientific data. Where necessary further surveys will be commissioned.

OUTPUT	Year 1	Year 2	Year 3	Year 4	Year 5
Seven index sea turtle nesting beaches surveyed	X	X	X	X	X
Major sea turtle foraging areas identified	X	X	X	--	--
Jamaican Iguana enclosures upgraded	X	--	--	--	--
Research programme on captive breeding established	--	X	X	X	--
Endangered flora and fauna habitat determined	X	X	X	X	--
Endangered flora and fauna booklet prepared	--	--	--	--	X
Public consultation on management and recovery strategies developed	--	--	--	--	X
Rapid ecological assessment of floral and faunal species in freshwater ecosystems conducted	X	X	--	--	--
Data digitised and mapped	--	X	X	--	--
Management and recovery strategies formulated	--	--	--	--	X

Goal 2 Sustainable Use of Biological Resources

Title: Development and Implementation of Criteria for Sustainable Use of Resources

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Fisheries Division, Forestry Department, Ministry of Land and Environment

Other Partners: Civil society, University of the West Indies

Duration: Three years

Objectives: To determine criteria for the sustainable use of terrestrial and marine resources, and to implement these criteria in order to conserve biodiversity thereby ensuring long-term benefits from their use.

Rationale: The sustainable use of resources is essential to the well being of members of the society in both the short and long-term. Basic living standards can be improved without depleting renewable natural resources and degrading the environment. This project will assist in achieving the sustainable use of Jamaica's natural resources through the development and implementation of appropriate criteria for sustainable use.

Specific Activities: Specific activities will include development of a biological inventory for harvestable and non-harvestable resources; determination of current levels of stock; calculation of harvesting quotas; economic valuation of non-harvestable resources and regulation of collection and harvesting of wild stock.

OUTPUT	Year 1	Year 2	Year 3
Biological inventory completed	X	X	--
Stock assessment completed	X	X	--
Quota determined	--	--	X
Economic valuation conducted	--	X	--
System of regulation implemented	--	--	X

Goal 2 Sustainable Use of Biological Resources

Title: Development of Sustainable Fisheries

Lead Agency: Fisheries Division

Supporting Government Agencies: Ministry of Agriculture, National Environment and Planning Agency, Jamaica Defence Force (Coast Guard)

Other Partners: Montego Bay Marine Park, Caribbean Coastal Area Management Foundation, Negril Coral Reef Preservation Society, Negril Area Environmental Protection Trust, Bluefields Peoples' Community Association, Friends of the Sea, Portland Environmental Protection Association, University of the West Indies (Centre for Marine Sciences, Discovery Bay Marine Laboratory, Port Royal Marine Laboratory)

Duration: Five years

Priority

Objective: To develop a sustainable fisheries industry in order to halt the current depletion of resources, degradation of the environment and loss of biodiversity.

Rationale: Fish harvesting practices range from traditional non-depletive methods such as line fishing to particularly destructive methods such as dynamiting and use of chemicals. The latter methods combined with over-harvesting, illegal catch of juveniles, and fishing during the closed seasons has resulted in severe depletion of stock and degradation of the environment. Fishing beaches are not managed and do not have adequate facilities to support the current level of activities. A Draft Policy on Ocean and Coastal Zone Management has been prepared to guide *inter alia*, the development of sustainable fisheries.

Specific Activities: Stock assessment of all fishable resources; determination of species-appropriate catch limits; setting of gear limitations; increase in the current level of enforcement; increase of fines and penalties to deter illegal practices; empowerment of fishers to manage fishing beaches; establishment of adequate facilities at fishing beaches; investigation of the mariculture industry; and increased capacity of the Fisheries Division to carry out its mandate. *Queen Conch:* Determine the maximum sustainable yield; establish a minimum shell size for the harvest of conch; revise the management plan, level of poaching and establish the management units;

OUTPUT	Year 1	Year 2	Year 3	Year 4	Year 5
Stock assessment conducted	X	X	X	X	X
Catch limits/quotas determined	X	X	X	--	-
Enforcement of regulations increased	X	X	X	X	X
Fishing beaches upgraded	X	X	X	X	X
Sustainability of mariculture industry investigated	--	--	X	X	--
Queen Conch abundance survey conducted	--	--	--	X	--
Mariculture policy completed	X	--	--	--	--

Goal 2 Sustainable Use of Biological Resources

Title: Development of Sustainable Forestry	
Lead Agency: Forestry Department	
Supporting Government Agencies: National Environment and Planning Agency, Ministry of Agriculture, Ministry of Land and Environment	
Other Partners: Civil society	
Duration: Three years	Priority

Objective: To develop Jamaica's forestry industry with emphasis on the development of sustainable harvesting of resources.

Rationale: The forestry industry is important not only for economic gain but also because of the major role that forests play in the island's ecological balance. Forested areas are high in biodiversity, and Jamaica has a wide range of forest types including dry and wet limestone forests, upper and lower montane mist forests and wetland forests. Forests are important in watershed management and provide habitats for numerous species of flora and fauna.

Specific Activities: Implementation of the National Forest Management and Conservation Plan; continual updating of the inventory of forest lands; assessment of the ecological impacts of introduced species; increase enforcement and penalties as a means of controlling illegal harvesting practices; improvement and expansion of programmes such as forest rehabilitation; and assessment of Crown Lands and private properties. *Lignum vitae*: To educate a critical core of professionals (architects, planners, builders) who interface with trees while executing their remit, especially on the south coast; to plant four thousand seedlings annually; to activate the tree preservation order on Government lands; to look at distribution, population size and level of harvesting; to collect varieties and establish germplasm banks and commercial plots. *Wetlands*: Stock assessment of remaining mangroves; increased enforcement against illegal harvesting and dumping in mangroves, and development and implementation of a management plan for mangroves. *Orchid*: assess habitats and carry out survey; establish an orchid seed and germplasm bank.

OUTPUT	Year 1	Year 2	Year 3
Inventory of forest lands updated	X	X	--
Ecological impacts of introduced species assessed	X	X	--
Increased enforcement of regulations	X	X	X
Orchid survey conducted and habitat assessed	--	X	X
Orchid seed bank and germplasm repository established	--	--	X
Personnel trained in the area of orchid identification	X	--	--
Land ownership ascertained	X	--	--
Mangrove forest stock assessed and inventoried	X	--	--
Wetlands management plan developed	--	--	X
Wetlands policy finalised	--	--	X
Lignum vitae commercial plot established	--	X	--
Public education and awareness programme implemented	X	X	X

Goal 2 Sustainable Use of Biological Resources

Title: Sustainable Management of Game Bird Populations

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Land and Environment

Other Partners: Game bird hunting clubs, Bird Life Jamaica, University of the West Indies (Life Sciences Department), Game Birds Management Committee, Jamaica Sport Shooting Federation

Duration: Two years

Objective: To achieve the sustainable use of Jamaica's game bird population.

Rationale: There are many gun clubs in Jamaica. Although most hunters adhere to existing regulations for bag limits, shooting seasons and game species, there are infractions resulting in a decline of some populations. Additionally, loss of habitat due to developmental pressure and small-scale agricultural enterprises, result in an increased threat to game species. =

Specific Activities: Assessment of Game Sanctuaries/Reserves; stock assessment of game species; monitoring during game hunting season; preparation of game bird management plan; and increased enforcement through the provision of more Game Wardens.

OUTPUT	Year 1	Year 2
Survey of game reserves conducted	X	--
Stock assessment of game species conducted	X	--
Monitoring conducted	--	X
Additional Game Wardens trained and appointed	X	X
Species guides prepared	--	X
Public education campaigns conducted	--	X
Game Reserves on private lands declared	--	X
Management plan developed	--	X

Goal 2 Sustainable Use of Biological Resources

Title: Sustainable Management of Bat and Dolphin Species

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Land and Environment

Other Partners: University of the West Indies-Life Sciences Department, Non-governmental Organisations

Duration: Four years

Objective: To develop a sustainable management plan for Jamaica's bat and dolphin populations, particularly endemic bat species.

Rationale: Twenty-one bat species have been recorded in Jamaica, two of which are endemic. Little research has been conducted on local bat species, their habitat or their status. Current practices such as cave tours using kerosene torches, mining of bat guano for fertiliser, and clearing of forests surrounding caves are having detrimental effects on bat populations because of the sensitivity of the species to habitat change/loss. The Bottlenose dolphin (*Tursiops truncatus*) has been informally reported in Jamaican waters but no comprehensive census has been conducted. The first established dolphin attraction in Jamaica appears to be popular both locally and overseas and there are other requests to establish more dolphin attractions. In order to address the harvesting of dolphins from the wild, the population needs to be assessed and discussions held with relevant stakeholders.

Specific Activities: *Bats* - Complete assessment of all populations in all known bat caves, to identify species composition; research on the ecology of each species to determine breeding seasons and feeding grounds; identification and analysis of caves suitable for recreational tours, noting that all Jamaican caves with bat populations pose a health risk (Histoplasmosis) to visitors; determination of user capacity for each cave; determination of closed season for tours based on breeding season analysis; training and certification of tour guides; preparation of a brochure on bats and cave tours; an EIA, with particular reference to bats and cave-dwelling invertebrates, will be required for any bat guano mining operations. *Dolphins* - obtain preliminary information on their population at historically known areas; assess habitat conditions and factors affecting survival.

OUTPUT	Year 1	Year 2	Year 3	Year 4
Bat				
Feasibility study of guano mining conducted	--	X	--	--
Assessment of bat populations completed	--	--	X	--
Cave tours identified	X	--	--	--
Cave tour guides trained and certified	--	X	--	--
Public information brochures prepared	--	--	X	--
Management strategy prepared	--	--	X	--
Dolphin				
Meetings with stakeholders convened	X	--	X	--
Review of literature and data completed	X	--	--	--
Boat and aerial survey conducted	--	X	X	--
Management strategy prepared.	--	--	--	X

Goal 2 Sustainable Use of Biological Resources

Title: Preparation of Ecological Zonation Plan and Land Use Plans for Declared Protected Areas

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Forestry Department, Fisheries Division, Ministry of Agriculture, Ministry of Land and Environment, Institute of Jamaica

Other Partners: St. Elizabeth Environment Protection Association, Portland Environment Protection Association, South Trelawny Environment Association, Windsor Research Station, Negril Area Environmental Protection Trust, University of the West Indies

Duration: Three years

Priority

Objective: To determine ecological zonation and land use plans for proposed protected areas and produce an Ecological Zonation/Land Use Map.

Rationale: Many areas have been identified as priority areas for protection status under the Protected Areas Policy. These areas are recognised as having high ecological value, aesthetic appeal and/or recreational potential. The project will enable detailed mapping of ecological zones, habitats and location of rare and endemic flora and fauna. This information is essential to ensure that protected areas are managed in a manner that they will effectively contribute to Jamaica's overall biodiversity conservation strategy.

Specific Activities: Land use survey; determination of ecological zones; identification of habitats for rare and endemic flora and fauna; and preparation of digital maps.

OUTPUT	Year 1	Year 2	Year 3
Land use survey conducted	X	--	--
Habitat identified	X	--	--
Ecological survey conducted	X	--	--
Ecological zones determined and defined	--	X	--
Data digitised and mapped	--	--	X
Red Data Book prepared	--	X	X

Goal 2 Sustainable Use of Biological Resources

Title: Promotion of Sustainable Tourism Practices

Lead Agency: Ministry of Industry and Tourism

Supporting Government Agencies: Ministry of Land and Environment, Jamaica Tourist Board, Tourism Product Development Company, Ministry of Education, Youth and Culture, Ministry of Local Government, Community Development and Sports

Other Partners: National Environment and Planning Agency, civil society, Urban Development Corporation, Jamaica Promotions Corporation

Duration: Two years

Objective: To continue the development of all aspects of the tourism industry with emphasis on conservation of ecological resources and biodiversity; development of alternative types of tourism as outlined in the Master Plan for Sustainable Tourism in Jamaica, including heritage tourism, nature trails and eco-tourism, to reduce the current pressure on ecological resources from traditional tourism.

Rationale: The tourism industry is based on the beauty of Jamaica's resources and the natural environment, but in many ways it has contributed to the degradation of the environment and reduction of biodiversity because of unplanned development, over-subscription of users, lack of adequate infrastructure, destructive practices and lack of awareness. The development of the resort areas of Port Antonio, Oracabessa, Kingston and the South Coast, requires information on carrying capacity to avoid pressures on ecological resources. Promotion of alternative types of tourism will help to alleviate some of the pressures on ecological resources resulting from traditional tourism activities. Development of sustainable eco-tourism activities will also increase awareness of biodiversity issues and encourage supporting research.

Specific Activities: Development of heritage tourism, eco-tourism and other alternative activities; continue the development and implementation of guidelines and codes of conduct; continue the promotion of greening of the tourism industry; acceleration of the TEAM Jamaica Programme for staff in the accommodation and attraction sectors, with additional emphasis on environmental education; and the preparation of a video on the Jamaican environment for hotel television.

OUTPUT	Year 1	Year 2
Heritage and eco-tourism attractions developed	X	--
Carrying capacity studies conducted	--	X
Video on Jamaican environment prepared	--	X
Code of ethics prepared and implemented	X	X

Goal 2 Sustainable Use of Biological Resources

Title: Development of a Sustainable, Community Based Management Plan for the Yallahs Lagoon Ecosystem

Lead Agency: Scientific Research Council

Supporting Government Agencies: St. Thomas Parish Council, National Environment and Planning Agency

Other Partners: St. Thomas Environment Protection Association, Yallahs Pond Management Group, University of the West Indies (Life Science Department)

Duration: Two years

Objective: To develop and implement a sustainable community based management plan for the Yallahs Lagoon Ecosystem

Rationale: The Yallahs Lagoon in St. Thomas is the only permanent hyper-saline ecosystem in Jamaica. Its environs support a variety of shorebirds and is the only site where *Artemia* (brine shrimp) are known to occur naturally in the island. Along with community partners, the Scientific Research Council (SRC) has led the investigation into the commercial potential of the two salt ponds which make up the Yallahs Lagoons. Research has focused on the use of technology to produce *Artemia* cysts and biomass, used in the aquaculture industry world wide as an important component of feed for raising fish.

The full potential of the Yallahs Lagoon Ecosystem can only be realised in the framework of a comprehensive Management Plan. The formulation and implementation of such a plan will ensure the preservation of the ecosystem's unique characteristics while providing policies and guidelines to facilitate the exploration and sustainable use of the natural resource for a wide but complementary variety of activities, including *Artemia* and salt production, eco - and heritage tourism, and conservation activities and research.

Specific Activities: Contract the assistance of specialist consultant to develop a management plan for the ecosystem, through consultations with community groups and stakeholders, field investigations and review of available data at the SRC and in the parish; training and awareness building to enhance the capability of the community to implement the management plan on a sustainable basis.

OUTPUT	Year 1	Year 2
Community based management plan prepared	X	--
Community capacity strengthening to implement plan (training of wardens management group)	X	X
Management plan reviewed	--	X
Management plan implemented	X	X

Goal 3 Facilitate Access to Biological Resources to Promote Developments in Biotechnology and Benefit Sharing

Title: Development of Natural Products Industry, Sustainable Use of Medicinal and Aromatic Plants and the Establishment of *In-situ* and *Ex-situ* Collections

Lead Agency: Scientific Research Council

Supporting Government Agencies: Institute of Jamaica, National Commission on Science and Technology, Ministry of Agriculture, Ministry of Commerce, Science and Technology, National Environment and Planning Agency, Forestry Department, Jamaica Promotions Corporation

Other Partners: University of the West Indies, College of Agricultural Sciences and Education, Northern Caribbean University, Natural Products Institute, Environmental Foundation of Jamaica, Environmental non-government organisations, community based organisations

Duration: Five years

Priority

Objectives: To determine pharmaceutical and nutraceutical properties of indigenous plants identified as having medicinal and other beneficial properties and to assist in the conservation and sustainable management of significant medicinal and aromatic plants

Rationale: Many plants of known medicinal value have been used in rural parts of Jamaica for centuries. Most of this information was informally transferred and not recorded until the Jamaica Memory Bank was formed. The information in the Memory Bank can now be used as a starting point for identifying priority species for focusing scientific research. Plants of known medicinal or other beneficial value must be targeted for more detailed scientific research and analysis. Medicinal and aromatic plants provide a vital contribution to the health system in Jamaica and many of these plants have not been scientifically studied for isolation of active compounds.

Specific Activities: Review of existing data particularly in the Institute of Jamaica; identification of priority species for analysis; collection of specimens and laboratory analysis and extraction; establishment of a gene bank for medicinal and aromatic plants consisting of field banks, seed banks and *in-vitro* banks; *ex-situ* propagation/conservation in selected areas; improvement of existing laboratory and technological systems; improvement of indigenous capacity to conserve plant species. The regulatory system required will be developed under another project.

OUTPUT	Year 1	Year 2	Year 3	Year 4	Year 5
Literature review conducted	X	--	--	--	--
Priority species identified	--	X	--	--	--
Specimens collected and laboratory extraction	--	--	X	X	X
Nutraceutical and pharmaceutical analyses conducted	--	--	X	X	X
Training conducted	--	--	X	X	--
Feasibility study for markets for bioprospected nutraceuticals and herbal remedies conducted	--	X	X	--	--
Genetic markers for economic plants identified	--	--	--	X	--
Gene bank established and maintained	--	--	X	X	--

Goal 3 Facilitate Access to Biological Resources to Promote Developments in Biotechnology and Benefit Sharing

Title: Preparation of Policies and Legislation to Facilitate Access to Biological Resources and Equitable Benefit Sharing

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Commerce, Science and Technology, Institute of Jamaica, Ministry of Land and Environment, Chief Parliamentary Counsel

Other Partners:

Duration: Three years

High Priority

Objective: To ensure policies and legislation are in place to guide and regulate access to national biological resources and ensure that the benefits derived from their uses are equitably shared.

Rationale: Jamaica has a wealth of biodiversity and has traditionally granted access to both national and foreign researchers to our genetic resources and to traditional knowledge. Current legislation is insufficient to ensure that there is regulated access to genetic resources and traditional knowledge and appropriate benefit sharing. Many plants are being taken out of the country for scientific investigation to determine their potential value as pharmaceutical products. Policies and legislation are required to facilitate and control access to genetic resources, and to ensure equitable benefit sharing and conservation.

Specific Activities: Identification of existing legal, policy and administrative framework regarding genetic resources; development of a policy and relevant legislation for access and a benefit-sharing regime; establishment of intellectual property regimes addressing ownership issues, as appropriate; standardisation of Material Transfer Agreements for commercial and scientific research to facilitate access to genetic resources; on-going updating of the Jamaica Memory Bank.

OUTPUT	Year 1	Year 2	Year 3
Jamaica Memory Bank updated	X	X	X
Existing Material Transfer Agreements reviewed	X	--	--
Policy and legislation on intellectual property rights related to traditional knowledge and use of bio-resources prepared	--	X	X
Policy and legislation to control access to genetic resources and ensure benefit sharing prepared	--	X	X

Goal 3 Facilitate Access to Biological Resources to Promote Developments in Biotechnology and Benefit Sharing

Title: Protection of Traditional Knowledge and Creation of a Traditional Knowledge Register/Library

Lead Agency: Institute of Jamaica

Supporting Government Agencies: National Environment and Planning Agency, Jamaica Intellectual Property Organisation, Ministry of Commerce, Science and Technology, Ministry of Agriculture, Ministry of Local Government, Youth and Culture

Other Partners: UNESCO

Duration: Three years

Objectives: To protect traditional knowledge in order to ensure equitable access to and benefit sharing for its use, preserve traditional lifestyles and practices useful to conservation of biodiversity and promote appropriate use of this knowledge.

Rationale: Traditional knowledge is quickly becoming lost in Jamaica. This knowledge is usually accessed without appropriate benefit sharing or prior informed consent and needs to be protected, collected and preserved in a manner acceptable to local communities. One means of protecting traditional knowledge and allowing benefit sharing to local communities is through the creation of a traditional knowledge register.

Specific Activities: Conduct assessment of traditional knowledge store in Memory Bank; obtain appropriate informed consent from owners of traditional knowledge to be stored in Traditional Knowledge Register; develop the means of accessing traditional knowledge and mechanism for benefit sharing from its use; conduct assessment needs for the protection of traditional knowledge by a *sui generis* system; seek protection of some forms of traditional knowledge under current Intellectual Property Right System with consent of holders; introduce appropriate legislative framework to protect traditional knowledge

OUTPUT	Year 1	Year 2	Year 3
Traditional knowledge collected in Memory Bank assessed	X	--	--
Traditional knowledge register developed and maintained	--	X	--
Consultation held with persons with traditional knowledge	X	X	--
Protection mechanism from traditional knowledge developed	--	X	--
Legislation framework for traditional knowledge developed	--	X	X
<i>Sui generis</i> system for traditional knowledge developed	--	X	X

Goal 4 Safe Transfer, Handling and Use of Living Modified Organisms

Title: Public Education on the Safe Handling and Use of Living Modified Organisms (LMOs)

Lead Agency: National Biosafety Committee

Supporting Government Agencies: National Commission on Science and Technology, Ministry of Agriculture, Ministry of Land and Environment, Ministry of Foreign Affairs and Foreign Trade, Institute of Jamaica

Other Partners: Civil society

Duration: Three years

Objective: To sensitize the public on the essential principles of the safe handling and use of products of biotechnology, through a Public Education Programme in Biosafety.

Rationale: The increasing application of modern biotechnology in the agricultural, health and industrial sectors has made it essential that countries institute regulatory frameworks for assessing and monitoring the importation, handling and use of genetically modified organisms and their derived products. The benefits of genetic engineering have fuelled the production of transgenic crops and it is predicted that by 2002 nearly all corn and soya grown in the United States will be genetically modified. The CBD requires that efforts be made to ensure safety for consumers and the environment when transgenic material is imported or developed.

Specific Activities: Preparation of information brochures and fact sheets; administration of baseline survey of knowledge and attitudes; presentation of information to target groups; participation in media interviews; hosting of a schools' debate; administration of a post-sensitization survey; publication of current international activities; hosting of public fora; and promotion of the Clearing-House Mechanism on Biosafety.

OUTPUT	Year 1	Year 2	Year 3
Brochures prepared	--	X	X
Baseline survey on knowledge and attitudes conducted	X	X	--
Campaign to present biosafety information to public and media launched		X	X
Schools' debate held	--	--	X
Public fora held	--	X	X
Post-sensitisation survey conducted	--	--	X

Goal 4 Safe Transfer, Handling and Use of Living Modified Organisms

Title: Institutional Capacity Building for Risk Assessment and Management of Living Modified Organisms (LMOs)

Lead Agency: Jamaica Bureau of Standards

Supporting Government Agencies: National Commission on Science and Technology, Ministry of Agriculture, Scientific Research Council, National Environment and Planning Agency

Other Partners: National Biosafety Committee

Duration: Three years

Objective: To increase institutional capabilities of all agencies involved with biotechnology in order to develop adequate procedures and measures for risk assessment and management.

Rationale: Increasing application of modern biotechnology necessitates proper knowledge and use of living modified organisms. It is the role of Government to minimize associated risks to human health and the environment.

Specific Activities: Training through recognised programmes in specified institutions overseas; establishment of a programme of local training workshops for staff of key institutions; and purchase of the necessary equipment to enable institutions and agencies to carry out research, data gathering and monitoring of LMOs in the country.

OUTPUT	Year 1	Year 2	Year 3
Overseas training in risk assessment and management of LMOs conducted	x	x	x
Local workshops conducted	--	x	x
Capacity for monitoring LMOs increased	--	--	x

Goal 4 Safe Transfer, Handling and Use of Living Modified Organisms

Title: Development of Regulatory and Administrative Measures to Control the Safe Handling and Use of Living Modified Organisms (LMOs)

Lead Agency: National Commission on Science and Technology

Supporting Government Agencies: Ministry of Foreign Affairs, Ministry of Health, Jamaica Bureau of Standards, Ministry of Agriculture, Chief Parliamentary Counsel, Ministry of Land and Environment, National Environment and Planning Agency

Other Partners:

Duration: Two years

Priority

Objective: To develop national measures for the regulation and administration for the control and safe handling and use of Living Modified Organisms.

Rationale: The existing National Biosafety Committee has a key role to play in the development of biosafety issues at the national level. However the National Biosafety Committee requires institutional strengthening to enable it to effectively perform this function.

Specific Activities: Preparation of a policy on biosafety and biotechnology; strengthening the institutional capacity of the National Biosafety Committee; and development of relevant legislation and training.

OUTPUT	Year 1	Year 2
Biosafety policy prepared	X	--
Capacity of National Biosafety Committee strengthened	X	--
Biosafety legislation developed	X	--
Capacity building conducted through training	X	X
Biotechnology policy prepared	--	X

Goal 5 Enhance Resource Management Capacity

Title: Human Resources Development in Identification, Conservation and Sustainable Use of Genetic Resources

Lead Agencies: University of the West Indies, Northern Caribbean University, College of Agriculture Science and Education, University of Technology

Supporting Government Agencies: Scientific Research Council, National Commission on Science and Technology, Institute of Jamaica, Ministry of Agriculture

Other Partners: Civil Society, National Environmental Societies Trust, Orchid Society of Jamaica, Natural History Society of Jamaica, Jamaica Horticultural Society

Duration: Three years

Objective: To increase the number of trained personnel in conservation, biodiversity, taxonomy, biotechnology and genetics.

Rationale: Graduate training is required to increase the number of dedicated specialists, especially in some areas where no national specialist now exists.

Specific Activities: Post-graduate training in biotechnology, taxonomy, and biosafety for key personnel in relevant institutions and agencies; identification of suitable programmes or courses locally and/or overseas; and organise training workshops targeting Environmental Non Government Organisations and Community Based Organisations (CBOs) for training in data collection and conservation techniques and training of para-taxonomist.

OUTPUT	Year 1	Year 2	Year 3
Specialist trained (biotechnology)	X	--	--
Specialist trained (taxonomy)	--	X	--
Specialist trained (biosafety)	X	X	X
Training workshops conducted	X	X	X

Goal 5 Enhance Resource Management Capacity

<p>Title: Expansion of the National Clearing-House Mechanism</p> <p>Lead Agency: Institute of Jamaica</p> <p>Supporting Government Agencies: National Environment and Planning Agency, Scientific Research Council, Forestry Department, Fisheries Division, National Commission on Science and Technology, Ministry of Land and Environment</p> <p>Other Partners: University of the West Indies, United Nations Environment Programme and United Nations Development Programme</p> <p>Duration: Three years</p>	Priority
--	-----------------

Objective: To expand the existing national Clearing-House Mechanism (CHM) to meet national needs in the area of information sharing and exchange, both nationally and regionally.

Rationale: Effective management of biological data and information remains an urgent priority despite recent initiatives to improve access to and management of biological data. In 1991, the Conservation Data Centre-Jamaica was established at the University of the West Indies as a biological data unit to assist in the establishment and development of National Parks. The Centre was closed several years ago. A national biodiversity information network, the National Clearing-House Mechanism has been established at the Institute of Jamaica to support the implementation of the Convention on Biological Diversity through the promotion and facilitation of scientific and technical co-operation. Biological, agricultural and biochemical data and information are urgently needed to meet this goal.

Specific Activities: Establishment of a national Clearing-House Mechanism Committee with representatives from key Government agencies, civil society and the academic community to provide a framework for strengthening the existing national CHM; assessment of the value of existing data at the Conservation Data Centre and transfer of relevant data and literature to the national CHM at the Institute of Jamaica; establishment of systems of consistent transfer of quality controlled data to the national CHM; creation of biological data in digital format to facilitate the use of Geographical Information Systems utilizing a format that is widely applicable; and participation in a regional metadata project developed by the Inter-American Biodiversity Information Network, which develops national capacity for more efficient and precise searches for information than the World Wide Web, identifies available information on biodiversity at the national level, identifies in-country information providers, and develops a national infrastructure for the exchange of biodiversity information.

OUTPUT	Year 1	Year 2	Year 3
National Clearing-House Mechanism Committee established	X	--	--
Existing biodiversity information from the closed Conservation Data Centre assessed and transferred	X	X	X
Workshops to identify data providers and data at the national level conducted	X	X	X
System of data transfer to the CHM established	X	X	X
Creation of digital format for data gathered (e.g. purchase of GIS software)	X	X	X
Development of meta-data bases	X	X	X

Goal 5 Enhance Resource Management Capacity

Title: Establishment of the Jamaica Protected Areas Biological Database

Lead Agency: Institute of Jamaica

Supporting Government Agencies: Ministry of Agriculture, Fisheries Division, Forestry Department, National Environment and Planning Agency

Other Partners: Jamaica Protected Areas Network, Jamaica Conservation and Development Trust, Negril Area Environmental Protection Trust, Montego Bay Marine Park, Negril Coral Reef Preservation Society, Windsor Research Station, Southern Trelawny Environmental Agency, Portland Environment Protection Association, Dolphin Head Trust

Duration: Two years

Objective: To provide a referenced source of information to evaluate the role, extent and status of protected areas in Jamaica.

Rationale: Protected areas are vital for biodiversity conservation. Areas already declared as well as those proposed for declaration will require detailed biological surveys to assist in preparation of management plans, preparation of zonation maps and identification of species and habitats for priority protection. The integration of isolated data from each protected area into a national database will provide the basis for a coherent, integrated conservation programme. Information compiled by the Conservation Data Centre, Jamaica, opened in 1991 and closed in 1998, needs to be reviewed and integrated. The Institute of Jamaica, host for the national Clearing-House Mechanism (CHM), will be the appropriate institution to host the Protected Areas Biological Database. The CHM will co-ordinate the development of the protected areas databases to ensure use of standardised methods, compatibility of data, efficient data exchange as well as support for NGO's with limited capacity. This project will be implemented after declaration and establishment of new protected areas, following the completion of the required inventories for these areas.

Specific Activities: Compilation of; i) biological aspects of protected areas (information should be available after implementation of other projects listed herewith); ii) lists of protection mechanisms for each protected area; iii) lists of infrastructure and species protected by each area; iv) list of threats to species; development of i) metadata for the protected areas and species; ii) metadata for bibliographic references, organisations, experts and geo-spatial information.

OUTPUT	Year 1	Year 2
Management information system developed	X	--
Staff trained	X	--
Metadata base developed	X	X
Links to CHM established	X	X

Goal 5 Enhance Resource Management Capacity**Title:** Repatriation of Indigenous Biodiversity Information**Lead Agency:** Institute of Jamaica**Supporting Government Agencies:** National Environment and Planning Agency**Other Partners:** University of the West Indies**Duration:** Four years**Objective:** To gain access to all Jamaican biodiversity information currently housed in museums, research institutions and universities overseas.**Rationale:** A considerable amount of research has been conducted on Jamaican flora and fauna with specimens collected and housed in overseas institutions. The aim would not be to physically return specimens and holdings to the island but to identify all relevant holdings, produce a catalogue of biodiversity information, and create electronic access to the information through the Clearing-House Mechanism at the Institute of Jamaica. This knowledge should be readily accessible to all Jamaicans, particularly decision-makers, so that resources are not wasted on research efforts where information may already exist. The information will also be used to enhance the existing knowledge base in the island.**Specific Activities:** Identification of institutions that house information relevant to Jamaican biodiversity; analysis of the type of information and its relevance to various areas of biodiversity conservation; establishment of a dedicated web-page hosted by the Institute of Jamaica to provide an electronic link to databases of identified institutions.

OUTPUT	Year 1	Year 2	Year 3	Year 4
Institutions and holdings identified	X	--	--	--
Information collected from overseas institutions	--	X	X	X
Web-page established	--	--	--	X

Goal 5 Enhance Resource Management Capacity

Title: Development of Increased Resource Management Capacity	
Lead Agency: University of the West Indies	
Supporting Government Agencies: National Environment and Planning Agency, Ministry of Land and Environment	
Other Partners:	
Duration: Two years	Priority

Objective: To increase the professional capacity of resource managers in the areas of economic evaluation of biodiversity, financial resources identification and project monitoring and evaluation

Rationale: The ecological resources of Jamaica provide the basis of many key industries, including top foreign exchange earners such as tourism. Many of these industries contribute to the loss of the very resources on which they are dependent. The development of policies that encourage users to account for the economic cost of natural resource depletion/degradation into their financial cost would transfer the burden of conservation from Government agencies, increase awareness by the industries of the resources on which they are dependent and are depleting, and seek to generate additional funds which can be targeted directly to biodiversity conservation. Project managers and environmental non-governmental organisations need to be trained in project monitoring and evaluation in order to provide effective reporting on projects.

The identification of international financial resource agencies (e.g. non-governmental organisations, philanthropic groups, financial institutions) interested in funding biodiversity projects; the preparation of targeted proposals and negotiation with representatives are all specialised skills currently lacking in Jamaica. Jamaica is therefore unable to access many potential sources of financial assistance. This project will train two persons to source and secure financial assistance for projects in the Action Plan whose services will be available to the National Biodiversity Secretariat.

Specific Activities: Training of five persons currently working in the field of environmental management or natural resources assessment, who already have a first degree (or higher) in economics or environmental management, at recognised educational institutions; training workshops, organised by the University of the West Indies, for other relevant personnel not requiring a high level of training. Overseas training of two individuals currently working in the field of environmental management or economics to acquire specialised skills to source and secure financial assistance for biodiversity projects. The Ministry of Land and Environment will organise a short training course, aimed at professionals already working in the field and with some experience of project monitoring and evaluation, to be held locally by an internationally recognised educational organisation with relevant expertise.

OUTPUT	Year 1	Year 2
5 persons with specialised skills in environmental economics trained	x	x
Professional staff at NEPA and MLE trained in project monitoring and evaluation	x	x
2 persons with specialised skills in sourcing financial resources trained	--	x

Goal 6 Public Awareness and Education and Community Empowerment

Title: Protected Areas Public Education/Information Programme

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Ministry of Land and Environment, Institute of Jamaica, Ministry of Agriculture, Ministry of Education, Youth and Culture

Other Partners: Jamaica Protected Areas Network

Duration: 2 years

Objective: To provide readily understood and accurate information on the protected area system including protected areas, Fish Sanctuaries, Game Reserves, heritage sites and forest reserves.

Rationale: The National Environment and Planning Agency is responsible for the development of a national system of protected areas, and for promoting public awareness of the ecological systems of Jamaica and their importance to the social and economic life of the island. Information provided will assist in promoting an appreciation for and/or understanding of the concept of protected areas and encourage public interest, support for and participation in all aspects of protected area planning and management.

Specific Activities: Research on values/benefits of protected areas and preparation of pamphlets, brochures, fact sheets, CD-ROM on protected areas; and identification of specific community activities which negatively impact on protected areas such as fires.

OUTPUT	Year 1	Year 2
Research on values/benefits of protected areas conducted	X	X
Audio-visual material produced and distributed	X	X
Pamphlets, brochures, fact sheets, CD-ROM prepared and distributed	X	X
Information on wild fire management prepared	X	--
Community consultation conducted	X	X

Goal 6 Public Awareness and Education and Community Empowerment

Title: Sensitization of the Judiciary and Training for Customs and Immigration Officers and the Constabulary	
Lead Agency: National Environment and Planning Agency	
Supporting Government Agencies: University of the West Indies, Forestry Department, Fisheries Division, Attorney General's Department, Ministry of Foreign Affairs and Foreign Trade, Institute of Jamaica, Jamaica Constabulary Force, Ministry of Land and Environment, Ministry of Agriculture	
Other Partners: Civil society	
Duration: Two years	High Priority

Objective: To sensitize the judiciary, staff of customs, immigration, and the constabulary to the importance and relevance of biodiversity including education on endemic and endangered species and habitats, conservation issues and threats to national biodiversity.

Rationale: Members of the judiciary and law enforcement officers are in a key position to assist in the conservation of biodiversity through their jobs in customs, immigration and in the courts. However, it is recognised that not enough emphasis has been placed on issues of biodiversity, conservation and environmental management as other issues in the society are pressing and demand attention. Sensitizing personnel in key agencies on biodiversity issues and regulations will significantly improve enforcement of environmental laws.

Specific Activities: Organise workshops for the judiciary which include topics: threats to biodiversity, key issues in conservation, valuation of natural resources and general enforcement and compliancy; organise workshops for enforcement, customs and immigrations officers and wardens which include topics: identification of endemic and endangered species, usual methods of export of such species, identification of harmful exotic species, usual methods of importation of such species, threats to biodiversity and key issues in conservation.

OUTPUT	Year 1	Year 2
Training workshop for Customs and Immigration officers conducted	x	--
Training workshop for Plant Quarantine and Veterinary Division conducted	x	--
Training workshop for Game Wardens along with NEPA and Forestry Wardens conducted	--	x
Training workshop for Jamaica Constabulary Force and Defence Forces conducted	--	x
Enforcement manual produced	x	--
Training Workshop for the Judiciary conducted	x	x

Goal 6 Public Awareness and Education and Community Empowerment

Title: Develop and expand existing environment education programmes and exhibits in the Royal Botanical Gardens, including the Hope Zoo

Lead Agency: Royal Botanical Gardens, Hope (Public Gardens Division), Hope Zoo

Supporting Government Agencies: Ministry of Agriculture, National Environment and Planning Agency, Forestry Department, Institute of Jamaica

Other Partners: University of the West Indies, Civil society, University of Technology, College of Agriculture, Science and Education, Tourism Product Development Company, Eboney Park, Jamaica Conservation and Development Trust, Private Sector, National Wildlife Foundation of Jamaica,

Duration: Four years

Objectives: To provide, through the Botanical Gardens, the public with readily understood and accurate information on a wide range of plants both in narrative, pictorial, and living exhibits and samples; provide information needed to conserve local herb and medicinal plants; enhance the existing public education and awareness programmes currently run by the Hope Zoo with effective displays at the exhibits, in conjunction with education material.

Rational: There is a need to increase the Jamaican public's appreciation of their endemic and local wildlife by providing the opportunity to see some of these plants and animals. The average person has limited knowledge of the importance of plants and basic horticultural practices. The development and implementation of an appropriate education programme will provide the information required to create awareness necessary for the improved appreciation of biodiversity and general environmental issues. The Public Gardens and Hope Zoo are the ideal venues to foster this programme. This will be done through showcasing endemic and local flora and fauna in improved exhibits which stimulate interactive learning and by reinforcing this experience with information packages and other literature.

Specific Activities: Establish a herb and medicinal garden for local plants which will be supported by a Gene Bank for endemic plants species; develop mechanisms to maintain the recently refurbished Hope Gardens Orchid House; organise workshops on propagation and growing techniques as it relates to grafting, stem cutting, mulching and composting to promote proper gardening techniques; establish a butterfly house for educational, research and conservation purposes; upgrade and enhance the existing Hope Petting Zoo facilities; improve local wildlife exhibits; establish nature trails with camping spots, animal feeding stations, bird watching and interpretive narratives; information packages for dissemination to the public and in particular students; and establish a biodiversity exhibit/nature trail based on the existing exhibit owned by the Jamaica Conservation and Development Trust.

OUTPUT	Year 1	Year 2	Year 3	Year 4
Local herb and medicinal gardens established	X	X	--	--
Workshop on propagation and growing techniques conducted	X	--	X	--
Gene bank on Jamaica's endemic species established	--	X	X	--
Butterfly house-Hope Gardens established and managed	X	X	X	X
Petting zoo and wildlife exhibit upgraded and enhanced	--	X	--	--
Biodiversity exhibit/nature trail established	--	X		
Prepare information packages	--	--	X	--
Butterfly House for the Giant Swallowtail Butterfly-Hope Zoo established	--	X	---	--
Biodiversity centre at Hope Zoo designed and constructed	--	--	X	--
Refurbishing Hope Botanical Gardens Orchid House continued	--	--	X	--

Goal 7 Promote Local and Regional Co-operation and Collaboration in Implementing the CBD and the NBSAP

Title: Build on Existing Regional Data and Information Exchange Mechanism

Lead Agency: Institute of Jamaica

Supporting Government Agencies: Forestry Department, Fisheries Department, Scientific Research Council, Ministry of Land and Environment, Institute of Jamaica, National Environment and Planning Agency

Other Partners: University of the West Indies (Centre for Marine Sciences/Centre for Environment and Development), IABIN, CARINET

Duration: Two years

Objective: To build on regional data exchange mechanisms with a view to initiating and promoting exchange of information.

Rationale: Article 17 of the CBD states that Contracting Parties should facilitate the exchange of information from public sources that are relevant to conservation, and that the information should include research on technical, scientific, socio-economic aspects, as well as on other areas including specialised and traditional knowledge. Information sharing is essential in supporting efforts to implement the provisions of the Convention. The National Clearing-House Mechanism, based at the Natural History Division of the Institute of Jamaica, in collaboration with other programmes and mechanisms will be instrumental in facilitating data and information exchange.

Specific Activities: Institute procedures and agreements for data and information access and use between relevant institutions and agencies in the region; continuing participation in regional initiatives such as IABIN and CARINET; identifying priorities and mechanisms for data transfer; and promoting development of a meta-database for biodiversity data within the Clearing-House Mechanism; collaboration between the National Clearing-House Mechanism and other organisations in the assessment and evaluation of national databases; greater collaboration between the National Clearing-House Mechanism and other organizations in the production of scientifically-sound resource material on biodiversity.

OUTPUT	Year 1	Year 2
Procedures and agreements for data access and use developed	X	X
Data and information priorities and needs identified	X	--
Indicators of information technology priorities, needs and impacts identified	X	--
Meta-data base developed	--	X
Directory of biodiversity research and management resource persons produced	X	--
Catalogues, CDs, etc. as a means of information exchange produced	--	X

Goal 7 Promote Local and Regional Cooperation and Collaboration in Implementing the CBD and the NBSAP

Title: Promotion of a Mechanism for Regional Technical and Scientific Co-operation

Lead Agency: National Environment and Planning Agency

Supporting Government Agencies: Institute of Jamaica, Forestry Department, Fisheries Division, Ministry of Land and Environment, National Commission of Science and Technology, Ministry of Agriculture, International Institute for Co-operation in Agriculture, Caribbean Planning for the Adaptation to Global Climate Change, CARICOM Fisheries Resource Assessment and Management Programme, Caribbean Agricultural Research Development Institute, CARINET

Other Partners: University of the West Indies, Civil Society

Duration: Two years

Objective: To promote regional technical and scientific co-operation in the field of conservation in order to facilitate implementation of the CBD and to derive benefits from co-operative agreements.

Rationale: Article 18 of the CBD promotes the establishment of joint research programmes and joint ventures for the development of technologies, and the promotion of international, and regional technical and scientific co-operation in the field of conservation.

Specific Activities: Collaborate with other countries in the Caribbean region to prepare a regional plan outlining the needs for research, monitoring, and inventory; increase the number of programmes and activities for conserving transboundary endangered and threatened species; participate in regional dialogue to establish guidelines to address problems associated with transport of pollutants and hazardous materials throughout the region; participate in regional development of guidelines regarding safe handling of living modified organisms; and promote ecologically sustainable tourism throughout the region.

OUTPUT	Year 1	Year 2
Collaboration in developing regional plan	X	X
Guidelines for conservation of transboundary species prepared	X	--
Guidelines for transportation of pollutants and hazardous materials prepared	--	X
Guidelines for safe handling of LMO's prepared	X	--
Regional sustainable tourism promoted	X	X

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APPENDIX I

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APPENDIX II

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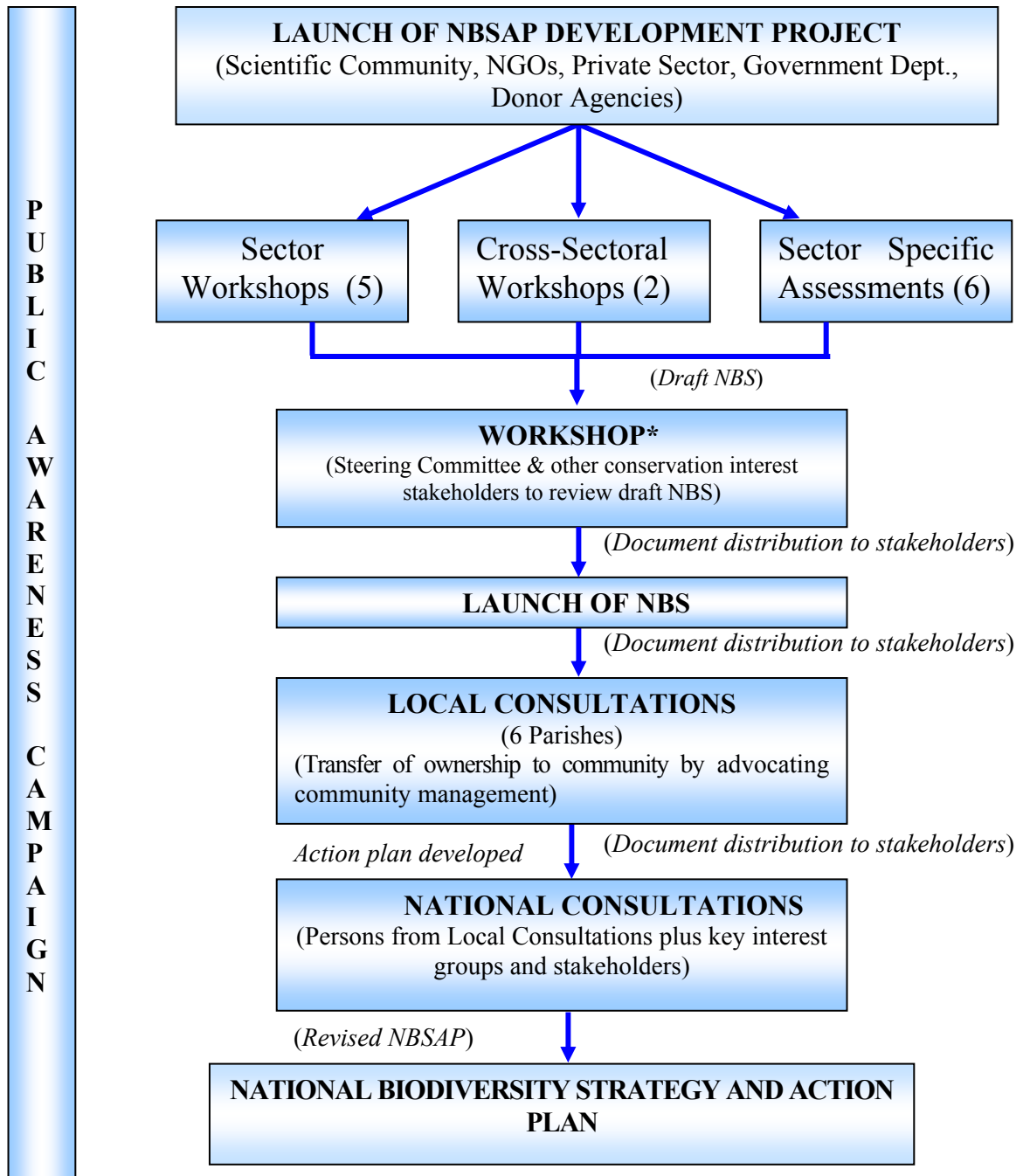
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*The assessment reports are available on www.nepa.gov.jm or in the National Environment and Planning Agency Documentation Centre.

APPENDIX III

**National Biodiversity Strategy and Action Plan Development
(Schematic Representation)**



*Workshop report available at National Environment and Planning Agency Documentation Centre.

APPENDIX IV

List of the Proposed Highest Priority and Priority Projects

Highest Priority Projects

- Establishment of the National Biodiversity Secretariat as a Supporting Mechanism to Implement and Monitor the National Biodiversity Strategy and Action Plan
- Preparation for the Declaration of Protected areas: Black River, Mason River, Port Antonio, Dolphin Head, Cockpit Country and Rozelle/Rozelle Falls
- Rehabilitation of Coral Reef Ecosystems
- Reduction of Pollutants in Freshwater and Marine Environments
- Preparation of an Alien Invasive Species Management Plan
- Implementation/Preparation of Recovery Strategies for Critically Endangered Species
- Preparation of Policies and Legislation to Facilitate Access to Biological Resources and Equitable Benefit Sharing
- Sensitization of the Judiciary and Training for Customs and Immigration Officers and the Constabulary

Priority Projects

- Financial Sustainability of Protected Areas
- Rehabilitate Degraded Forests
- Development of Sustainable Fisheries
- Development of Sustainable Forestry
- Preparation of Ecological Zonation Plan and Land Use Plans for Declared Protected Areas
- Development of Natural Products Industry, Sustainable Use of Medicinal and Aromatic Plants and the Establishment of *In-situ* and *Ex-situ* Collections
- Establishment of *In-situ* and *Ex-situ* Collection
- Development of Regulatory and Administrative Measures to Control the Safe Handling and Transfer of Living Modified Organisms (LMOs)
- Expansion of the National Clearing-House Mechanism
- Development of Increased Resource Management Capacity

APPENDIX V

CHRONOGRAM

PROJECTS	DURATION					
	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6-10
Establishment NBS	█	█	█			
Financial Sustainability	█	█	█	█	█	
Private Landowners	█	█				
Preparation for declaration of PA	█	█	█	█		
Declare Forest Reserves	█	█	█	█		
Rehabilitate Degraded Forests	█	█	█	█	█	
Rehabilitation of Coral Reef	█	█	█	█	█	█
Regulate collection	█	█				
Freshwater and Marine Ecosystems	█	█				
Establish Plant Rescue Centre	█	█				
Invasive Species Strategy	█	█	█			
Ocho Rios Plan	█	█				
Critically Endangered Species	█	█	█	█	█	
Criteria for Sustainable Use	█	█	█			
Sustainable Fisheries	█	█	█	█	█	
Sustainable Forestry	█	█	█			
Sustainable Game Birds	█	█				
Bat and Dolphin Population	█	█	█	█		
Ecological Zonation Plan	█	█	█			
Sustainable Toursim	█	█				
Yallahs Lagoon Ecosystem	█	█				
Natural Products	█	█	█	█	█	
Access & Benefit Sharing	█	█	█			
Traditional Knowledge	█	█	█			
PE Safe Handling	█	█	█			
Risk Assessment	█	█	█			
Regulatory and Control for LMOs	█	█				
HRD for Genetic Resources	█	█	█			
Clearing-House Mechanism	█	█	█			
PA Biological Database	█	█				
Repatriation Information	█	█	█	█		
Resource Management Capacity	█	█				
PA Public Education Programme	█	█				
Sensitisation of Judiciary	█	█				
PE Botanical Gardens & Hope Zoo	█	█	█	█		
Regional Data & Information Exchange	█	█				
Technical and Scientific Cooperation	█	█				

APPENDIX VI

Lead Agencies, Supporting Agencies and Partners

The Partner organisations identified in the Action Plan are those organisations which have submitted project ideas or have been identified by the Steering Committee as having a role to play in the implementation and co-ordination of specific projects.

Government Ministries

Ministry of Agriculture

- Forestry Department
- Fisheries Division
- Hope Zoo
- Public Gardens Division
- Plant Quarantine Division
- Veterinary Division

Ministry of Commerce, Science and Technology

Ministry of Education, Youth and Culture

Ministry of Foreign Affairs and Foreign Trade

Ministry of Health

Ministry of Industry and Tourism

Ministry of Land and Environment

Ministry of Local Government, Community Development and Sports

- Fire Department

Ministry of Mining and Energy

Ministry of National Security

- Attorney General's Department
- Chief Parliamentary Council
- Immigration Division

Ministry of Water and Housing

Government Agencies

Institute of Jamaica

Jamaica Bureau of Standards

Jamaica Information Service

Jamaica Promotions Corporation

Jamaica Tourist Board

National Commission on Science and Technology

National Environment and Planning Agency

National Irrigation Commission

National Water Commission

Petroleum Corporation of Jamaica

Planning Institute of Jamaica

Scientific Research Council

Tourism Product Development Company

Urban Development Corporation

Water Resources Authority

Academic Institutions

College of Agriculture, Science and Education

Jamaica Maritime Institute

Northern Caribbean University

University of the West Indies

Centre for Environment and Development

Centre for Marine Sciences

Discovery Bay Marine Lab

Port Royal Marine Lab
 Caribbean Agriculture Research Development Institute
 University of Technology

Non-governmental Organisations/Community-based Organisations

BirdLife Jamaica
 Bluefields Peoples' Community Association
 Buff Bay Development Action Committee
 Caribbean Coastal Area Management Foundation
 Dolphin Head Trust
 Friends of the Sea
 Jamaica Conservation and Development Trust
 Jamaica Environment Trust
 Jamaica Horticultural Society
 Jamaican Iguana Research and Conservation Group
 Jamaica National Parks Trust Fund
 Jamaica Protected Areas Network
 Jamaica Sport Shooting Federation
 Montego Bay Marine Park Trust
 National Arboretum Foundation
 National Environmental Societies Trust
 Natural History Society of Jamaica
 Negril Area Environmental Protection Trust
 Negril Coral Reef Preservation Society
 Orchid Society of Jamaica
 Portland Environment Protection Association
 Southern Trelawny Environment Protection Agency
 St. Ann Environment Protection Association
 St. Elizabeth Environment Protection Association
 St. Thomas Environment Protection Association
 Windsor Research Centre

Private Sector/Other Organisations

Institute of Architects
 Jamaica Hotel and Tourism Association
 Masters Builders Association
 Private Sector Organisation of Jamaica
 St. Elizabeth Homecoming

International Organisations

American Zoo Association - Lizard Advisory Group
 Caribbean Planning for the Adaptation to Global Climate Change
 CARICOM Fisheries Resources Assessment and Management Programme
 International Institute for Co-operation in Agriculture
 The World Conservation Union (IUCN)
 United Nations Development Programme
 United Nations Environment Programme/Regional Coordinating Unit

APPENDIX VII

GLOSSARY

Alien species

Species introduced deliberately or unintentionally into areas outside their natural habitat, where they have the ability to invade, establish themselves, out-compete natives and take over their new environments.

Aquifer

An underground bed or layer of earth, gravel, or porous stone that contains water and releases it in appreciable amounts.

Biological Resources

Includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems, with actual or potential use or value for humanity (Source: Convention on Biological Diversity).

Bimodal

Having or exhibiting two contrasting forms.

Bio-prospecting

The practice of pharmaceutical firms sending scientists into natural habitats to gather samples for the purpose of testing to determine whether they have properties that may be patented for a profit.

Biosafety

Efforts put forward to reduce and eliminate the potential risks resulting from biotechnology and its products (Source: Biosafety Protocol).

Biotechnology

Any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use (Source: Convention on Biological Diversity)

Broadleaf Forest

A forest which consists mainly of trees with broad, flat leaves of many different shapes. They also called hardwood as broad leaved trees have harder woods.

Buffer zone

The region laying in immediate proximity to the border of a protected area or a transitional zone between areas managed for different objectives. Buffer zones may have land use

controls that allow only activities compatible with protection of the of the core area, such as research, environmental education, recreation and tourism.

Calcareous algae

Algae that deposits calcium carbonate (limestone) in its tissue.

Called in

Provision under section 12(1) of the Town and Country Planning Act, which requires that any or all development applications within a prescribed area be referred to the Authority for determination, instead of the Local Planning Authority. Under section 12(1A) of the Town and Country Planning Act, all developments not in conformity with a Development Order are to be referred to the TCPA for determination.

Captive Breeding

The propagation or preservation of animals outside their natural habitat, involving the control by humans of the animals chosen to constitute a population as well as mating choices within that population.

Co-management

The sharing of some aspects of responsibility, and benefits between government, local communities and civil society organisations, in the management of natural resources.

Conservation

The management of human interactions with genes, species, and ecosystems so as to provide the maximum benefit to the present generation while maintaining their potential to meet the needs and aspirations of future generations; encompasses elements of saving, studying, and using biodiversity.

Critically endangered

A species which faces an extremely high risk of extinction in the wild in the immediate future.

Ecology

A branch of science concerned with the inter-relationships between organisms and their environment.

Ecosystem

A dynamic complex of plant, animal, fungal, and microorganism communities and their associated non-living environment, interacting as an ecological unit (Source: Convention on Biological Diversity).

Eco-tourism

Travel undertaken to witness sites or regions of unique natural or ecological quality, or the provision of services to facilitate such travel.

Endangered

Species or subspecies of fauna and flora that are considered to be at very high risk of extinction in the near future, provided present factors contributing to numerical decline or habitat degradation remain as they are or worsen over time.

Endemic

Refers to species or subspecies that are restricted in occurrence to a specified region or locality, and do not occur naturally in any other region.

Estuary

The part of the wide lower course of a river, where its current is met by the tides. An arm of the sea that extends inland to meet the mouth of a river.

Ex-situ Conservation

The conservation of components of biological diversity, outside their natural habitat (Source: Conservation on Biological Diversity).

Extinct

Species that are no longer known to exist in the wild, even after extensive searches within established habitats as well as other locations where they are likely to have occurred.

Gene bank

A facility established for the *ex-situ* conservation of individuals (seeds), tissues, or reproductive cells of plants or animals.

Germplasm

The genetic material that comprises the inherited qualities of an organism, especially its specific molecular and chemical constitution. Germplasm is living tissue from which new organisms can be grown (e.g. seeds or other plant parts such as leaves, pieces of stem, pollen or even just a few cells can be cultured into a whole plant).

Greenhouse gas

Man-made and naturally occurring chemical compounds found in the Earth's atmosphere (e.g. methane, water vapor, sulphur hexafluoride (SF₆), nitrous oxide, chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and carbon dioxide) which allow sunlight, radiated in the visible and ultraviolet spectra to enter the atmosphere unimpeded, thus increasing temperature levels within the atmosphere and contributing to Global Warming.

Herbaceous

Relating to or characteristic of a herb, as distinguished from a woody plant.

Hydrological basin

A geographical area drained by a particular surface water and/or groundwater system. The basin boundaries are demarcated so that there is generally no flow from one basin into another.

Igneous

Rock produced under conditions involving intense heat, e.g. igneous rock is rock formed by solidification from a molten state, especially from molten magma.

Indigenous species

A species that occurs in multiple areas, but is confined to areas that it occupies naturally, unless directly or indirectly introduced and cared for by humans.

In-situ Conservation

The conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

Integrated Coastal Zone Management

Conscious management process that acknowledges the inter-relationships among inland and coastal uses, and the environment. Embraces upland watersheds, the shoreline and its unique landforms.

Invasive species

Any alien species that becomes established in natural or semi-natural ecosystems or habitats and is an agent of change and threatens native biological diversity (IUCN).

Karst

An area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams, and caverns.

Lentic

Pertaining to standing water bodies, experiencing circular but not lateral flow, e.g. ponds, lakes, pools.

Living Modified Organism (Genetically Modified Organisms)

Any living organism that possesses a novel combination of genetic material obtained through modern biotechnology. A living organism is a biological entity, capable of transferring or replicating genetic material.

Lotic

Pertaining to water bodies experiencing lateral flow, e.g. rivers, streams, brooks.

Material Transfer Agreement

A legal agreement that is required whenever material is being transferred from provider to recipient. Material may be any form of biological materials, such as cultures, cell lines, plasmids, nucleotides, proteins, transgenic animals or plants, pharmaceuticals or any other chemical compounds.

Maroons

Taken from the Spanish word "cimarrones", meaning unruly, fugitive, and wild, this term was given to fugitive ex-slaves who settled in the mountains of Jamaica after escaping captivity from the Spaniards during the 18th century. The term is still used to describe the descendants of this group.

Metamorphic

Rock produced by, or exhibiting certain changes, that minerals or rocks may have undergone since their original deposition through the influence of heat and pressure.

Micro-climate

The climate of a small, specific place within an area as contrasted with the climate of the entire area.

Montane

Upper Montane: natural forests with greater than 30% canopy cover, above an altitude of 1800m, with any seasonality regime and leaf type mixture.

Lower Montane: natural forests with greater than 30% canopy cover, between an altitude of 1200 and 1800m, with any seasonality regime and leaf type mixture.

Mulch

A protective covering, usually of organic matter such as leaves, straw, or peat, placed around plants to prevent the evaporation of moisture, the freezing of roots, and the growth of weeds.

Nectarivorous

Relating to organisms that feed on the nectar of flowers; e.g. certain birds, bats and insects.

Rare

Of species that are infrequently occurring or thin in density.

Red Data Book

A compilation of data regarding the population status of species included in the Red List. Both the Red List and Red Data Book show the risk of extinction of species, based on the biological data.

Red List

A compilation of endangered wildlife species.

Saline

Referring to water containing salt as dissolved saline particles, as in seawater or brackish water.

Species

A group of interbreeding organisms that do not ordinarily breed with members of other groups.

Sustainable Use

The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (Source: Convention on Biological Diversity).

Swamp

A seasonally flooded bottomland with more woody plants than a marsh and better drainage than a bog.

Threatened Species

Species or subspecies or their population that is likely to become endangered within the foreseeable future throughout all or a part of their range, if the factors causing numerical decline or habitat degradation continue to operate.

Transgenic plants

A transgenic crop plant contains a gene or genes, which have been artificially inserted instead of the plant acquiring them through pollination. The inserted gene sequence (known as the transgene) may come from another unrelated plant, or from a

completely different species. Plants containing transgenes are often called genetically modified or GM crops, although in reality all crops have been genetically modified from their original wild state by domestication, selection and controlled breeding over long periods of time.

Vascular plants

Plants that possess vascular tissue for transporting water, nutrients and plant photosynthetic products.

Wetland

An areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which, at low tide does not exceed six (6) metres.