DOMINICA NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

2014-2020

DECEMBER 2013

PREPARED BY THE MINISTRY OF ENVIRONMENT, NATURAL RESOURCES, PHYSICAL PLANNING AND FISHERIES

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The United Nations Environmental Program

The Government of Dominica

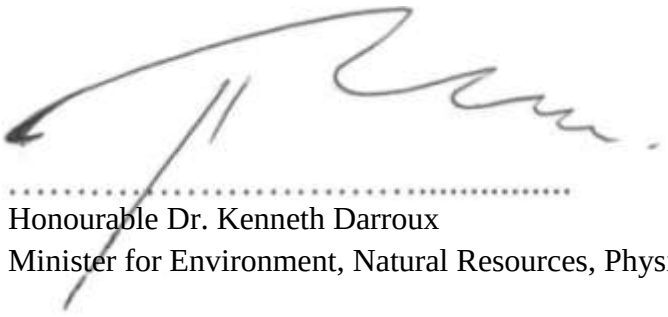
Preface

The Commonwealth of Dominica is proud of its rich biodiversity heritage and of the way Dominicans have managed this resource for centuries. However, economic and livelihood challenges of the twenty first (21st) century demand that the Government take a much closer look at this resource and put in place mechanisms and structures to ensure its continued productivity and sustainability. To this end, on 4th July, 1994, the Government of Dominica ratified the United Nations Convention on Biological Diversity. In 2001, the Government made a public declaration of its commitment to biodiversity management in Dominica, and to the UNCBD by the preparation, approval and submission to the CBD of its Biodiversity Strategy and Action Plan (NBSAP).

The 2001 NBSAP has served Dominica well but it is now time to evaluate its impact, to recognize the achievements of stakeholders and to chart the way forward to 2020. While the National Goals and Objectives remain the same, actions necessary to achieve the vision had to be adjusted to address new and emerging challenges facing biodiversity in Dominica. It is also necessary to align progress in biodiversity management with the Aichi targets.

As in 2001, the development of the NBSAP was ably spearheaded by the Environmental Coordinating Unit (ECU) in the Ministry of Environment, Natural Resource, Physical Planning and Fisheries with technical support from the Biodiversity Steering Committee and the consultant team. The Ministry wishes to recognize the effort of its Environmental Coordinating Unit in positioning Dominica globally while honoring its responsibility to inform and educate the nation on environmental issues including biodiversity management.

Special recognition and thanks must go to the Global Environmental Facility (GEF) and the United Nations Environmental Programme (UNEP) for financial and technical support respectively; to the Government of the Commonwealth of Dominica for political direction, technical and financial support and to all stakeholders who participated at various levels and in a variety of ways to ensure access to and equitable sharing of Dominica's biodiversity resources.



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Honourable Dr. Kenneth Darroux
Minister for Environment, Natural Resources, Physical Planning and Fisheries

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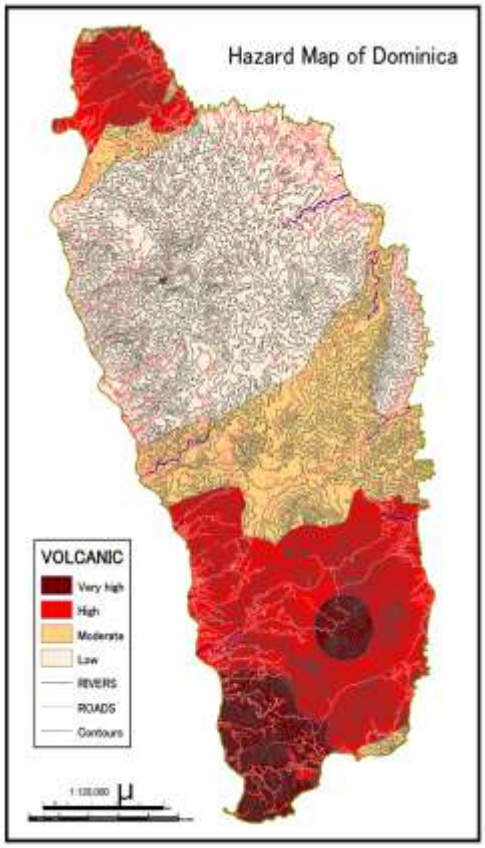
Acronyms

ABS	Access and Benefit Sharing
BD	Biological Diversity
CARDI	Caribbean Agriculture Research and Development Institute
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CCI	Conservation International
CDM	Clean Development Mechanism
CHM	Clearing House Mechanism
CITES	Convention on International Trade in Endangered Species
COP	Conference of Parties
ECU	Environmental Coordinating Unit
GEF	Global Environmental Facility
GHG	Green House Gases
GMO	Genetically Modified Organisms
GSPS	Growth and Social Protection Strategy
JICA	Japanese International Cooperation Agency
LBS	Land Base Source of Pollution
LMO	Living Modified Organisms
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Government Organization
NSA	Non State Actors
PA	Protected Areas
R&D	Research and Development
SGP	Small Grants Programme
UNCBD	United Nations Convention on Biological Diversity
UNEP	United Nations Environment Program
WHLEEP	World Heritage Local Entrepreneurship Program
UNESCO	United Nations Education, Scientific and Cultural Organisation

Chapter 1: Situational Analysis

Figure 1 Hazard Map of Dominica



Situational Analysis

The 'Nature Island' Dominica is 751 $km^2$of volcanic deposit situated in the Eastern Caribbean Sea15^0 25'N $61^0$20' W. The shape and orientation of the island combined with its elevation have resulted in rainfall distribution that ranges from 1500mm on the west coast to over 8750 mm annually in parts of the interior. Like most of the islands in the Eastern Caribbean, Dominica is geologically young. The formation of these exclusively volcanic islands began in the Eocene (35-55 million years ago) and still continues (Martin-Kaye 1963). This dating speaks to Dominica's diverse, evolving and fragile biodiversity resources. This coupled with the human impact poses a plethora of threats to the biological diversity of the island. This phenomenon is of great concern to Dominicans.

Terrestrial Biodiversity

The Island has a rich and diverse flora and fauna, which are influenced by its geography and history. The 'Nature Island' boasts of the most extensive natural forests in the entire Eastern Caribbean, being home to the most diverse assemblage of wildlife among the smaller Caribbean islands**.** The vegetation types (flora) include Littoral woodland, Elfin woodland, Semi-deciduous forest, mature Rain forest, Montane forest, scrub woodland and savannah. Other natural vegetation types are influenced by soil conditions including wetlands and fumarole vegetation.

Dominica's fauna includes:

- 179 species Birds
- 55 species Butterflies
- 20 species Crabs
- 11 species Crayfish & Shrimp
- 3 species Amphibians
- 17 species Reptiles (4 snakes)
- 18 species Mammals
- 11 species Stick Insects
- ~45 species inland Fish

Major threats to terrestrial biodiversity in Dominica include:

- Deforestation
- Agro-chemical pollution
- Natural disaster and climate change
- Hunting and capture of wild life
- Invasive species

Recognizing the economical, biological, social and cultural value of Morne Trois Pitons National Park, the Government of Dominica petitioned the United Nations Education Scientific and Cultural Organization (UNESCO) to declare this a World Heritage Site.

Inscription: Morne Trois Pitons National Park (Dominica)

Morne Trois Pitons National Park

814

Dominica

N(i)(iv)

The Committee inscribed the Morne Trois Pitons National Park on the basis of natural criteria (i) and (iv) for its diverse flora with endemic species of vascular plants, its volcanoes, rivers and waterfalls, illustrating ongoing geo-morphological processes with high scenic value.

The Centre was asked by the Bureau to write a letter to the authorities of Dominica requesting them to provide a time frame for the revision of the management plan, and encouraging them to submit a technical assistance request for this revision. In addition, the Bureau requested the Dominica authorities to control further hydroelectric power development in the Park and act to eliminate private holdings in the Park. The answer, dated 12 September 1997, from the Dominican authorities has been transmitted to IUCN for evaluation

The Committee commended the authorities of Dominica for their response to the Bureau's request to provide a time frame for the revision of the management plan, and for having submitted a technical assistance request for this revision. The Committee took note of the answer provided by the Dominican authorities that they have no plans for further hydroelectric power development in the Park, and they would act to eliminate private holdings in the Park.

Agriculture and Biodiversity

The data currently being used for decision making in agriculture was derived from the 1995 agricultural census; this was before the implementation of the NBSAP, there is therefore no documented empirical record of the impact of the NBSAP on agricultural management and production in Dominica. There is need for a new and updated agriculture census. The 1995 census reported that27% of Dominica's land area is used for farming.

Records from stakeholder consultations point to the need for a review of the agriculture sector performance to reflect current political pronouncements, international obligations and local biodiversity goals and targets. Stakeholder Consultations reveal the following:

- Agriculture and land degradation including deforestation are two of the greatest contributor to loss of indigenous biodiversity
- Removal of buffer zones and windbreaks along riverbanks has caused a decrease in actual numbers of species of terrestrial fauna along most river banks in Dominica.
- Private landholdings of forested areas threaten biodiversity due to habitat fragmentation and poor agricultural practices such as the use of agrochemicals.
- The agricultural diversification program has successfully contributed to biodiversity conservation.
- Livestock was the greatest contributor to increase in agricultural production[1]
- Food security (the ability to produce and purchase food) is a threat to Dominica's native biodiversity; new species of plants and animals are introduced into Dominica, to support food security efforts, are displacing native plant and animal species.
- Construction of low cost housing on flat lands pushed agriculture uphill into forested areas.
- There are a number of weak, outdated, and sometimes overlapping pieces of legislation that affects the sustainability of biodiversity.
- There is no policy on traditional knowledge, or invasive species.
- There is some basic genetic research in the preparation of tissue culture in the agriculture sector in Dominica.

In 2003, a survey conducted by the Caribbean Agriculture Research and Development Institute (CARDI) reported twenty three (23) accessions of sweet potato. By 2012, only five (5) of these could be found and these are mainly the varieties of high commercial value. During the same period, the CARDI staff in Dominica changed from twenty (20) professionals to only two (2). Some agricultural biodiversity (such as peppers) common to Dominica has been lost due to lack of proper storage and some due to infection.

[1] Information taken from Agriculture Corporate Plan 2011- 2013

Threats to Biodiversity Sustainability

While some threats are sector specific, others cut across all sectors of biodiversity management. Cross-cutting issues include:

- Weak legislative frameworks and the absence of an integrated development process.
- Environmental Impact Assessments (EIAs) are not undertaken for some major developments that have significant impact on biodiversity conservation. Even when EIA's are done the recommendations are not implemented due to the absence of a rigorous Monitoring and Evaluation program.
- National budget constraint
- Biodiversity is not seen as a big money earner
- Aerial application of pesticides

Threats to biodiversity which are important to Agriculture:

- Displacement of native species by high yielding imported varieties.
- Market demands – preference for foreign (species) food
- Intellectual Property rights not legally protected – legislation in draft.
- Inadequate development of germplasm banks and repository for the safe storage of local genetic material
- Loss of agricultural lands to development.

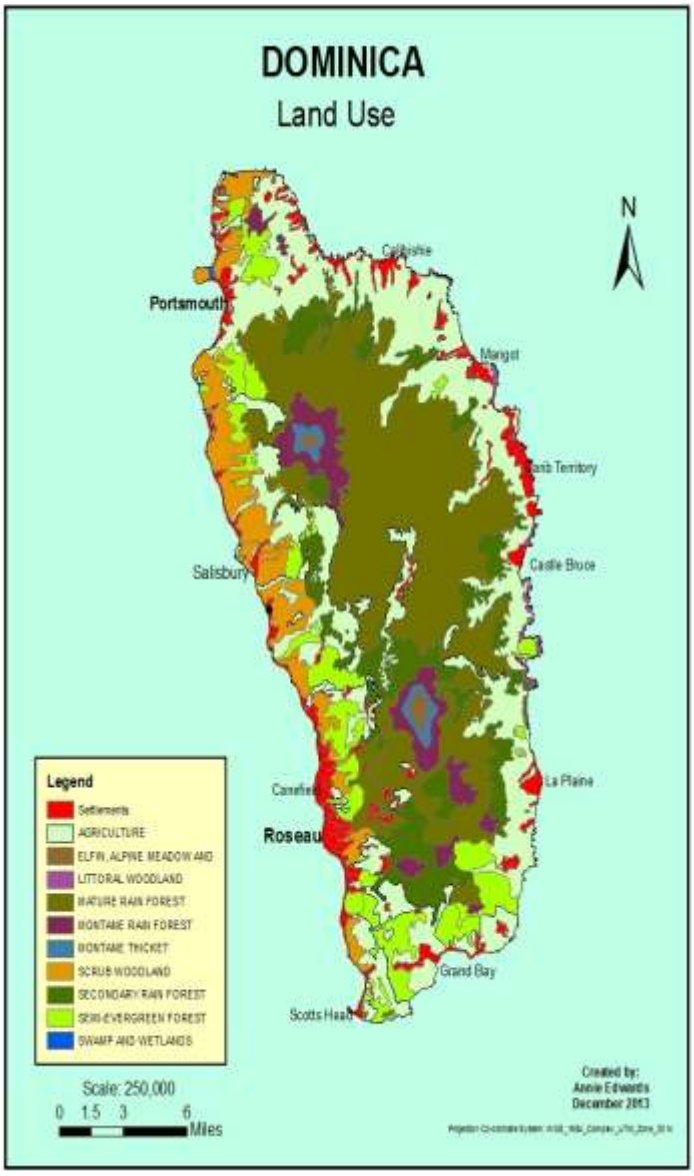
Threats to biodiversity from Tourism:

- The Ministry of Tourism is now working on a new master plan but biodiversity is not high on this agenda.
- No consideration is given to the carrying capacity of the sites frequented by visitors.
- Influx of foreign cultures and new norms reduce the significance of some biological resources and traditional knowledge leading to their loss

Threats to biodiversity from Civil Society:

- Insufficient public education and awareness of the value of biodiversity resources
- Overexploitation of the Gommier tree (*Dacryodes excelsa)* for the sap for commercial use.

Figure 2: Dominica Land Use Map



- Failure to use scientific information in decision making; local communities are not empowered. Fifty percent (50%) of Dominica's GEF SGP funding is directed towards public education and information dissemination.
- Absence of livelihood opportunities force unsustainable exploitation of biodiversity resources

Marine and Aquatic Biodiversity

The Fisheries Division of the Ministry of Environment, Natural Resources, Physical Planning & Fisheries have oversight for all marine and coastal resources in Dominica. In their management drive they organize and support the operations of the fourteen (14) registered Fisheries Co-operatives and approximately five (5) fisher groups across Dominica. Not all registered Fisheries Cooperatives are members of the National Association of Fisherfolk Cooperative (NAFCOOP). Despite the best efforts of the organizers 62% of fishers surveyed did not belong to a fisher group or co-operative. The Division is conscious of the tremendous amount of work needed to reach national and international targets and goals relating to biodiversity.

The Fisheries Industry Census of 2011 is the second of its kind for the Commonwealth of Dominica, the first census having taken place in 2008.In order to have current and accurate data for decision making, it is recommended that Dominica conduct a Fisheries Industry Census every four to five years. The next census is therefore scheduled for 2016. This census was conducted with the help of the Japan International Cooperation Agency (JICA). The Objectives of the census were:

i) To capture critical baseline data required for determining the present status of the fishing industry in Dominica.

ii)To collect socioeconomic data and to make the necessary linkages between the physical, social and economic dynamics that exist within the industry.

iii) To capture important data and information otherwise not collected via regular data collection programmes of the fisheries division.

In addition to the factors highlighted by the census, marine and aquatic biodiversity in Dominica is threatened by:

- Extraction of coastal resources – sand, gravel, rocks.
- Coastal construction – Sea defenses and retaining walls for roads
- Negative impacts of ghost fishing
- Inappropriate fishing gear (example use of nets with inappropriate mesh size)
- Land-based sources of marine pollution.
- Invasive species like the lion fish (*Pterois volitans*), sea grass (*Halophilia Stipulaceae)*
- High levels of poverty which put heavy reliance on biodiversity resources such as fish stocks
- Pollution from domestic waste water and sewage

Figure3 is an extract from the Fisheries Industry Census, and highlights the challenges faced by fishing operations in Dominica.

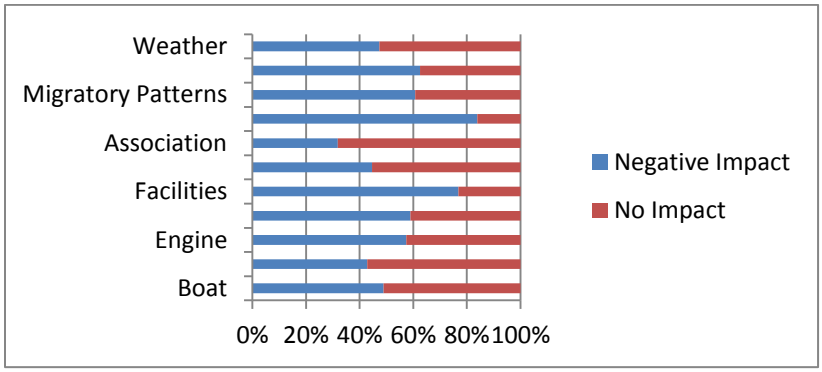


Figure 3Factors affecting fishing operations in Dominica

Marine Biodiversity Research: Ongoing marine research is adding significantly to the knowledge base and management of the marine biodiversity. Recent (2011) data from ITME points to:

- Significant increase in *Halophilia Stipulaceae*, a sea grass native to the Red Sea. This invasive species is displacing local species.
- *Syringodium Filiforme as* being the most abundant native species of sea grass in the waters of Dominica.
- The 2009 storm surge as having a significant negative impact on sea grass beds.

Work by the local Fisheries Division highlights the following issues:

- Decrease in the volume of water in rivers and estuaries. There is an absence of estuarine basin and a resulting reduction of near shore species.
- Anecdotal evidence suggests that the species used for livelihood and dietary support are diminishing.
- Loss of forest cover is affecting soil water retention thus reducing stream flow and causing loss of biodiversity.
- Sand, rock and gravel mining is destroying coastal habitats and reducing coastal biodiversity.
- Land-based activities like quarrying are destroying coastal habitats. Zooplankton ecology along the coast is declining thus resulting in the loss of food source for some species.
- Decline in inshore fishing due to land based sources of pollution, increased pressure on population, and to allow for the natural replenishment of coral reef species
- An increase in offshore fishing of large pelagics (Dolphin, Yellow fin Tuna, Skip Jacks and Blue Marlin) in the waters around Dominica.
- Climate Change impacts such as frequent El-nino events are resulting in changes in the migratory patterns of some fish species which are moving further north.
- The lion fish which was not seen in 2000 has been increasing in numbers in 2013.
- Ground swells (source) have started earlier and last longer. The resulting turbid water decreases biodiversity.

Figure 4. *Syringodium filiforme*

Case One
Invasive Sea-grass dominates Dominica coast line

Ongoing marine research is adding significantly to the knowledge base and management of the marine biodiversity in Dominica. Recent (2011) data from Institute for Tropical Marine Ecology shows a significant increase in *Halophilia Stipulaceae (92% cover in one area)*, a sea grass native to the Red Sea. This invasive has no natural predator in this region so it grows unhindered and displays the native species *Syringodium Filiforme* which supports the growth of juvenile and near shore pelagic .

Figure 5*. Halophila stipulacea*

Value of Biodiversity

Dominica has been the object of a number of pharmaceutical industries which focus primarily on exploiting the country's diverse but fragile biological resources. Other research and development sectors, including local entrepreneurs, have begun to revitalize bio-prospecting in other fields namely, biofuels, biotechnology and the development of low-cost protein rich foods. Government is currently seeking help from the international community to develop legislation and management plans to protect its biodiversity resources, while ensuring that these potential and growing economic streams are shared equitably, especially with the local and indigenous peoples who are stewards of the biological diversity from which option value is derived.

In a paper entitled 'Advancing Crop Biodiversity Genomics in an Approach to Adapt to Climate Change for the Enhancement of Food Security and Economic Development in Dominica', the Ministry of Agriculture & Forestry – Division of Agriculture made the case for action at the national level to strengthen plant genetic resource. Recognition was given to the way in which climate change is impacting ecosystem boundaries and changing genetic make-up. This highlights the need for agro-biodiversity conservation taking into consideration the impact of climate change on the conservation of plant genetic resources of relevance to agriculture and food security. The Ministry sees the need for a proactive climate change adaptation strategy

Dominica is committed to:

- Engaging the public and private sectors to ensure that development policies and business practices designed around short-term needs do not compromise the biodiversity upon which the future of humanity ultimately depends;
- Catalyzing global efforts to recognize and conserve the option value of biodiversity and avoid its loss.

To this end, links have been forged with several research institutions in the hope of realizing long term benefits from medicines and other products from bio-prospecting.

The aforementioned factors do not take into account the protection of Dominica's abundant supply of fresh water which accounted for 5.09% of GDP in 2007. This figure has grown significantly with the export of bottled water and does not include the benefits derived by nationals who tap into the rivers and streams for domestic uses as well as agriculture.

Dominica's biodiversity accounts for 48% of local food supply which comes in the form of wild meat, fish (from the rivers and sea), fruits, root crops and the wide range of domestic agriculture products. Additionally, biodiversity provides energy in the form of fuel wood and charcoal, raw material for the craft industry, timber for the local market, and a host of products that contribute to the quality of life in Dominica. Dominica's net greenhouse gas (GHG) emissions indicate that the country a sink for GHG. Thanks to its lush green forest.

Chapter 2: Review of NBSAP 2001-2005

NBSAP 2001-2005: In the period 2001 to 2005 during the active phase of Dominica's first NBSAP, only about 30% of the objectives were achieved. However, between the periods 2005 to 2013, national consciousness as it pertains to Biodiversity, thrived so that by mid-2013 an estimated 60% of the expected results were achieved.

Active agencies in the promotion of biodiversity were the Ministry of Agriculture and Forestry, the Ministry of Physical Development, Environment and Planning, the Global Environment Facility Small Grants Program and the Non-State Actors (NSA) which is an amalgamated body of NGO, CSOs and Private Sector entities.

In 1994, the Government took decisive action to address biodiversity issues by ratifying the United Nations Convention on Biological Diversity (UNCBD), however a National Biodiversity Strategy and Action Plan (NBSAP) was implemented in 2001. It was proposed to implement this NBSAP through a collaborative effort involving the public and private sectors and civil society. Twelve (12) years on the NBSAP has achieved some significant milestones and has exposed some major challenges (Table 1) that require biodiversity management authorities to revisit the strategy and implementation plan.

Table 1: Summary of strategic review

BD Strategic Focus	Success	Challenges	Gaps
Conservation and sustainable use	Exceed 20% conservation set by Caribbean Challenge	Legally establishing and Enforcing the exclusive economic zone	Need to ratify the Cartagena LBS protocol
Legislation review and development	Environmental legislation drafted. Land Use management plan and legislation being developed	Human and financial resource to enforce legislation. Legal authorization of ECU as coordinating entity.	Absence of comprehensive environmental legislation
Public education and awareness	Several on-going public education program	Often supported by project funds. Lacks consistency and proper coordination.	Some resources are not available/catered for
Stakeholder involvement	Over 15 non-governmental entities involved in NBSAP review	Group longevity and consistency	Absence of non-state actors in policy development
Research and Knowledge management	Average of 10 research permits per year granted by Forestry between 2005 and 2012	Retaining data locally and receiving appropriate remuneration for use of resource	Link between Research and development not made

The Conservation of Dominica's Natural Resources is captured through the establishment of a series of protected areas in the form of Forest Reserves and National Parks.These areas are protected by an evolving policy and legislative frame work that includes:

- Forests Act (Ch. 60:01), & Regulations (1959)
- National Parks & Protected Areas Act (Ch. 42:02), & Regulations (User Fees; Power Craft; National Parks) (1975)
- Forestry & Wildlife Act (Ch. 60:02), & Regulations (1976)
- Forest Policy
- Convention on International Trade in Endangered Species of Flora and Fauna (CITES)
- Convention on Biological Diversity (CDB)

Cross sector issues affecting conservation of biodiversity in Dominica include:

- Tourism – Tourism development, hotels and trails can result in habitat modification. Pollution and diseases negatively impact biodiversity
- Agriculture - poor agricultural practices; use of hybrid varieties; deforestation, pesticide use, and redirection of water courses negatively impacts the resource base
- Fisheries - weak legal framework and lack of enforcement impacts marine resources such as the turtles
- Increased incidence of invasive species
- Utilities - potential impacts of renewable energy development such as Hydro & Geothermal systems can have significant negative impact on biological resources
- Non-Governmental Organizations/Civil Society - limited involvement of NGOs/CBOs & Private Sector in the policy development process
- Land use planning – subdivision of lands lead to fragmentation of ecosystems; unauthorized and uncontrolled development makes no provision for ecosystem protection; infrastructure development does not always respect environmental resources; conversion of land from forest or scrub land to agriculture or housing, ecosystems and their associated resources are lost
- Unregulated activities on private land can result in loss of biodiversity

Since the launch of the first National Biodiversity Strategy and Action Plan in 2001, the country has made considerable positive strides towards the conservation and sustainable use of its biodiversity resources. The development of a management plan for the Morne Trois Pitons National Park World Heritage Site and the preparation of the Second Fisheries Industry Census (2011) are two best practices that are worthy of note.

Other conservation efforts mounted in Dominica as a direct result of the NBSAP include

- The work of the World Heritage Local Entrepreneurship Program (WH-LEEP) which is designed to support community-based entrepreneurs operating around the World Heritage sites.
- The launch of the GEF-SGP community-based initiative "Compact" which aims at supporting community based initiatives to increase the effectiveness of BD conservation of global significance. The groups work around PAs to improve the livelihood of the local population while serving as custodians of the PA.

- Dominica Sea Turtle Conservation, a local NGO, has trained over seventy five (75) persons over the past three years to do beach monitoring in protection of turtles, their eggs and their hatchlings. The state has since provided fulltime employment for more than fifty of these persons.
- Wise management conservation efforts by the Forestry Department to do agro-forestry and replanting of trees on a small scale, and on private lands.

Fair and Equitable Sharing

The Government of the Commonwealth of Dominica is currently examining, with a view to ratify the Nagoya Protocol on Access to Genetic Resources and the fair and equitable sharing of benefits arising from their utilization of the Convention on Biological Diversity. This international agreement is aims at sharing the benefits arising from the utilization of genetic resources, in a fair and equitable way, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies. This international agreement also takes into account all rights over those resources and technologies, and with appropriate funding will contribute to the conservation of biological diversity and the sustainable use of its components.

In keeping with the tenets of the protocol, Dominica sought the help of the Edmund Institute in the United States of America in 2009 to develop legislation on Access and Benefit Sharing. The resulting draft ABS legislation, along with the draft Biosafety legislation, has been incorporated into the Climate Change, Environment and Natural Resource Bill.

With the exception of National Parks and Protected Areas, Dominica nationals have few restrictions as it relates to the harvesting of biodiversity resources on the island. This freedom allows unsustainable practices in the harvesting of resources such as river fish and the Gommier tree.

Purpose of NBSAP –Goals and Objectives

Article 6 of the Convention on General Measures for Conservation and Sustainable Use states that each Contracting Party shall, in accordance with its particular conditions and capabilities:

- Develop national strategies, plans or programs for the conservation and sustainable use of biological diversity.
- Integrate, as far as possible and where appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programs and policies.

National Biodiversity Strategies and Action Plans (NBSAPs) are therefore the principal instruments for implementing the Convention at the national level. The Convention requires countries not only to prepare a national biodiversity strategy but that they also ensure that this strategy is integrated in the mainstream planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity.

In keeping with its obligation under the CBD, the Government of the Commonwealth of Dominica prepared its first NBSAP in 2000. This review is intended to track the progress of the 2000 NBSAP, highlight success stories to build upon, identify gaps and constraints and design appropriate

strategies and a plan of action to fill the gaps thereby enabling the NBSAP to achieve its stated goals.

Dominica's goals as it relates to biodiversity management are stated in Section 4 of the 2000 NBSAP and reproduced here for convenience and emphasis. The Government still views biodiversity as a base from which to launch its national development thrust, and a medium around which Dominicans can coalesce. The goals are as follows:

1. The conservation and sustainable management of Dominica's terrestrial and marine biodiversity to ensure intra- and inter-generational equity.
2. The promotion of sound and sustainable agricultural practices and technology within existing agricultural human capital so as to minimize the loss of agro-biodiversity, and reduce vulnerability to desertification, soil loss, and the contamination of water resources.
3. To ensure that biotechnology knowledge and concerns are widely distributed so that all life is guaranteed and benefits derived are equitably shared.

The **Objective**s are as follows:

1. To ensure that the biological resource of Dominica remains rich and diverse by:
   • maintaining optimum systems resilience;
   • maintaining resistance to invasive alien species;
   •maintaining ecosystem structure and function; and
   •maximizing ecological integrity by reducing negative environmental impact of human influences.

2. To ensure that Dominica is populated by a diversity of peoples who promote and undertake the wise and sustainable use of natural resources.

3. To reduce or eliminate the potential risks from the use of biotechnology and its by-products while at the same time exploiting opportunities presented that are in keeping with Dominica's sustainable development agenda.

4. To reduce and/or minimize the loss of terrestrial and marine biodiversity.

5. To ensure that the basis for development is through the sustainable use of terrestrial and marine biological resources.

6. To ensure the equitable and sustainable distribution of social and economic benefits from the use of terrestrial and marine biological resources.

Under objective 1 which called for efforts to secure a biologically rich and diverse Dominica with system resilience, resistance to invasive alien species, sustained ecosystem structure and function, and improved ecological integrity; the following achievements and challenges were observed:

Table 2: Outcome from Objective 1 of the NBSAP

Achievements	Challenges
Morne Trois Piton National Park declared a Protected Area and gained World Heritage Status.	EIA findings not enforced. Inadequate support for PA maintenance and transfer of lessons learnt.
Heightened awareness of invasive species; crop quarantine, importation ban on pet birds and other control measures implemented.	Fungal attack on mountain chicken believed to be caused by invasive. Citrus greening disease, black sicka toga, and red palm mite all attributed to invasive alien species.
Establishment of GEF-SGP compact program – a community based interactive program http://www.thegef.org/gef/news/gef-sgp%E2%80%99s-community-management-protected-areas-conservation-compact-initiative-builds-new-partn	Limited civil society buy-in. Inadequate public awareness and buy-in.
WHLEEP, Conservation international supporting community to take action around world heritage sites.	Small enterprises struggle to survive because of a lack of affordable credit with favorable payment conditions or reasonable credit obligations
Prohibition legislation effected. Pet stores refused licenses to import birds.	Despite regulations and membership of CITES, some exotic and endangered animals were permitted to enter and leave Dominica. Such actions endanger indigenous species.

Objective 2 speaks to the reduction of risk from the use of biotechnology and its by-products. In response to this, the Government of Dominica has ratified the Biosafety protocol that seeks to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health. Draft biosafety legislation has been developed and is being added as a chapter to the draft National Environmental Act. This Act will be sent to Parliament for approval and enactment during 2014.

Objective 3 was intended to reduce or minimize the loss of terrestrial and marine biodiversity. Efforts in this direction include the ongoing review of legislation to increase fines for catching turtles out of season and the illegal exportation of wild life like the *Amazona Imperalis*. However, there is some loss of terrestrial habitat and pollution of marine and aquatic habitats which are detracting from the otherwise commendable achievement.

Objective 4 built upon objective 4 requires an understanding of the fact that national development is through the sustainable use of terrestrial and marine biodiversity. While there is some ongoing education in this area, the momentum needs improvement. There is no official acceptance of this position by Government, even though there is some posturing in this direction.

Objective 5 calls for the equitable and sustainable distribution of social and economic benefits derived from terrestrial and marine biological resources. Progress in this area is seen in the draft Access and Benefit Sharing (ABS) Legislation which will eventually be incorporated into the Climate Change, Environment and Natural Resource Bill. This objective has experienced some challenges in that private individuals have attempted to deprive other citizens' access to state resources which require legal interventions to ensure the rights of access to all.

Examination of the **strategic directions** articulated under the 2000-2004 NBSAP revealed that actions proposed by the relevant authorities to achieve the biodiversity objectives were only partially implemented. Analysis of the results following the implementation of the NBSAP revealed that while there were strategies in the NBSAP to achieve its objectives, there was no strategy for its own implementation. The following table summarizes the strategies, the results at the end of 2004, and the challenges.

Table 3: NBSAP Strategy, impact and challenges

Strategy	Resulting Impact	Challenge
Development of Comprehensive national land use Plan.1, 13.	Land use plan currently being developed.	Absence of tools to support enforcement
Review/amend existing legislation. 2, 9, 19, 21, 29, 30.	Some review done, some legislation drafted; the process is ongoing	The AG's Office has limited capacity to do timely drafting of legislations.
Develop and implement a comprehensive public education awareness and training program. 3, 8, 18, 20, 23.	There are sector specific education programs in schools and communities. Biodiversity awareness is widespread in Dominica	Lack of coordination results in duplication and uncovered gaps.
Identification and protection of sensitive, threatened ecosystem in particular the Indian river. 4, 10, 28, 30.	Some areas identified and are proposed as PA.	Part of the area is private lands and has been subdivided and sold
Research and development in agriculture including wildlife farming technology to reduce stress on wild population. 5, 14, 28.	Pilot project ongoing. The GEF-SGP has provided financial support to assist community involvement in R&D.	Not enough was known about the life cycle of the target animals
Research, inventory and Monitoring to develop a comprehensive data base on distribution and medical plants. 6, 12, 15, 16, 17, 28.	Fisheries and Forestry have ongoing research programs. There is a cancer research project supported by Ross University developing bioassays from sponges. See also case study 1.	Medical research is expensive and takes a long time. This is compounded in a small island with limited human, financial and scientific resources.
Develop a national policy on water use, conservation and extraction. 7	A project aimed at giving the system 100% redundancy and costing approximately EC$41M has started.	A significant portion of water catchment is on private lands; Climate Change predictions are for reduced precipitation.

Strengthen and develop traditional knowledge and cultural practices in biodiversity. 25, 26, 27	Traditional knowledge and cultural practices are strong and being shared.	Shortage of written instruction and need to study long term impact of some actions.
Sign protocol and develop biosafety framework. 29, 31, 32	Biosafety protocol signed and draft legislation developed.	Legislation needs regulations.

Of the thirty-two (32) strategies in the 2000-2004 NBSAP which are designed to achieve the national biodiversity objectives and the country's obligations to the UNCBD, eleven (11) are being followed through ongoing projects and initiatives. The central themes include information dissemination, staff training and conservation efforts. These issues are central to the operations of the state machinery. Efforts to address another nine (9) of the strategies are in progress having started much later than anticipated. Only three (3) of the stated strategic directions have been mainstreamed into the development agenda of Dominica, six (6) were never attempted while three (3) were attempted but abandoned.

In the area of legislative development and policy formulation, a significant amount of work was done but primarily at the drafting stage. Draft legislation were developed for land management, ABS, biosafety protocol and environmental management but no approval has yet been given for any of these.

The education program made good progress, all initiatives are ongoing but in a sector specific manner. There is therefore some overlap and repetition and in a few instances counterproductive effort.

Three strategies were designed to support agricultural research. One has been implemented while the other two are being tested.

Case Study Two

Larouma *(Ischnosiphon arouman)* , Gommier (*Dacryodes excelesa*) and the Kalinagos

The Kalinago is an indigenous tribe on the island of Dominica. Although they are well integrated into society, they still maintain much of their traditional life style including living off the land.

The Larouma and Gommier are plants the Kalinago use to make craft and canoes. The craft is sold mainly to visitors. The value of these resources has not been accurately qualified but conservative estimates put the value EC$5m per year. Efforts by the forestry department to farming the La rumen met with petite larceny by the very people they were intended to help. The method they use to harvest the Gommier tree requires cutting the tree trunk open thereby killing the tree.

Currently both plants are only found in the interior of the forest far from the people who use them and the plant population is dwindling.

Training the Kalinago to cultivate the Larouma and sustainable bleed the Gommier has been unsuccessful thus far. As a result, the plants species are endangered and the livelihood of the people threatened.

Strategy #4 called for the identification and protection of sensitive / fragile / threatened ecosystems with priority given to the Indian River wetland among others, and Dry Scrub Woodland, and the identification and protection of buffer areas required to protect and conserve threatened flora/fauna and ecosystems. The Indian River wetlands are privately owned lands which were subdivided and sold while the Dry Scrub Woodland has been severely scarred by immigrants with different cultural practices and mindsets.

The Ministry of Forestry and Agriculture has responsibility for Dominica's flora and fauna which occupies approximately 65% (195 square miles) of the 300 square miles island. Since 20% (60 square miles) of Dominica's forested land is protected by law, this means that 135 square miles of forest are in private hands[2]. The challenge here is that the Forestry Act does not provide protection for forest on private land.

The **Action Plan** in the 2001 to 2005 NBSAP was a list of seventeen ongoing and proposed projects activities that if fully implemented, would have led to the achieved of the stated strategies and ultimately the national biodiversity goals and the requirements of the convention. Unfortunately, less than 20% of these projects were implemented during the life of the NBSAP. Since the planned actions were not accomplished, it is reasonable to conclude that the strategies were not fully implemented hence the goals and objectives not fully achieved.

The most successful actions were those led by the Environmental Coordinating Unit and the Physical Planning Department; both agencies are part of the same Ministry.

[2]Participatory Forest Management Project: Improving Policy and Institutional Capacity for Development, June 2006

The actions that have resulted in some positive impacts are:

 # 2 Public information awareness and education – strategy 3, 8, 18, 20, 31

 # 3 Development of Legislative reform– strategy 2, 7, 19, 21, 24, 29, 30.

 # 4 Integrated Land use planning and management – strategy 1, 4, 13, 19.

 # 5 Capacity Building and institutional strengthening for environmental management – strategy 1, 4, 13, 19.

 # 7 Comprehensive Water Resource Management - strategy 7

 # 12 Community participation in terrestrial biodiversity conservation – strategy 4 and 11

 # 16 Biodiversity and Climate Change adaptation program – strategy 28

Chapter 3: NBSAP 2014-2020

This chapter speaks to the **Strategic Direction** Dominica has adopted in the pursuit of sustainable biodiversity management in line with the objectives of maintaining a diverse and rich biodiversity resource base as the foundation for national development. The strategic direction is supported by an **Action Plan** that gives the minimum indicative steps necessary for the achievement of the objectives.

Strategy Direction

Nature Isle: Dominica has been dubbed the Nature Island of the Caribbean. Further, in his 2011 budget speech the Hon. Prime Minister enunciated a ten point plan to make Dominica an "Organic Island". These pronouncements point to a strategic development plan that emphasizes the importance of biodiversity to the life of Dominica.

The Government is convinced that the basis for development in Dominica is through the sustainable use of terrestrial and marine biological resources (Objective 4). To this end, the Government has solicited the help of the United Nations Environmental Program in engineering a development strategy to make and market Dominica as an "Organic Island". The program takes cognizance of Dominica's rich biodiversity and encourages conservation through agriculture, tourism and culture. The strategy here is to use organic farming techniques, integrated pest management (IPM) programs and soil conservation strategies to ensure food security and biodiversity conservation.

CASE STUDY 3
CRABS VERSES SEA WALL

The Black Crab (*Gecarcinusruricola)* is a species of *crab common to Dominica*. This crab spends its adult life on the land but migrates to the beach to deposit its young in the shallow coastal waters. When old enough, the young crabs migrate to the land where they grow to adulthood and the cycle is repeated.

Catching of the crab is a popular pastime and the crab meat a delicacy to Dominicans.

The main highway on the south eastern part of the island runs along the coast and has been severely impacted by storm surge. In response, the government built huge retaining sea walls that run for miles along the coast. These walls make it almost impossible for the crabs to cross from land to sea. The migrating crabs are trapped on the highway where thousands are killed by vehicle. The result is a decrease in the crab population and the corresponding loss in social and economic benefits.

Biodiversity and the Economy: Currently, there is no comprehensive report onthe contribution that biodiversity makes to the economy of Dominica or the livelihood of its people. However, anecdotal evidence and the scattered bits of data tell of the significant contribution that is bigger than any other single sector. This picture is masked by fragmentation of biodiversity contributions under ministerial headings.

In 2012, agricultural production accounted for 12.3 percent of total GDP, with an overall increase in the sector of 7.5 percent despite the 23.5 percent decline in banana production. Tourism contribution to the GDP contracted by 1.6 % in 2012[3] (> 60 percent of this amount is attributed to Biodiversity)

[3] Prime Minister's 2013 Budget Address

while water resources contribute 5.9% not including contribution from hydroelectricity. Timber extracts (for lumber and charcoal) netted an average of $3.67 million per year for the ten-year period 2002 to 2012.

In-Situ Biodiversity occupies *approximately*70% of the national land space. Managing such a vast resource demands more that the state can provide; all stakeholders therefore have a role to play in the management of such a vital resource. Currently, the NGO community complains of exclusion from the decision-making process and limited access to financing and technical information. Human capacity constraint also prohibits NGO from capitalizing on decision making opportunities when they occur.

Indigenous People: The Kalinago are the indigenous people of Dominica whose way of life has not changed significantly over the last hundred years. However, some of their livelihood practices are unsustainable and need to be modified using available and appropriate technology. The strategy, therefore, is to train these citizens in sustainable harvesting techniques as well as encourage *in-situ* conservation strategies – domestic cultivation of indigenous plants grown in the wilds.

Sustainable Harvest: The Fisheries Department has implemented a number of strategies aimed at protecting the resource while maximizing its utilization to meet the social and economic needs of the country. The following strategies are seen as success stories that can be reproduced.

1. The formation of fisheries cooperatives at community level that allow for education exchanges, technology transfer and financial support.
2. Provision of appropriate gear to fishers, as well as, using fishers to police the behavior of others.
3. Discouraging the use of ghost fishing (fish pots that are frequently lost).
4. Providing training to relatives and friends of fishers to effectively utilize all of their catch.

Management of Invasive Species: Despite the efforts implemented under the 2001 NBSAP, Dominica has suffered from the negative impacts of alien species. The Fisheries department highlights the presence of the *Lion Fish* and *Halophila stipulacea.* The Forestry Department laments the presence of the *Puerto Rico Crested anole*, the *Chytrid tungus* and the *Palm mite.* Some of these organisms are predators to native species hence they thrive at the expense of the native species. The Ministry of Agriculture needs to strengthen its quarantine procedures and expand its *ex- situ* conservation efforts to increase the local gene pool of endangered species.

National Targets; priorities

The Commonwealth of Dominica is pursuing a ‘green’ development path in keeping with the government’s pronouncement that declared Dominica the ‘Nature Isle’. Consequent upon this aspiration, Dominica is aligning its development agenda and biodiversity conservation strategy with the global biodiversity objectives. All of the goals and targets of the 2011-2020 Strategic Plan are therefore considered relevant and will be addressed to the extent possible within the development framework and as far as they amplify the Nature Isle concept and influence biodiversity management

in Dominica. However, the country has selected the following five targets as national priorities. It is hoped that these priorities will be fully realized by 2020.

The agreed selected targets are:

1. By 2020 at the latest, all residents of the Commonwealth of Dominica will be aware of the value of biodiversity, and the steps they can take to conserve and use it sustainably.
2. By 2020, at least 15% of areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
3. By 2020, pollution, including from excess nutrient, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
4. By 2020, at least 20% of terrestrial, inland water and 15% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem service, are conserved through comprehensive ecologically representative and well-connected systems of effectively managed, protected areas and other means, and integrated into the wider land and seascape.
5. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stock has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation, and to combating desertification.

As a first step in reaching these targets, Dominica has developed a biodiversity/land degradation project entitled Supporting Sustainable Ecosystems by Strengthening the Effectiveness of Protected Areas System. The emphasis of this project is the development of a protected area system management plan that strengthens national institutional and systemic structures, protected areas network, protected areas enabling environment, and civil society role on biodiversity management. This project will specifically address Targets 4 and 5 above. Additionally, Dominica has signed on to the UNEP lead Caribbean Challenge Initiative (CCI) that call for the protection of 20% of terrestrial and near shore marine and coastal resources by 2020.

This initiative will find synergy and some financial support from the Banana Accompanying Measures for the Commonwealth of Dominica; a €15.27 million project funded by the European Union. This project makes provision for Enterprise Development, Information Systems, Physical Infrastructure, Technology Development and Innovation and Standards which are all relevant to agriculture biodiversity thus supporting Targets 2 and 3 above.

Policies

The Government of Dominica has made provision for the conservation and sustainable use of its biological resources through the development and implementation of several different legal instruments (Acts, Bills, and Policies). Because these instruments were developed at different times, the reality to which they speak differs. Consequently, there is some overlap, obsolescence, and general weakness. There is now a need for harmonization and commitment to updating and upholding these protective legislations. The in-exhaustive table below highlights the efforts of the Government to protect its biodiversity while depicting the current legislative challenges.

Table 4: Legal Instruments that protect Biodiversity

Document Title	Brief Description	Implementing Agency	Status
Access and Benefit Sharing Bill	To all citizens access to the benefits of BD resources	Ministry of Legal Affairs, Environmental Coordinating Unit, Forestry Division, Division of Agriculture	Incorporated into Climate Change, Environment and Development Bill
Agriculture Policy 2014-2020	Provides direction to Agricultural development	Ministry of Agriculture	Functional
Biosafety and Biotechnology Management Bill	Supports the Cartagena Protocol	Ministry of Legal Affairs and Trade, Division of Agriculture	Incorporated into Climate Change, Environment and Development Bill
EIA Regulations	To control the environmental impact of development	Physical Planning Division	Pending
Forest Policy	Regulate the use of forest resources	Forestry Division	Pending adoption
Forests Act 1959 Forest and Wildlife Act 1976	Protection of Forest Biodiversity	Forestry Division	Functional; to be amended
Marine Pollution Management Bill 1999	To protect the Marine Environment from Land Base Pollution	Ministry of Legal Affairs, Fisheries Division	Not well enforced
Protected Areas Bill	Provision for the effective management of protected areas	Physical Planning Division, Division of Agriculture, Forestry Division, Ministry of Legal Affairs	Bill is under review

Physical Planning Act 2002	Act to guide and regulate physical development	Physical Planning Division	Functional
Pond Casse Land Use	Watershed Management plan	Physical Planning Division, Dominica Water and Sewage Company (DOWASCO)	Pending adoption
Protected Areas Bill	To provide for the designation and management of areas of biological importance	Forestry, Agriculture and Ministry of Legal Affairs	Sent to Parliament
Trade in Endangered Species Bill 2004	Bill to support the implementation of CITES	Ministry of Trade and Legal Affairs	Functional
Quarry Bill and Regulations	To regulate and control quarry activities	Physical Planning Division	Pending approval
National Parks and Protected Areas Act (1975)	Management of Protected Areas and National Parks	Forestry Division	Functional
Fisheries Act (1987)	Management of Fishery and Marine Resources	Fisheries Division	Functional with need of revision
Solid Waste Management Act	To manage the collection and safe disposal of solid and hazardous waste.	Ministry of Health, Dominica Solid Waste Management Corporation (DSWMC)	Functional

Dominica's Agriculture Policy (2014-2020) aims to enhance food security, growth and development of the agricultural sector through the sustainable utilization of human, natural and other resources. The influx of persons from diverse cultural background and different food preferences is bringing changes to traditional food.

This NBSAP review is a follow on from the work presented in 2001. It seeks to build upon and embellish the development thrust of Dominica as it pertains to the management of Biodiversity. Consequently, the strategic direction and objectives enunciated in 2000 remains in place and this latest effort seeks to build around and upon them to strengthen Dominica's position nationally and globally as it pertains to the sustainable use of Biodiversity.

In conformity to the aforementioned position, the following strategies address gaps and unfinished business in the 2000 NBSAP even though the presentation format differs. For the period 2014 to 2020, the following strategies will give direction to Biodiversity Management in Dominica.

Strategies

The following strategies are designed to give direction to biodiversity management at the national level in order to achieve the local and international targets and ultimately achieve the national goals. These strategies take cognizance of the shortcomings of the 2001-2005 strategies and seek to build upon the successes. The list is a condensed, succinct but accurate reflection of the more exhaustive list generated by stakeholders. These strategies seek to:

1. Improve the protection and management of the country's natural environment. The Growth and Social Protection Strategy (GSPS) calls this ***the main challenge facing Dominica***. This strategy will be supported by the evolving Climate Change, Environment and Natural Resource Bill, the proposed land use plan and the Protected Area (PA) system plan, all of which are expected to come into effect during the life of this NBSAP.

2. Establish a biodiversity knowledge network and coordinating mechanism with links to the various Ministries and Departments, academic institutions, professional organizations and non-state actors. The effort would be led by the ECU that should have wider jurisdiction and mandate under the evolving environmental legislation.

3. Improve public awareness and participation in decision making. The ECU will coordinate the development of a national environmental education and awareness program that will bring together the sectoral pieces that currently exist.

4. Improve stakeholder involvement in Biodiversity management. NGOs should be facilitated to participate in decision making surrounding resource management and exploitation.

5. Establish and utilize the Clearing House Mechanism (CHM) for more effective data dissemination.

6. Develop and implement an economic valuation system for Biodiversity resources and ecosystems services with the view to more accurately reflect their contribution to the economy.

7. Establish a financial mechanism or provide incentives to support biodiversity development. This should be linked to research opportunities and bio-prospecting. The resident Universities and other scientific bodies like CARDI would be encouraged to support control research.

8. Develop a built in reporting system for early warning of threats, periodic update for policy makers and support to the national reporting requirement under the convention.

9. Strengthen *ex-situ* conservation of threatened and endangered species using available institutions, relevant organizations and research entities as repository for genetic resources.

10. Develop joint ventures between Government and private land owners to save and protect fragile, sensitive, threatened ecosystems located on private lands.

11. Seek approval for the Climate Change, Environment and Natural Resource Bill with inclusion relative to the ABS and Biosafety protocols. The legislation should make provision for the strengthening of the Environmental Coordinating Unit - the seat of the Biodiversity and Biosafety focal points.

12. Develop and implement a protected area systems plan with allocated financial resources. The plan will include a description of key strategies and priorities, and make provision for integration into government institutional, administrative and budgeting process.

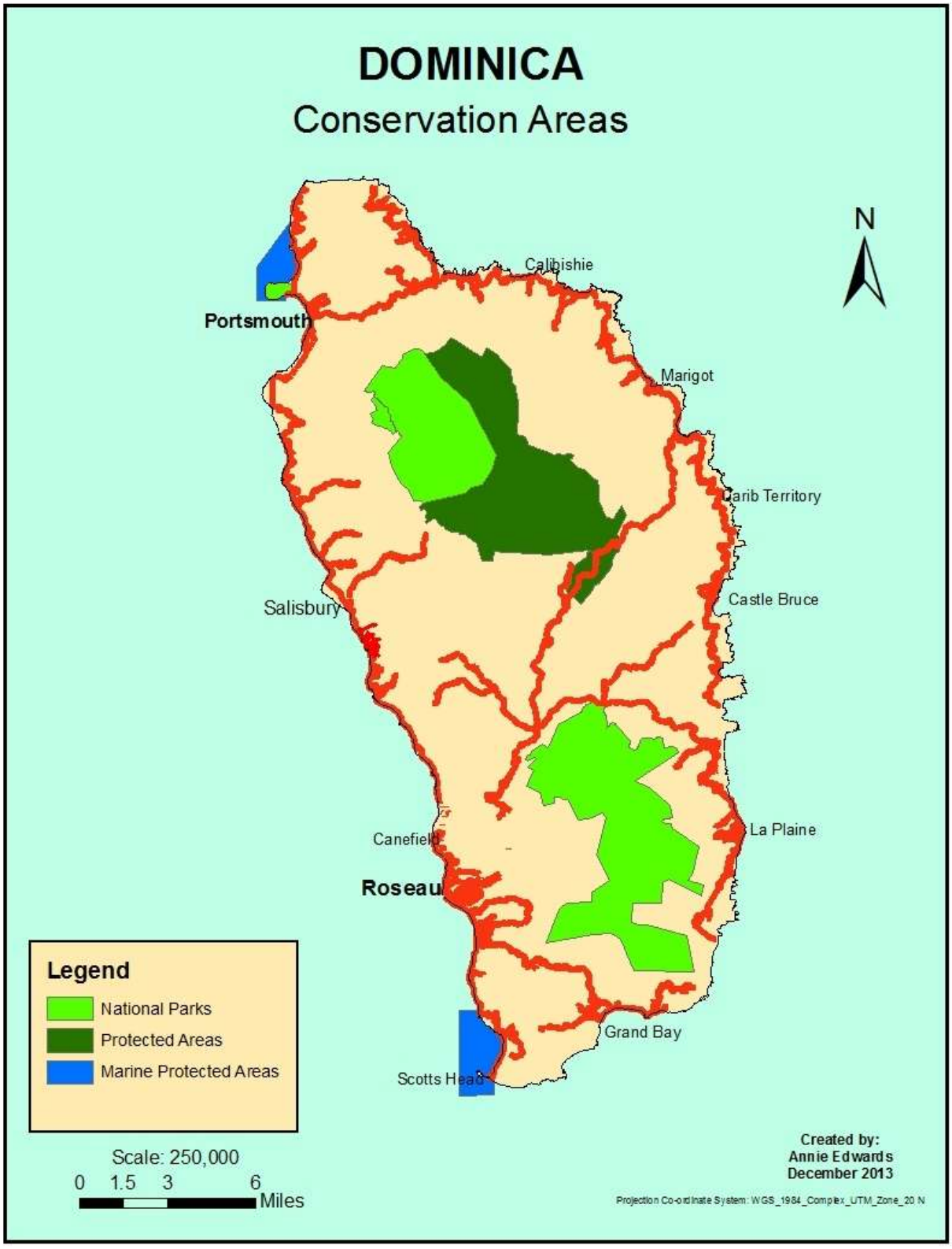
These strategies will support and be supported by Protected Areas Legislations currently being drafted. Approximately 65% of Dominica is covered by forest and managed by the Forestry Act. However, it is recognized that this Act cannot do justice to the resources contained in the protected areas designated by the laws of Dominica (see Table 5 below and Fig 3).

Table 5: Protected areas in Dominica

Type	Ecosystem type	Official Name	Status	IUCN Category	Location	Area in Ha
National Park	Forest, Marine, Coral Reefs	Cabrits National Park	Draft Management Plan Developed; no regulations	II- National Park	North (North of Portsmouth)	531.4
National Park	Rivers, Forest, Wildlife Habitat	Morne Diablotin National Park	Management Plan Developed	II- National Park	North (in the Northern Mountain Ranges of Dominica)	3,336
National Park	Rivers, Lakes, Forest, Geomorphologic resources, Wildlife Habitat	Morne Trois Pitons National Park	Management Plan Developed	II- National Park	15°19′30″N 61°19′00″W	6,872
Forest Reserve	Forest, wild life habitat	Central Forest Reserve	Governed by Forestry Act	VI- Protected area with sustainable use of natural resources	North Central	410
Forest Reserve	Forest, springs	Northern Forest	Governed by Forestry Act	VI- Protected area with	North Central	5,475

		Reserve		sustainable use of natural resources		
Marine Reserve	Marine	Soufriere-Scotts Head Marine Reserve (SSMR)	Established under SRO#17 of 1998	V- Protected Landscape/ Seascape	South West (encompasses the villages of Scott's Head and Soufrière up to Anse Bateau, near the village of Pointe Michel)	Unspecified
Protected Water Catchment	Rivers and lakes.	Stewart Hall Water Catchment Protected Forest		VI - Protected area with sustainable use of natural resources		
	The areas listed below are areas of interest not official declared as protected					
National Park	Hot Springs	Soufriere Sulphur Springs National Park	Management Plan Developed	*III- Natural Monument or Feature*		102

Figure 3: Conservation Areas in Dominica



Building on the consciousness arising from the NBSAP, the Government of Dominica embraced several national and regional initiatives targeting Protected Areas (Table 4PA initiatives).One outcome of these initiatives is the thrust to develop a Protected Area Management Plan in support of the Morne Trois Pitons World Heritage Site.

Table 6: PA initiatives in Dominica

INITIATIVE	Type of PA	Period
Caribbean Large Marine Ecosystem –CLME	Marine	2008-2012
Integrated Watershed and Coastal Area Management –IWCAM	Terrestrial and aquatic	2006-2011
OECS Protected Area and Associated Livelihoods - OPAAL	Marine and Terrestrial	2005-2011
Special Program on Climate Resilience (SPCR)	Terrestrial	2012-2017

Actions Planned

The **action plan** presented here represents issues to be addressed at the policy level that will lead to the success of the strategies which in turn will achieve national and international targets and the national objectives and goals. For this reason, actions are presented per objective with accompanying outputs, resource needs and risk factor.

Objective 1 is seeking to conserve Dominica's rich and diverse biodiversity resource. This is truly a national concern as spelt out in the 'nature isle' pronouncement. Dominica's tourism product is its impressive biodiversity resource. In addition to harvesting the biodiversity resource, the health and aesthetic value of the intact resource is huge. The economic value has not been quantified and the full potential not yet explored. The global benefit is also unknown but the fact that Dominica is a net sink for GHG is a value that the world can ill afford to compromise.

Table 7: Action Plan for BD Object 1

Objective 1.	Action Plan	Responsible Party/agency	Outputs	Resource required	Risk Factor
To ensure that the biological resource of Dominica remains rich and diverse	Conduct inventory of BD resources	Divisions of Agriculture, Forestry and Fisheries	Updated list of flora and fauna in Dominica	US$2,000,000	Finding qualified taxonomist and being able to raise the money
	Establish baseline for agreed targets	Divisions of Agriculture, Forestry and Fisheries, and the Environmental Coordinating Unit (ECU)	Baseline established for all national targets	US$200,000	Completing the assessment in time for the next reporting period.
	Strengthen quarantine efforts and enforcement legislation	Dominica Air and Sea Port Authority (DASPA) And Quarantine Unit of Agriculture Division	Quarantine regulations and SOP in place	US$50,000	Biosafety legislation may not be approved in time to make impact

Objective 2 seeks to position Dominica to get the best of both worlds. Its rich biodiversity resource is attracting researchers from universities and pharmaceutical companies worldwide. At the same time, genetically modified organisms (GMO) are entering the country as hybrid cultivars that threaten to replace indigenous species. Understanding and managing biotechnology to the benefit of Dominicans is the intent behind this objective. The actions under this objective are therefore intended to take advantage of the technology while protecting the integrity of the resource base. Such a herculean task requires the combined effort of Dominica's entire population and the stream of visitors who come to share the benefits of the resource.

Table 8: Action Plan for BD Objective 2

Objective 2.	Action Plan	Responsible party/Agency	Output	Resource required	Risk Factor
To reduce or eliminate the potential risks from the use of biotechnology and its by-products	Coordinate policy on food security, technology and BD conservation.	Division of Agriculture and ECU	A national policy on food security that addresses GMOs.	US$150,000	Not enough knowledge about GMOs penetration into the food industry.
	Reduce conflict between traditional agriculture and organic farming	Ministry of Agriculture	A policy defining organic agriculture and its place in Dominica	US$800,000	Organic agriculture may not instantly yield returns to make it attractive.
	Expand public awareness on biosafety issues	ECU and Ministry of Education	Biosafety issues in prominent places in the media	US$300,000	Presentation may not be attractive to catch the public attention
	Include biosafety regulation into environmental legislation	Ministry of Legal Affairs	National legislation gazette.	------	Ministries of legal affairs may not attach enough significance to the issue to push it through.

Objective 3 seeks to minimize loss of terrestrial and marine biodiversity. There is currently no accurate record of the loss of biodiversity in Dominica. However, CARDIs records have shown the loss of at least fifteen (15) species of the sweet potato over the last twenty (20) years. A number of 'hot pepper' species are extremely rare and may already have been lost. Achieving this objective not only requires policy intervention but also civil society involvement is equally important.

Table 9: Action Plan for BD Objective 3

Objective 3.	Action Plan	Responsible party/Agency	Output	Resource required	Risk Factor
To reduce and/or minimize the loss of terrestrial and riverine biodiversity.	Draft legislation to stop the use of deleterious substances in the harvesting river fish.	Ministry of Legal Affairs and the Forestry and Wildlife Division	Harvesting legislation and river patrol.	US$25,000	Policing rivers may be impossible given the number of rivers and their location
	Direct CARDI to act as first level genetic pool.	Ministry of Agriculture	National storage site for genetic resources	US$ 250,000	Potential destruction from tropical storm
	Strengthen and enforce permitting system for harvesting, development and research of forest resources	Ministry of Legal Affairs and the Forestry and Wildlife Division	A controlled harvesting mechanism for aquatic forest resources	US$75,000	That permitting become more important than conservation
	Establish BD knowledge network among Environment, Agriculture, Forestry and Fisheries with some emphasis on traditional knowledge	ECU and CHM team	Functional CHM with links to BD data sources	US$25,000	TK may not be able to stand against empirical scientific data
	Bring Agriculture Sector performance in line with BD principles	Ministry of Agriculture and ECU	Reduction in pesticide use. Increase in use of buffer zones	US$300,000	Market forces and demands for foreign foods may nullify efforts
	Promote soil	Ministry of	Good	US$250,000	Budgetary

	conservation through education	Agriculture and Forestry	agriculture practice among farmers. Reduced sedimentation in rivers and the sea	per year	constraint might make it difficult for Government.

Objective 4 reiterates and emphasizes the reality that Dominica's wealth is in its biodiversity. For this reason, sustainable use of this resource must be the mandate of every Dominican. Knowledge sharing should therefore not be left to chance but should be supported by development policies. Effort in this direction will support both the national and international (convention) call for conservation.

Table 10: Action Plan for BD Objective 4

Objective 4.	Action Plan	Responsible party/Agency	Output	Resource required	Risk Factor
To ensure that the basis for development is through the sustainable use of terrestrial and marine biological resources	Seek agreement among farmers to regulate pesticide use in support of the Organic Island concept	Division of Agriculture	Land Zoning plan that separates organic farming area from traditional farming areas	US$150,000	Aerial application of pesticide may render organic farming impossible
	Encourage the use of the sustainable principles spelt out in the agriculture policy to support both traditional and organic agriculture	Ministry of Legal Affairs, Agriculture Fisheries and Planning	Policy guidelines for designating organic farming areas	US$ 100,000	Zoning private land depends on the land owners agreeing to the use of their land
	Develop economic accounting system for BD resources	Ministries of Agriculture and Finance	Economic value for specific BD resources established	US$300,000	Value may be market-based and not the true value of the resource
	Pursuing REDD and REDD+ and carbon	Forestry, Ministry of Finance, ECU	Dominica will benefit from Adaptation	US$10,000,000	Country size may not be attractive to the market

	financing in support of Dominica's forest		fund. CDM project operational.		

Objective 5 addresses the livelihood issues and dependence of human beings on the remaining biological resources of the earth. While the dependence is clear, the economic value is not so clear. Biodiversity value needs to be integrated into budgetary processes and the reciprocal support provided for conservation and expansion.

Table 11: Action Plan for BD Objective 5

Objective 5.	Action Plan	Responsible party/Agency	Output	Resource required	Risk Factor
To ensure the equitable and sustainable distribution of social and economic benefits from the use of terrestrial and marine biological resources	Promote partnership between government and private land owners	Ministry of Legal Affairs; Private land owners	Agreement between private land owners and government to support BD conservation	US$25,000	Private land owners do not want to be encumbered with legal agreements
	Training of indigenous people in resource management	Ministry of Agriculture and Forestry	Indigenous persons able to sustainable harvest forest resources	US$200,000	Indigenous people like their freedom and may not gravitate to technology
	Formulation of financial plan to support BD management	Ministry of Agriculture and Ministry of Finance	Government committed to financial support for BD management	US$200,000 per year	The current economic climate may not be able to accommodate added financial commitment

In addition to the foregoing financial resources required to implement the Action Plan, there are some synergistic actions that will buttress the NBSAP. These include:

- The development of co-management arrangements by the Caribbean RFM, a US$ 50M initiative
- The Banana Accompanying Measure (BAM) US$16M
- The SPCR Agriculture and food security component, US$ 5M
- Sustainable management of terrestrial, coastal and marine resources funded by the German cooperation (GIZ) US$5M
- Dominica Sea Turtle Conservation US$25,000
- Mountain Chicken *(Leptodactylus fallax*) Conservation US$40,000
- Agroforestry, food security and soil stabilization US$ 6.075M
- Sustainable Land Management community mapping US$ 1.6M

NBSAP Stakeholders

Although biodiversity issues cut across all sectors and Ministries of Government, the Ministries and Departments that were most instrumental in the implementation of the 2000 NBSAP were the Ministry of Agriculture and Forestry, Ministry of Environment, Natural Resource, Physical Planning and Fisheries. These agencies will again take the lead in biodiversity management during the period 2014 to 2020. However, much greater investment of time and resources are needed by all Dominicans, and the friends who come for a bath in the hot springs, bird watching, whale watching or just to escape the mega cities.

Table 12: Main Stakeholder Groups

Name of Agency	Responsibility
Dominica Sea-Turtle Conservation	Support turtle conservation. Train nationals in conservation principles.
Environmental Coordinating Unit	Coordinate all environmental issues including biodiversity Management. Focal point for CBD.
Forestry, Wildlife and National Parks Division.	National resource managers and custodians. Manage forest resources, do inventory, and implement conservation legislation.
Fisheries	Manage marine resource, train fishermen, monitor changes in marine resources –fish stocks, sea-grass beds, etc.
Ministry of Agriculture	Regulates the use of germplasm; Works to control invasive species
Ministry of Finance	Manage revenue generation and expenditure on biodiversity resources.
Ministry of Legal Affairs	Develop, enact and enforce Legislations necessary for biodiversity protection.
National Coastguard	Police the coast and its resources.
Physical Planning	Regulate land use; set boundaries for PA and livelihood activities.
Non-State Actors	This civil society body owns, manages and conserves biodiversity resources nationally.

Ringed-Kingfisher

Chapter 4: Mainstreaming the NBSAP

"The most important lesson of the last ten years is that the objectives of the Convention will be impossible to meet until consideration of biodiversity is fully integrated into other sectors. The need to mainstream the conservation and sustainable use of biological resources across all sectors of the national economy, society, and the policy-making framework is a complex challenge at the heart of the Convention."3 COP VI

Mainstreaming in this document means integrating biodiversity into sectoral plans and policies using any method or approach appropriate to Dominica's development status.

Biodiversity use and services permeated the Dominican society, from food and raw material in the community of the indigenous people, to the aesthetics and recreational pleasure of visitors. It is almost impossible to live in Dominica and not be impacted by its biodiversity. In some fortuitous almost mythical way, Biodiversity in Dominica has been mainstreamed but administrative, institutional and political bodies have not keep pace with the change. The challenge now therefore, is to align the institutional and political structures the reality of the people.

At the local level, communities interact with the living landscapes and ecosystems for food, shelter and recreation. At the Commercial and Ministerial levels, biodiversity is the product bought and sold; in essence, it is the currency of Dominica. In this context, Goal # 4 ('ensure that the basis for development is through the sustainable use of terrestrial and marine biological') finds meaning.

Unfortunately, the sustainability element of this goal is the area of weakness for Dominica. The chart that follows shows the progression from goal or vision to work program or reality.

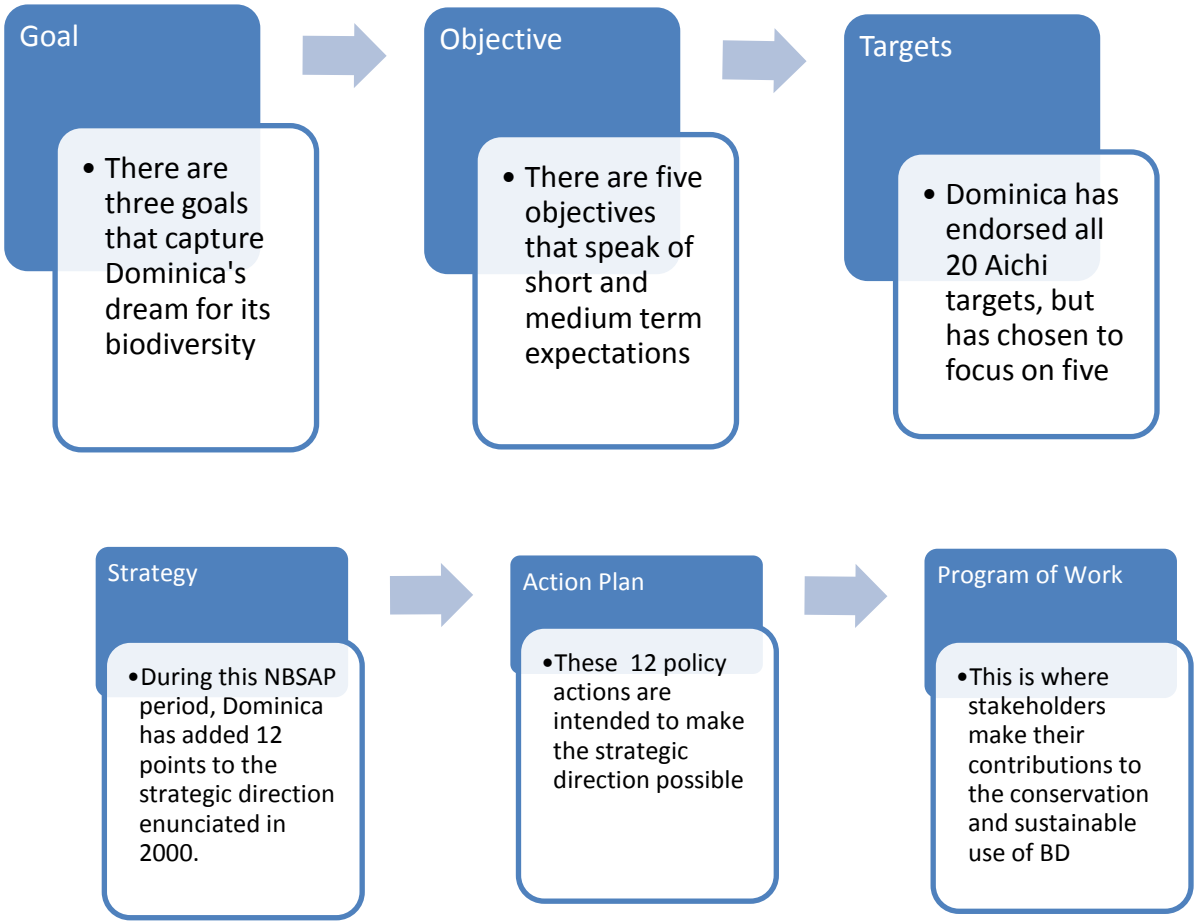


Table 13: Mainstreaming BD in Dominica

Goals	1.The conservation and sustainable management of Dominica's terrestrial and marine biodiversity	2.The promotion of sound and sustainable agricultural practices and technology within existing agricultural human capital	3.To ensure that biotechnology knowledge and concerns are widely distributed so that all life is guaranteed and benefits derived are equitably shared.
Objectives	1. To ensure that the biological resource of Dominica remains rich and diverse 4. To ensure that the basis for development is through the sustainable use of terrestrial and marine biological resources	3. To reduce and/or minimize the loss of terrestrial and marine biodiversity 4. To ensure that the basis for development is through the sustainable use of terrestrial and marine biological resources	2. To reduce or eliminate the potential risks from the use of biotechnology and its by-products while at the same time, exploiting opportunities presented that are in keeping with Dominica's sustainable development agenda

	5. To ensure the equitable and sustainable distribution of social and economic benefits from the use of terrestrial and marine biological resources		5.To ensure the equitable and sustainable distribution of social and economic benefits from the use of terrestrial and marine biological resources
Targets	1. By 2020 at the latest, all residents of the Commonwealth of Dominica will be aware of the value of biodiversity and the steps they can take to conserve and use it sustainably 2. By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity 4. By 2020, at least 15% of terrestrial, inland water and 15% of coastal and marine areas especially areas of particular importance for biodiversity and ecosystem service, are conserved through comprehensive ecologically representative and well-connected systems of effectively managed protected areas and other means and integrated into the wider land and seascape 5. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stock have been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation, and to combating desertification	2. By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity 3. By 2020, pollution, including from excess nutrient, has been brought to levels that are not detrimental to ecosystem function and biodiversity 4. By 2020, at least 15% of terrestrial, inland water and 15% of coastal and marine areas especially areas of particular importance for biodiversity and ecosystem service, are conserved through comprehensive ecologically representative and well-connected systems of effectively managed protected areas and other means and integrated into the wider land and seascape 5. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stock has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation, and to combating desertification	1. By 2020 at the latest, all residents of the Commonwealth of Dominica will be aware of the value of biodiversity and the steps they can take to conserve and use it sustainably 3. By 2020, pollution, including from excess nutrient, has been brought to levels that are not detrimental to ecosystem function and biodiversity 5. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stock have been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation, and to combating desertification
Strategy	1. Improve the protection and management of the country's natural environment.	1. Improve the protection and management of the country's natural environment.	2. Establish a biodiversity knowledge network and coordinating mechanism

	3. Improve public awareness and access to decision making 4. Improve stakeholder involvement in Biodiversity management 5. Establish and utilize the Clearing House Mechanism 7. Establish a financial mechanism to support biodiversity development 8. Develop a built in reporting system for early warning, periodic update for policy 9. Strengthen *ex-situ* conservation of threatened and endangered species 10. Develop a joint venture between Government and private land owners 12. Develop and implement a protected area systems plan	2. Establish a biodiversity knowledge network and coordinating mechanism 7. Establish a financial mechanism to support biodiversity development 9. Strengthen *ex-situ* conservation of threatened and endangered species 10. Develop a joint venture between Government and private land owners 12. Develop and implement a protected area systems plan	3. Improve public awareness and access to decision making 4. Improve stakeholder involvement in Biodiversity management 5. Establish and utilize the Clearing House Mechanism 6. Develop and implement an economic valuation system for Biodiversity resources 7. Establish a financial mechanism to support biodiversity development 8. Develop a built in reporting system for early warning, periodic update for policy 9. Strengthen *ex-situ* conservation of threatened and endangered species 10. Develop a joint venture between Government and private land owners 11.
Action Plan	Conduct inventory of BD resources Establish baseline for agreed targets Strengthen and enforce permitting system for harvesting forest resources Develop economic accounting system for BD resources Formulation of an MOU between government and private land owners	Conduct inventory of BD resources Establish baseline for agreed targets Strengthen quarantine efforts and enforcement legislation Reduce conflict between traditional agriculture and organic farming Direct CARDI to act as first level genetic pool	Conduct inventory of BD resources Expand public awareness on biosafety issues Draft legislation to stop the use of deleterious substances in the harvesting of river fish Strengthen and enforce permitting system for harvesting forest resources Establish BD knowledge network including traditional knowledge
Program of Work	-PA Management system: -GEF funded project,US$2m. -PPCR.US$8m	-BAM funded Project, US$16m -Sustainable management of terrestrial and coastal	-Agriculture Food Security FAO initiative US$5m -Dominica Sea Turtle Conservation US$40,000

	-Co-management arrangements US$3.6m	resources; GIZ, US$5m -S$300,000	-Mountain Chicken Conservation US$40,000.
Responsible Agency	The ECU and its parent Ministry will take the lead with support from all other Ministries, statutory bodies, private sector agency and relevant NGO.	Ministry of Agriculture; Fisheries Department, ECU	NGO, Fisheries, Agriculture

Mainstreaming Tools and Approach

In mainstreaming biodiversity management into the national development agenda of Dominica, five main approaches and associated tools are being employed:

1. The integration of biodiversity management into existing development programs that are already part of the economic and social fabric of the country. One tool that would be used here is the ***poverty alleviation*** program. This program provides financial and technical support to poor, rural and marginalized persons with the intent of raising their standard of living thus reducing the impact on biodiversity. As the economic plight of the people improves, squatting, deforestation, and overexploitation of natural resources is expected to decrease. It would then be possible to track biodiversity conservation through social assessment that examines housing, employment, and health parameters.

2. Enhanced ***complementarity between agriculture and biodiversity*** management. There is in Dominica an Agriculture Ministry with policies and funded programs. Agriculture is a big contributor to GDP thus the Ministry is heavily involved in research and development. More importantly, agriculture is about managing biodiversity; hence, improvement in agriculture is akin to agricultural sensitivity. Biodiversity development, management and monitoring can and should be an integral part of agricultural development.

3. Advance the ***Protected areas management*** system which is already an integral part of the national work program of Dominica, and has several reporting requirements tied to international obligations. Tracking biodiversity management through PA systems management is a natural fit. Dominica already has in place draft PA legislations that will facilitate mainstreaming biodiversity.

4. ***Direct financial investment in biodiversity*** including valuation assessment of BD indicators. As scientific research on BD resources expands, resources would need to be reinvested in BD conservation and management to ensure sustainability of the resource. Specific indicators would need to be identified and a tracking process established so that the health and viability of the resources are known, and response measures established to deal with any challenge that emerges.

5. Maintain a ***Green House Gas emission*** >0. As a signatory to the UNFCCC, Dominica is obligated to report to the COP on its GHG emissions and efforts to reduce global warming. Maintaining natural forest cover is the most effective way to reduce GHG emissions, and is also an excellent biodiversity conservation strategy. It is possible that GHG levels can rise above zero while the forest remains intact, however, deforestation will definitely increase GHG emissions. This CO2 sequestration makes Dominica eligible for benefits under the Clean Development Mechanism.

The NBSAP Process and Impact

Recognizing the contribution of the 2001 NBSAP to biodiversity management in Dominica;

Cognizant of the need to align the national work program and targets to the global program and targets;

Determined to meet its local and global obligations under the CBD;

The Government of Dominica obtained financial assistance from GEF – UNEP to undertake the ***Revision of the NBSAPs and Development of Fifth National Report to the CBD.*** The process was as follows:

- **Stakeholder consultation and training**: The group of 31 stakeholders present at this consultation and training felt that the 2000 NBSAP served its purpose even though it did not achieve all of its targets or fully reach its goal. The consensus was that the shortfall was attributed to the dynamics of development including politics, economics, demographics and globalization as well as climate change. Dominica's economic challenges did not allow the government to invest in biodiversity management as anticipated. When the financial deficit is added to the droughts, floods, landslides and the associated demographic shifts that occurred during the period, the result could have been worst.

  The workshop concluded that there was an urgent need to mainstream biodiversity through institutional planning with committed financing, the Environmental Coordinating Unit (ECU) can be a good vehicle to lead the mainstreaming process but its role must be clearly defined and financed. The public education carried out by the ECU needs to be amplified and infused into other education programs nationwide.

- **Ministerial consultation**: The consultant leading the process met with individuals and small groups from key ministries including Finance, Planning, Agriculture and Environment. These meetings reveal that the institutional structure for biodiversity management needs to be strengthened using financial and policy instruments. It was clear that the financial support had to come from external sources given the current economic plight of the government. Partnerships with external agencies must be vigorously pursued since Dominica's biodiversity is of global significance.

- **NGO consultation and training**: The meeting concluded that for decades the NGO community has been at the forefront in conservation of biodiversity in Dominicabut their efforts and are still inadequate. This state of affairs can be attributed to lack of funds, need for enabling policies, lack of attention or priority, and lack of advocacy and awareness at some levels.

- **Institutional capacity assessment and training; preparation of strategy and action plan**: With regard to, the capacity to implement the 2014-2020 Strategy and Action Plan, there was uncertainty. Many issues were tabled surrounding the appropriateness of the strategies and action plans, and the ability of Government to implement them without institutional strengthening. It was clear that some issues from 2000 are still current and may require different treatment. There was consensus on the fact that biodiversity is of significant

economic value to Dominica but that accurate dollar value cannot be stated due to lack of data and an absence of environmental economic skills in the relevant Ministries of Government. The indigenous Kalinago people (4.3% of the population)extract a significant amount of their livelihood from the forest – food, fuel, craft material, building material and medicine – but there is no record of quantity or value.

- **Stakeholder and steering committee review of NBSAP**. The information gleaned from the foregoing consultations and meetings was incorporated into the first draft NBSAP produced from a desk review of relevant documents. The resulting document was then submitted to the steering committee and stakeholders for review and validation.

- **Submission of NBSAP to Cabinet and UNCBD**: The document resulting from the stakeholder and steering committee review was submitted to the Cabinet of Ministers (sometimes referred to as the Parliament) for political endorsement. Political endorsement will clear the way for the policy actions necessary to drive the strategy.

- **Media Coverage**: Although not listed among the main outputs of the NBSAP process, the media coverage of the outputs was of paramount importance in the absence of a functioning CHM. Information on the review process was introduced into family discussion through the media. Given the central role of biodiversity management in the life of Dominicans, it was unfortunate that the media coverage was not as vivacious as was necessary so that feedback from the wider public did not occur.

Contribution to global BD impact: Section 5 of the 2000 NBSAP catalogues the indigenous, endemic and endangered species of flora and fauna in Dominica. No inventory or census of Dominica's biodiversity has been conducted since 1990.

Dominica's contribution to global BD impact extends beyond the endemism that it holds to the hope which it gives to the world in the search for medicines and other pharmaceuticals not forgetting the contribution to pure science. In the ten (10) year period 2004 to 2013, the Forestry Department issued over one hundred (100) research permits mainly to Universities (see Appendix 1). Other research activities are ongoing under the auspices of the Fisheries Department, the Ministry of Agriculture and the Ministries responsible for Tourism, Planning and Water.

Dominica's contribution to global $C0_2$ reduction is significant and warrants much more support in the form of carbon financing institutions. The challenge is that 200 square miles of forest is often not considered as globally significant.

Progress towards 2020 targets: Dominica's 2001 -2005 NBSAP was not fully implemented largely due to financial, technical and human limitations. As a consequence, Dominica like most of the world, did not reach the 2010 biodiversity target. Technology transfer under the Convention has been very limited and there was insufficient scientific information for policy and decision making.

Decision X/2 of the Conference of the Parties adopted the Strategic Plan for Biodiversity (2011-2020) and urged Parties and other Governments to develop national and regional targets in the

framework of the Aichi Biodiversity Target. In response to this call and with the commitment to BD conservation in Dominica, the Government of Dominica through its Environmental Coordinating Unit has set its local targets cognizant of the Aichi targets.

The greatest risk to Dominica not meeting its commitment and stated national targets is the possibility that the anticipated financial resources projection may not be accomplished. There is willingness among relevant stakeholders, and a commitment by the national biodiversity steering committee, to make the strategy and action plan work towards achieving the 2020 targets.

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Chapter 5: Monitoring and Evaluation

Tracking the progress and achievement of the NBSAP is key to determining its true value, and making decisions as to what is missing, how it can be improved to become more beneficial, who should do what, how much should be invested in its implementation, and ultimately in biodiversity management in Dominica. Tracking will also provide answers to the following important questions; Are the targets meaningful and realistic? Did stakeholders really buy into the process and take ownership of the action plan? Did government provide the technical, financial and political support anticipated?

In answering these questions, the tracking process should possess some baseline from which to measure progress. Additionally, the agreed indicators should be measurable and simple enough so that all stakeholders can understand and support their use.

In the following table (Table 14), the national targets are the five selected from the Aichi Targets with 2020 as the set date. The base lines are estimated based on professional judgment and the cumulative opinion of three stakeholder workshops. However, the NBSAP has baseline data gathering as one of its first task. The idea therefore, is to review the baseline presented here during the first year of implementation of the NBSAP.

Table 14: Baseline, Indicators and Targets.

Baseline	Indicators	Targets
While approximately 45% of Dominicans have some knowledge of Biodiversity, less than 25% are aware of	The ECU developed comprehensive environmental education program. Biodiversity education outreach aired on main radio station. All	All residents of the Commonwealth of Dominica will be aware of the value of biodiversity and the steps they

its economic value and the means of protecting it.	schools recognizing world Biodiversity day. ***Area of focus: BD Management***	can take to conserve and use it sustainably. ***Means of verification: BD survey.*** ***Monitoring level: Standard***
Agriculture extension service training farmers in crop and livestock production and expansion, development and strengthen farmer group; Modernization of the Portsmouth Agricultural Station, transfer new technologies and research by the Chinese Agricultural Technical Mission; Implement data Collection and Management Project; implementation Phase 2 of the Disaster Risk Mitigation Project with FAO;. Dissemination of Meteorological Data to guide production techniques.	Ongoing training programs for extension officers. PA management developed and extended to all forest managers. ***Area of focus: BD Management***	Areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity. ***Means of Verification: BD survey and site assessment.*** ***Monitoring level: Standard***
Dominica's Prime Minister supported the call for Dominica to go Organic. There are some organic farmers in Dominica. Pesticide use in Dominica is regulated.	Pesticide use in agriculture regulated. Health of ecosystem adjacent to agriculture field yield positive reports on examination. ***Area of Focus: Assets; BD value of landscape***	Pollution, including from excess nutrient, has been brought to levels that are not detrimental to ecosystem function and biodiversity. ***Means of Verification: Qualitative site assessment*** ***Monitoring level: Standard***
Dominica currently has 20% coastal and marine area protected. The challenge is to sustain this achievement and expand the terrestrial coverage.	Improvement in management investment. Increase in conservation education and awareness. Good management of existing coastal, marine and terrestrial ecosystems. ***Area of focus: Assets; BD value of seascape and landscape***	At least 15% of terrestrial, inland water and 15% of coastal and marine areas especially areas of particular importance for biodiversity and ecosystem service, are conserved through comprehensive ecologically representative and well-connected systems of effectively managed protected areas. ***Means of Verification: Quantitative assessment.***

		Monitoring level: Advance
Dominica's net GHG emission is a negative quantity. Frequent landslides increase the area of degraded land making it difficult to reach the 15% of restored land.	Change in forest cover. Improvement of degraded lands. Reduction in CO^2 emissions ***Area of focus: Asset building and outcome***	Ecosystem resilience and the contribution of biodiversity to carbon stock have been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems. ***Means of verification: Quantitative assessment*** ***Monitoring level: Advance***

The indicators in table 14 do not constitute an exhaustive list for Dominica neither do the targets cover all of the biodiversity issues of concern. There is therefore a need to identify other indicators and list sites, institutions and agencies that are critical to biodiversity management and development in Dominica. The resulting information will be necessary in the preparation of a comprehensive tracking tool for biodiversity management in Dominica. Financial input is therefore required, but to date the source has not been identified.

Reporting:

Strategy #8 of this 2014 – 20020 NBSAP requires that Dominica develops a built-in reporting system for early warning of threats, for periodic update of policy makers and to provide support for the national reporting requirement under the convention. For this to be realized, a mechanism to capture and store the M&E results emanating from the tracking discussed earlier must be developed. The information would then be converted to data for decision making and reporting. The Environmental Coordinating Unit will lead these activities and be charged with reporting. Other Ministries, Agencies and NGO tasked with activities under the Action Plan, should submit their report to the ECU during the third quarter of each year.

Annual reports would be produced on:

- Biodiversity assets – landscapes, seascapes, protected areas, ecosystems and habitats.
- Biodiversity management – agencies reporting on the results of their BD program or support to other BD programs nationwide.
- Outcomes and asset building – results of actions undertaken in support of the NBSAP action plan.

Appendix 1

Research Permit Issued 2004

Title of Research Activity/Project	Institution	Country
Student Research Projects	University of Wales – Bangor	Wales
Song Studies of *Myadestes genibarbis* (Ruffos-throated Solitaire)	(Self-sponsored)	USA
Student Research Projects (Tropical Ecology)	State University of New York	New York, USA
Stiletto fly Diversity in Dominica (Part II)		USA
Tropical & Field Biology	Texas A & M University	USA
Taxonomy in Support of Biocontrol of Citrus Root Weevils	Florida A & M University,	USA
Turtles (RoSTI)	WIDECAST	
Selanops Spiders of the Caribbean	Univ. of California, Berkley	USA

Research Permit Issued 2005

Title of Research Activity/Project	Institution	Country
Tropical Biology Field Course	University of Bangor – Wales	Wales, UK
Expanding our Knowledge of Insect and Plant Diversity of Dominica	Clemson University, Smithsonian Inst.	USA
Expanding our Knowledge of Insect and Plant Diversity of Dominica	Clemson University, Smithsonian Inst.	USA
Investigating Invertebrates above and below waterfalls on Dominica	Univ. of Central Oklahoma	USA
Tropical Ecology Field Course	State University of New York	USA
PhD & MSc on Fauna/Flora interactions , wrt hummingbirds and other pollinators	Univ. of Aahurs	Denmark
Taxonomic Revision of Prestoea in the Lesser Antilles	Missouri Botanical Gardens	USA
Study of Rufous-throated Solitaire & Bird Vocalizations	Univ. of Massachusetts	USA
Mating system and population structure of Caribbean Heliconias & their interaction with Purple-throated Caribs	Smithsonian Inst., George Washington	USA

Turtles (RoSTI)	WIDECAST	
Texas A&M Undergraduate Field Course in Dominica	Texas A&M	USA
Preliminary study of lianas and invasive plants of Dominica	Clemson University	USA
Tropical Biology Field Course	Clemson University	USA
Functional Anatomy of Gobiid Fishes from Dominican Streams	Clemson University	USA
Vector borne rickettsial agents on Dominica	Center for Disease Control	USA
(Continuation of Jan. 2005 Research on True Bugs of Dominica	Clemson; USDA, Entom Lab, Wash. DC	USA
The Ants of the Caribbean	Florida Atlantic University	USA
The abundance & distribution of nesting cavities & food resources used by the two endemic, endangered Amazona parrots of Dominica	Clemson	USA

Research Permit Issued 2006

Title of Research Activity/Project	Institution	Country
Freshwater Crustaceans & Fish of Dominica	(Toulon Agency)	Dominica
Breeding Biology & Habitat Associations of the Pulmbeous Warbler	Ball State University	USA
Climbing Milkweeds of the West Indies	North Carolina State Univ.	USA
Abundance & distribution of nesting cavities & food resources used by Amazon parrots of D/ca	Clemson University	USA
Biology Field Course + Anoles research	Universrity of Wales - Bangor	UK
Tropical Ecology Field Course	State Univ. of New York	USA
Taxonomic Review of Aiphanes minima(for MSc Thesis)	Florida International University	USA
PhD & MSc on Fauna/Flora interactions , wrt hummingbirds and other pollinators	Univ. of Aahurs	Denmark
The Ants of the Caribbean	T	USA
Sea Turtles / RoSTI	WIDECAST	USA
Spider Diversity on Dominica	Earlham College	USA (Indiana)
Interactions between the Purple-throated Hummingbird and Heliconias	Smithsonian, George Washington,	USA
Abundance & distribution of nesting cavities & food resources used by Amazon parrots of D/ca (Ctd)	Clemson University	USA

Research Permit Issued 2007

Title of Research Activity/Project	Institution	Country
Silica-scaled chrysophytes (Plankton) from Dominica	Central Michigan University	USA
Students Field Biology Projects, Anolis oculatus and Anolis christatellus	University of Wales, Bangor	U.K
Tropical Forestry Conservation Field Course	University of Toronto	Canada
Collect, Identify and Characterize the Distribution and abundance of mosquito species on the island	Yale University	USA
Environmental Sciences Field Course-Tropical Ecology	SUNY College, NY	USA
Watershed Ecosystems Demonstration Tropical Resource Management	Clemson University	USA
Dominica Spiders Diversity	Earlham college, Indiana	USA
Hummingbirds	Hummer Bird Study Group	USA
Turtles	WIDECAST	USA
Physics of Dominica Rainfall	Yale University	USA
Co-evolution Convergence & Displacement Across Geographic Mosaic Hummingbirds and Heliconias	Mus of Nat.l History, George Washington University	USA
	Amherst University	USA
Researching Clonal Ant, *Platytherea punctata*	University of Regensburg	Germany
Age-related changes in light requirements for Dominican rainforest tree species."	University of Toronto	Canada
Study Abroad Biology Field Course; Hymenoptera Study	Texas A&M University	USA
Eastern Caribbean Plant Biodiversity Project (Coll. Montane, RF Elfin, Wetland, fumarole plants	Univ. of the West Indies	Barbados
Course in Tropical Limnology	Clemson University	USA
Researching Plants of the Genus *Cakile*	Harvard University Herbarium	USA
Investigation of nich shift between native *A. oculatus* and invasive *A. cristetellus*	U. of Wales, Bangor	UK
Satellite Tracking of Leatherback Sea Turtles	U. of Wales, Alberstwyth	UK

Research Permit Issued 2008-2009

Title of Research Activity/Project	Institution	Country
Assessment of the biodiversity of Drosophila; microbial associates of Drosophila	Liverpool University	UK
The Role of Agoutis as agents of seed dispersal and seed predation in Dominica's rainforests	Clemson University	USA
Master of Research Ecology Field Course 2009	University of Bangor	UK
Species Composition, Relative Abundance and Habitat Occurrence of Neotropical Migrants Overwintering	Miami university Ohio	USA
An Evaluation of a Eucharitid Parasitoid of the Little Red Fire Ant	University of California,	USA

	Riversdale	
A case study of the Ecotourism Development Program and assessment of carrying Capacity - TfFlls, EPool	Clemson University	USA
Systematics of Caribbean Broad-Nosed Weevils (Coleoptera: Curculionidae)	Univ. of Puerto Rico at Mayaguez	Puerto Rico
Scientifically based conservation and traditional ecological knowledge: how compatible?	Miami University, (Ohio)	USA
Instructional activities for in-service teachers regarding observation and ID of freshwater macroinvertebrates	Clemson University	USA

Research Permit Issued 2009-2010

Affiliated Institution	*Country*	*Title of Research Activity*
Smithsonian Migratory Bird Centre	USA	Connectivity of Migratory Bird Populations wintering in the Caribbean
Syracuse University; Dept Anthropology	USA	The War in Slavery (Cabrits/Fort Shirley) Continuation from 2008
Williams College	USA	Geology and Biodiversity of Dominica's Boiling Lake
Institute of Zoology, ZSL	UK	Diversity, systematics and phylogeny of the extinct rice rats of the Lesser Antilles
Int. Institute of Tropical Forestry / USFS	Puerto Rico	Permanent Plot establishment and Initial measurement at Syndicate
Environmental Pritection in the Caribbean (EPIC)	USA	Seabird breeding Atlas of the Lesser Antilles
Seismic Research Centre	Trinidad	Geothermal and Volcano Monitoring
Zoological Society of San Diego	USA	Ecology & Conservation of Iguana delicatissima in their coastal range in D/ca
Hampshire College	USA	Vertical stratification of animals in forest canopy: ants, whip spiders & hummingbirds
Dept. of Entomology, Univ. of California,	USA	Evaluation of a eucharitid parasitoid of the Little Red Fire Ant.
Dominica Sea Turtle Conservation Organisation	Dominica	DomSeTCO Community-based Sea Turtle Research and Conservation in Commwealth of Dominica
Amherst College & Natl. Musum of Natural History	USA	Mechanisms of Divergent and Disruptive Selection in Two Hummingbird-pollinated Heliconias
SUNY College of Env. Sci & For. Syracuse	USA	2010 Tropical Ecology Course (FOR/EFB523)
University of Toronto	Canada	
University of Toronto	Canada	Carbon content and physiology of Dominican rainforest trees
Clemson University	USA	Behavioural Ecology of Amphibious Snail, *Neritina punctulata* in Dominica
Clemson University	USA	Carrying Capacity / ETDP Site
Texas A&M University	USA	2010 Study Abroad - Field & Tropical Biology
University of California, Davis	USA	Gauging Current Economic and Environmental Impacts of Ecotourism in Dominica

University of Illinois Urbana-Champaign	USA	A Survey of Tree Hoppers on Dominica
University of Tulsa	USA	Survey of Dominican Freshwater Streams for Species of the Genus Rivulus
Ross School of Medicine	Dominica / France	Herbarium of Plants of Dominica
Laboratory of Ecology	France	Population differentiation at different scales in a vulnerable Antillean bird species: the Forest thrush *Cichlherminia lherminierii"*

Research Permits issued for 2012

University/Institution	Country	Title of Research
University of New England, Biddeford	USA	To identify the migration and wintering grounds of the Caribbean Martin (Progne dominicensis)
Dominica Sea Turtle Conservation Organisation	DOMINICA	Community-based Sea Turtle Research and Conservation in the Commonwealth of Dominica
Amherst College Massachussette & Smithsonian Inst.	USA	Mechanisms of Divergent and Disruptive Selection in Two Hummingbird-pollinated Heliconias."
Clemson University	USA	BIOSC 496 Tropical Limnology
Clemson University	USA	Diatom Flora of Dominica
University of Scranton	USA	Genetic and morphological relationships of bats of Dominica to bat populations of neighboring Lesser Antillian islands".
Loma Linda University,CA	USA	Phylogeography of the Boid Snake Genus *Epicrates* in the West Indies Inferred from Mitochondrial DNA".
Montgomer Botanical Center	USA	Collecting Dominica Palms for Conservation and Research
Union College, NY	USA	Undergraduate Geology class in Volcanology (GEO-206)
Miami University, Ohio	USA	Processes and timeless scales of magma evolution of the Morne Patates volcano