

**CARIBBEAN COMMUNITY CLIMATE CHANGE
CENTRE/ SPACC PROJECT
TECHNICAL REPORT
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**MORNE DIABOLTIN NATIONAL PARK –
Improved Management Plan 2011 - 2016**

Prepared for the Government
of the Commonwealth of
Dominica

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EXECUTIVE SUMMARY

The review and development of the Morne Diablotin National Park (MDNP), is one of several initiatives being undertaken by the Government of Dominica under the World Bank- GEF-funded Special Programme for Adaptation to Climate Change, SPAAC, a regional programme, implemented by the Caribbean Community Climate Change Centre, CCCCC, as part of a strategy to reduce the vulnerability of Dominica's ecosystems to the impact of climate change.

This management plan was previously developed in 2008 under a USAID/Government of Dominica - funded programme and is presently being updated to include adaptation measures to reduce the impact of climate change on the biodiversity of the Park.

Morne Diablotin National Park is a spectacular wilderness area with many rivers and mountains and impressive primary forest rich in wildlife. The Park was officially created in January 2000. It is located in the North-west part of Dominica, centred on the island's highest peak (4,747 f). It comprises 8,425 acres of some of the finest and least disturbed rainforest in the insular Caribbean. The majority of the area is very rugged and above 2000 ft. elevation. Several peaks occur within the Park and a deep ravine, the Picard Gorge, runs through the north-west section. The majority of its forest has no or little value as timber and much of the land is either too steep or prone to landslides or the soils too poor to permit agriculture. Yet the Park has tremendous value as protection forest since it includes portions of the watersheds of 12 rivers, four of which provide water to domestic, agricultural and industrial users in the north of the island. It is also host to two species of highly endangered parrots the Sisserou or Imperial Parrot *Amazona imperialis* and the Jaco or red-necked Parrot *Amazona arausiaca*, and to a number of other rare or endemic species including the endemic plants *Chromolaena impetolaris* and *Chromolaena macrodon* which are only known from Morne Diablotin.

Morne Diablotin National Park has a Visitor Centre with a parking area. There is a short loop trail and view point over Picard Gorge that runs from the Visitor Centre. Non-resident visitors pay a small entrance fee to the Park. No carrying capacity was established but because the Park is not frequented by cruise ship visitors, no limit on the number of visitors per day has been set. Guiding services are offered by private individuals and companies.

The Park is managed by the Forestry and Wildlife Division of the Ministry of Agriculture, Fisheries and Forestry as a wildland area with visitors restricted mostly to day use pedestrian activities because of its small size and the necessity to maintain the natural setting.

The protection of the remaining populations of the Imperial and Red-necked Parrots is a principal objective of the Park. Because the populations of both species, particularly the Imperial Parrot are very small and restricted to primary forest, the loss of even a few birds can substantially increase the risk of chance extinction due to natural catastrophes such as hurricanes or lead to further population decline. Consequently, special attention needs to be paid to the parrots' requirements and the impact of human activities on their populations when considering appropriate management for the Park. While there are no human settlements within the Park, there are several communities located within 5 miles of its boundaries.

Between October and February, Red-necked Parrots regularly move down to adjacent estates and occasionally feed on and damage agricultural crops, citrus in particular. Attacks by parrots on oranges and grapefruit have been a source of conflict that has not been resolved. Rare Species Conservatory Foundation (RSCF) has donated to the citrus farmers a fruit processing plant which allows citrus growers to pick the fruits before they are entirely ripe. This would be expected to assist in the problem to the extent that parrots are not feeding on green citrus. This has been implemented.

VISION

The vision for the MDNP is of a protected wild area with little human influence where nature is allowed to take its course; where all species are protected; where researchers are encouraged to study and students have an opportunity to learn about the workings of nature; and where visitors are encouraged to visit, observe, and learn, but leave the area unchanged for others to enjoy. Guided by this vision, the specific management objectives for the MDNP are to:

- A. Conserve the Park's biological diversity, natural resources and wilderness values;
- B. Protect endangered, threatened and endemic species occurring within its boundaries, especially the endemic and endangered Imperial and Red-necked Parrots;
- C. Maintain ecological and hydrological functions;
- D. Monitor and manage the impact of climate change.
- E. Assist visitor's to be aware of, understand, and appreciate the natural, cultural, and societal values associated with the Park, and to enjoy and connect with nature;
- F. Contribute to the education of Dominican students in environmental studies;
- G. Promote and facilitate research to improve the understanding of the functioning and management of Dominica's natural forest ecosystems;
- H. To provide safe recreational opportunities for visitors in ways that will maintain the natural character of the Park;
- I. To support the ecotourism industry by providing access to outstanding natural features and scenic viewpoints, guiding visitor groups when needed, and interpreting the Park's features and resources; and.
- J. Support adjacent landowners and communities by promoting alternative livelihoods that are compatible with, and contribute to, the other National Park objectives.

IMPACT OF CLIMATE CHANGE

There have been no scientific studies on the impact of climate change in the Park. The impact of natural disasters triggered by extreme weather events may cause severe and irreversible impacts on the natural habitats, ecological and biological processes of the park which could be manifested in the extinction of endemic species and changes in community composition and configuration. Observations on the impact of Hurricane David on the Park have reinforced this.

Some of the impacts observed include the destruction of the nesting and food bearing trees of the Amazona parrots which led to the death of some of these species. Pre-hurricane populations of the parrots were 400 Amazona arausiaca and 120 Amazona imperialis. They were diminished to 250 and 75 respectively. (Thomas Duncan Nichols. PhD, MD-November 1980). With respect to the vegetation of the Park, Dr Nichols indicated that the lower slopes of the Park suffered 10% damage but the upper slopes of Morne Diablotin into the Elfin woodland suffered 30- 40 % damage with trees being uprooted while in the slopes east and south of the Park there was heavy damage with the majority of the trees being mutilated or uprooted.

D.H. Kulkarni (1981) noted that two years following the hurricane there was a plethora of “epicormic twigs or invasive climbers” among the stems of the damaged forest trees and that elfin woodland was severely impacted as a result of the death of a large number of trees in big patches and the subsequent thick suppression of weeds and vines which slowed down the natural process of regeneration after 2 or more years. This suggests that successive storms could virtually wipe out this vegetation type.

Changes in phenology of some plants species were observed by Forestry and Parks personnel which affected plant/ wildlife relationship where there were reduced food supplies for some bird species

.

There was also an increase in the conversion of forest land to agricultural land as a result of the loss of forest trees.

The park is home to the largest population of Dominica's endangered parrots: the Sisserou or Imperial Parrot *Amazona imperialis* and the Jaco or red-necked Parrot, *Amazona arausiaca*, as well as to the endemic plants, *Chromolaena impetiolaris* and *Chromolaena macrodon*.

The primary objective for the establishment of the Park is the protection of the remaining populations of the Imperial and Red-necked Parrots. The populations of both species, particularly the Imperial Parrot are very small and restricted to primary forest. The loss of even a few birds can substantially increase the risk of extinction. Climate change could potentially lower the parrot carrying capacity of the forest over a period of time and hence negate the objectives of the Park.

PROPOSED MANAGEMENT OF CLIMATE CHANGE

Presently, there is no management framework for monitoring or management of climate change. A multi-pronged, integrated approach is required that includes preventive and corrective actions, exchange of information and development of mitigation measures, based on sound scientific principles.

As such, the following guiding principles are being recommended for consideration with respect to managing the impact of climate change on national parks:

- Utilization of available scientific information and traditional knowledge in the decision making
- Assessment of impacts through appropriate research, monitoring, vulnerability assessment and risk preparedness measures
- Building of public support through the establishment of partnerships with policy makers, the landowners, farmers, communities and other stakeholders in the development and implementation of programmes to manage the impact of climate change
- Minimizing the impact on gene pool, on species and their diverse habitat.
- Increasing the resilience of sites by reducing non-climatic sources of stress

- Undertaking capacity building, research, and sharing of information
- Developing successful and appropriate management responses to include climate change vulnerability analysis, risk assessment and preparedness and adaptation management strategies
- Developing and implementing best practices and sharing this information with management partners and key stakeholders.

OBJECTIVES

- To understand the impact of climate change on the Parks and to sensitize policy makers, communities and other stakeholders
- To work with all stakeholders to undertake research and monitoring and to develop and implement adaptation measures to increase the resilience of the parks to the impact of climate change.
- Increase the resilience of the Parks by reducing non-climatic sources of stress, re-designing boundaries and buffer zones to facilitate migration of species, and reducing the carbon footprint.
- To undertake ex-situ research to maintain the genome of endemic and indicator species of the Parks
- To collaborate, co-operate and share best practices and knowledge

Evaluation of the extent of monitoring of climatic variables in the National park indicates that there has been some monitoring of rainfall. The Forestry and Wildlife Division monitors rainfall in the vicinity of the Park in the areas of the Emerald Pool, Delices and Pont Cassé utilizing standard rain gauges. Rainfall data is also measured by Domlec in the areas of Laudat, Trafalgar and the Fresh Water Lake while Yale University currently has ten recording rainfall stations installed at La Plaine, Freshwater Lake, Springfield, Canefield Airport, Rosalie, Botanical Gardens, Pont Cassé, Grand Fond, Laudat Village and Boeri Lake. However none of these are harmonized or coordinated to meet the needs of the Park.

A report by Shawn Boyce¹ indicates that a thorough understanding of the current and future fluctuation in the weather, climate and river water levels within the Park must be a prerequisite for managing the impact of climate change. Consequently, he recommends the following:

- The installation of a weather station in the Park located in such a way that data can be collected from both the windward and leeward slopes of the mountainous interior and that “at a minimum the wind direction, wind speed, air temperature, solar radiation and humidity sensors are installed to enable the estimation of evapo-transpiration fluxes at the installation locations and wider surroundings which is a necessary step for water budget calculations”.
- The installation of one rain gauge above the forest canopy of the Park to study the rainfall interception process.
- Continuous monitoring of water levels within the National Parks so as to provide data on water level trends that are needed to manage the resource.
- The determination of rainfall trigger values and soil moisture content required for the initiation of landslides so as to manage fresh water resources both within and exterior to the confines of the National Park System.

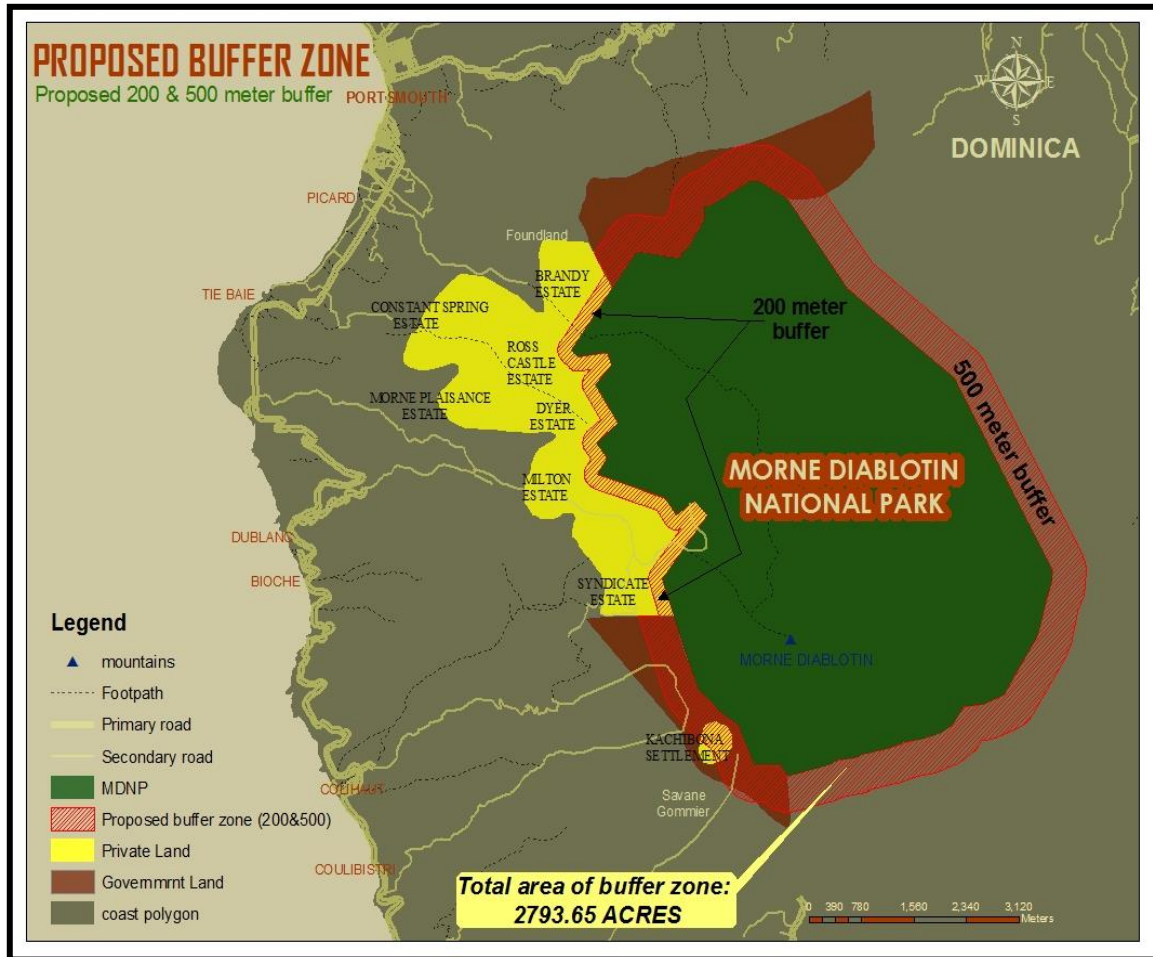
ZONING

A simple zoning system will be used to give geographical expression to the different management objectives. A Wilderness zone covers most of the Park, and no infrastructure other than unimproved trails will be allowed. Improved trails, overlooks, and rain shelters will be permitted in the Extensive Use Zone.

The proposed buffer zone for the Park consists of three sub-zones (see map below):

¹ Shawn A. Boyce - Data Collection and Management Strategy for the Commonwealth of Dominica Final report (Prepared by Caribbean Institute for Meteorology and Hydrology), 2010

- A 500 m buffer of government- owned forest lands of the Northern Forest Reserve along the eastern and southern boundaries;
- 200 m buffer of privately- owned forest lands on rugged terrain within 1 km. of the northern boundary; and,
- A 200 m buffer of privately- owned agricultural lands within 2 km. of the western boundary.



Although the Forest reserve is a protected area and owned by the state, this does not exempt it from controlled felling of trees that can be permitted in a protected area. The entire area consists of 2793.65 acres, of which 358.99 acres are privately owned. It is recommended that this area is properly demarcated and be adopted as a buffer zone and that all necessary actions are taken to ensure that no further encroachment or expansion of existing activities take place within this area. It is expected that

negotiations will be undertaken with the land owners as part of the process for the official establishment of the buffer zone.

MANAGEMENT PROGRAMMES

Park management is to be built around 5 management programmes. The Resource Protection Programme is designed to safeguard the integrity of the biological resources, natural features and watersheds of the Park through actions that build public support and counter specific threats such as impact of climate change, illegal hunting, visitor impacts agricultural encroachment, and contamination of water sources. The programme will focus on building stakeholder relations, quality design and maintenance of infrastructure, public education and awareness, boundary demarcation, reduction of anthropogenic activities and periodic patrols of the Park.

The objective of the Public Use Programme is to facilitate the understanding and enjoyment of the Park and its resources by the general public, provide outdoor recreation opportunities, and contribute to the sustainable development of Dominica by providing a high quality environment for low impact ecotourism activities. The Programme will maintain the current access routes, and if proven feasible and environmentally sound, develop two new trails along the Picard River, and re-establish an historic trail that crossed the Park from West to East (Visitor Centre to the Bense Heights). Simple trail brochures will provide maps and an explanation of the features seen along the trails, and guide services will be enhanced.

The Research and Monitoring Programme seeks to improve knowledge of the Park's biota, physical features, and natural processes, impact of climate change; compile and make accessible research information for decision-making that will improve management effectiveness; and, identify trends in resource condition. Incentives will be provided for researchers to carry out projects that are a priority for Park management. The monitoring of park resources by national staff will seek to improve the capture,

organisation, and disposition of information during regular Park patrols that will assist in early identification of trends in resource condition.

The Environmental Education and Public Awareness Programme will be developed to inform visitors as to the environmental, social, and economic values of the Park; educate the public, and especially leaders of public opinion, on the environmental issues relevant to the management of the MDNP, issues with respect to the impacts of Climate Change on sites, management responses, the role of communities, park users and policy makers in reducing the impact of climate change; and inform the public of the management practices for the Park, threats to the Park's objectives including the threats posed by climate change, and ways that stakeholders can help to reduce or mitigate those threats. First priority will be given to the development of environmental education opportunities for students by working with teachers and assisting with field trips to the Park. A second priority will be the development of media coverage to improve public awareness of the Park and its objectives.

The objectives of the Community Outreach Programme is to insert the Park into the mainstream of sustainable development in Dominica, thereby assuring that the Park becomes a critical development resource that is understood and appreciated by a spectrum of stakeholders. This will be accomplished by activities in the Buffer Zone, such as providing technical assistance and financial incentives to develop amenity sites and routes, reforestation, and the development of alternatives that will reduce damage by wildlife to agricultural products.

The Plan will be implemented by a soon to be established National Park Service. Stakeholders will participate in management through a Park Advisory Committee and participation in cooperative projects in the Buffer Zone. By the end of the planning period, Park Staff will include a Superintendent, 2 Technical Officers, 1 Ranger, 3 Guards, 2 Wardens, an Accounts Clerk/Secretary, and a Driver. Administrative officers for the Park will be established in Portsmouth. The Park will have a 4WD pickup truck and regular office and field equipment. Studies of management effectiveness will be

carried out at the beginning and end of the planning period in order to determine progress and highlight management requirements for the subsequent planning period.

The costs of the management plan exceed the average annual budget that has been available in recent years. Sustainable finance for Park management is a major constraint that will be dealt with by establishing a Conservation Trust Fund in Dominica. It is expected that the Fund will be able to begin supporting Park management costs in 2013. In this way, it is expected that all components of the Plan can be implemented by 2016

INTRODUCTION

Background

The Government of the Commonwealth of Dominica has undertaken several initiatives to protect its natural resources which constitute an integral component of its social and economic development strategy. Following the ratification by government of the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), the United Nations Framework Convention on Climate Change (UNFCCC), the Stockholm Convention on Persistent Organic Pollutants (the Stockholm Convention), and the Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol, a number of programmes are being undertaken to combat the impact of climate change on the biodiversity of Dominica.

Under the Special Programme for Adaptation to Climate Change (SPACC) project funded by the GEF-World Bank and implemented by the Caribbean Community climate Change Centre, (CCCCC) a number of initiatives including this one are being undertaken as part of a strategy to reduce the vulnerability of Dominica's ecosystems to the impact of climate change. These include the following:

- Design of buffer zones for the Morne Trois Pitons and Morne Diablotin National Parks
- The development of a Sustainable Land Management Plan (SLM) as a mechanism to assist in the design of elements of the buffer zone through the engagement of key target communities adjacent to the boundary of the MTPNP and MDNP considered as critical points for anthropogenic pressure on the two park
- Data Collection and Monitoring aimed at achieving the following:
 - An assessment of existing meteorological data and recommended data needs of the National Parks
 - Development of an asset Mapping legend to capture all ecological information relevant to SLM

- Development of a database on biodiversity in Dominica to include the procurement of computer equipment and software for data repository to inform the Park management process and to serve as baseline data against which future data collection could be assessed
- Procurement, installation and testing of meteorological instruments and training of relevant personnel in the use and management of these instruments.
- The development of projects in communities adjacent to the Park aimed at reducing negative impacts of communities on the national parks. These include the “Installation of Storage and Distribution System for Irrigation Water”

Other studies undertaken include the development of a National Forest Policy in 2010 to guide the sustainable management of the forest resources while maintaining or improving the present area of forest cover as well as a number of programmes under the OECS (Organization of Eastern Caribbean States) Protected Areas and Associated Sustainable Livelihoods (OPAAL) Project funded by the GEF- World Bank and Fond Francais pour l’Environnement Mondial, FFEM, aimed at developing a framework for managing protected areas so that the region’s biodiversity will be protected from further degradation. Some of the projects included the following:

- Review of National Protected Areas Policy, Legal and Institutional Framework; and the development of a Communication Plan for the Cabrits National Park in 2006.
- Opportunities for Sustainable Livelihoods in the Cabrits National Park (Espeut, 2006),
- Cabrits National Park Marine Section Management Plan 2007-2012. (Edwards, 2007),
- Environmental and Socio-Economic Studies for Cabrits National Park, Dominica (Ecoengineering, 2007)
- Cabrits National Park (Marine Section) Sustainable Livelihood Project, (NICE/SIE, 2008).
- Implementation of a livelihoods sub-projects for the communities in the vicinity of the national park 2009-2011)

The review and development of the Morne Diablotin National Park is being undertaken under the Special Programme for Adaptation to Climate Change (SPACC) project. The Commonwealth of Dominica has been selected as one of the beneficiary countries to review and revise the management plans of the Morne Diablotin National Parks and its neighbouring communities of Colihaut, Dublanc and Bioche (CDB) and the Morne Trois Pitons National Park World (MTNPWHS) and adjacent communities and to recommend detailed designs and implementation of adaptation measures.

The goal of the SPACC project is “to implement specific (integrated) pilot adaptation measures addressing primarily, the impacts of climate change on the natural resource base, focused on biodiversity and land degradation along coastal and near-coastal areas. This will be achieved through: (i) the detailed design of pilot adaptation measures to reduce expected negative impacts of climate change on marine and terrestrial biodiversity and land degradation; and (ii) the implementation of pilot adaptation measures”.

The project also seeks to “produce knowledge of global value on how to implement adaptation measures in small island states that can be applied in other countries in the region”.

The Government of the commonwealth of Dominica, GoCD, developed a 5-year management plan 2008- 2013 for the Morne Diablotin National Park with technical assistance from the USAID Caribbean Open Trade Support (COTS) Programme. To date, no substantial activities outlined in the plan have been implemented. Discussions with the Forestry and Parks personnel indicated that one of the main reasons is that the plan has not been ratified by government for implementation. Additionally, the department is in the process of setting up a management structure for the National Parks with technical assistance from the Caribbean Development Bank after which, it is hoped, that the necessary human and financial capital will be forthcoming for Park management.

Under this current programme funded by the GEF / World Bank, the plan has been updated to incorporate the following:

- Emerging social, economic, and environmental (including climate change) parameters
- Changing land use of lands adjacent to the park
- Establishment of a buffer zone.
- Adaptation to climate change

The Morne Diablotin National Park (MDNP) was established in January 2000 to conserve a spectacular wilderness area in northwest Dominica centred on the island's highest mountain. The area is covered by impressive primary forest rich in wildlife, and gives rise to many rivers.

In preparation for the legal designation of the area as a national park, a draft management plan was prepared in 1993. The plan provided an overview of the information available on the park and surrounding region, identified and analyzed the issues to be addressed, and made specific recommendations for management.

While the MDNP is currently being managed by the Forestry and Wildlife Division of the Ministry of Agriculture, Fisheries and Forestry, the Government of Dominica is in the process of setting up a National Park Service that will have the mandate to manage the country's national parks. The revised management plan for the MDNP must take into account this new management structure.

Thus, the plan presented in this document is an update of the 2008- 2014 Management Plan. The text in this document draws heavily on this plan.

This plan has been prepared through a participatory process. A consultant was hired to lead the process which included:

- Field reconnaissance;
- In-depth discussions with personnel of the Forestry and Wildlife Division;

- Meetings with communities adjacent to the Park
- Interviews with stakeholders, both in and out of government;
- Input from a national stakeholders' workshop
- Preparation and review of a draft;
- Discussion of the draft at a series of workshops attended by a variety of stakeholders; and,
- Revision of the draft to incorporate recommendations.

PART A

DESCRIPTION

1. BACKGROUND

1.1 Location and Boundaries

The Commonwealth of Dominica is the largest and most northerly of the Windward Islands in the Lesser Antilles, lying between Guadeloupe and Martinique. The island measures 29 miles (40 km.) by 14 miles (22 km), extending from 15°10'N-15°40'N and 61°15'W-61°30'W, and covers an area of 289 square miles (751 km²). Dominica is the most mountainous of the eastern Caribbean islands, rising to 4,747 ft (1,422 m) at Morne Diablotin. The Park is located about 28 miles (1 hour 15 minute drive) from Roseau, the capital, and 12 miles (30 minute drive) from the town of Portsmouth (see Annex A, Map 1). The Park was carved out of the Northern Forest Reserve, and complements the Cabrits National Park in the marine and coastal zone (see Annex A, Map 2). The marine resources of the north coast, which are influenced from the run-off from the Park, are indicated in Annex A, Map 3.

1.2 Access

The western boundary of the Park can be accessed by a 4 mile agricultural feeder road that leaves the main Roseau to Portsmouth road ¼ mile north of the village of Dublanc. This paved one lane road winds up through dry coastal scrub forest; past citrus, banana, and mango plantations of the Milton and Syndicate Estates; and arrives at the Park Visitor Centre. The Syndicate Road links in with a track that leads south, outside the boundary of the Park, and then west to Colihaut. It is currently blocked by landslides. Another track approaches to within 1 mile of the northeast boundary of the Park. It originates in Bense Village and is paved up to the entrance to the trail to the Chaudiere Pool on the Hampstead River (see Annex A, Map 4). A dirt track then continues up a ridge to the last agricultural lands to the boundary of the Northern Forest Reserve.

Also, it can be noted that within the Park there are two major trails. The Morne Diablotin Trail leads from the Syndicate Estate near the Visitor Centre to the top of Morne Diablotin. The lower portions of the trail in the rainforest have been maintained, but the upper portion

in the elfin woodland and montane thicket formations is in poor shape. Due to hurricane and storm damage, tree trunks and limbs across this part of the trail make it difficult to pass. The Morne Turner Ridge Trail is an unused trail that has not been maintained. It leads from the Picard Estate up the Picard Valley along Morne Turner Ridge, eventually joining the Morne Diablotin Trail at about 4,000 ft. There are also a number of unmarked hunter' trails in the Park, one of which follows an historic French-built trail from the terminus of the track from Bense to the northeast boundary of the Park, and from there to the Morne Turner Trail.

1.3 Park Establishment

There have been calls since the late '70s for the government to establish a nature reserve of National Park centred on Morne Diablotin to protect the Imperial and Red-neck Parrots (Shanks and Putney, 1979; and Maximea, 1983). Most of the area of principal conservation and watershed value was protected in 1977 when it was included within the Northern Forest Reserve. However, it was felt that the level of protection afforded, particularly for the parrots, was inadequate. Of particular concern were other important privately owned lands extensively used by Red-necked Parrots that were unprotected, notably the Morne Plaisance, Syndicate, Dyer and Milton Jude Estates northwest of the Northern Forest Reserve.

Since 1982 there were several attempts to convert portions of the Morne Plaisance and Dyer Estates from forest to agriculture. These efforts were opposed by the Forestry and Wildlife Division, and finally in 1989, with the help of Birdlife International and RARE Centre, a total of 204 acres were acquired for conservation and a "Parrot Reserve" was established. In 1990 a proposal was put forward for the establishment of Morne Diablotin National Park, incorporating the Parrot Reserve and a large Park of the Northern Forest Reserve. A management plan for the proposed Park was developed in 1993 by the Forestry and Wildlife Division with the assistance of Birdlife International and the Environment and Development Group of Oxford in the U.K. However, it was not until

January, 2000, that the Morne Diablotin National Park was actually declared and gazetted with an area of 8,425 acres.

1.4 Conservation value of the Park

The park is home to Dominica's endangered parrots: the Sisserou or Imperial Parrot *Amazona imperialis* and the Jaco or red-necked Parrot, *Amazona arausiaca*, also the endemic plants: *Chromolaena impetiolaris* and *Chromolaena macrodon*.

2. PARK ENVIRONMENT

2.1 Summary of Physical Aspects

2.1.1 Climate

Temperature averages range from 21° C. at the highest elevations to 25 ° C. at the lowest and there is little seasonal variation.

Dominica receives, on average, between 250 and 380 cm of rain each year. Rainfall averages 10,000 mm. per year at the highest elevations to 4,000 mm. per year at the lowest (see Annex A, Map 6). More than half the rainfall received in the course of the year, occurs in the primary rainfall season which coincides with peak tropical storm activity in the tropical Atlantic – From June to October

Morne Diablotin is almost always enveloped by rain or mist. The driest season occurs between February and May, but humidity seldom falls below 85%. NE trade winds blow during most of year, but there is a SE pattern July to September when tropical storms can hit the island. There is an average of one hurricane every 15 years.

Dominica: Climate Trends and Projections

- There is evidence to suggest that the climate of Dominica is changing. Both maximum and minimum temperatures have increased in the recent past.
- The warming trend is expected to continue. The country is projected to be warmer by up to 1.3oC by the 2050s and between 2 and 3 degrees by the end of the century.
- Winter months will see marginally larger increases in temperature than summer months.
- The frequency of very hot days and nights will increase, while the number of very cool days and nights will decrease.

- The country is likely to be drier in the mean. Projections are for up to 20% drier by mid century and up to 50% drier by 2100. July-August will likely be drier.
- The seasonality of Dominica will be largely unchanged. The cooler (with respect to late season temperatures) dry early months and wet hotter late months will still prevail.
- Hurricane intensity but not necessarily frequency is likely to increase
- Caribbean sea levels are projected to rise by up to 0.24 m by mid century.
- Sea surface temperatures in the Caribbean are projected to warm, up to approximately 2°C by the end of the century.
- El Niño Southern Oscillation, ENSO's impact on Dominican rainfall (early and late season) will likely continue given projections of the phenomenon's continued occurrence in the future.

2.1.2 Greenhouse Gas Emissions

The 1994 GHG Inventory for Dominica indicated the following:

Dominica's INC described Dominica as a net sink of Greenhouse Gases (GHG) in 1994. The data showed that Dominica had gross emissions of 76.53Gg of CO₂, which were offset by removals from changes in forest and other woody biomass stock and from the abandonment of managed lands, resulting in a net sink of 295.14 Gg of carbon dioxide.

There were also small quantities of methane, nitrous oxide and non-methane volatile organic compounds – 2.73 Gg, 0.042 Gg and 6.13 Gg respectively.

The key sources of carbon dioxide emissions were as follows:

- Transport – 50%.
- Energy Industries – 26%.
- Commercial and Industrial Uses – 10%.
- Industry – 5%.
- Residential – 4%.

- Other – 5%

Dominica as a source of Carbon dioxide emission is negligible as a result of the vast forest cover of the island.

2.1.3 Geology and Soils

Dominica is a summit of a submerged mountain chain at the eastern edge of the Caribbean Tectonic Plate. Surface rocks of Park mostly of Pleistocene origin, although there some more recent formations derived from volcanic debris and overlaying areas of shoreline conglomerates. Earth tremors are common. Shallow and porous allophane latosol and podzol soils (see Annex A, Map 7) show high water retention in the topsoil and high subsoil permeability.

Soil nutrients are concentrated in surface organic matter from the trees themselves. High rainfall produces leached soils highly susceptible to erosion.

2.1.4 Geomorphology and Hydrology

The Park topography ranges from 215 m. to 1,448 m. and is centred on Dominica's highest mountain. Steep slopes of more than 60% are common. This rugged topography causes an uplift of air currents that result in heavy rainfall and a large number of watercourses. There is high risk of landslides over much of Park, especially if the forest is removed (see Annex A, Map 8).

Ten rivers originate within the Park and two rivers have part of their catchments within the Park. Map 9 in Annex A presents a map of general land use in and around the Park, and shows the catchments that are used for water systems for the town and villages around the Park.

2.2 Summary of Biological Aspects

2.2.1 Flora and Vegetation Types

No extensive survey of the Park's flora has been carried out. A list of mainly woody species from western slope identifies about 180 species but there are many other species that are yet to be recorded. The main vegetation type in the Park is the rainforest with a dense canopy and rich diversity of lianas. Secondary rainforest occurs on the northern and western boundaries where pioneer and secondary trees that have come in after hurricanes, agricultural clearings, or selective logging. The Montane Thicket vegetation type occurs above 850 m. on thin soils, but not on exposed ridges or summits, and its canopy reaches only 10-15 m. The Elfin Woodland vegetation type occurs above 850 m. on the most exposed ridges and summits; covers only a small portion of the Park and is constantly shrouded in mist and hence is often called "cloud forest". It is characterized by impenetrable growth of small, gnarled trees 3-9 m. high. A map of the vegetation types present in the Park and surrounding areas is presented in Annex A, Map 10.

Elfin Woodland occurs in very high elevations and is in limited quantities. They have been identified in the two parks. These areas may receive increased interest as potential radar or electronic sites. There is at present one such site on Morne Micotrin. Wherever this type of vegetation is found such access has been responsible for the loss of significant elfin woodland in some countries.

2.2.2 Fauna

Only the higher invertebrates have been documented in the Park. Invertebrates, such as freshwater shrimp and freshwater and terrestrial crabs occur in the Park, but no collections have been made. There are 24 species of butterflies identified in the Park, but fishes have not been studied. Amphibians identified in the Park include 2 spp. of frogs, while reptiles include 5 spp. of lizards, and 4 spp. of snakes. Some 53 spp.

species of bird have been recorded for the Park of which 30 are regular breeders. The best known spp. are the endemic and endangered 'Sisserou' or Imperial Parrot, and 'Jaco' or Red-necked Parrot. The mammals recorded in the Park include 17 spp., mostly bats.

It is in the interest to extend the buffer of the MDNP into the unallocated state lands to ensure the greatest protection of the parrots and the pristine rain forest which comprise their habitat. It would serve as a "Parrot refuge/ sanctuary.

The area of buffer zone should be extended much further into private land to protect the habitat of the 2 parrots and to extend the habitat home range requirements of the species

There is very little information on the following:

- Ecological relationships of the 2 species to their environment and to each other
- What is a viable population level
- Where are critical habitats located
- What is the tolerance threshold for human disturbance

As such, it is important that anthropogenic activities in the habitat of the parrots be significantly reduced to minimize the impact on the parrot population and to reduce the carbon footprint in the area.

2.3 Important Ecological Relationships

Hurricanes and rainfall have shaped the composition of flora and fauna in the Park. Forest vegetation and soils absorb most of the rainfall, which is gradually lost through evapo-transpiration and evaporation thereby keeping humidity high and promoting further rain. Droughts are rare. The soils of the Park are nutrient poor since most of the nutrients are bound up in the plant material. There are tight plant-animal interactions for pollination, seed dispersal, feeding by mammals and birds. Introduced spp. probably cause damage to native vegetation, but this has not been documented. Rats are

probably the most damaging. The area has been hunted for centuries, but the effects on populations are unknown though it is probable that in the past it has depressed parrot populations.

2.4 Summary of Cultural Aspects

No Carib or Arawak sites have been identified in the Park. Some 6 maroon (runaway slave) camps were located in or near the Park, though locations are not known. Before there was a road around the north of the island, several forest trails traversed the Park to link communities on the windward and leeward coasts; sections of these trails are still visible. The first recorded ascent of Morne Diablotin took place in 1867 by a Scottish physician, Dr. John Imray. Local Rastafarians had a camp in what is today the Park in the '70s, and it is still visible.

3. RESOURCE USE IN AND AROUND THE PARK

3.1 Forestry and Agriculture

Though the Park contains significant expanses of rainforest that contain some 12 valued timber species, the rugged inaccessibility, lack of roads and high cost of moving equipment from one logging site to another have made commercial forestry uneconomic in the Park. The same situation is true for agriculture. Consequently, the Park's forests have remained largely untouched.

In the Syndicate area which bounds the Park, there is some abandoned agricultural land inside the Park that was acquired by government. This was also the case at Dyer Estate where agricultural activity was found inside the Park boundary and up to 600m outside the boundary.

These agricultural plots were mainly citrus plants, root crops ("ground provisions") and bananas. It was observed that trees were cut within the park boundary for this purpose.

Agricultural activities were also evident within 600m external to the boundary of the Park at Savane Gommier. These activities stopped near the national park boundary. Although signs of pesticide use were not seen in Savane Gommier, signs of "Pesticide disposal here" were seen at two different locations in Savane Gommier thus indicating that pesticides were used in the area.

3.2 Tourism and Recreation

The number and characteristics of visitors to the Park is not recorded and is unknown. The dissatisfaction with the profitability of the Visitor Centre concession would seem to indicate that the numbers are quite low. Many Dominicans undertake the Morne Diablotin climb once in their lifetime, but otherwise there is little use of the Park for

recreation by locals. A few tour operators offer cruise ship passengers that visit Portsmouth a visit to the Park, but numbers and trends are unknown.

3.3 Water Supply

Five rivers originating in the Park (Picard, Hodges, Coulibistrie, Dublanc and Tweed) are tapped for domestic, commercial, and industrial uses by the Dominica Water and Sewage Company (DOWASCO). This represents about 35% of the Park's watershed (see Annex A, Map 11). The Picard River system supplies water to cruise ships that dock at the Cabrits National Park.

3.4 Research

A number of scientists, mostly biologists, have carried out research in and around the Park over the last 30 years. These studies have focused on the populations and ecology of the Imperial Parrot and Red-necked Parrot, other avifauna, mammals (notably bats), reptiles, butterflies and forest trees in the Syndicate and Dyer Estates and the Picard Valley. The research has also focused on how wildlife responds to agricultural and forestry development and determining ways in which such development can be managed to lessen the impact on wildlife.

3.5 Hunting

Agouti, opossum, and various species of bird (mainly the Red-necked Pigeon) and crab are illegally hunted for food and sport, although the incidence of hunting is unknown. The slopes of Morne Diablotin are an important area for hunting wild pig, and hunter's trails and pit traps are regularly found. Most of the hunting is by locals.

3.6 Surrounding Land Use

While there are no settlements within the Park, houses can be found approximately 2km (1mile) from the area. The population within 2 km of the park is in the parish of

St. Peter and has approximately 1421 persons within an approximate area of 12.6 sq. mi.

The areas to the east and south of the Park are part of the Northern Forest Reserve (See Annex A, Map 2) Areas to the north comprise large estates (Chilenbain, Maikay and Brandy that are on rugged and inaccessible lands that are mostly covered in forest. Land to the south (En L'ilet and Macatrin Valley) are also very rugged and unpopulated. The greatest concentration of human use for agriculture and forestry around the Park occurs to the west and north-west on the Syndicate, Dyer and Morne Plaisance Estates.

4. LEGAL STATUS AND MANAGEMENT FRAMEWORK

4.1 Current Management

Morne Diablotin National Park was legally established in January, 2000, and is currently managed by the Forestry and Wildlife Division of Dominica. Other legislation and agreements affecting the Park include the:

- Memorandum of Agreement on the tenure and management of the "Parrot Reserve" which turns over the Reserve to the Government of Dominica so that it can be included in the MDNP;
- National Parks and Protected Areas Act. No. 16, 1975 which outlines the purpose, and permitted and not permitted uses for National Parks; the Act permits the Minister of Agriculture to grant licenses to water and electric companies of Dominica to construct any road or maintain any structure with the boundaries of a National Park for the purposes of carrying out their respective business; and.
- Agreement for researcher operating in Dominica

4.2 Proposed Management

Actions are underway to establish a semi-autonomous National Park Service for Dominica, which would then become the management authority for the MDNP. Creation of the NPS is called for under the National Parks and Protected Act of 1975, so no additional legislation is required. The current target date for establishment is July, 2008.

4.3 World Heritage Status

In recent years there has been discussion regarding the feasibility of including MDNP in the Morne Trois Pitons World Heritage Site designation. This would require a change in

boundaries of the existing World Heritage Site so that MDNP could be included as part of a serial site. To accomplish this, a request for a change of boundaries would have to be forwarded to UNESCO for consideration by the World Heritage Committee.

4.4 Complementary Projects

Two Global Environmental Facility (GEF) Projects and the Dominica Social Investment Fund provide potential sources of funding for projects within the MDNP and for communities in the Park's Buffer Zone.

4.4.1 GEF Small Grants Programme

The GEF Small Grants Programme, focuses specifically on projects in the Buffer Zones of the Morne Trois Pitons and Morne Diablotin National Parks. The following themes are eligible for funding:

- Sustainable agriculture
- Sustainable tourism
- Traditional knowledge preservation
- Waste management
- Renewable energy technologies
- Protected Area Management

PART B

EVALUATION

5. IMPORTANCE OF THE PROTECTED AREA

There are a number of characteristics that contribute to the importance of the Park. While it is small, about half the size of Morne Trois Piton National Park, the extent of primary forest, especially elfin woodland and montane thicket, is regionally significant. The Park contains most of the sequence of natural moist forests types (rainforest, elfin woodland, and montane thicket) that occurs on the volcanic islands of the Eastern Caribbean, and has some of the highest diversity of flora and fauna of any area in Dominica. It contains 31.7 % of the Dominica's total area of elfin woodland and montane thicket. The Park boasts healthy populations of the endemic and endangered Imperial Parrot and Red-neck Parrot, and the only remaining populations of the Imperial Parrot. A large number of species that are restricted to Dominica or the Lesser Antilles occur within the Park including 11 species of birds, 4 species of mammals, 2 species of amphibians, 4 species of reptiles, and 4 species of plants.

Over 90% of the Park is virgin forest, and the position of the Park on the north-west, leeward side of the island offers it more protection from hurricanes than most other parts of the island, thereby sparing the forests of the severe damage caused in other areas. The ruggedness and inaccessibility combined with the poor quality of the soil give the Park natural protection against extensive human disturbance.

The Park provides drinking water to an estimated 5,600 people, and the Cabrits cruise ship berth. High water retention and permeability of the Park's soils ameliorates the flow of water in streams and rivers leaving the area, and provides a constant flow; protects agricultural lands at lower elevations.

The Park is accessible to visitors being only 30 minutes by vehicle from the Cabrits Cruise Ship Berth and the Town of Portsmouth. The rainforest is appealing to visitor, especially for specialised bird watching tours. More scientific research has been carried out in the Park than in any other area of Dominica. Park covers most of the range of the Sisserou Parrot, the symbol of Dominica.

6. STATEMENT OF SIGNIFICANCE

Morne Diablotin National Park protects one of the last remaining areas of old growth tropical rainforest in the Eastern Caribbean, the major habitat of the endemic and endangered Imperial (Sisserou) and Red-necked (Jaco) Parrots, and a source of water for the populations of northern Dominica.

7. ANALYSIS OF ISSUES

7.1 Implementation of the Initial Management Plan

The "Management and Development Plan, 1993-2003" is a relatively lengthy document of 124 pages. It includes considerable descriptive material that will only be summarised in this second generation plan. A summary of the management actions included in the Plan, and an indication of whether each has been implemented or not is presented in Annex B. Of the 136 activities planned:

- 58 % were implemented in one way or another
- 51 were fully implemented;
- 19 were partially implemented;
- 09 are ongoing;
- 20 are considered not necessary after the fact (15%); and,
- 37 were not implemented (27%)

Of course, the activities of the plan are not comparable in terms of difficulty, cost, or importance, but in any case, this numerical distribution of results provides a rough accounting of plan implementation. It is interesting to note that roughly one-third of the planned activities were not implemented in 15 years for a plan that was scheduled for implementation in 10 years.

7.2 Analysis of Current Management Situation

Park staff most knowledgeable about the current management status of the MDNP participated in a SWOT (strengths, weaknesses, opportunities, and threats) analysis, and identified the following points:

(SEE SWOT ANALYSIS ON FOLLOWING PAGE)

SWOT Analysis for Morne Trois Piton National Park

Strengths

- Park legally established.
- Boundaries with private lands are demarcated.
- Land owned by government.
- High biodiversity and range of habitat types.
- Presence of a diverse set of endemic, endangered, and rare species.
- Paved access road through the Syndicate Estate.
- Existing trails and signage.
- Brochure for the nature trail.
- Linkage of park trails to the proposed national trail.
- Nature Centre administered by concessionaire.
- Interpretive panels on display at the Nature Centre.
- Fee system in place.
- Trained guides are available for birdwatchers.
- Parrot research and conservation.
- High quality water resources.
- Proximity to Cabrits ship berth.
- Complementary ecotourism potentials exist in the buffer zone and in northern Dominica.

Weaknesses

- Continued hunting of pigs, agouti, and ramier pigeons, and suspected occasional hunting of parrots.
- Damage to agricultural crops in the buffer zone by wildlife.
- Little linkage of the Park to productive activities in the buffer zone and surrounding lands.
- Inadequate financial resources for management.
- No on-site staff.
- Few attractions in the Park and Buffer Zone are accessible to visitors.
- Few functional linkages between ecotourism activities in the Park and those in the buffer zone and surrounding areas
- Perceived conflicts in the buffer zone between ecotourism activities and community water systems.
- No brochure on the Park or on the Morne Diablotin or Morne Turner trails.
- Inadequate materials for environmental education activities.
- Lack of capacity to work with communities in the Buffer Zone to make better use of the potential which the Park represents for economic development related to ecotourism, research, and environmental education.
- Inadequate demarcation and signage for boundaries in some areas.
- Information on the Park is dispersed and difficult to access, including the relatively abundant scientific information on the two endemic parrot species in the Park.
- Information on parrot habitat and distribution has not been utilized to develop conservation plans for each species.
- Morne Diablotin trail presents significant dangers for visitor use and urgently requires maintenance and upgrading.
- No regular monitoring program for the Parks resources (except parrots), especially with respect to visitor impacts and impact of climate change.
- Underutilization of the Park's resources for ecotourism, research, and education.

Opportunities

- Development of alternative financing mechanisms,
 - National Parks Fund capitalized by:
 - Debt-for-nature-swaps;
 - The GEF and FFEM
 - The Caribbean Development Bank;
 - Contributions from multi- and bi-lateral development agencies;
 - The private sector; and,
 - Park concessions and fees.
 - Watershed maintenance fees for water sold to cruise ships.
 - Increase in entrance fees.
- Improvement and diversification of ecotourism activities within the Park (see Annex A, Maps 12 and 13).
- Maintenance and improvement of the Morne Diablotin trail.
- Development of a high-volume circular trail from the Syndicate Nature Centre up the Picard River to the two falls, and return via the southern tip of the Picard Gorge to the Nature Centre.
- Tie-in of Park trails to the National Trail.
- Maintenance and improvement of trails from the Syndicate Nature Centre to Turner Ridge, and from Turner Ridge through the Northern Forest Reserve to Bense.
- Stronger linkages between the Park and economic activity in the Buffer Zone, especially the development of high-quality ecotourism attractions and activities (research facilities, visitor accommodations, trails, etc.)
 - Development of the section of the National Trail that will skirt the western boundary of the Park and will provide access to the Kachibona Lake and Springs.
 - Low cost accommodations and working space for researchers.
 - Visitor accommodations (campsites, cottages, B&Bs)
 - Improvement of the Milton Falls access, removal of the current fencing, and restoration of the natural setting.
 - Horseback riding and ATV opportunities (from Tibay on Portsmouth-Roseau Highway via the Morne Plaisance Road, Syndicate, and Colihaut Heights)
 - Mountain Biking route from Portsmouth to the Syndicate Nature Centre, the tie-in the Colihaut Heights, to Colihaut, and back to Portsmouth.
- Coordinated work programs with surrounding Village and Town Councils, especially with respect to trail development and maintenance, developing adaptation measures for climate change, reforestation, and visitor accommodations, (including researchers).
- Cooperative research with universities.
- More frequent use of the Park for environmental education for teachers and students.
- Potential for reforestation in the Buffer Zone paid for by funding for carbon sequestration.
- Research to estimate the contribution of MDNP and the entire Park System to the economy of Dominica.

Threats

- Increase in the number and severity of hurricanes and other impacts as a result of climate change.
- Continuing inadequate financial resources prevents Park from being a contributing partner in the sustainable development of northern Dominica, and thus irrelevant to the people and politicians.
- Continued damage of crops by parrots in the Park Buffer Zone leads to increased hunting and poisoning.
- Inadequately maintained trails lead to visitor injuries.
- Continued hunting.
- Digging of pits for wild pigs by hunters causes injuries to staff or visitors.
- Lack of staff capacity and finance reduces Park protection, the attention to visitors and students, and cooperation with Village and Town Councils, and residents of the buffer zone.
- Inadequate environmental education causes local people and politicians to be ignorant of the Park, its assets, and potentials, and unaware of the importance of the Park for the sustainable development of Northern Dominica.
- User conflicts (water, tourism, conservation, and crop damage by wildlife).

7.3 Conflict with local farmers

Between October and February, Red-necked Parrots regularly move down from the Park into the Syndicate, Milton, Jude, and Morne Plaisance Estates, and even lower areas close to the coast. This movement is believed to be in response to a shortage of food in the forests at this time. During this period, the Parrots feed on and damage agricultural crops, especially citruses.

Farmers regularly threaten to kill the birds leading to confrontation between local farmers and the Forestry and Wildlife Division. The problem is like to become worse since the range of the Red-necked Parrot is expanding.

7.4 Sensitivity to Disturbance

7.4.1 Anthropogenic Activities

Both species of parrot are sensitive to human disturbance, though the Red-necked Parrots are frequently seen close to or in agricultural and inhabited areas. The areas around known nesting sites should be avoided during the main breeding season (February – June). The Imperial Parrot tends to inhabit forest between 600 m. and 1,300 m. and human activities between these heights should be minimised.

7.4.2 Impact of Climate Change

Currently, the monitoring of climatic variables within the confines of the Morne Diablotin National Park is very limited. The Division of Agriculture owns, manages and operates a standard rain gauge located at the Syndicate Visitor Centre. The Centre is located just outside the limits of the Morne Diablotin National Park (see map 5). This type of gauge installed provides a daily rainfall accumulation over a specified 24 hour period provided that it is read daily by an observer. The information gleaned is insufficient for monitoring of climate data within the Park

Climate and weather conditions including elevated temperatures, natural disasters like drought, storm surges, hurricanes, earthquakes, volcanic activity, and landslides periodically affect or threaten Dominica. These conditions threaten the biodiversity of the park through its potential impact on the reproductive cycle of plant and animal species, biological resources, potable water sources that can be affected by drought and flooding, among others. These natural disasters, particularly hurricanes contribute to land degradation in Dominica.

The park is home to the largest population of Dominica's endangered parrots: the Sisserou or Imperial Parrot, *Amazona imperialis* and the Jaco or red-necked Parrot, *Amazona arausiaca*, as well as to the endemic plants: *Chromolaena impetiolaris* and *Chromolaena macrodon*.

The primary objective for the establishment of the Park is the protection of the remaining populations of the Imperial and Red-necked Parrots. The populations of both species, particularly the Imperial Parrot are very small and restricted to primary forest. The loss of even a few birds can substantially increase the risk of extinction due to natural catastrophes such as hurricanes or lead to further population decline. Climate change could potentially lower the parrot carrying capacity of the forest over a period of time and hence negate the objectives of the Park.

High winds negatively impact on wildlife through destruction of feeding grounds, nesting sites and roosting areas. This can be further exacerbated by droughts, floods and increased hurricanes. Some of this was manifested in the Parks post hurricane David in 1979.

In terms of the impact on endemic species, Hurricane David (1979) had a profound impact on the *Amazona* species of parrots. Documented information revealed that the lower slopes of Morne Diablotin from the Syndicate area suffered 10% damage with broken limbs and uprooting of large trees. The upper slopes of Diablotin into the elfin

woodland, which support the larger population of *A. Imperialis*, suffered 30 – 40% damage with trees being uprooted.

Forestry and Parks personnel also indicated that there were signs in the change in phenology of some plant species after the hurricane. (No documented information) There were changes in the flushing of flowers and fruits with implications of reduced food supplies for some bird species especially the Amazona species.

Studies have shown that after Hurricanes David in 1979 and the populations of Imperial Parrots and Red-Necked Parrots fell for several years, dropping from 120 post hurricane to as low as 75 for the Imperial Parrots and from 400 to 200-250 Red-necked parrots (Thomas Duncan Nichols. PhD, MD-November 1979).

Dominica's Initial Communication on Climate Change, INC under the UNFCCC 2001 indicates the following with respect to the impact of climate change on Dominica's vegetation types:

“Dominica’s vegetation type, especially in its mountainous interior exhibits a pronounced altitudinal zonation due to climate. Any changes in climate are likely to affect these. For example, assuming a lapse rate of 1° C per 500 ft, the low scenario of 1.7°C would elevate vegetative zones by 850 ft and the high scenario (3.5°C) by 1750 ft. Under the high temperature scenarios elfin woodlands could disappear completely, and some species unique to Dominica could be lost. (Parry, 2001. personal communication)”.

With respect to the vegetation of the Park, Dr Nichols indicated that the lower slopes of the Park suffered 10% damage but the upper slopes of Morne Diablotin into the Elfin woodland suffered 30- 40 % damage with trees being uprooted; while in the slopes east and south of the Park there was heavy damage with the majority of the trees being mutilated or uprooted.

Observation of forest vegetation 2 years post Hurricane David indicated the presence of invasive species as a result of extensive damage to the elfin woodland. D.H. Kulkarni (1981) described it as a “plethora of epicormic twigs or invasive climbers among the stems of the damaged forest trees”. He indicated that after 2 years there were ample seedlings beneath the thick suppression of weeds and vines which “seem to be trying hard to penetrate”. He recommended simple treatment of weeding and vine cutting to ensure their rescue and to quicken the process of natural regeneration.

Discussions with the Forestry Division have also indicated that Elfin woodland has decreased as a result of impact of the hurricanes, mainly because of the slow process of natural regeneration since this area is exposed to wind erosion, soil erosion and landslides especially when stripped of its vegetation as was the case after hurricane David. Elfin woodland occupies a narrow range which is influenced by climate and geography. Major changes in temperatures and rainfall could shift the range and /or cause destruction of this ecosystem.

Post the hurricane there was an increase in farming activities in areas where large trees were toppled.

Landslides and Soil Erosion

Landslides are triggered by extreme rainfall. Landslide analysis indicates that the majority of the Park as can be also be described as a centralized high landslide risk especially in the east, west and southern areas. Increased rainfall especially during the “hurricane Season”- July to November could trigger landslides which could impact negatively on the biodiversity of the forest.

Sea-Level Rise

There has been no documented evidence of sea level rise in Dominica. However, extreme weather conditions have had a negative impact on coastal communities

destroying roads and flooding of homes and property. The MDNP is located in the interior of the island. However there are some coastal villages adjacent to the park that are vulnerable to sea level rise. 50 %of farmers in the vicinity of the National park live in the villages of Coulibistrie and Colihaut -2 coastal areas that are very vulnerable to coastal damage from sea level rise. As such, the impact of sea level rise can force these communities to utilize their private land adjacent to the Park for increased agricultural activities and housing.

In addition to this, the socio-economic value of the Park can be affected by climate change through closure of the Park in response to extreme events and lost income from visitation as well as increased expenditure on the maintenance of park infrastructure in the event of damage.

Bird watching is the main economic activity in the Park in addition to hiking. Dominica is a lure for bird watchers because of the potential of sightings of the endemic species of parrots and other birds. (The tourism authorities have no statistical data on no of bird watchers).

Activities related to climate change are both natural (natural disasters) and man-induced (anthropogenic). In attempting to manage the impact of climate change it is important to understand the process, to develop baseline climatic data within the Park so as to monitor climate trends and changes. Also important is the need to have baseline information on the biological resources of the park so as to monitor the impact of climate on these resources.

Presently, there is very little public awareness programmes for policy makers and stakeholders and this must be addressed so as to galvanize support for the programme. The development of an efficient database for storage, access and retrieval of information is critical for management of climate change as well for information exchange and sharing. Recommendations for this will be included Section C- Prescription

7.5 Viability of Parks' Wildlife Populations

The Park is part of a larger forest area in northern Dominica, much of which is encompassed by the Northern Forest Reserve. Thus the Park's wildlife populations are not discrete, and in some cases may not even be self-sustaining. Consequently, loss or degradation of the forest surrounding the Park, particularly in the Northern Forest Reserve, could have significant adverse impacts on the Park's flora and fauna.

PART C

PRESCRIPTION

8. VISION AND OBJECTIVES

The vision for the MDNP is of a protected wild area with little human influence where nature is allowed to take its course; where all species are protected; where researchers are encouraged to study and students have an opportunity to learn about the workings of nature; and where visitors are encouraged to visit, observe, and learn, but leave the area unchanged for others to enjoy. It is seen as a space where the creation is respected and allowed to evolve, and where peace is the guiding theme - peace with nature, peace among peoples, and peace within the individual.

Guided by this vision, the specific management objectives for the MDNP are to:

- A. Conserve the Park's biological diversity, natural resources and wilderness values;
- B. Protect endangered, threatened and endemic species occurring within its boundaries, especially the endemic and endangered Imperial and Red-necked Parrots;
- C. Maintain ecological and hydrological functions;
- D. To develop effective management responses to climate change.
- E. Assist visitor's to be aware of, understand, and appreciate the natural, cultural, and societal values associated with the Park, and to enjoy and connect with nature;
- F. Contribute to the education of Dominican students in environmental studies;
- G. Promote and facilitate research to improve the understanding of the functioning and management of Dominica's natural forest ecosystems;
- H. To provide safe recreational opportunities for visitors in ways that will maintain the natural character of the Park;

- I. To support the ecotourism industry by providing access to outstanding natural features and scenic viewpoints, guiding visitor groups when needed, and interpreting the Park's features and resources; and.
- J. Support adjacent landowners and communities by promoting alternative livelihoods that are compatible with, and contribute to, the other National Park objectives.

The following objectives specific to climate change are being recommended for incorporation in the existing objectives;

- To understand the impact of climate change and to sensitize policy makers, communities and other stakeholders
- To work with all stakeholders to undertake research and monitoring and to develop and implement adaptation measures to increase the resilience of the parks to the impact of climate change.
- Increase the resilience of the Parks by reducing non-climatic sources of stress, re-designing boundaries and buffer zones to facilitate migration of species, and reducing the carbon footprint.
- To undertake ex-situ research to maintain the genome of endemic and indicator species of the Parks
- To collaborate, co-operate and share best practices and knowledge

9. ZONING

Not all of the Park objectives can be achieved in all areas of the Park, so zoning is used as a tool for giving a spatial dimension to specific management objectives. The zoning for the MDNP (see Annex A, Map 14) is quite simple. The vast majority is zoned as wilderness, and a small sector in the northwest of the park, surrounding the Visitor Centre, is zoned for extensive use. A buffer zone surrounds the entire Park.

9.1 Wilderness Zone

This zone includes the large area of undisturbed natural forest that was once characteristic of all the mountains of Dominica, and is critical to conserving the biological and genetic diversity and ecological integrity of this ecosystem. The Wilderness Zone, which covers 98% of the Park, is managed to achieve:

- A. Maximum conservation of natural habitats and genetic material of the forest ecosystem;
- B. The protection of the endangered and endemic populations of the Imperial and Red-necked Parrots established in the Park;
- C. The maintenance of intact watersheds;
- D. The provision of opportunities for non-manipulative research and basic environmental monitoring; and,
- E. The provision of opportunities for motivated visitors to experience the forest wilderness on its own terms, without facilities other than basic trails.

9.2 Extensive Use Zone

This zone has two distinct portions: a small relatively flat area of forest located in the north western part of the Park bordering the Syndicate Estate, and the adjacent Picard Gorge. The flat has suffered varying degrees of disturbance, mostly selective logging and clearance of undergrowth in the past, and has small scattered clearings, areas of secondary forest, and old skid trails. Nonetheless, it still retains much of its original forest cover and wildlife, and offers spectacular vistas over the Picard Gorge, which retains its full complement of natural characteristics, including a series of waterfalls, cascades, and pools. The flat is considered one of the least "sensitive" areas of the Park since it is already somewhat altered, and is outside the usual range of the Imperial Parrot (although they are still sometimes seen in the area). Both the flat and the gorge are at relatively low elevation and their location on the leeward side of the island means that they receive less rain than the rest of the Park. This complement of characteristics makes this an ideal area for short-term visitors such as cruise ship passengers and ecotourists, and as a result, is an ideal location for visitor and administrative facilities. Indeed, the Visitor Centre and existing nature trail are already located in this area.

The objectives for management of this zone are to:

- A. Orient visitors to the Park, its resources and values (both material and non-material), and to its role in the sustainable development of Dominica;
- B. Provide opportunities for recreation and environmental educational that are in harmony with the Park vision and overall objectives;
- C. Stimulate business opportunities at the Visitor Centre and in the adjacent buffer zone to generate income for the Park, local communities and northern Dominica in general; and,
- D. Serve as a focal point for infrastructure in support of educational and recreational activities, research and monitoring, Park administration, and outreach to neighbouring landowners and communities.

9.3 Buffer Zone

The recommended buffer will comprise of a depth of approximate 200m south west on lands adjoining the national park and 500m on the north and east areas within the forest

reserve. This additional 500m would come from the Forest Reserve. The rationale for this is the need to protect a larger area of the forest to ensure the preservation of the habitat of the parrots and to protect the area from being subjected to controlled felling of trees which can be permitted in a forest reserve.

Establishment of the 200 m buffer zone would mean inclusion of some acreage from the Syndicate, Dyer and Morne Plaisance Estate that are privately owned and cultivated. The proposed buffer zone for the Park has a total area of 2793.65 acres,(1130.5ha) of which 358.99acres (145.2 ha)are privately owned. It consists of three sub-zones (Refer to Map below):

- Government owned forest lands of the Northern Forest Reserve along the eastern and southern boundaries;
- Privately owned forest lands on rugged terrain within 1 km. of the northern boundary; and,
- Privately owned agricultural lands within 2 kms. of the western boundary.

The objective for management of the Buffer Zone is to achieve a good neighbour policy based on the notion of sustainable development that seeks to harmonize the Park's objectives with the aspirations for development of surrounding landowners and communities. Accordingly, the purpose of the Buffer Zone is to:

- Assure that management of the Northern Forest Reserve buffers the Park from threats to its resources and to its integrity; and,
- To increase the Park's resilience to the impact of climate change and to reduce anthropogenic activities in the Park
- Work with neighbours to maximise potentials for development on private lands that complement the Park's use for ecotourism, research, and production of water; and minimize conflicts that may arise from damages caused by wildlife from the Park, or from incompatible developments on private lands that represent a threat to Park values.

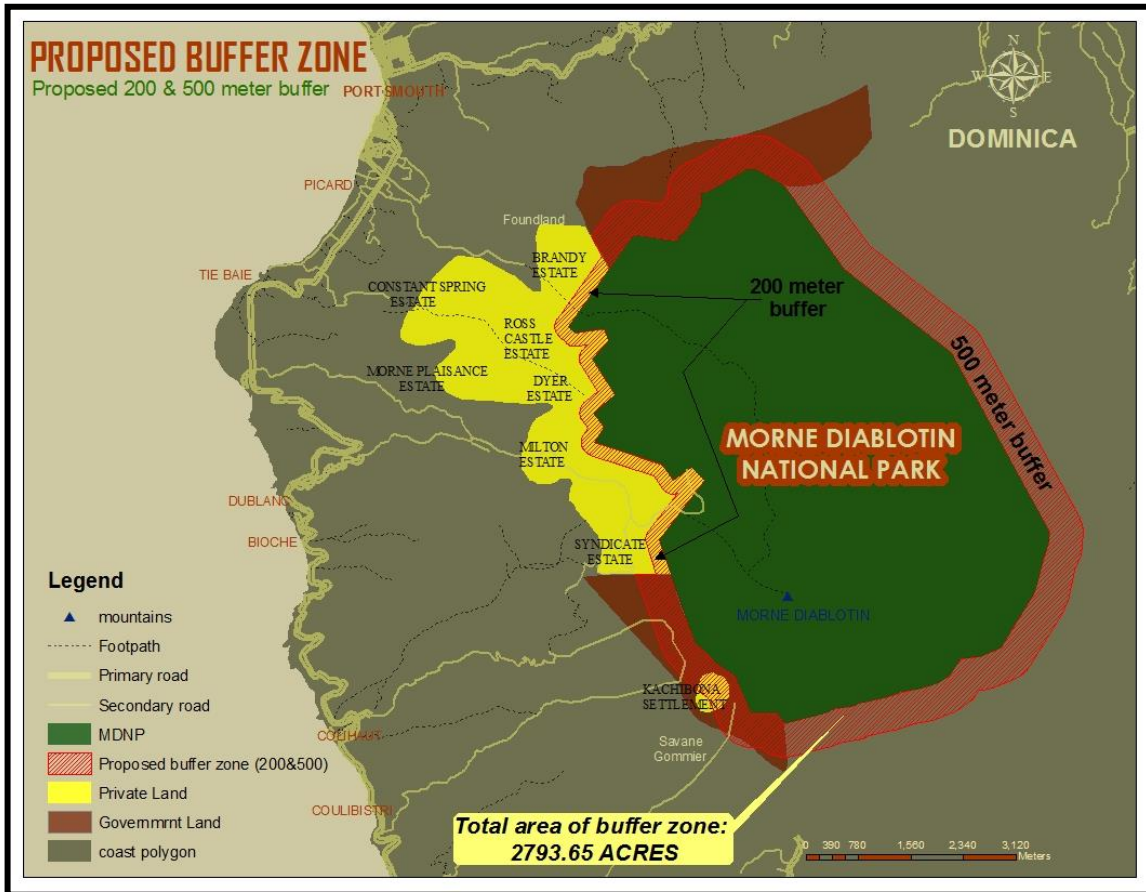


Figure 2: Proposed Buffer Zone

10. MANAGEMENT PROGRAMMES

The specifics of "WHAT" is required for management of the Park are articulated through the following management programmes on resource protection, visitor use, research, environmental education, and community outreach.

10.1 Resource Protection Programme

The Resource Protection Programme is the most important for attaining the Park's objectives, and will be given priority in budget allocations.

10.1.1 Objective

The Programme objective is to safeguard the integrity of the biological resources, natural features, and watersheds of the Park through actions that manage the impact of natural disasters and reduce the impact of anthropogenic activities on the resources of the Park. This entails a 2-pronged approach of building public support and countering specific threats. These include illegal hunting, visitor impacts, agricultural encroachment, contamination of water sources and combating climate change.

10.1.2 Policy

The policy for resource protection is to give highest priority to research, management of climate change, and the development of sound relations with stakeholders through active cooperation in sustainable development that focuses on shared agendas. Infrastructure design, public education, and boundary demarcation will be seen as supporting strategies, while law enforcement will only be used as a last resort.

10.1.3 Management Actions

10.1.3.1 Building of stakeholder relations

Park resources will be best protected when the Park is seen as a vital element of, and

dynamic partner in, the sustainable development of northern Dominica. Three strategies will be employed to achieve that outcome: (1) a good neighbour policy, (2) proactive cooperation in regional development, and (3) organisation of a Park Advisory Committee.

Good Neighbour Policy: Regular contacts with neighbours will be used as the means for implementing a good neighbour policy that generates mutual understanding and positive relationships. This is a two-way process that requires listening, empathy, and attempts to help with each other's problems. Potential areas of collaboration are discussed in section 10.5.3. What needs to be underlined here is that a good neighbour policy is perhaps the most effective tool in building awareness of, and appreciation for, Park values with those stakeholders who are closest to the Park and who are critical to management success.

Proactive cooperation in regional development: This subject is discussed in detail in Section 10.5.3. As with the good neighbour policy, this element of the Resource Protection Programme is one of the most powerful tools for developing commitment to the Park's management objectives. It relies on the development of understanding through practical experience, and the friendship derived from coordinated action toward shared goals. This approach is more effective and long-lasting than theoretical understanding promulgated through teaching and preaching.

Park Advisory Committee: This Committee will be established (see description and tasks in Section 12.1.1) to provide an input from stakeholders into the Administration of the Park. It will also be a tool for engaging stakeholders in the management process, raising their awareness of issues related to management, and to develop and transmit values that are consonant with the vision and objectives of the Park. The members of the Park Advisory Committee will be encouraged to pass on Park information and values to their constituents. To assist this, a yearly event will be held in the Park to honour the work of the Advisory Committee, and engage their constituencies.

10.1.3.2 Infrastructure design, implementation, and maintenance

Quality design, implementation, and maintenance of infrastructure support resource protection by inducing visitors to behave in appropriate ways.

Trails: Quality design, implementation, and maintenance are particularly important so that visitors are encouraged to stay on designated trails. This reduces the trampling of vegetation, erosion, and disturbance of fauna. Good trails are designed to match the volume of expected users. In the wet climate of the rainforest, high volume trails need to be wide enough to accommodate 2 people walking together, have drainage that prevents water from accumulating, and have a compact surface that resists erosion. Sturdy, slip resistant steps will be used in steep terrain. Trail layout will, whenever possible, be routed to complete a circuit, to feature a specific destination (mountaintop, viewpoint, waterfall, etc.) and not bring visitors near to features that might cause them to leave the trail.

Visitor Centre: The current facility is well-designed, is in keeping with the Park environment, and is well run and maintained by the concessionaire. However, greater use of this facility must be generated if the concessionaire is to receive the income required to continue its operation and maintenance.

Car Park: The existing car park at the Visitor Centre is adequate for normal visitor loads. However, there is no designated area for overflow parking and this will be needed during special events. An area adjacent to the existing car park will be gravelled and signed as overflow parking.

10.1.3.3 Education and Awareness

The Environmental Education and Awareness Programme for the Park is outlined in Section 10.4. It is important to note that one of the purposes of the Programme is to assist in resource protection. For this reason, there will be close interaction between the Resource Protection and Environmental Education and Awareness Programmes so

that threats to the Park are defined in specific terms and education efforts undertaken to change the behaviours that produce these threats.

10.1.3.4 Boundary Demarcation - Establishment of the Zones of the Park

Physical demarcation of Boundaries and establishment of a buffer zone

Objectives: To establish the boundaries of the park using standardized, internationally accepted signage so as to ensure that boundaries that have been gazetted for the National Park correlate with what is actually seen on the ground and to establish buffer zones to protect the resource and disallow activities that are not compatible with the preservation of the biological integrity of the Park.

Activities:

- To undertake an inventory of the resources in the zoned areas
- Reforest and restore degraded areas of the Park and buffer zones
- To undertake a visitor use programme compatible with the Park Zoning plan

A 1- year demarcation renewal programme should be established for clearing of the boundary lines and buffer zones of the Park. It is recommended that hardy, showy perennials like the African Tulip or Agave sp. should be planted along the lines especially at corner points for easy location.

Activities to be undertaken for Boundary demarcation

- Re-establish and formalize the boundaries of the Park with the use of GIS methods to develop a marker database of information.
- Implement demarcation programme utilizing appropriate markers and developing effective signage. This will also take into consideration identified zoned areas.
- Develop a 1- year boundary maintenance programme with respect to markers

Natural Resource Conservation- 1A	Timeframe (in years)				
Establishment of Buffer Zone	1	2	3	4	5
Finalize and obtain approval	❖	❖			
Legal Guidance, implementation	❖		❖		
Funding for compensation	❖				
Finalize with land owners	❖	❖			
Funding, survey and demarcation			❖	❖	
Develop proposal for sites	❖	❖			

Natural Resource Conservation-1A	Time Frame (In years)				
Establishment and demarcation of Zoning Plan	1	2	3	4	5
Finalize zoning plan		❖			
To undertake a inventory of the resources in the zoned areas			❖		
To undertake a visitor use programme compatible with the Park Zoning plan (Refer to					
Visitor use programme)			❖	❖	❖

Purchase markers, production of information signs, placement and maintenance of markers and signs.

All boundaries of the Park will be demarcated in their entirety, giving priority to the western and north western boundaries that abut private lands. Boundary demarcation will include the clearing of underbrush to establish sight lines, and the planting of visually distinctive native plants that are adapted to the forest under story. A 1 year maintenance programme should be established.

10.1.3.5 *Periodic patrols*

Regular patrolling of Park boundaries will be carried out to control hunting, encroachment, and/or contamination of water sources. An electronic data base will be established to archive incident reports, observation of endemic, rare, threatened and invasive species; and provide the raw data that will enable the identification of the most problematic areas, and the most effective programming and required frequency of patrols. Initially, patrolling of the boundaries will give priority to the boundaries that have been demarcated, and the known entry points into areas that have not been demarcated. As data is collected and analyzed, the routing and frequency of patrolling will be revised accordingly.

10.1.3.6 *Managing Climate Change*

A Research and Monitoring Programme will be developed which seeks to improve knowledge of the physical and biological characteristics of the park, to monitor, collate and make available hydro-meteorological data in support of park management and to identify current and future trends in resource condition.

Research and monitoring will include in-situ and ex situ research aimed at the preservation of the genetic resources of the Park so as to maintain its biodiversity. The objective is the preservation of ecosystem function through the stabilization of key flagship species that are affected by climate change- the endemic species of animal and

plants e.g. The Amazona species of parrots, indicator species and the vegetation types typical of this forest.

A public awareness and sensitization programme on climate change and its impacts will be developed to sensitize policy makers, stakeholders and the communities so as to solicit collaboration in effecting adaptation measures for climate changes and to reduce anthropogenic activities on the Park in an effort to increase the resilience of the Park. This will be incorporated into the Environmental Education and Public Awareness programme for the Park outlined in Section 10.4.

The following are specific activities to be undertaken to manage climate change. These activities will be incorporated into the overall activities of the Park;

Activities

- To develop public awareness and community outreach programmes so as to sensitize and educate the stakeholders and communities adjacent to the Park to understand and manage the impact with climate change.
- Undertake hydro-meteorological monitoring in the Park which will entail the following:
 - Upgrading of the current hydrological monitoring programme and instrumentation of the Forestry Division
 - Establishing an efficient data collection, management and retrieval system in the Forestry Division
 - Installing a weather station in the Park to monitor and assess the hydrometeorology of the Park for water budget calculations data as a long term strategy
 - Install one rain gauge above the forest canopy of the Park to study the rainfall interception process.
 - Monitor water levels within the Park to provide data on water level trends that are needed to manage the resource

- Determine rainfall trigger values and soil moisture content required for the initiation of landslides so as to manage fresh water resources both within and exterior to the confines of the National Park System.
- Develop a disaster management plan for the Park to include forecasting capability, early warning systems.
- Train staff responsible for monitoring and collating climate data
- Undertake watershed management techniques
- Review legislation and policy of the National Park to allow for restoration of degraded areas of the Park
- Establishment of a buffer zone to facilitate migration of species - Refer to 10.1.3.4
- Reforest and restore degraded areas of the Park and buffer zones
- Provide incentives to land owners with land adjacent to the Parks to reduce impact on the Park
- Establish seed-gene bank and collect and store seeds and plant materials of all endemic and indicator plant species
- Establish a living collection of plants – ex-situ field gene banks
- Strengthen the co-operation between Forestry and national parks service, land owners and the private sector

10.1.3.7 Interpretation of Monitoring Data

The monitoring component of the Research and Monitoring Programme is outlined in section 10.3.3.1. The monitoring information generated will be stored in a data base and will be analyzed on a quarterly basis to detect trends and patterns that require actions by the Resource Protection Programme. The following data will be of special concern and will trigger a search of remedial actions:

- Disturbance of parrot nesting sites or other critical habitats by visitors;
- Loss of endemic plants of the montane thicket environment along the Morne Diablotin Trail;

- Trail erosion;
- Declining water quality and water level trends of the Picard River;
- Agricultural encroachment; and/or,
- Indications of hunting within the Park.
- Hydro-meteorological data
- Physical and biological resources of the Park.
- Rainfall trigger values and soil moisture content required for the initiation of landslides so as to manage fresh water resources both within and exterior to the confines of the Park.

10.1.4 Input Requirements

Development of the Resource Protection Programme outlined here will require the following inputs:

Staff:

- 20% of a Park Superintendent's time
- 40% of a Technical Officer's time
- 40% of a Ranger's time
- 1 Guard

Infrastructure:

1. Clearing and demarcation of the Park's boundaries.
2. Annual maintenance of the cleared boundaries.
3. Surfacing of an overflow parking area adjacent to the Visitor Centre, and signing.

Materials

- Weather Station
- Mounting Tripod
- Solar Radiation Sensor
- Soil Moisture Sensor

- Barometric Pressure Sensor
- Recording Rain Gauge
- Satellite Telemetry System
- Ultrasonic Water Level Recorder
- Boost Regulator+Water Level
- Logger+Enclosure
- Solar Panels
- 1 general video on the MDNP, 15 minutes in length
- 4 "update on the MDNP" videos, each 15 minutes in length

Other:

1. Provision of a scholarship to a CERMES student at the University of the West Indies to develop a study on the economic contribution of the MDNP to the economy of Dominica.
2. Development of a data base on resource protection that includes patrol reports and monitoring data, and subsequent analysis for decision-making.
3. Training in hydro-meteorological monitoring and data-base management
4. Upgrading of existing monitoring systems

10.2 Visitor Use Programme

10.2.1 Objectives

The objective of the Public Use Programme is to facilitate the understanding and enjoyment of the Park and its resources by the general public, provide excellent outdoor

recreation opportunities, and contribute to the sustainable development of Dominica by providing a high quality environment for low impact ecotourism activities.

10.2.2 Policy

The policy for the Visitor Use Programme is to contribute to the sustainable development of Dominica by providing facilities and recreational opportunities that are in scale with the demand, consonant with the Park's resources and objectives, that are of interest to visitors (both local and foreign), and that fit with the scheduling requirements of the tourism industry, especially cruise-ship passengers.

10.2.3 Management Actions

10.2.3.1 Access (see Annex A, Map 13)

Roads: Although the current access roads to the Park at the Syndicate Visitor Centre, and at the Bense Heights are narrow, they are adequate for current visitor loads, and for those foreseen for the next 5 year period.

Trails:

Access to features inside the Park will be provided entirely by trails. These trails will be of one of three different design characteristics:

- Type A trails with a 1 meter tread width; full tarrish; foot bridges; drainage canals; sturdy, anti-slip steps; viewing platforms at key points; and strategically placed rain shelters with benches.
- Type B trails with a 0.75 meter tread; tarrish for particularly difficult sections; and sturdy, anti-slip steps.
- Type C trails with a 0.5 meter tread and natural surface.

All trails will be adequately signed and maintained on an annual basis. The Visitor Centre concessionaire will be contracted for regular litter clean-up of litter along all trails. Other requirements for these trails are outlined below.

CURRENT TRAILS

- Visitor Centre Nature Trail (Type A)
- Layout adequate
- Surfacing and drainage requires maintenance
- A sturdy, safe and secure observation platform for the Picard Gorge, and a spur trail to it, are required.
- Morne Diablotin Trail (Type B)
- The current state of the trail is unsafe, and it will be closed to the public until improvements are completed.
- The layout will be changed so that the trailhead is located at the Visitor Centre itself, and then connects to the current trail while remaining visually separate from the access road. The current width is adequate.
- Limbs and branches crossing the upper reaches of the trail will be cleared.
- Historic Trans-Island Trail (Type C)
- During the period of French colonial occupation of the island, a Trans-Island trail connected Bense, on the East Coast with Dublanc and Portsmouth on the West Coast. Portions of this trail still exist, and some are used by hunters, Forestry and Wildlife Division staff, and researchers. This approximately 15 km. trail will be relocated and developed as a wilderness, type C trail. It will begin at the Chaudiere Pool trailhead in the Bense Heights, climb to Turner Ridge, and then descend to the Visitor Centre.

NEW TRAILS

- Picard Falls Trail (Type A)
- A feasibility and environmental impact study will be carried to determine if this trail can be routed and constructed in such a way as to minimise disturbance to parrots, avoid flood damage, and maintain Picard River water quality.
- This approximately 4 km. trail will be designed as a loop with the trailhead at the Visitor Centre. It will descend from the Syndicate flat into the Picard Gorge, meander upstream to the two waterfalls at the head of the canyon; climb out of

the gorge, if possible, to viewpoints that would enable glimpses of the falls from a distance; and then continue back to the Syndicate Flat along the lip of the gorge.

- If constructed, it is expected that this will become the most heavily used trail in the Park, and thus a Type A trail is required.
- Lower Picard Gorge Trail (Type A)
- A feasibility and environmental impact study will be carried to determine if this trail can be routed and constructed in such a way as to minimise disturbance to parrots, avoid flood damage, and maintain Picard River water quality.
- If the trail is constructed, it should be with the expectation that visitors will bathe in the River.
- If it is determined that there is sufficient natural aeration of the water to mitigate the effects of regular bathing in the River, the landowners with holdings along the route of the proposed trail will be contacted, and legal permits negotiated for the trail right-of-way.
- This will be a linear 6 km. trail that starts within the Park and then crosses onto private land for about 2/3 of its length. It will branch off from the Visitor Centre Nature Trail, descend into the Picard Gorge and follow the Picard River downstream to the road terminus at the DOWASCO water intake.
- It can be expected that this trail will be heavily used by cruise ship passengers, so if it is constructed, it will need to be a Type A trail.

10.2.3.2 Visitor Centre

As noted in section 10.1.3.2, the current Visitor Centre facility is well-designed, and well-run and maintained by the concessionaire. The improvement of current trails, the development of new trails, and full cooperation with the tourism industry will generate enough visitors to enable the concessionaire to make a decent return on his investment, which is currently not the case.

10.2.3.3 Brochures

A colour brochure for the Park, which will include a map, basic information on the park's resources, and notes on road and trail access, will be printed. It will be made available

at the Visitor Centre, the airport, the cruise ship ports, and at all tourist accommodations on the island.

Simple black and white brochures will be developed for each of the trails. These will feature a trail map, information on specific features to be found along the way, and safety information. These will be made available at the Visitor Centre.

10.2.3.4 Guide Services

Tour groups usually arrived with their own licensed guides. In addition, there are local guides from nearby villages who have been trained, but do not have clients presently. As visitation to the Park increase, it will be necessary to update the training of these guides, and establish procedures for linking them to tour groups when they are needed. This will be discussed in greater detail in section 10.5.3.7.

It should be noted that specialized guides for birding are also employed for hikes in the Park. These are highly qualified staff members of the Forestry and Wildlife Division who have worked with researchers, and are very knowledgeable. They currently perform guide services on their days off. This arrangement seems to be adequate for the current demand. As demand increases, however, it may be necessary to find ways of making more time available for them to do this highly specialized work, while at the same time retaining them as part of the Park staff.

10.2.3.5 Entrance Fees

There is a national entrance fee system for National Parks and ecotourism sites, which includes visits to the MDNP. Currently those fees are deposited to a special government account, and a portion becomes available for investment in the Parks. This system will be improved by the creation of an independent Conservation Trust Fund that will use these fees as counterpart funding for international donations. This will be discussed in more detail in section 13.4.

10.2.4 Inputs Required

Staff:

- 20% of a Park Superintendent's time
- 30% of a Technical Officer's Time
- 20% of a Ranger's time
- 50% of a Guard's time
- 2 Wardens

Infrastructure:

1. Construction of 1 observation platform
2. Construction of 10 kms. of Type A trails
3. Upgrading of 5 kms. of Type B trails
4. Construction of 10 kms. of Type C trails
5. Annual maintenance of all trails.
6. Arrangements with the Ministry of Public Works to maintain, and clear the shoulders of vegetation of the Visitor Centre access road.

Materials:

- 1 general colour brochure on the Park
- 5 individual black and white trail brochures

Other:

1. Develop feasibility and environmental impacts studies for 2 Type A trails in the Picard Gorge.
2. If studies indicate the Picard trails can be developed without unacceptable environmental impacts, and can survive flooding from major storms, design and route 2 Type A trails.
3. Relocate 1 Type C trail.
4. Annual contract for collection and analysis of water samples from the Picard River

5. Negotiation with landowners along the proposed route of the Lower Picard Gorge Trail to obtain the right-of-way.
6. Negotiate the transfer to, and administration and disbursement of Park Entrance Fees to be established by the Conservation Trust Fund.
7. Annual contract with the Visitor Centre concessionaire for regular litter clean-up along all trails.

10.3 Research and Monitoring Programme

10.3.1 Objectives

The objective of the Research and Monitoring Programme is to:

- Improve knowledge of the Park's biota, physical features, and natural processes and to understand the impact of climate change.
- Compile and make accessible research information for decision-making that will improve management effectiveness.
- Identify trends in resource condition.
- Measure changes which occur as a result of climate change.
- To develop and implement adaptation measures to increase the resilience of the parks to the impact of climate change.
- To maintain the genome of endemic and indicator species of the Parks
- To collaborate, co-operate and share best practices and knowledge so as to improve research and monitoring techniques and programmes

10.3.2 Policy

The policy of the Research and Monitoring Programme is to provide incentives for researchers to carry out projects in the Park that will provide information relevant to management decisions; and to regularise the capture, organisation, and disposition of information during regular Park patrols that will assist in early identification of trends in resource condition.

10.3.3 Management Actions

10.3.3.1 *Research and monitoring Priorities*

Researchers interested in using the Park for their work will be encouraged to address one or more of the following priorities as part of their research plan:

- Undertake vulnerability assessment of the Park
- Species inventories, especially invertebrates (particularly moths), coleopterans, crustaceans, freshwater fish, mosses and liverworts;
- Life histories, and population and distribution studies of key species;
- Identification of critical sites and habitats of endangered and endemic species; and threshold levels for disturbances to wildlife populations.
- Establishment of indicators of climate change and monitoring of these indicators and trends.
- To undertake ex-situ research to maintain the genome of endemic and indicator species of the Parks
- Establish seed-gene bank and collect and store seeds and plant materials of all endemic and indicator plant species
- Establish a living collection of plants – ex-situ field gene banks
- Undertake watershed management techniques

Monitoring of the Park environment is essential for generating the data that provides early warnings of deterioration of Park resources. Key elements that will be monitored on a regular basis include:

- Parrot populations;
- Endemic plants of the Park
- Water quality of the Picard River;
- The introduction and distribution of invasive species;

- Hydro-meteorological data
- Visitor numbers and whether they arrive in organised tours, small groups or individually
- Trail conditions; and,
- Condition of the Visitor Centre interpretive exhibits.

The information derived from monitoring will be incorporated into a data base in formats that facilitate retrieval and analysis for decision making. Observation of deteriorating resources will trigger a search for possible causes and the identification of possible mitigation actions.

10.3.3.3 *Incentives for Researchers*

The following Incentives will be offered for researchers to work in the Park on themes of interest for Park management including the following:

- Use without charge of the modest living quarters in the lower level of the Visitor Centre;
- Free access to the library on Park research and the monitoring data base;
- Rapid consideration of research requests and the granting of permits; and,
- Free guide services by Park Rangers.

The specific incentives to be offered to each researcher and the information to be provided to the Park Administration by the researcher will be clearly spelled out in a Research permit.

10.3.3.4 *Water sampling*

Water from the Picard River will be sampled at a point adjacent to the Visitor Centre and at the DOWASCO intake on an annual basis. The first measurement will be completed as soon as possible as a baseline reading that can be compared with subsequent measurements. This will provide the data for determining if the construction of trails along the Picard River, and their use by visitors, has an impact on water quality.

Construction of the two Picard gorge trails will be sequenced. The Picard Falls Trail will be constructed first as its entire length will be on Park lands and no questions of right-of-way will be involved. This portion of the river has no large pools, so it is likely that only a small portion of visitors will chose to enter the water. The water sampling before and after construction should provide a good indication of any possible effects on degradation of water quality. If these tests indicate that construction and use of the Picard Falls Trail results in little degradation of water quality, then plans for the construction of the Lower Picard Gorge Trail will move ahead, that is, if right-of-way issues can be resolved.

10.3.3.5 Data Base

As noted in section 10.1.3.6, an electronic research and monitoring data base will be established to provide a virtual library of park research, and record and maintain monitoring data. The data base will be established in a format that facilitates easy retrieval and analysis of information. The data that will be collected during regular patrols was outlined in section 10.1.3.6, and this will be complemented from the data obtained from analysis of water samples.

10.3.4 Input Requirements

Staff:

- 10 % of Park Superintendent's time
- 20% of Technical Officer's time
- 10% of a Ranger's time
- 50% of a Guard's time

Infrastructure:

- Establish physical infrastructure for housing of seed bank
- Establish a plant nursery

Other

- Agreement with the Ministry of Health to analyze annual water samples for coli form bacteria.
- Recording by the Nature Centre concessionaire of visitor numbers, whether they are local or foreign, and whether they arrive in tour groups or self-organized groups

10.4 Environmental Education and Public Awareness Programme

10.4.1 Objectives

Management actions for diminishing or mitigating Immediate threats to the Park, such as hunting, agricultural encroachment, visitor impacts, and contamination of water sources will be dealt with by the Resource Protection Programme as outlined in section 10.1. The objectives for the Environmental Education and Public Awareness Programme, are different, and seek to:

- Inform visitors as to the environmental, social, and economic values of the Park;
- Educate the public, policy makers, leaders of public opinion, on the environmental issues relevant to the management of the Park to include the climate change and its impact on the Park.
- Inform the public of the management practices for the Park, threats to the Park's objectives, and ways that stakeholders can help to reduce or mitigate those threats.

10.4.2 Policy

The policy for the Programme is to give first priority to environmental education for students near the end of their primary schooling, and second priority to general information for public awareness through media coverage.

10.4.3 Management Actions

10.4.3.1 Environmental Education

The environmental education component will focus on the training of school teachers who teach students in the last year of their primary education, and assisting secondary students carrying out projects related to the environment. Teachers will be trained to develop a set of lesson plans that use the Park as the focus. This training will include the provision of materials that can be used by the teachers to incorporate into their lesson plans. Teachers will also be trained on how to conduct field trips to the Park, and how to carry out specific activities that take advantage of the forest and riverine environments. The environmental education component will be coordinated with the Ministry of Education.

10.4.3.2 Public awareness

The public awareness component will focus on media coverage and interpretive exhibits at the Visitor Centre and will be coordinated closely with the Government Information Service. It will focus on issues related to resource management, conservation and issues affecting the resources to include the impact of climate change in an effort to sensitize policy makers, communities and other stakeholders on the issues of climate change.

Media coverage of the Park and its values is currently sporadic and infrequent, and when there is coverage of the Park, it is generally part of a larger package regarding the National Parks of Dominica in general. This is appropriate and should be continued and enhanced. Media coverage will be improved by preparing a short general video on the Park. The video will be provided to the media, and it will then be available for local programmes on a range of themes. The same video will be provided to major tour operators, hotels, and restaurants as well, and they will be encouraged to have the video available for their clients. The general video will be supplemented by quarterly updates from the Park, which will cover specific themes and "what's new in the Park".

The Park Administration will work with private firms to prepare these materials, and will provide technical assistance, as needed. A major theme of these videos will be a presentation of the Park's values, and its contribution to the economy of Dominica. Thus, considerable work will be required in preparation of the videos to develop authoritative data on the economic value of the Park, as it is, and the value to be added through implementation of this management plan. This work will be implemented through an agreement with the University of the West Indies. The Park will provide funding for a student thesis on the subject through the CERMES Programme.

Interpretive Exhibits: The displays at the Visitor Centre are well executed and capture the major interpretive themes of the Park. As a result, the current Visitor Centre set-up contributes to public education directly, and by presenting information on the resources of the Park, enhances awareness and appreciation of its values, which in turn contributes to Park protection.

Special events

As noted in section 10.1.3.1, an annual event will be staged at the Visitor Centre facility to enhance public outreach. The Annual Morne Diablotin Day in the Park will be scheduled to:

- Encourage policy makers, key civil servants, the staff of the National Park Service, representatives of collaborating international organisations, hoteliers, restaurant owners, researchers, and collaborating educators to spend a day together in the Park;
- Provide an opportunity to feature cultural activities that feature conservation messages;
- Announce or launch new projects or activities;
- Recognize stakeholders who have contributed to Park management;
- Present awards to Park staff who have performed above and beyond the call of duty;
- Provide an opportunity for Park staff and the families of stakeholders to enjoy the Park and become familiar with its features; and,

- Stimulate media coverage.

10.4.4 Input Requirements

Staff:

- 10% of a Park Superintendent's time
- 50% of a Technical Officer's Time

Infrastructure:

- No new infrastructure is required

Materials:

- 1 Training Syllabus for Teachers
- 1 Publication of materials for use in developing lesson plans

Other:

Annual organisation of a Special Event.

10.5 Community Outreach Programme

10.5.1 Objectives

The objective of the Community Outreach Programme is to insert the Park into the mainstream of sustainable development in Dominica, thereby assuring that the Park becomes a critical development resource that is understood and appreciated by a spectrum of stakeholders.

10.5.2 Policy

The policy of the Community Outreach Programme is to work with stakeholders to determine how the Park can best support sustainable development, and develop cooperative projects that will achieve that goal.

10.5.3 Management Actions

A number of options will be considered for cooperative projects, and priority will be given to those that are in the Park Buffer Zone. Potential initiatives include the development of amenity sites and routes; the development and marketing of tent camps, cottages, and research support facilities; reforestation in the Park Buffer Zone; development of a mini citrus processing plant, and the retraining and use of guides.

10.5.3.1 Development of amenity sites and routes

There are a number of natural sites in the Buffer Zone that complement the amenities of the Park. These include waterfalls (Brandy and Milton), river pools (Chaudiere and on the Picard River); the Kachibona Lake, spring, and falls, and potential mountain bike and/or horseback trails. All of these sites and routes are on private lands.

Development of these sites for tourism would complement the Park's amenities, would add to the interest of potential tourism circuits, and would provide opportunities for landowners to earn income from entrance fees and the sale of food and refreshments.

The development of these sites will be carried out as a cooperative endeavour of the Park, and the private landowner(s). Financing would be provided on a project by project basis by the Conservation Trust Fund through a cost-sharing arrangement. The Park Administration would assist with the design and upgrading of access roads and trails, and on-site facilities if they are needed. The goal will be to have these amenity sites meet the same design and maintenance standards for infrastructure (access roads, trails, rain shelters, and toilet facilities) as are applied to the Park.

The charging of entrance fees at each site will be avoided if possible. Tour operators will be asked to include of the entrance fee(s) as part the overall charge for the tour.

The operator would then be responsible for passing on the entrance fee to the owner of the amenity. It may also be possible to include these entrance fees in the general entrance fee system for national parks, but that would have to be studied on a case by case basis.

10.5.3.2 Cottages, tent camps, and research facilities

There is potential for land-owners near the Visitor Centre to diversify their income by accommodating tourists and researchers. However, marketing is a major obstacle, so a good deal of caution needs to be exercised before investment is made. Current levels of visitation are not great enough to warrant the building of new accommodations. This may change, however, over the course of implementation of this plan. In any case, an incremental approach will be taken. If demand by researchers indicates that a basic facility, such as a small group of tent cabins, could be feasible, this could be a first investment. If demand continues to increase, further units could be added, or more elaborate facilities, such as cottages, could be included in the accommodation mix. Decisions will have to be made on a project by project basis, and supported by clear projections of demand based on experience. Again, funding for such facilities will be shared by the land-owner and the Conservation Trust Fund.

10.5.3.3 Waitukubuli National Trail

The Waitukubuli National Trail will pass along the western boundary of the MDNP (see Annex A, Map 3). This could potentially increase the demand for overnight accommodation in areas close to the trail and in the vicinity of the Visitor Centre. The Trail will also pass by the Kachibona Lake and spring, which could be attractive sites for camping facilities. Again, this could be done on an incremental basis, with only a few campsites being developed in the first instance, and others added as demand increases. The key to success may very well be the inclusion of information on the campsites on the map for the National Trail. A cooperative approach will again be taken with technical guidance provided by the Park's Administration, and finance shared by the Conservation Trust Fund and the private land-owner

10.5.3.4 Horse and Mountain Bike Trails

There are a number of old roads, tracks, and trails on the western side of the Park that have potential for development as horseback riding trails or mountain bike trails. The Park Administration will be alert to entrepreneurs who may be interested in developing

these opportunities, and where possible, assist in project development for submission to the Conservation Trust Fund.

10.5.3.5 Reforestation

There are considerable extensions of land in the buffer zone that need to be reforested. Given the benefit of reforestation for carbon sequestration, ecosystem restoration, and watershed protection, reforestation is an attractive investment. This work could again be approached on a cooperative basis with the Division of Forestry providing technical assistance, the landowner providing the land, and the Conservation Trust Fund providing the finance. If a large enough area can be lined up, and contracts signed with landowners to guarantee the permanence of the forest cover over a specific time period, then it will be possible for the Conservation Trust Fund to pay for the reforestation work through the sale of carbon credits.

10.5.3.6 Citrus processing plant

Land-owners along the western boundary of the Park complain about the damage caused by wildlife, especially the Red-necked Parrot, to their citrus plantations, and have pressured government to allow them to eliminate the problem through hunting. Government, on the other hand, through the Ministry of Agriculture, is seeking other solutions that will not damage wildlife populations. One solution that has been discussed with landowners is the development of a mini citrus processing plant that would allow the harvesting of fruits before they are damaged by wildlife. This solution is currently being pursued with the support of the Rare Centre. Another option that will be investigated is the trucking of fruits to an already established processing facility in the Layou Valley.

10.5.3.7 Guides

Individuals from the communities of Dublanc and Colihaut on the west coast have been trained previously as tour guides, but most have not been able to obtain steady work as such. As use of the Park increases, there will be an increased demand for tour guides. Guides with specialized knowledge of the MDNP and its environs will have a better

chance of being hired for tours to the Park. This would benefit the Park by having guides available that are familiar with the Park's objectives, its resources, and management. Thus, a special course will be held for already licensed guides to provide them with specialized knowledge of the MDNP. In preparation for the course, tour operators will be contacted to determine what they think the needs are for specialized training, and the mechanisms that can be put in place to be able to create a market place for specialized guides; that is, a mechanism for connecting the needs for guide services by tour operators and self-formed tourist groups with the guides who are trained and ready to perform this function. Guides who successfully complete this course will be provided with a certificate, and entered into a list of preferred guides for the Park. After the course, the Park Administration will promote the use of these guides, monitor performance, identify a cadre that is particularly competent, and promote their continued learning and regular service in the Park.

10.5.4 Input Requirements

Infrastructure

1. Assist local land owners to develop high quality projects for the construction of standard infrastructure (access road, Type A trail, rain shelter picnic tables, and pit toilets) at 2 amenity sites (Milton Falls and Brandy Falls), and to submit the proposals to GEF Small Grants Programme, the Special Programme for Adaptation to Climate Change, the Social Investment Fund, and/or the National Parks Foundation.
2. Assist local land owners in the development of proposals for improved organic farming, and in submitting proposals to the GEF Small Grants Programme, the Special Programme for Adaptation to Climate Change, the Social Investment Fund, and/or the National Parks Foundation.
3. Support construction of the section of the Waitukubuli National Trail that will border the western boundary of the Park. Work with local landowners to identify

opportunities for the development of tent cabins and campsites that would cater to trail users, especially at the Kachibona Lake, Springs, and Waterfall. Assist them with the preparation and submission of high quality proposals to the GEF Small Grants Programme, the Special Programme for Adaptation to Climate Change, the Social Investment Fund and/or the Conservation Trust Fund. Make sure that any facilities that are constructed are clearly indicated on the official Waitukubuli National Trail Map.

4. Provide technical assistance to entrepreneurs or Village Councils that wish to develop horseback riding or mountain bike trails in the Park Buffer Zone. Assist them in developing good proposals and submitting them to the GEF Small Grants Programme, the Special Programme for Adaptation to Climate Change, the Social Investment Fund, and/or the Conservation Trust Fund.

Staff

- 20% of Park Superintendent's time
- 50% of Technical Officer's time
- 20% of a Ranger's time
- 50% of a Guard's time

Other

1. Provide technical assistance to Village Councils and landowners to prepare and submit to the GEF Small Grants Programme, the Special Programme for Adaptation to Climate Change and/or the Conservation Trust Fund proposal(s) for reforestation and organic farming in the Park Buffer Zone
2. Provide assistance to landowners to resolve the problems of wildlife damage to citrus crops, either through the transport of fruits to the Layou Valley processing plant, or by installing a mini processing plant closer to the Park Buffer Zone.
3. Organized specialized course on the MDNP for already licensed guides, and help establish procedures for connecting visitor groups with suitable guides.

11. MANAGEMENT EFFECTIVENESS

Since the establishment of the MDNP, the costs of management and development have been shared by the Government of Dominica and international donors. The Government of Dominica has:

- Dedicated the lands of the Morne Diablotin area to National Park management, thereby forgoing alternative resource uses (opportunity cost);
- Paid staff costs; and,
- Provided office space and equipment for Park staff.

International donors have provided:

- Intermittent training for Park staff;
- Infrastructure costs;
- Transportation;
- Some equipment; and,
- Assistance to local communities for alternative livelihoods

Implementation of this management plan will require consistently higher levels of investment than has been forthcoming since establishment of the Park. As new mechanisms are put into place to raise additional funding nationally and internationally, more sophisticated procedures will be needed to track progress in management of the Park, and to provide data on costs and benefits. This is needed so that donors can receive reliable data that enables them to evaluate in concrete terms the return on their investment, and justify further investments.

One mechanism for generating the required data is through evaluations of management effectiveness, which use specific criteria for measuring progress with respect to the Park's management plan. A first evaluation will be conducted at the beginning of the Plan period to record the base-line condition of Park management. Subsequent evaluations will be conducted to track progress. The frequency of repeat evaluations

will depend on the demand for this information. As a minimum, an evaluation will be conducted at the end of the Plan period in 2016 to track progress, and identify future targets for improvement. The evaluation will be used to identify clear priorities for the next planning period, presumably 2017-2021. More frequent evaluations will be conducted if donors want this kind of evaluation at the beginning and end of individual investment projects, or to generate reliable quantitative data to use to justify a project proposal.

12. GOVERNANCE AND ADMINISTRATION

A project to establish a semi-autonomous National Park Service for Dominica will be completed in 2011 under a Caribbean Development Bank/ Government of Dominica – funded project. It is expected that recommendations coming from this report will be considered in the final administrative structure for the MDNP. Discussions have also been initiated regarding the formation of a Conservation Trust Fund (NPF) whose mission would be to contribute to the sustainable finance of Dominica's National Park System.

Ideally, the management of the Parks would be somewhat decentralized by creating an office in Portsmouth that would serve the Cabrits and Morne Diablotin National Parks, and the ecotourism sites in the north of Dominica. However, until the Parks Foundation is up and running and the financial base for the system is enhanced, financial constraints will dictate that the current centralized management model with a single office in Roseau will continue at least until 2011.

12.1 Organisational Structure

The organisational structure of the MDNP will be built around a voluntary MDNP Advisory Committee and paid staff of the National Park Service. Occasional consultants will be hired for specific tasks.

12.1.1 Park Advisory Committee

The MDNP Advisory Committee will be composed of 5 members generally representative of stakeholders (conservationists, education, tourism, water authority, and neighbouring landowners), and will serve in their personal capacities. Honorary members, with voice but no vote, will be recruited from time to time to provide specialized expertise. Members will be appointed by the Board of the National Park Service for terms of 2 years. The MDNP Park Superintendent will serve as Secretary to

the Committee and will have a voice but no vote. The Committee will meet at least twice a year and more often when required. The Committee will elect their own officers and develop their own procedural rules. Decisions of the Committee will be advisory in nature. However, any recommendation of the Committee not implemented by the National Park Service will require a detailed written explanation by the National Park Service Director.

12.1.2 National Park Service staff

Currently, there is no staff assigned specifically to the MDNP. Instead, staff of the Forestry and Wildlife Division carries out management activities as required, and as funding becomes available. Though the time allotted to the MDNP is not tracked, it is estimated that staff time allocations currently are as follow:

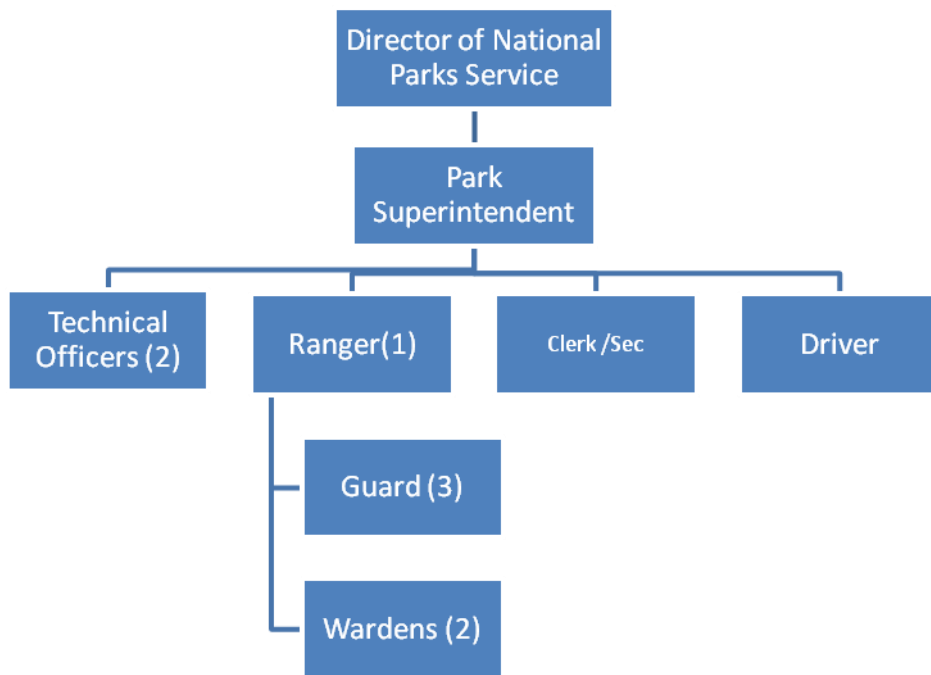
- Superintendent of National Parks – 0.2 fulltime equivalent
- Technical Officers – 0.3 full time equivalent
- Rangers – 1 full time equivalent
- Guards – 1 full time equivalent
- Wardens – 0.1 full time equivalent
- Accounts clerk – 0.1 full time equivalent
- Secretary – 0.1 full time equivalent
- Drivers – 0.2 full time equivalent

By 2014, the National Park Service staff for the MDNP will be increased to:

- A Park Superintendent who will also be responsible for the Cabrits National Park,
- 2 Technical Officers
- 1 Ranger (Sr. level)
- 2 Guards (Jr. level)
- 2 wardens (for collection of entrance tickets and visitor statistics)
- An accounts clerk / secretary,
- 1 driver

This estimate is based on the time requirements for development of each management programme as outlined previously and summarized in the following table (expressed in full-time equivalents):

Staff	Protection Program	Visitor Use Program	Research & Monitoring Program	Environmental Education Program	Community Outreach Program	Administration & Operations
Superintendent	0.2	0.2	0.2	.01	0.2	0.2
Tech Officers (2)	0.4	0.3	0.4	0.5	0.5	0.2
Rangers (1)	0.4	0.2	0.1	-	0.2	0.1
Guards (3)	1.0	0.5	0.5		0.5	0.5
Wardens (2)		2.0				
Finance Officer						.1 - .2
Accounts Clerk/Sec.						1.0
Driver						1.0



All staff will be supervised by, and report to, the Park Superintendent who in turn will report to the Director of the National Park Service as shown in the simple organigram above:

12.2 Incentives and training

Staff of the Forestry and Wildlife Division is unusually well qualified and dedicated civil servants, many of whom have long experience. This has been achieved by encouraging staff to take advantage of training opportunities, and by providing whatever incentives as are possible and compatible with the work at hand, such as allowing them to take on part-time outside work to supplement their salaries. This has been effective in creating a motivated and competent work force.

It is expected that a number of current staff members of the Forestry and Wildlife Division will be transferred to the National Park Service when it is established, and that the same staff policies that have built loyalty and competence will continue. These policies will be replicated at the level of the MNDP. Special attention will be given to integration of the work at the MDNP with similar work in other Parks in Dominica, and at the regional level where the trend is toward harmonization of policies and practices in the OECS States. Staff will also be assigned to support researcher's activities in the Park. Research permits will specifically include the requirement to train Park staff on the job, and wherever possible support Park staff to attend international meetings and participate in specialized training opportunities.

12.3 Administrative Offices, Transportation, and Equipment

It is expected that when the National Park Service is established, it will be provided with minimally adequate office space, transportation, and office and field equipment. Operations will be carried out from a central office in Roseau, and personnel, transportation, and equipment assigned as needed for activities in each of the Parks.

With the creation of a Conservation Trust Fund, hopefully in 2012, and the capacity it will have to capture new financial resources, it is expected that the funding available for implementation of the MDNP work programme will begin to increase in 2013.

Accordingly, in 2012, administrative offices for the MDNP will be established in Portsmouth, and two 4WD pick-up trucks, and suitable office and field equipment will be acquired for management of the Morne Diablotin and Cabrits National Parks.

13. FINANCE

13.1 Implementation Sequence and Estimated Costs

A detailed implementation schedule and estimated costs of the MDNP management programme outlined in this plan is presented in Annex B, using as a base the estimated budget for MDNP for 2010/2011. In summary, the annual costs (in EC\$) are estimated as follows:

2011 – 114,433.

2012- 147, 905

2013– 163,864.9

2014 – 185,309

2015 – 264,465.4

2016 – 560,031

13.2 Income

As noted above, It is estimated that the portion of the government budget used for the management of MDNP is about EC\$ 114,433. It is expected that the Caribbean Development Bank Project being currently undertaken for establishment of a National Park Service in Dominica, and the Special Programme on Climate Change will provide additional funding sources starting in 2012.

13.3 Gap

It can be seen that currently there is a deficit between the projected costs of the 5 year period of the plan and the projected income from the government budget. The estimated gaps (in EC\$) are as follows:

2012 – 33,473

2013 – 49,432

2014 – 70,876

2015 –150,032

2016 - 445,598

13.4 Filling the gap sustainably

Current fundraising for the National Parks of Dominica is opportunistic and often responds to donor initiatives rather than to systematic planning. This makes it difficult to implement management plans in a reasonable amount of time, and results in shifting priorities. The establishment of the National Park Service provides a unique opportunity to break with the modus operandi of the past, and implement mechanisms that will lead towards more sustainable finance of the National Park System. Many countries (over 50 to date) have found that a key mechanism for developing sustainable finance is the creation of a Conservation Trust Fund. Discussions have begun in Dominica to explore the feasibility of creating this kind of entity to assist the new National Park Service in obtaining the finance required to implement its mission. A more detailed description of the Conservation Trust Fund concept is provided in Annex C.

Implementation of the plan outlined in this document relies on the establishment of a Conservation Trust Fund in Dominica. Indeed, even with the potential for funding through the GEF Small Grants Fund, the Special Programme on Climate Change, and the Caribbean Development Bank, there is still little chance that this Plan will be implemented within the foreseen time frame without the contributions of a Conservation Trust Fund. For planning purposes, it is assumed the Fund will be established in late 2012, and that financial support for implementation of MDNP will start to become available for the 2013 budget.

Thus, for years 2012 and 2013, it is projected that the international projects coming on stream at the end of 2011, will be able to cover the deficits for those years (EC\$33,473 for 2012, and EC\$ 49,432 for 2013). For the 2014-2016 period, the goal is that the

combination of international projects and revenues of the Conservation Trust Fund cover the steadily increasing deficits currently projected for that period (EC\$ 70,876 in 2014, 150,032 in 2015 and 445,598 in 2016. If these goals are not met, then the period for implementation of this plan will have to be extended.

14. CONCLUSION

The plan presented here for the management of the MDNP for the 2012-2016 period is a rather modest one. Indeed, during the first 2 years, it is assumed that the budget will not increase significantly, and thus few new activities will be feasible. However, if a Conservation Trust Fund can be established within the next year, it is feasible to expect that during the 2013-2015 period full-time staff dedicated exclusively to MDNP can be financed together with a more ambitious programme of trail development and cooperation with the Park's neighbours to assist them in taking advantage of the Park for the sustainable development of the surrounding region. However, it must be emphasized that the implementation of this Plan is contingent on establishing a Conservation Trust Fund for Dominica during 2012.

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ANNEX A - Maps

Map 1: Location of Morne Diablotin National Park

Map 2: National Parks and Forest Reserves

Map 3: Coastal and Marine Resources

Map 4: Access

Map 5: Land Ownership

Map 6: Rainfall

Map 7: Generalized Soils

Map 8: Landslide Hazard

Map 9: Generalized Land Use

Map 10: Vegetation

Map 11: Water Resources

Map 12: Potential Ecotourism Sites in and around the Park

Map 13: Map 13: Access and Planned Infrastructure

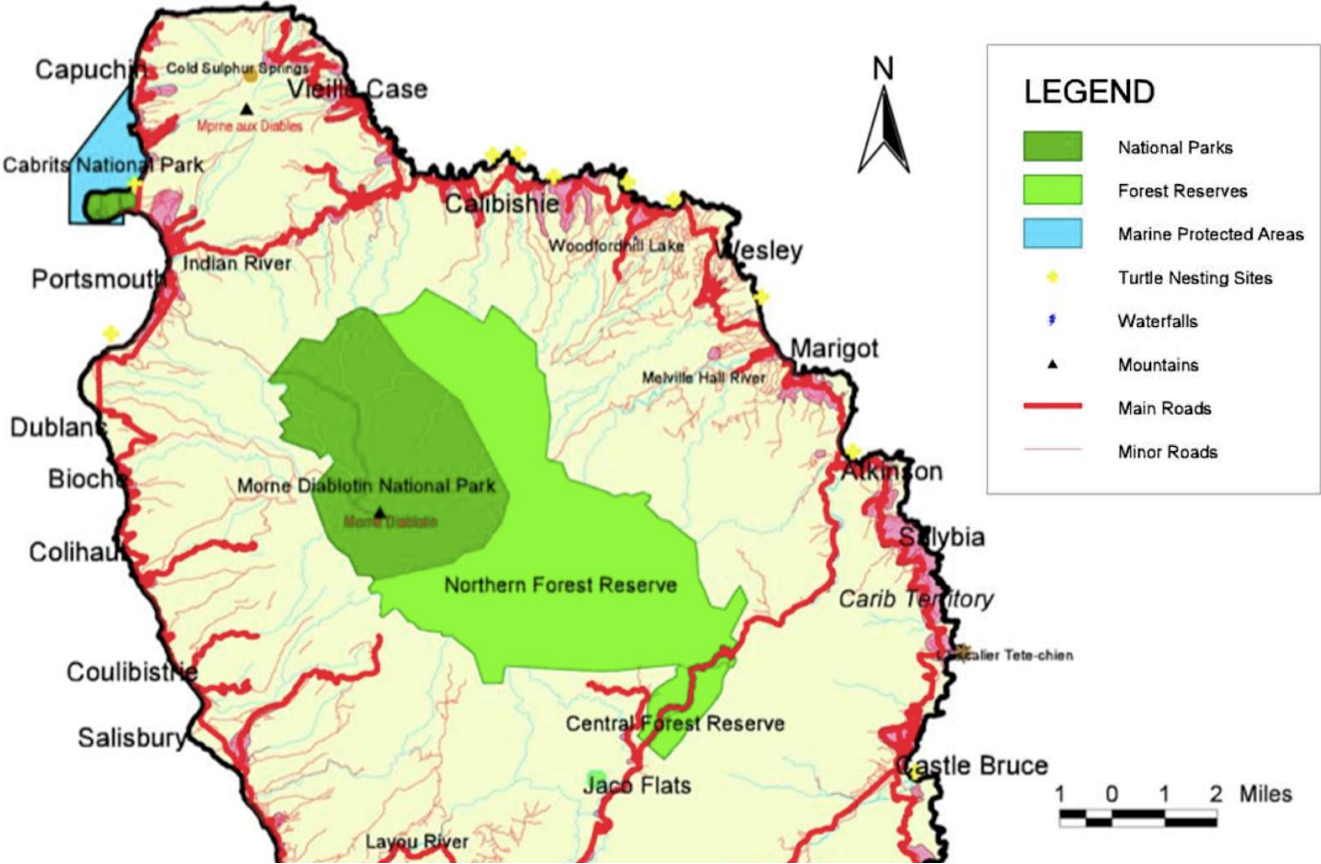
Map 14: Zoning

Map 15: Buffer Zone



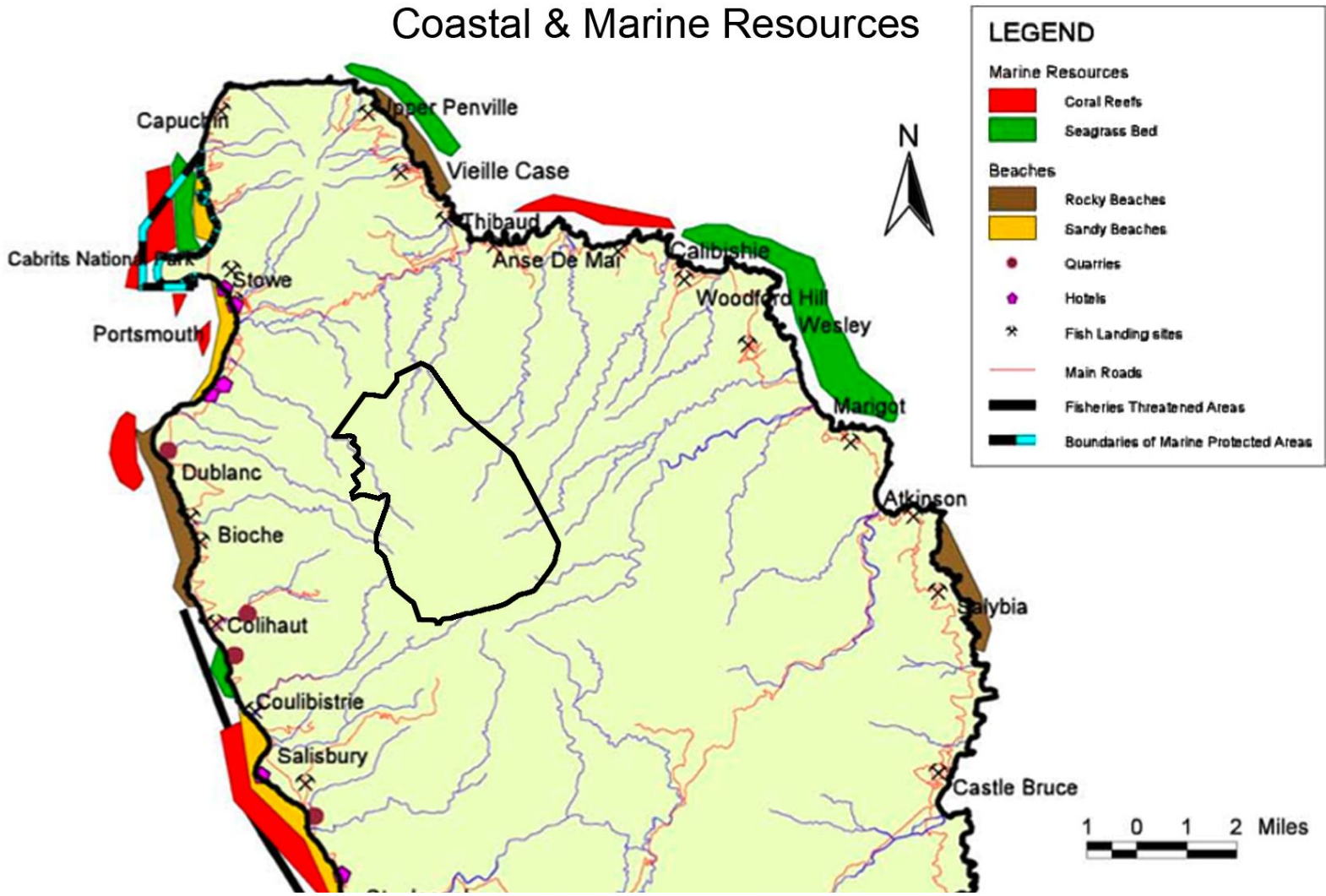
Map 1: Location of Morne Diablotin National Park

National Parks & Forestry Reserves

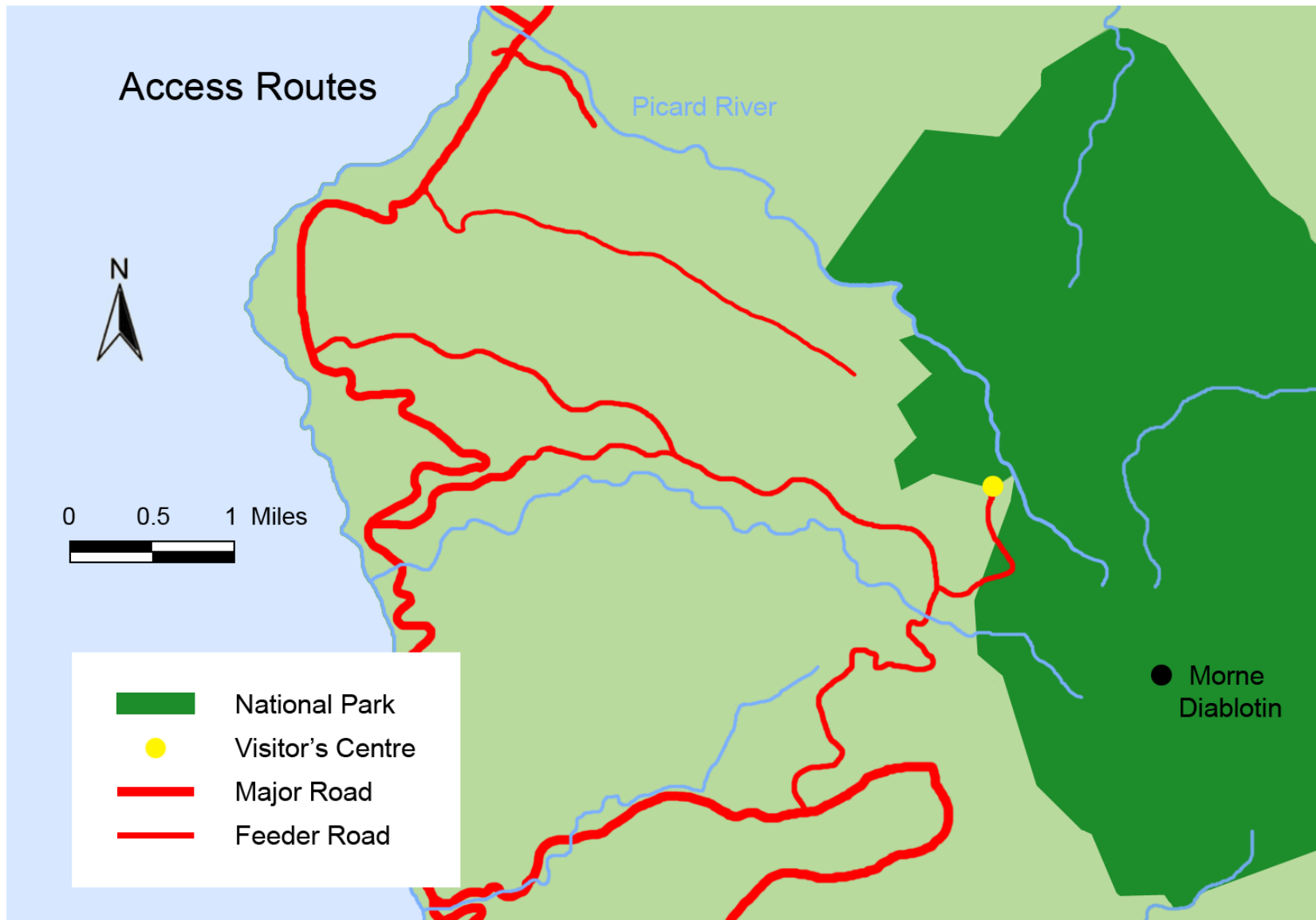


[Map 2: National Parks and Forest Reserves](#)

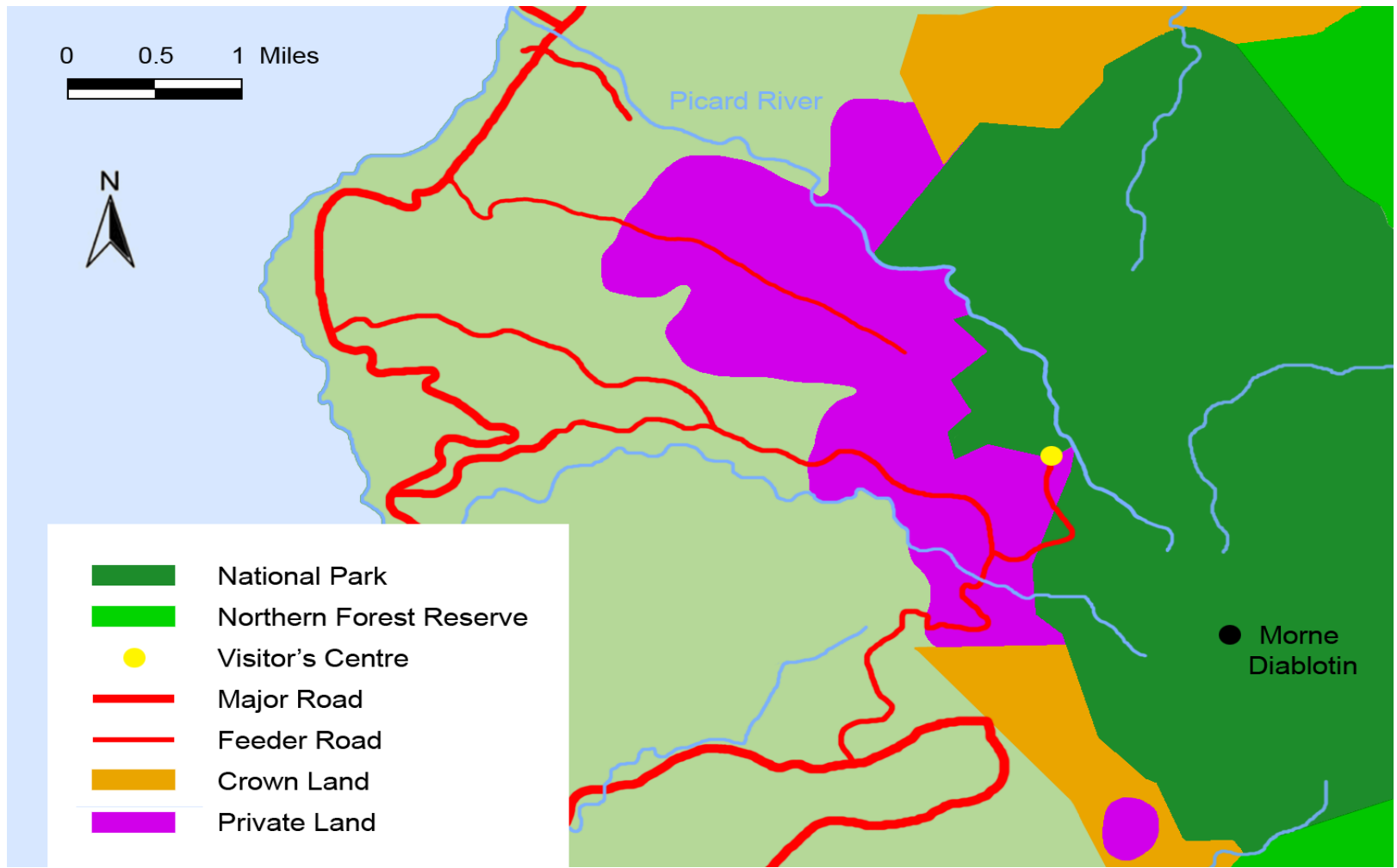
Coastal & Marine Resources



[Map 3: Coastal and Marine Resources](#)

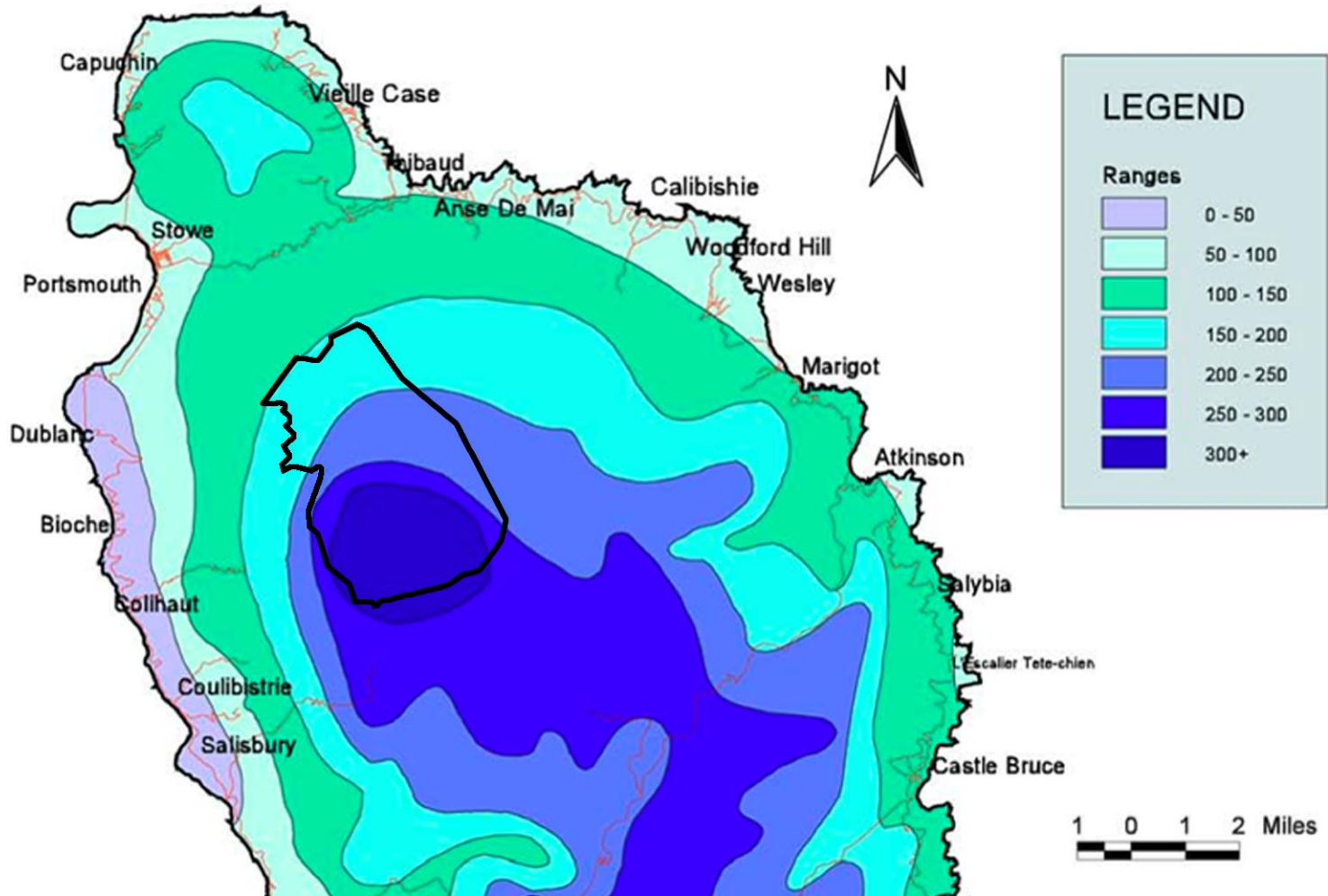


Map 4: Access Routes



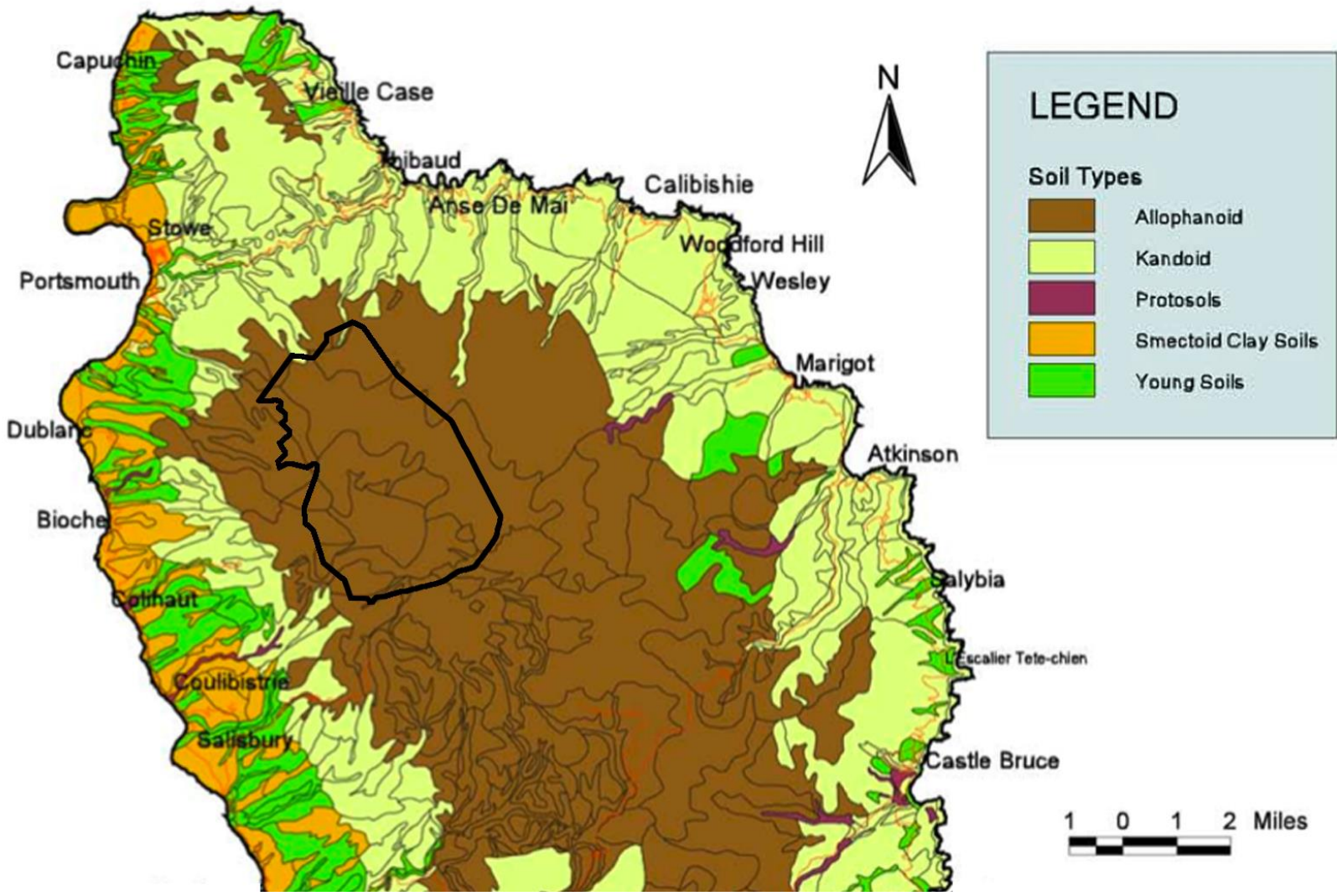
Map 5: Land Ownership

Rainfall



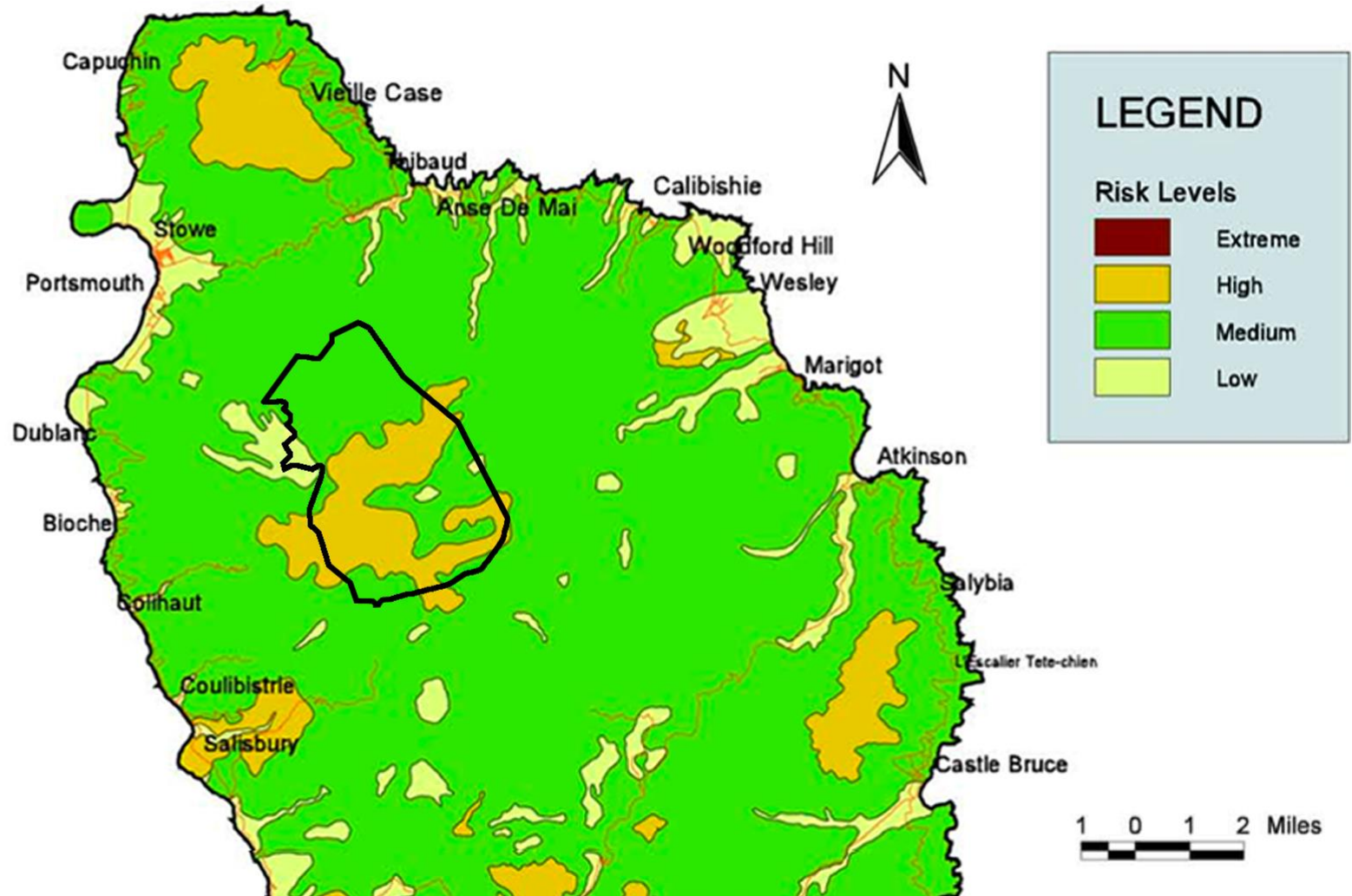
Map 6: Rainfall

Generalized Soils



Map 7: Generalized Soils

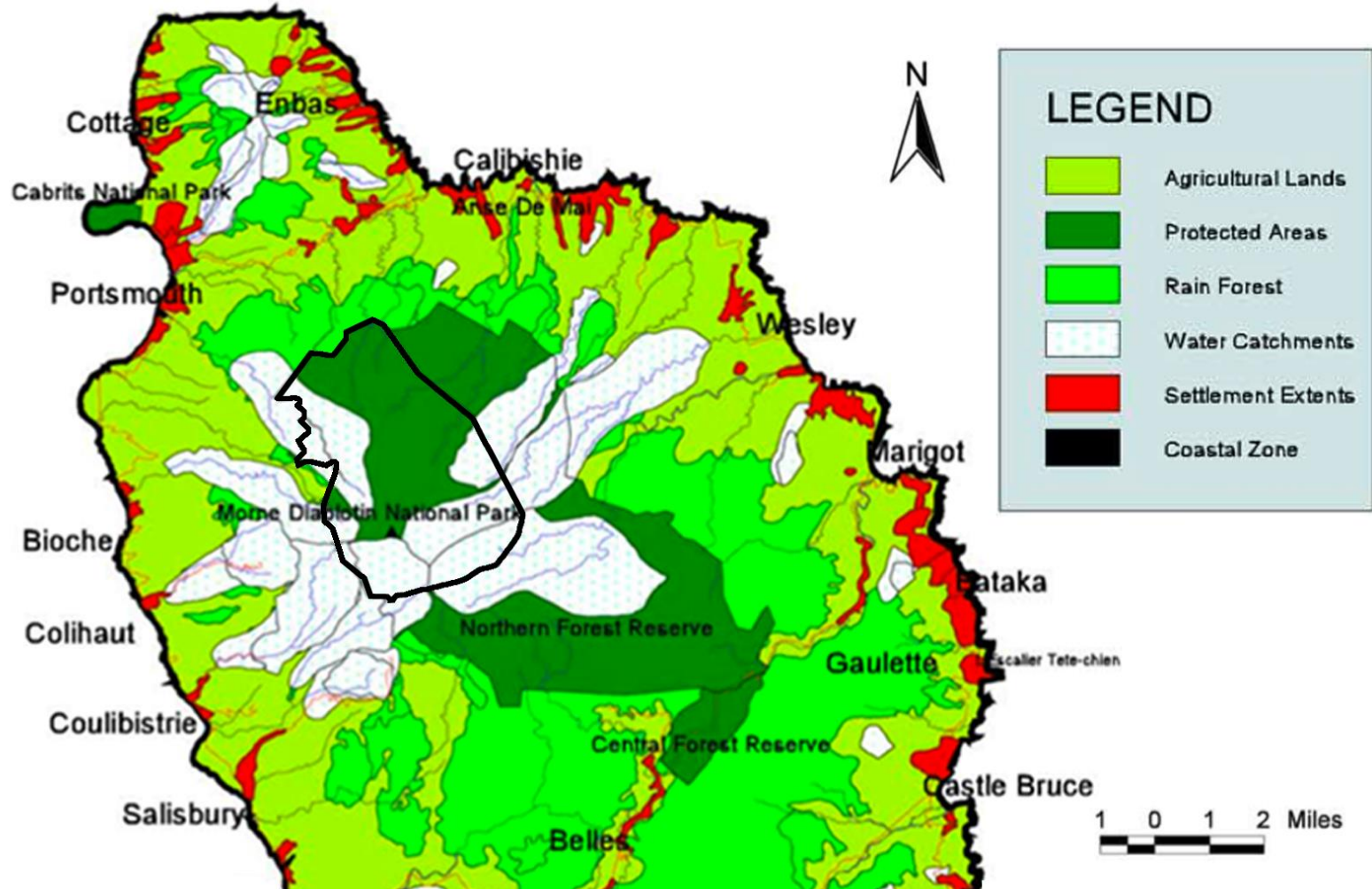
Landslide Hazard



Map 8: Landslide Hazard Area

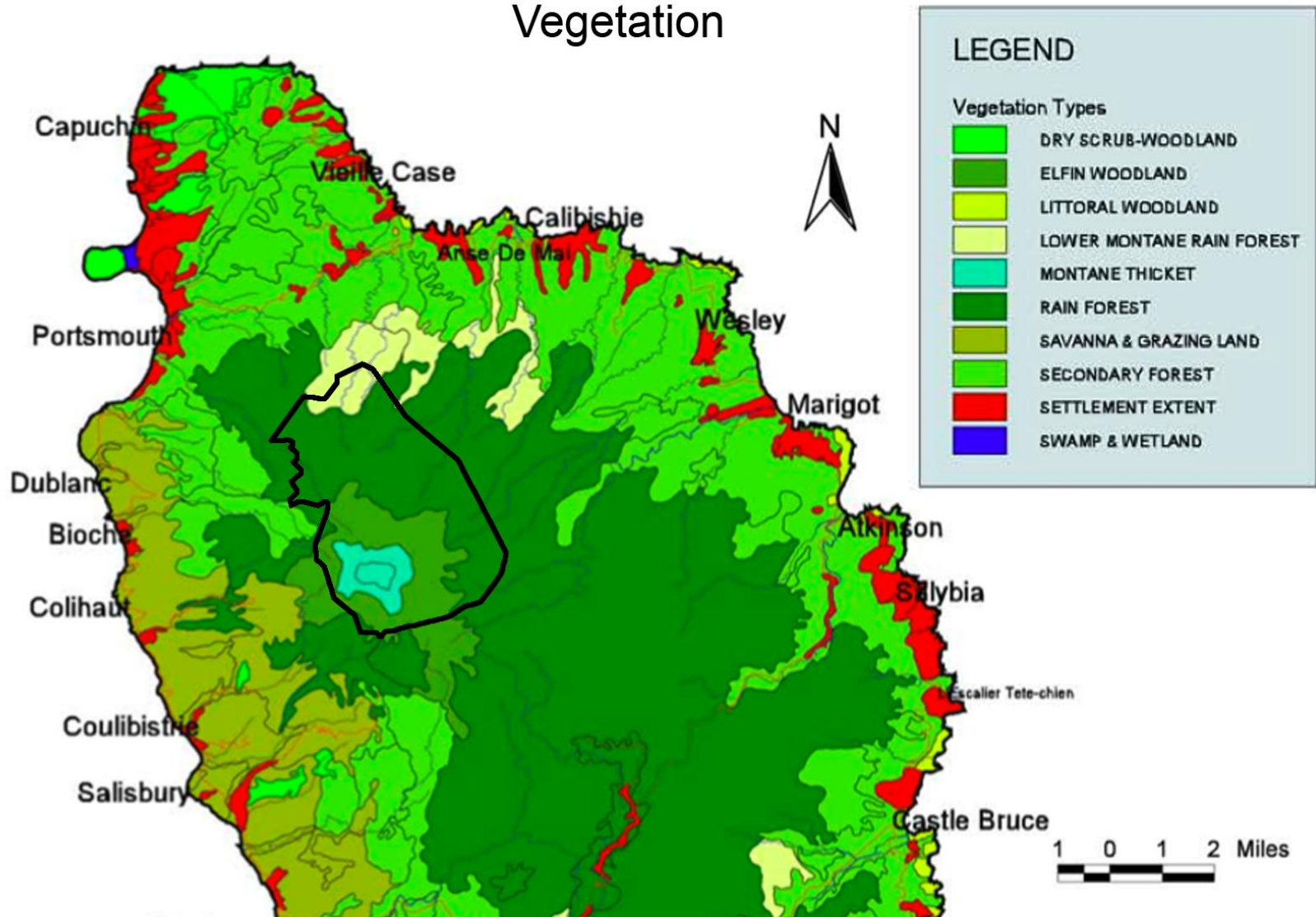
Map 8: Landslide Hazard

Generalized Land Use



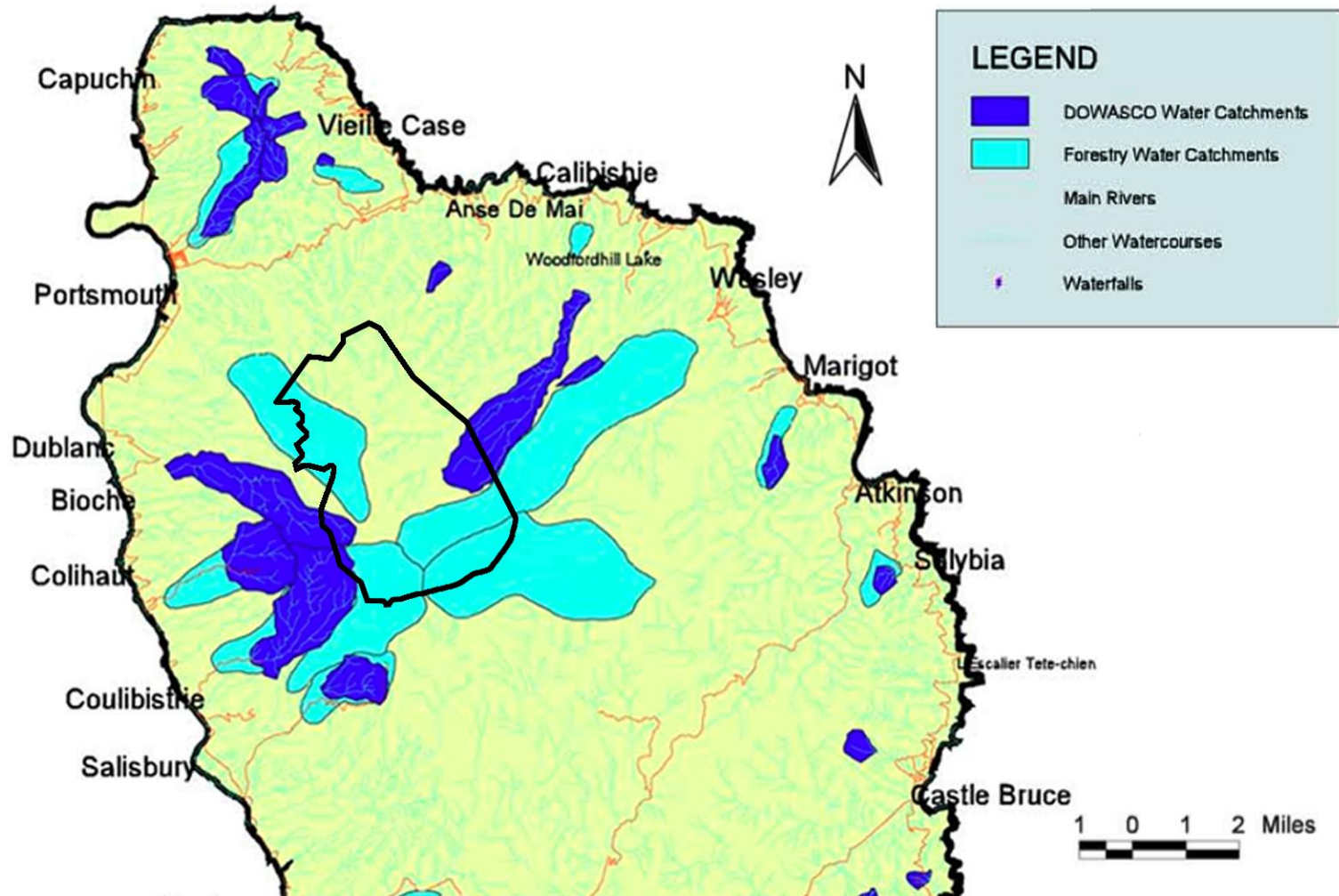
Map 9: Generalized Land Use

Vegetation



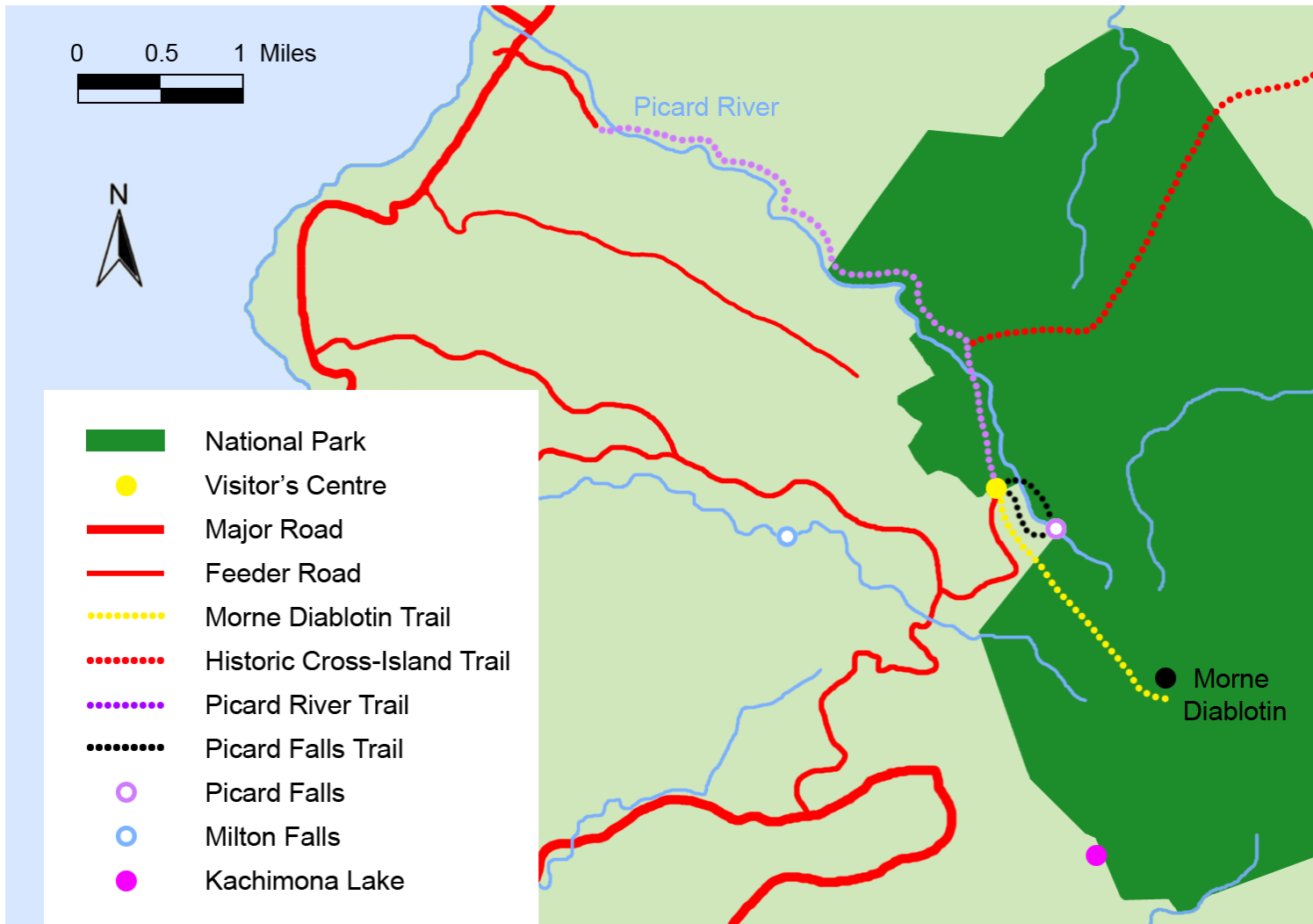
Map 10: Vegetation

Water Resources



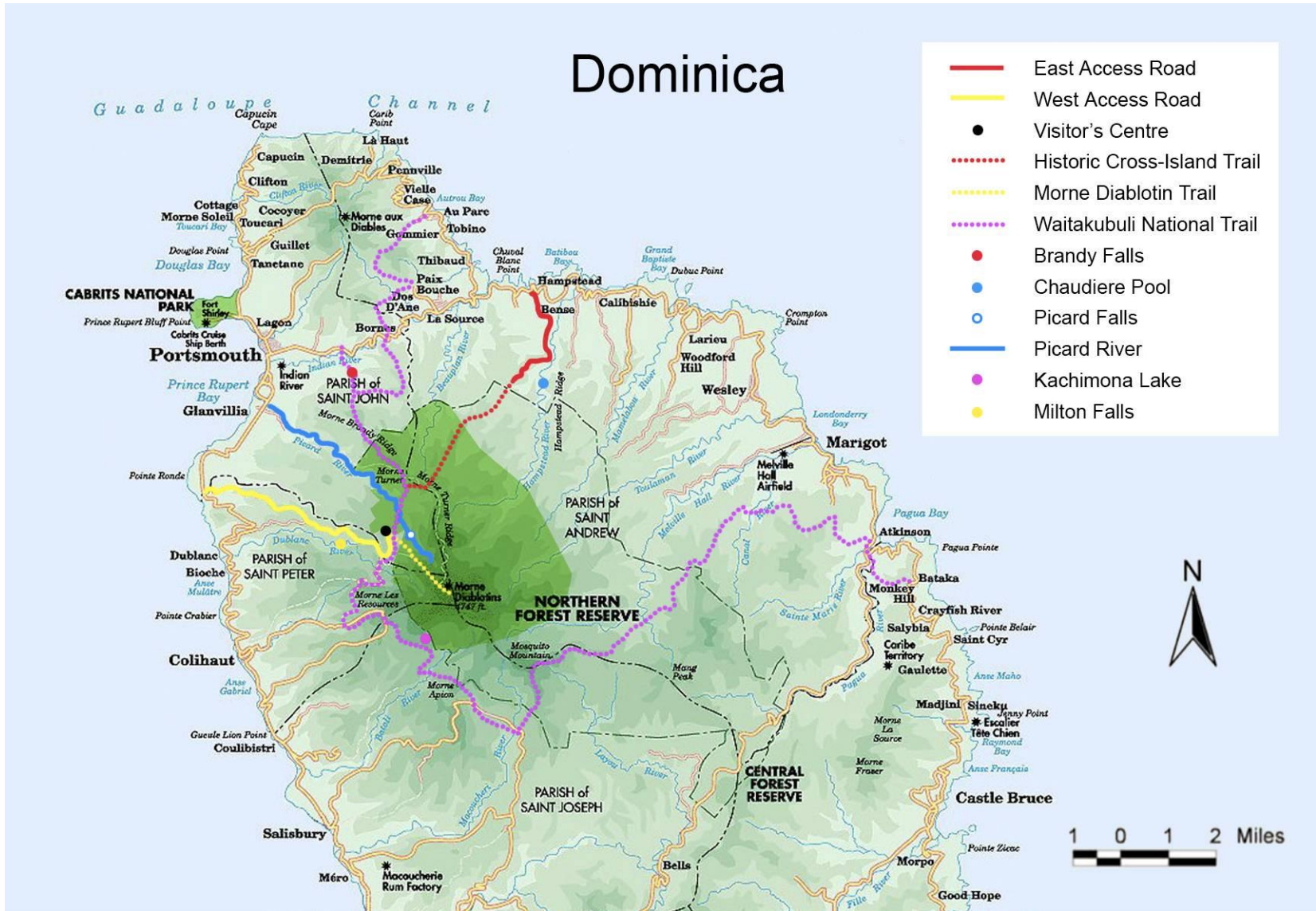
Map 11: Water Resources

Map 11: Water Resources



Map 12: Potential Ecotourism Sites in and around the Park

Dominica



Annex B - Implementation of 1993 Management Plan for MDNP

Management Program and Actions	Implementation	Comments
Park and Admin. Zone Boundaries		
• Survey	Yes	
• Demarcation	No	Old boundaries of Forest Reserve there, but not cleared
Nature Centre		
• Site plan	Yes	
• Architect plan	Yes	
• Building contracts	Yes	
• Site preparation	Yes	
• Construction of building and car park	Yes	
• Construction of camping site	Not an issue	To do on private lands
• Landscaping	Yes	
Nature Centre Access Road		
• Route selection	Yes	
• Construction	Yes	
Trails for Visitors and Patrol		
• Trail plans	No	
• Construct trails & structures in IUZ	Partial	Nature trail constructed
• Construct patrol trails	No	
• Remove picnic area from EEZ	Yes	
• Reroute & upgrade Morne Diablotin trail	No	
• Reroute & upgrade Morne Turner trail	No	
Land Acquisition & Park Consolidation		
• Relocate squatter from parrot reserve	Yes	
• Declare National Park	Yes	
• Decide to lease or purchase private lands	Yes	
• Purchase 80 ha. plot south of Parrot Reserve	Yes	
• Negotiate lease/purchase of private lands	Yes	
Species Protection		
• Parrot nest protection	Yes	
• Patrol of borders with agricultural lands	Partial	
• Prepare cons. plans for both parrot species	On-going	Surveyed extent of habitat and populations; studies on ecology and breeding biology; consolidate into plan not done yet.

• Control access to upper areas of Park	Not an issue	
• Protect sensitive areas for endemic plants	Not an issue	At summit of Morne Diablotin and Turner; they protect themselves
• Enforce no-hunting policy in buffer zone	No	Needs to be looked at again
• Monitor populations of endangered, rare, and endemic species in the Park	Yes	
Park Boundary Watershed and Forest Protection		
• Implement erosion control measures	Not an Issue	Non needed
• Patrol Park boundaries to prevent encroachment and loss of forest	On-going	
• Patrol Park trails	On-going	
• Monitor visitor impacts on elfin woodland and montane thicket areas	Not an issue	Visitation is limited; limited damage
Law Enforcement		
• Publicize Park laws and regulations	Partial	Being done through EE program, but more needs to be done
• Enforce Park's Act, especially hunting regulations	Yes	
• Design and instigate fine system	Yes	Need to increase fines
• Design & implement public law & order measures	Not an issue	
Fire Prevention		
• Train Park Staff in fire fighting procedures	Not an issue	
• Equip Park facilities with fire fighting equipment	Yes	
• Post fire regulations at Nature Centre	Not an issue	
• Develop fire contingency plans	Not an issue	
Anti-Vandalism and Threat Measures		
• Repair and replace vandalized artefacts	Not an issue	
• Maintain 24 hr. security at Nature Centre	Yes	
• Carry out anti-vandalism campaign	Not an issue	
Litter Control		
• Place rubbish bins along trails and at Nature Centre and implement litter collection schedule	Not an issue	
• Design and implement anti-litter campaign	Not an issue	
Buffer Zone Management		
• Government to discuss and adopt buffer zone concept	No	
• Prepare multiple land-use plan and recommendations for land-use practices in	No	

buffer zone		
• Establish buffer zone	No	
• Implement management plan for buffer zone	No	
National Park / Nature Centre Orientation		
• Erect display boards at nature centre	Yes	
• Produce general park brochure	No	For nature trail only
Forest Trails Interpretation		
• Erect interpretive and directional signs	Partial	On nature trail
• Produce leaflets on each trail	Partial	Nature trail only
Environmental Education		
• Produce written materials for Nature Centre	No	
• Produce audio-visual and display materials for Nature Centre	No	
• Education extension for schools	Yes	
• Adult summer school course	Not an issue	
• Mass communication program	Partial	Part of EE Program
Environmental Research		
• Status of imperial and red-necked parrots	Yes	
• Breeding biology of imperial and red-necked parrots	On-going	
• Forest regeneration and succession	Partial	In buffer zone, but not continuing
• Impact of rats on wildlife populations	Not an issue	
• Methods to prevent or reduce crop damage by parrots	Yes	Discussion, citrus processing plant
Research on Human Utilization of Park and Buffer Zone		
• Visitor impacts	No	
• Contribution of Park to the Dominican economy	No	PPA system, not only Park
• Land use in the buffer zone	No	
• Use of medicinal plants from the Park	No	
• Agroforestry techniques for the buffer zone	Not an issue	Not Park's role
Research Policy and Practice for the Park		
• Devise Memorandum of Agreement template for research	Yes	Policy exists and application form and process
• Design collecting permits for Park	Yes	Part of process; fees established
Revenue Raising from Visitors		
• Develop plans for entrance fee system	Yes	
• Run pilot exercise to identify problems	Yes	

• Public information campaign on fee system	Yes	
• Train staff on entrance fee system	Yes	
• Review entrance fee system	On-going	
Alternative Revenue Sources		
• Review alternative options	On-going	
• Establish conservation society and operate mailing list	Not an issue	Not Parks role
• Train staff in project proposal preparation	No	Need to do through Park Fund
• Determine local opportunities for sponsorship	No	Fund is potential framework
Private Sector Contribution		
• Market research to determine interest from local business and small operations	No	Specialized task that requires enabling framework
• Prepare regulations concerning concessions in the Park	Yes	
Financial Structure and Management System		
• Government to discuss and approve revenue-raising policy for Park	Partial	User fees, filming, marriages, but no overall policy
• Refine revenue raising and costs of Park development	No	
• Study of alternative financial structures	No	
• Financial manager	No	
Park Maintenance		
• Maintain Park boundaries	Partial	
• Maintain Nature Centre	Yes	Joint arrangement between Concessionaire and Min. of Tourism; will be transferred to NPS
• Maintain Park equipment	On-going	
• Maintain access road to Nature Centre	Partial	Problem from intersection to Nature Centre
Public Safety		
• Maintain facilities to safety standards	Partial	Except for Diablotin Trail
• Equip Nature Centre with safety equipment and erect signs regarding safety information	Partial	
• Formalize arrangements with safety services	Yes	Can call on police and ambulance services; no Park staff trained in search and rescue.
• Train Park staff in first aid and safety protocols	On-going	
• Design and implement accident liability waiver	Yes	On tickets
Sites Management		
• Control visitor numbers	No	

• Monitor visitor numbers and activities	Partially	
Staffing and Administrative Structure		
• Park Warden	Partial	AT entrance, verify visitor site pass; visitor liaison, monitor; spot checks at MDNP
• Park Guards	Partial	Forest Guards help out as possible
• Park guides	Not an issue	None on staff; but licensed ones are permitted as tour guides
• Security guards	Yes	Concessionaire
• Caretaker	Not an issue	Bring in teams from the Gardens when needed for trail work
• Administrative staff	Partially	Staff of NP Unit
• Draw up terms of reference and work programs for staff	Partially	Note site specific, but for all parks
• Create and boundary maintenance team	No	Done ad hoc by forestry staff; want to give contracts to private sector where possible
• Enlist Technical Coordinator and support for implementation of plan	No	
• Train all park staff in relevant fields	Partial	General staff training
Tour Guide Operations in the Park		
• Prepare operating agreement with local tour companies	No	Discussing charging tour operators and guides for use of Parks
• Train and certify local tour guides	Yes	Done at national level by Min. of Tourism
Park Facilities and Equipment		
• Equipment for boundary demarcation	No	
• Trail materials	No	
• Equipment for Nature Centre	Not an issue	No equipment there
• Materials for education programs	Partially	Brochure and interpretive panels
• Equipment for research and monitoring programs	Yes	For parrot research
• Computer and communications equipment for Roseau Office	Yes	Used to have radio, but now use cell phones; cost is borne by individual officers.
Park Promotion		
• Prepare visitor and research brochure	No	
• Prepare regular media articles	Partial	
• Prepare promotional video	No	
• Produce Park logo	No	

Institutional Framework for Park Management and Development		
• Convene open meeting in Portsmouth for local communities	No	
• Create local Advisory Committee	No	
• Create new Management Committee	No	
• Convene briefings on Park development for tour agents	No	
Amendments to the National Parks Act		
• Prepare Park regulations	Yes	User fees, NP regulations; still more to be done
• Prepare amendments to National Parks Act	On-going	Amendments proposed; in process of review and approval; establishment of NPS could be stimulus
• Amend National Parks Act	No	

ANNEX C – ANNUAL COST ESTIMATES

Current Costs, 2010

(In EC Dollars)

ITEM	COST/YEAR	QUANTITY	ANNUAL COST	SUBTOTAL	COMMENTS
RECURRENT COSTS					
Staff:					
Superintendent	50,061	0.2	10,012		
Technical Officer	42,972	0.3	12, 891		
Ranger	33757	1.0	33, 757		Forester I
Guard	25, 252	1.0	25,252		Forester II
Warden	18, 824	0.1	1882.4		
Finance Officer	36,000	0.1	3,600.0		
Secretary	19,824	0.1	1,982.4		
Driver	14,907	0.2	2,981.4		
				92,358.2	
Training					
Sr. Staff	2,000	0.7	1,400		
Jr. Staff	1,500	2.4	3,600		
				5000	
Fuel	15,000	0.2	3,000	3,000	
Maintenance					
Vehicles	4,700	1.0	4,700		
Equipment	3,000	0.2	600		
Boundaries	2,000	1.0	2,000		
Trails	5,000	1.0	5,000		
				12,300	
Insurance	3,550	0.5	1,775	1,775	
TOTAL				114,433.2	

Cost Estimates, 2011
(In EC Dollars)

ITEM	COST/YEAR (‘08 prices)	QUANTITY	ANNUAL COST	SUB- TOTAL	COMMENTS
RECURRENT COSTS					
Staff:					
Superintendent	50,061	0.2	10,012		
Technical Officer	42,972	0.3	12, 891		
Ranger (Forester I)	33757	1.0	33, 757		Forester I
Guard (Forester II)	25, 252	1.0	25,252		Forester II
Warden	18, 824	0.1	1882.4		
Accounts Clerk	36,000	0.1	3,600.0		
Secretary	19,824	0.1	1,982.4		
Driver	14,907	0.2	2,981.4		
				92,358.2	
Training					
Sr. Staff	2,000	0.7	1,400		
Jr. Staff	1,500	2.4	3,600		
				5000	
Fuel	15,000	0.2	3,000	3,000	
Maintenance					
Vehicles	4,700	1.0	4,700		
Equipment	3,000	0.2	600		
Boundaries	2,000	1.0	2,000		
Trails	5,000	1.0	5,000		
				12,300	
Insurance	3,550	0.5	1,775	1,775	
CAPITAL					

COSTS					
Studies	-				
Water samples	1,000		1,000		Picard River
Evaluation of mgt. Effectiveness	20,000		20,000		External consultant
				21,000	
Publication					
Colour brochure on MDNP	2.00 ea.	2,000	4,000	4,000	Printing
Total				139,432	
3% increase in costs over 2010				3,432.9	
GRAND TOTAL				142,864.90	

Cost Estimates, 2012

(In EC Dollars)

ITEM	COST/YEAR ('08 prices)	QUANTITY	ANNUAL COST	SUB- TOTAL	COMMENTS
RECURRENT COSTS					
Staff:					
Superintendent	50,061	0.2	10,012		
Technical Officer	42,972	0.3	12,891		
Ranger (Forester I)	33,757	1.0	33,757		Forester I
Guard (Forester II)	25,252	1.0	25,252		Forester II
Warden	18,824	0.1	1,882.4		
Financial Officer	36,000	0.1	3,600.0		
Secretary	19,824	0.1	1,982.4		
Driver	14,907	0.2	2,981.4		
				92,358.2	
Training					
Sr. Staff	2,000	0.7	1,400		
Jr. Staff	1,500	2.4	3,600		
				5000	
Fuel	15,000	0.2	30,000	30,000	
Maintenance					
Vehicles	4,700	1.0	4,700		
Equipment	3,000	0.2	600		
Boundaries	2,000	1.0	2,000		
Trails	5,000	1.0	5,000		
				12,300	
Insurance	3,550	0.5	1,775	1,775	
CAPITAL COSTS					
Studies	-				
Water samples	1,000		1,000		Picard River

Evaluation of mgt. effectiveness	20,000		20,000		External consultant
Picard trails feasibility study	Staff from Forestry Division	-	-	-	Includes environmental impact assessment
Total				141,433.2	
6% increase in costs over 2008				6865.9	
GRAND TOTAL				148,309.1	

Cost Estimates, 2013

(In EC Dollars)

ITEM	COST/YEAR ('08 prices)	QUANTITY	ANNUAL COST	SUB- TOTAL	COMMENTS
RECURRENT COSTS					
Staff:					
Park Manager	50,061	0.5	25,030.5		
Technical Officer	42,972	1.0	42,972		
Ranger (Forester I)	33,757	1.0	33,757		Forester I
Guard (Forester II)	25,252	1.0	25,252.0		Forester II
Warden	18,824	1.0	18,824.0		
Finance Officer	36,000	.1	3600.0		
Secretary	19,824	1.0	19,824		
Driver	14,907	1.0	14,907	184,166.5	
Training					
Sr. Staff	2,000	1.0	2000		
Jr. Staff	1,500	2.5	3750		
				5750	
Fuel	15,000	1.0	15,000	15,000	
Maintenance					
Vehicles	4,700	1.0	4700		
Equipment	3,000	3.0	9,000		
Boundaries	2,000	2.0	4,000		
Trails	5000	2.0	10,000		
				27,700	
Insurance	3550	1.0	3550	3550	
				236,166.5	
CAPITAL COSTS					
Studies	-				
Water samples	1,000		1,000	1,000	Picard River
Total				237,166.5	

9% increase in costs over 2010				10,298.9	
GRAND TOTAL				246,465.4	

Cost Estimates, 2014

(In EC Dollars)

ITEM	COST/YEAR ('08 prices)	QUANTITY	ANNUAL COST	SUB- TOTAL	COMMENTS
RECURRENT COSTS					
Staff:					
Park Manager	50,061	0.5	25,030		
Technical Officer	42,972	2.0	85,954		
Ranger (Forester I)	33,757	1.0	33,757		Forester I
Guard (Forester II)	25, 252	2.0	50,504		Forester II
Warden	18, 824	1.0	18,824		
Finance Officer	36,000	.2	7200		
Secretary	19,824	1.0	19,824		
Driver	14,907	1.0	14,907		
				256,000	
Training					
Sr. Staff	2,000	1.0	2,000		
Jr. Staff	1,500	2.7	4,050		
Guide Course	8,000		8,000	14,050	Specialized course on MDNP
Fuel	15,000	1.0	15,000	15,000	
Maintenance					
Vehicles	4,700	1.0	4,700		
Equipment	3,000	5.0	15,000		
Boundaries	2,000	2.0	4,000		
Trails	5,000	2.0	10,000		
				33,700	

Insurance	3,550	1.0	3,550	3,550	
Total				322,300	
CAPITAL COSTS					
Infrastructure	-				
Observation Platform	25,000	1.0	25,000		Picard Valley
Type A trail	53,000/mi.	2.0	106,000		
Type B trail	10,000/mi.	2.0	20,000		Upgrading
Type C trail	13,000/mi.	1.0	13,000		Relocate
				164,000	
Studies	-				
Water samples	1,000		1,000		Picard River
Evaluation of mgt. Effectiveness	20,000		20,000		External consultant
				21,000	
Publications					
B+W trail brochures	200	5.0	1,000	1,000	
Videos					
General video on MDNP	25,000	1.0	25,000	25,000	15 minutes
Total				533,300	
12% increase in cost over 2008				13,731	
GRAND TOTAL				547,031	

Cost Estimates, 2015
(In EC Dollars)

ITEM	COST/YEAR ('08 prices)	QUANTITY	ANNUAL COST	SUB- TOTAL	COMMENTS
RECURRENT COSTS					
Staff:					
Park Manager	50,061	0.5	25,030		
Technical Officers	42,972	2.0	85,954		
Ranger	33,757	1.0	33,757		Forester I
Guards	25,252	3.0	75,756		Forester II
Wardens	18,824	2.0	37,648		
Finance Officer	36,000	.2	7,200		
Secretary	19,824	1.0	19,824		
Driver	14,907	1.0	14,907		
				300,078	
Training					
Sr. Staff	2,800	1.0	2,800		
Jr. Staff	2,000	3.0	6,000		
				8,800	
Fuel	15,600	1.0	15,600	15,600	
Maintenance					
Vehicles	4,700	1.0	4,700		
Equipment	3,000	6.0	18,000		
Boundaries	2,000	2.0	4,000		
Trails	5,000	3.0	15,000		
				41,700	
Insurance	4,000	1.0	4,000	4,000	
Total				370,107	
CAPITAL COSTS					
Infrastructure					
Type A Trail	53,000/mi.	2 mi.	106,000		

Type C Trail	13,000/mi.	5 mi.	65,000		
Gravel surfacing & signing of parking area	50,000		50,000		Overflow parking for Visitor Centre
				221,000	
Studies	-				
Water samples	500	2.0	1,000		Picard River
Econ. Study	20,000		20,000		Contribution of MDNP to national economy
Evaluation of mgt. Effectiveness	20,000		20,000		External consultant
				41,000	
Videos	-				
15 min. Videos	25,000	2.0	50,000	50,000	Update on MDNP
Total				682,187	
15% increase in costs over 2008				17,164.9	
GRAND TOTAL				699,342.9	

ANNEX D - SUPPLEMENTARY BUDGET FOR MANAGING CLIMATE CHANGE

Managing the Impacts of Climate Change						
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Subtotal
Develop public awareness and education programmes targeted at policy makers, the general population, communities and stakeholders on the issues of climate change (to be incorporated under <i>COMMUNICATION, EDUCATION AND PUBLIC AWARENESS</i>)						To be budgeted under public awareness
Upgrade the current hydrological monitoring programme and instrumentation of the Forestry Division	*****					Budgeted
Install a weather stations in the Park to monitor and assess hydro--meteorological data	27,473.00					27,473.00
Install one rain gauge above the forest canopy of the Park to monitor and study the rainfall interception process.						
Maintenance of all equipment		1000	2000	3000	3000	9,000

<p>Establish seed/gene bank.</p> <p>Establish physical infrastructure for housing of seed bank</p> <p>Collect and store seeds and plant materials of all endemic and indicator plant species</p>						Budgeted for Under MTNPWH
<p>Establish a living collection of plants – ex-situ field gene banks.</p>						Technical input
<p>Establish a nursery at MDNP</p>	10, 000					10, 000
<p>Reforest and restore degraded areas of the Park and buffer zones</p>						Forest technical input
<p>Develop and implement silvicultural techniques to promote forest productivity maintain genetic diversity and promote ecosystem health</p>						
<p>Establish “Green Globe” or other relevant programme for all attractions in the Park</p>			30, 000	10,000	10,000	50,000

Establish forecasting capability, early warning systems In collaboration with Disaster Management Unit		10, 000				10,000
Provide incentives to land owners with land adjacent to the Parks to reduce impact on the Park						
Establish Social Forestry Programmes		10,000	5,000	5000		20, 000
TOTALS	33, 473	21,000	37,000	18,000	13,000	122,473,000

Year	Budget	Budget/Climate change	Revised Budget
2010	114,432		
2011	114,433.2	33,473	147,905
2012	142,864.9	21,000	163,864
2013	148,309	37,000	185,309
2014	246,465.4	18,000	264,465
2015	547,031	13,000	560,031

ANNEX E – CONSERVATION TRUST FUND CONCEPT

INTRODUCTION

The revision of this plan is supported by the GEF/World Bank under the Special Programme for Adaptation to Climate Change (SPACC) project. The previous plan 2009- 2014 was prepared in 2008 and was funded by the USAID Caribbean Open Trade Support (COTS) Programme. The plan has not been ratified by the Government of Dominica and as such no component of the plan has been implemented. In the meantime, the vision of the Park has evolved, and it is now seen as a resource that must actively contribute to the sustainable development of northern Dominica.

Additionally, the institutional arrangements for management of the Parks are shifting. A National Park Service is being established that will have responsibility for managing the 3 national parks of Dominica (Morne Trois Pitons National Park and World Heritage Site, Morne Diablotin National Park, and Cabrits National Park) as well as the Ecotourism Sites scattered around the island. In essence, the Park Service will be responsible for the major natural assets of Dominica that are managed for biodiversity and watershed conservation, and tourism.

One important aspect of the revised management plan for the MDNP is financial sustainability, because implementation of the plan depends to a great degree on the availability of funding. Since MDNP is a part of a wider system of protected areas, questions of finance must be considered in the wider context. How can the protected areas of Dominica be funded so that they contribute fully to the conservation of the island's biodiversity and water resources, while at the same time supporting the tourism industry? The current government budget and concessionaire and visitor fee systems are

inadequate. So what can be done to develop adequate funding, especially now that a National Park Service is to be established?

The answer is that much can be done if the right mechanisms are in place. In fact, the problem is not a lack of funding sources, but rather the lack of appropriate mechanisms to adequately tap the available sources.

CONSERVATION TRUST FUNDS

One financing mechanism that has received attention during the past 15 years is the Conservation Trust Fund (CTF). CTFs are legally independent institutions that raise, administer, and disburse funding. They do not implement projects but rather work through other existing implementing organizations. They usually make grants to government protected area agencies, NGOs, and/or local community groups for activities that protect biodiversity and promote community-based sustainable development near protected areas. The last 15 years of experience with CTFs in more than 50 countries demonstrates that they not only complement the funding provided by national governments and international donor agencies, but can also serve to mobilize substantial additional funding from national governments, international donor agencies, and the private sector.

Although CTFs do not implement conservation activities or projects themselves, they can influence the priorities and the operating procedures of government agencies and NGOs by providing them with otherwise hard-to-obtain additional financial resources. In many cases (Mexico, Peru, Ecuador, South Africa and Bhutan), CTFs serve not only as funding mechanisms, but also as catalysts for institutional reform of government protected area agencies. In other countries such as Brazil, CTFs have served as catalysts for the creation of new partnerships with the private sector. In still other cases

(as in the 23 CTFs whose financing comes from the proceeds of bilateral debt reductions by the US Government), CTFs have served as mechanisms for strengthening NGOs.

OPERATION OF A CONSERVATION TRUST FUND

Governance

CTFs are set up as independent institutions, usually as a foundation or not-for-profit corporation, depending on the particular legislation of a country. For example, in Dominica, a similar type of organization, the Social Investment Fund, was set up under the Companies Act. One important lesson learned from experience is that the most critical factor for good governance of a CTF is to have a large non-government majority on its Board of Directors, and to limit the number of government representatives to 20% or less. CTFs whose governing boards have a non-government majority, and are not chaired by a government Minister or housed inside of a government Ministry, are more transparent and accountable in how they spend funds. In some cases, donor representatives are included on the Board, but this has turned out to be limiting in some cases where the presence of a specific donor representative gives the perception that the CTF is the client of only one donor institution, thereby driving away other potential donors.

In some CTFs, a Founder's Committee or similar body is set up to play an oversight function with respect to the Board. The Founder's Committee is made up of the representatives of the institutions that established the CTF in the first place. This Committee has the power of veto over any decision made by the Board of Directors which contravenes the original intent of the legal instruments that established the Fund.

In some cases, CTFs play a lead role in strategic planning and priority setting for a country's national park system, either at the direct request of the government, or by default (i.e., because neither the government nor anyone else is doing this). Recent studies show that CTFs have served as the mechanism for financing up to 75% (in Peru) or even 90% (in Bolivia) of the annual operating costs of a country's protected area system, which can give them a significant indirect (or direct) influence on how those protected area systems are managed. This is true even in cases like Ecuador, where a CTF provides only 20% of such operating costs, or Mexico where a CTF provides only 14% of the total operating costs for 22 protected areas.

Staffing

CTFs seek to maintain low staff levels so that they can maximize the amount available for grant-making. The larger the CTF, the more efficient operations can be as a percentage of total revenues. At start-up, CTFs usually have to spend up to 40% of their funding on administrative overheads, but as they grow in experience and resources, even small funds can usually get their administrative overheads down to about 25% of total revenues. Starting funds usually need only a Director and a Secretary. As the CTF develops, an Administrative Officer and one or more Project Officers can be brought on board to administer funds, organize and implement the requests for proposals, advise the Board of Directors on project selection, supervise and monitor project implementation, and report to donors. These functions can also be outsourced if preferred.

Sources of Funding

A 2002 study of CTFs in Latin America and the Caribbean found the following distribution of funding sources:

Debt for nature swaps	48%
Global Environment Facility (GEF)	27%
Bilateral Grants	9%
Governments	7%
Loans through bi-lateral or multi-lateral institutions	5%
Earned income (fines, entrance fees, concessions, etc.)	2%
Private foundations	1%
Donations from multilateral organizations	<1%

These figures show clearly the importance of international funding which adds up to 91% of all current sources. Since this study was carried out, some CTFs have made breakthroughs in tapping into private sources of funding, mostly through the corporate sector.

Grant Making

The basic function of a CTF is to make grants that further biodiversity conservation and other relevant objectives. The guidelines for grant-making are normally outlined in a "Grant-Making Manual", or in a broader "Operations Manual" that has a section on grant-making. Grant priorities can either follow established government policy, such as a biodiversity strategy or protected area action program, or can be developed by the CTF's Board of Directors. The entities eligible for grants are usually defined by the Board of Directors as well and can include government agencies, NGOs, local

community groups and/or the private sector. In many instances, the guidelines for grant-making at any particular time are defined in a "call for proposals" that clearly sets out priorities (thematic and/or geographical), deadlines for application, eligibility criteria, monitoring and evaluation requirements, amounts to be granted, and other operational details.

Monitoring and Evaluation

Most CTFs monitor and evaluate "project completion" indicators. There are no reported cases of CTF funds being stolen, misappropriated, or diverted for unauthorized uses. The general record of CTFs seems to be better than the general record of accountability of individual projects financed by international donor agencies or national governments.

However, many CTFs have not collected detailed baseline data that would permit monitoring of biodiversity impacts of their grants, because collecting such data is often expensive, time-consuming, highly skilled work, for which the best methodologies are sometimes still a subject of debate even among scientific experts. Instead, many CTFs collect and analyze "proxy indicators" for biodiversity conservation, such as the number of (1) additional park guards that have been hired, (2) vehicles and radios purchased to equip park guards, (3) training courses given to park managers, (4) public environmental awareness campaigns that have conducted, and/or (5) environmentally sustainable livelihood projects for local communities in park buffer zones.

Fund Administration

Most CTFs administer their funds through different account types. In general these accounts include trust funds (where the capital is maintained and only the interest is available for grant-making), sinking funds (where an initial seed capital is

spent over time, such as with project funding), or revolving funds (where regular income, such as concession fees, entrance fees, or fines build up in an account until spent). Each of these account types may also be divided into sub-accounts so that the funding from different sources is tracked independently. This is a must for most donors.

Investment Performance

The financial performance of CTFs ---i.e., the annual rates of return on the investment of their endowments, sinking funds, and revolving funds---has generally been similar to that of many developed country non-profit institutions such as universities and foundations, averaging between 6% and 9%, depending on which years are used as a reference, and on how much of the CTFs' portfolios are invested in stocks as opposed to bonds.

THE WAY FORWARD

There appear to be opportunities for furthering the development of a CTF in Dominica, both related to the development of national parks. The first is the on-going GEF- World Bank Project. There may be an opportunity for Dominica to request support for the establishment of a CTF as a pilot effort in the region. The other immediate opportunity is the Caribbean Development Bank Project related to the development of a National Park Service in Dominica. It would be entirely fitting to link the establishment of this new entity with the simultaneous establishment of a CTF that might be entitled a "National Parks Fund". There may be other opportunities as well through the U.S. AID financed Caribbean Open Trade Support Program, the European Union, the FFEM (French Global Environment Facility), or other related program initiatives.