



**ORGANISATION OF EASTERN CARIBBEAN STATES
ENVIRONMENT AND SUSTAINABLE DEVELOPMENT UNIT**

**PROTECTED AREAS SYSTEMS PLAN FOR
ST. KITTS AND NEVIS
FINAL SYSTEMS PLAN REPORT**



ECO REPORT NO : 43/2009

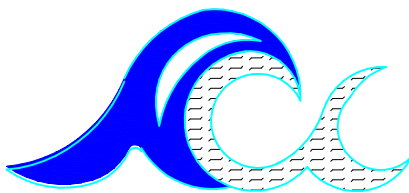
APRIL 07, 2010

PREPARED BY

Ecoengineering Caribbean Limited

**62 EASTERN MAIN ROAD, ST. AUGUSTINE,
TRINIDAD, WEST INDIES**

**PHONE: (868) 645-4420 FAX: (868) 662-7292
e-mail : ecoeng@mail.tt**



**ORGANISATION OF EASTERN CARIBBEAN STATES
ENVIRONMENT AND SUSTAINABLE DEVELOPMENT UNIT**

**PROTECTED AREAS SYSTEMS PLAN FOR
ST. KITTS AND NEVIS**

SYSTEMS PLAN REPORT

ECO REPORT No. 43/2009

April 07, 2010

PREPARED BY

ECOENGINEERING CARIBBEAN LIMITED

62 EASTERN MAIN ROAD
ST. AUGUSTINE
TRINIDAD, WEST INDIES

TELEPHONE: (868) 645-4420

FAX: (868) 662-7292

e-mail: ecocaribe@mail.tt

EXECUTIVE SUMMARY

INTRODUCTION

The Governments of the OECS Participating Member States (PMS) have made significant commitments to protecting their countries' resources as signatories to international conventions and through policy statements, legal and institutional instruments, recent environmental programs, and financial support of conservation activities through budget allocations. They have also recognised the importance of establishing protected areas as the primary method of preserving biodiversity and conserving valuable natural resources assets.

In terms of planning for PAs, only some of the PMSs have Systems Plans in place, most of which are outdated and do not encompass existing and proposed terrestrial and marine areas in a comprehensive nor cohesive manner.

The OECS Secretariat through its Environment and Sustainable Development Unit (ESDU) is implementing the OECS Protected Areas and Associated Sustainable Livelihoods (OPAAL) Project. The projected outputs for Component 1 of the OPAAL Project address Policy, Legal and Institutional Arrangements Reform within PMSs and include eight goals. This National Protected Areas Systems Plan for St. Kitts and Nevis is being implemented under Goal v: "updated or new national PA System Plans".

Objectives of the PA Plan

The following are the objectives of this study and report:

- To present a practical, time-frame specific phased approach to implementation of the PA Plan;
- To provide the full range of required resources and capacity building for establishing and managing the system;
- To recommend means of financing the operationalisation of the plan;
- To indicate the level of priority for each of the proposed system components;
- To provide a means to monitor and evaluate the system and its effectiveness over the timeframe of the plan; and
- To provide the proposed boundaries of the sites being proposed.

Limitations

There were a number of limitations encountered while drafting this Systems Plan, including the following:

- Unavailability of Site Specific Data on Biological Diversity;
- Limitation of Site Visits;
- Unclear Rationale for consideration of Specific Sites; and
- Timing of Parallel OECS Studies.

PLAN PREPARATION

The process for writing this Systems Plan was as follows:

- Workplan;
- Review of Data;
- Site Visits;
- Workshops;
- Data Analysis; and
- Public Participation.

At the beginning of the project a Workplan and Inception Report were submitted to the OECS-ESDU which detailed the information requirements for the project, highlighted the output documents at the various stages and provided a schedule for completing the project.

As would be expected for a document of this type, there was a heavy reliance on existing data either from parallel studies under the OPAAL project or from other sources. This data was accessed for use in this study. Additionally, a series of site visits was conducted to provide critical data on the variety of habitat types that were being considered to be included in the Systems Plan as well as to provide updated information on the present status of some of these sites.

In accordance with the scope of works provided by the OECS-ESDU for this project, two workshops were also facilitated in-county to gather information on the biological diversity of ecological sites as well as to determine the management structure and requirements for all sites (or classes of sites) being considered. These two workshops - The Ecological Gap Assessment (EGA) and Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM) - provided invaluable information for this Systems Plan.

Throughout this project and in preparing this plan there was the obvious need to consult with the public. This occurred at these various stages:

- Document Review,
- Site Assessment and Consultation with Stakeholders,
- Presentation of Draft Systems Plan.

FRAMEWORK FOR PA SYSTEM

Before the actual analysis of the sites (or classes of sites) to be considered for including in the Systems Plan there must be some discussion of the context in which this Systems Plan will exist on a number of levels: local, national, regional and international. The overarching legislation that would govern the management and administration of protected areas is the draft National Conservation and Environmental Management Act (NCEMA, 2009) which is intended to supersede the existing National Conservation and Environmental Protection Act (NCEPA, 1987). At a regional and international level, the designation of protected areas will partially fulfil the requirements of the country under the Convention on Biological Diversity. Other conventions such as the MARPOL convention and its enforcement will also have considerable impact on the marine protected areas that will form part of this National Systems Plan. There is also need for this Systems Plan to link with the existing national planning initiatives of the country namely the St. Christopher National Physical Development Plan and the Nevis Physical Development Plan.

ECOLOGICAL DIVERSITY (ST. KITTS AND NEVIS)

The small size and geographic location of St. Kitts and Nevis, as well as the climatic conditions experienced influences the terrestrial ecology and contribute to the relatively high endemism and vulnerability of its biota. The country borders the American continent which provides a stopover for migratory avian species during the winter months. In addition, some of the country's beaches are known to be nesting sites for various species of marine turtles.

The following is a brief summary of the biological diversity of the islands of St. Kitts and Nevis:

Terrestrial Resources

- St. Kitts and Nevis has 145 Pteridophyte species (fern and fern-allies), 22 of which occur on Nevis but not in St. Kitts and 41 of which occur in St. Kitts, but not on Nevis. There are also 45 plant species known to be endemic to the country or to the Lesser Antilles.

- There is no country-specific data on invertebrate diversity. However, some work has been done on the island of Nevis for invertebrate species that are of some importance, prominence or pose a hazard. These include Poisonous Centipede, Caribbean Mud Fiddler Crabs, Wolf Spiders, Great Land Crab, Donkey Spiders, Ghost Crab, Scorpions, Land Hermit Crab, Crayfish, Sally Lightfoot Crab, Lesser Blue Crab and Honeybees.
- Bats are the only terrestrial mammals native to St. Kitts and Nevis, and they constitute the largest mammalian group (a total of six species in total for the country). Other mammals (all introduced) in the country include the Agouti (no longer reported), White-tailed Deer, Indian Mongoose, Rats, Mouse and the African Green (or Vervet) Monkey (abundant).
- There are 9 species of freshwater fish reported for St. Kitts and 5 reported for Nevis.
- Only two species of amphibians are found on the islands of St. Kitts and Nevis, the Piping Tree Frog and the Marine Toad. The Crapaud or Mountain Chicken, a native to St. Kitts and Nevis became extirpated through habitat modification and overexploitation for food.
- The islands of St. Kitts and Nevis are home to ten (possibly eleven) recorded species or sub-species of terrestrial reptiles. They include Tortoise, Common Woodslave Gecko, Giant Woodslave Gecko, Lesser Antillean Iguana, Green Iguana, Green Lizard, Brown Lizard, Ground Lizard, Blind Snake, a subspecies of the Blind Snake and Racer Snake recorded for both islands.
- Of the 116 species of birds found in St. Kitts and Nevis, 113 are indigenous species and 3 are non-native species. Of the 72 native, non resident species, 22 are seabirds, waterfowl or other aquatic species, 26 are shorebirds, 7 are non-passerine landbirds and 17 are passerine landbirds.

Coastal Resources

- The island of St. Kitts has a total coastline of 78.1 km, consisting of 34.7 km of cliff rocks, 10.8 km of cobble, 6.3 km of boulders and rocks, 13.1 km of black volcanic sand and 13.2 km of golden sand. Nevis also has sandy beaches, rocky shores and massive sea cliffs. The most prominent sandy beach is a 4 km stretch of coastline north from Charlestown to Cades Bay, called Pinneys Beach.

- On the island of St. Kitts, there are a number of saltwater ponds located on the Southeast Peninsula. Nevis has a system of freshwater lagoons located throughout the island, some of which are along the coast and are therefore subject to saltwater intrusion. Two small ponds located northeast of Basseterre are the only freshwater ponds on the island of St. Kitts. These ponds provide habitats for many migratory seabirds and shorebirds in the fall and spring
- Generally, the mangroves are not abundant on the island of St. Kitts. The most extensive mangrove systems occur on the Southeast Peninsula. On the island of Nevis, red and black mangroves no longer occur naturally in any of the mangrove systems. Stands of white mangroves are dominant on the island, accompanied by fewer buttonwood species. These mangrove systems can be found at Bath Bogs / Bath Stream, Parris Pond, Pinneys Pond , Jessups Bogs / Bowrin Pond, Fort Ashby Lagoon, Mariners Pub Lagoon / Lawrence's Pond, Cades Bay, Jones Bay, Oualie Beach, Newcastle, Nisbet's, Long Haul Bay and at Indian Castle / White Bay .

Marine Resources

- In St. Kitts and Nevis, coral reefs and seagrass beds occur primarily along the Southwest coast between Nag's Head and the southern end of Basseterre Bay, the Northwest coast between Sandy Point and Dieppe Bay, the East coast between Conaree and Friar's Bay, the Southeast coast adjacent to the Narrows, the island of Nevis (reasonable balance of coral reefs surrounding the island), and the Northwestern and southern coasts of Nevis.
- The species of coral found in the waters of the islands virtually span the entire spectrum of tropical coral diversity from the finger coral to the Staghorn and Elkhorn corals. Other species such as sponges and soft corals usually accompany these stony hard corals. Seagrass communities are typically co-dominated by Turtle Grass and Manatee Grass.
- Migrant mammals include Humpback Whale, Sperm Whale, Bottled nosed Dolphins, Rough-toothed Dolphins, and Spinner Dolphins.
- There are 462 species of marine fish tabulated for St. Kitts and Nevis of which 16 species are deemed threatened.

- There are three species of sea turtles that are known to nest in St. Kitts and Nevis, the Hawksbill Turtle, Green Turtle, and Leatherback Turtle. All are internationally classified as endangered.
- Eighteen invasive species have been identified for St. Kitts and Nevis on the Global Invasive Species Database.

PRESENT STATUS OF ECOLOGICAL AND CULTURAL HISTORICAL BASE

The following table summarizes the present status of the ecological and cultural resources to be considered for including into the Protected Areas System:

ITEM	COMMENT
BRIMSTONE HILL FORTRESS NATIONAL PARK	
Location and Extent	Brimstone Hill Fortress National Park (BHFNP) is situated on the West Coast of St. Kitts, between Half Way Tree and Sandy Point Town. It occupies an area of approximately 15 ha including a buffer zone of approximately 400 m.
Legal Status	BHFNP is a National Park under both the NCEPA and draft NCEMA Acts of St. Kitts and Nevis and a World Heritage Site listed by UNESCO.
Features	<p>Heritage Outstanding British fortress.</p> <p>Exceptional example of 17th and 18th century British Military architecture.</p> <p>Ecological Nesting site for eight species of birds.</p> <p>Geological Emerged as a result of underlying volcanic activity some 6000 years ago.</p>
Pressures and Threats	<ul style="list-style-type: none"> • Exceeding carrying capacity. • Fires, which originate in the surrounding cane fields and grassland. • Hurricanes have weathered walls in this Century. • Heavy and prolonged rainfall can produce rock and land slides. • Dirt and grime can affect external walls over time. • Earthquake and volcanic eruption are potential dangers in these Caribbean islands.

ITEM	COMMENT
Pressures and Threats (Cont'd)	<ul style="list-style-type: none"> • Inappropriate Development; • Potential for Geothermal Energy Power; and • Livestock Grazing.
Management Structure and Challenges	The Society for the Restoration of Brimstone Hill was managed the fortress until 1987 when the NCEPA Act gave management authority to the Brimstone Hill Fortress National Park Society.
CENTRAL FOREST RESERVE NATIONAL PARK	
Location and Extent	The Central Forest Reserve National Park (CFRNP) is situated in the centre of the island of St. Christopher, and occupies all lands above the 1,000ft contour. The CFRNP occupies approximately 50 km ² of land, or 12,500 acres.
Legal Status	The Central Forest Reserve was designated a National Park by the Government of St. Kitts and Nevis on 23 October 2006, and officially gazetted on 29 March 2007.
Features	<ul style="list-style-type: none"> • Various vegetation types including, Elfin Sierra Palm Cloud Forest, Evergreen Forest Sierra Palm Forest, Sierra Palm Transitional Tall Cloud Forest, and Steep Montane Non-Forest Vegetation. • It represents the primary source of water for human consumption on the island of St. Christopher. • The CFRNP houses a series of nature and scenic trails which support eco-tourism ventures as well as recreational and educational programmes.
Pressures and Threats	<ul style="list-style-type: none"> • Erosion; • Overcrowding; • Extraction of Ornamental and Medicinal Plants; • Illegal Farming; • Hurricanes / Natural Disasters; • Damage to Water Resources; and • Invasive Species.
Management Structure and Challenges	<ul style="list-style-type: none"> • Management responsibility for the CFRNP is vested in the Department of Physical Planning and the Environment (DPPE). • The lack of capacity and practical experience presently impedes the proper management of the CFRNP. • There is also currently a poor relationship between the stakeholders involved in CFRNP and the DPPE. • The lack of a defined (on the ground) boundary for the CFRNP. • High difficulty in monitoring of illegal activities such as illegal growth of marijuana, plant extraction and littering;

ITEM	COMMENT
Management Structure and Challenges (Cont'd)	<ul style="list-style-type: none"> • Difficulty in monitoring or preventing agricultural encroachment, unsanctioned development and trail cutting; • Law enforcement is low; and • Recruitment and retention of managers is difficult.
NEVIS PEAK NATIONAL PARK AND CAMPS RIVER WATERSHED	
Location and Extent	<ul style="list-style-type: none"> • The Nevis Peak National Park includes all land on the island above the 1,000 foot contour, ascending to the top of the 3,232 foot tall Mount Nevis. • This protected area links the Camps River Watershed to the north north-east, via Camps Ghaut and wetlands to the coast.
Legal Status	The NPNP is earmarked under the Draft Nevis Physical Development Plan as a protected area.
Features	<ul style="list-style-type: none"> • Volcanic formations, • Vegetative zones such as Elfin Woodland, Rainforest, Montane Thicket, Palm Brake, and Riparian Forests. • The island's major watershed and springs • A freshwater lagoon, and • The largest living reef system around Nevis.
Pressures and Threats	<ul style="list-style-type: none"> • Charcoal Production; • Built Development; • Overharvesting of Plants; • Clearing for Farming; • Livestock Grazing; • Water Contamination from Farming; • Water Contamination from Wild Monkeys; • Water Contamination from Domestic Sources; and • Dumping of Industrial and Construction Wastes. • The lack of proper (on the ground) boundary demarcation.
Management Structure and Challenges	<p>The management plan envisages that:</p> <ul style="list-style-type: none"> • The Ministry of the Environment (Physical Planning Department) has the overall responsibility for the management of the Nevis Peak National Park; • The Nevis National Trust has been created as a statutory corporation under the draft Nevis National Trust Ordinance, 2007 to administer its affairs; and • The Nevis Peak National Park Advisory Committee is responsible for advising the National Trust Council on matters specifically pertaining to the proposed park.

ITEM	COMMENT
Management Structure and Challenges (Cont'd)	Management Challenges include: <ul style="list-style-type: none"> • Difficulty in monitoring or preventing agricultural encroachment, • Unsanctioned development; • Trail cutting; • Low enforcement is low; and • Difficulty in securing the sites.
BASSETERRE VALLEY AQUIFER NATIONAL PARK	
Location and Extent	The Basseterre Valley Aquifer National Park (BVANP) is situated generally to the east of the town of Basseterre, occupying an area of approximately 197 ha.
Legal Status	The St. Kitts National Physical Development Plan, 2006 lists the BVANP as a proposed Protected Area.
Features	A significant portion of the public supply of potable water in St. Kitts comes from this aquifer.
Pressures and Threats	<ul style="list-style-type: none"> • Climate variability and the recurrence of drought. • Effects of previous fertilizer application to cane fields, • Sewage treatment and disposal • Storm water run off along major roads which cross the aquifer. • Inappropriate Development; • Stray Animals; • Illegal Dumping; • Agrochemical Contamination; • Industrial Waste; • Contaminated Airport Runoff; • Illegal Topsoil Removal; • Fires; and • Toilet Waste / Sewage.
Management Structure and Challenges	The Basseterre Valley Aquifer Protected Area project falls under the jurisdiction of the Basseterre Valley Advisory Committee. Management Challenges include: <ul style="list-style-type: none"> • Managing the resources (water) given the high demand for it; and • Difficulty in managing illegal activities such as arson and illegal dumping.
MARINE AREAS	
Location and Extent	<ul style="list-style-type: none"> • The South East Peninsula Marine Management wraps around the South-east Peninsula of St. Kitts and extends to the north coast of Nevis.

ITEM	COMMENT
Location and Extent (Cont'd)	Sandy Shoal Coral Reef can be found on the north-west corner and leeward side of the island at the town of Sandy Point.
Legal Status	The Southeast Peninsula Marine Management Area and Sandy Point Marine Management Area are designated as protected areas in the St. Kitts National Physical Development Plan, 2006.
Features	<ul style="list-style-type: none"> • Sea grass and calcareous algae. • Salt ponds which possess a mangrove fringe. • Three species of endangered sea turtles, the green, hawksbill and leatherback turtle, nest at the South-east Peninsula beaches. • Local fisheries such as finfish, conch and lobster. • Two bird nesting sites at Booby Island and Nag's Head.
Pressures and Threats	<ul style="list-style-type: none"> • Uncontrolled diving and indiscriminate anchoring of boats, • Overfishing; • Climate Change; • Closure of Sugar Industry; • Tourism Development; • Theft of Cultural Resources; • Sand Mining; • Anchor Damage to Reefs and Seagrass Beds; • Geothermal Pipeline / Cable Construction; • Invasive Species; and • Solid Waste including International Garbage.
Management Structure and Challenges	<p>The SEPMMMA will be under the responsibility of the Ministry of Sustainable Development. Proposal for a Management Committee comprising of Fisheries Management Unit, Dive operators, fishers organizations, Port Authority, Coast Guard, etc.</p> <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring the harvesting of juvenile / undersized species, • Poaching of turtles and their eggs, • Poaching of Bobby eggs and • The extraction of marine artefacts.
TURTLE NESTING BEACHES	
Location and Extent	<ul style="list-style-type: none"> • Sea Haven Turtle Nesting Beach is situated on the north coast of Nevis overlooking The Narrows. • Keys Turtle Nesting Beach is situated on the windward coast, between Barker's Point and Cayon.

ITEM	COMMENT
Legal Status	<ul style="list-style-type: none"> • Sea Haven Beach is identified as a Coastal Conservation Area under the Nevis Physical Development Plan, 2008. • Keys Turtle Nesting Beach is a proposed protected area.
Features	<p>Both beaches have one or a combination of the features below making them suitable for nesting:</p> <ul style="list-style-type: none"> • Flatter slopes to make it easier for the turtles to cross the beach. • Firm sand to allow for the flippers to gain “purchase” to drag the turtle up the beach • Clear beach area without debris. • Back beach vegetation suitable for nesting Hawksbill turtles • Stable sand conditions for successful hatching.
Pressures and Threats	<ul style="list-style-type: none"> • Inappropriate Development; • Human Activity (Driving, Horseback Riding, Littering and Sand Mining); • Poaching; • Light Pollution; and • Predation.
Management Structure and Challenges	<ul style="list-style-type: none"> • Sea Haven Beach is currently monitored by the Nevis Turtle Group. • Keys Beach is monitored by the St. Kitts Sea Turtle Monitoring Network. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in controlling the poaching of eggs and animals, • Monitoring and controlling sand mining (legal and illegal), • Unsanctioned development (creating light sources), and • The removal of vegetation.
SALT PONDS	
Location and Extent	<ul style="list-style-type: none"> • On the island of St. Kitts there are a number of saltwater ponds, many of which are concentrated on the Southeast Peninsula. • Pond size varies greatly. For example, Great Salt Pond covers an area of 200 ha while Friars Bay Salt Pond is approximately 20 acres of which approximately 10 acres is actual pond.
Legal Status	Salt Ponds are considered owned by the person that owns the surrounding lands.

ITEM	COMMENT
Features	<ul style="list-style-type: none"> • Salt ponds are usually located close to the sea, just landward of the beach berm (dunes). • They function as part of the surface drainage system, with some surface water entering the ponds from the landward side before being discharged to the sea. • Variable hydrology with the dry and wet seasons. • As the dry season progresses the water in the ponds can become hypersaline, supporting a specialized fauna and microfauna. • Many support a mangrove fringe and diverse and abundant bird life.
Pressures and Threats	<ul style="list-style-type: none"> • Tourism development, • cutting of the dune barrier, • dumping of rubble and garbage, • removal of the vegetative screen, and • eutrophication as a result of continuous run-off from the golf course.
Management Structure and Challenges	<ul style="list-style-type: none"> • The management structure related to the Salt Ponds is unclear at this time. • The DPPE appears to exercise some control on the modification of these ponds under the planning approvals process. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Monitoring illegal dumping at the ponds. • Removal of mangrove vegetation.
FRESHWATER LAGOONS	
Location and Extent	Nevis has a system of freshwater lagoons (ponds and wetlands) located throughout the island, some of which are along the coast.
Legal Status	<ul style="list-style-type: none"> • Camps Springs and the Associated Wetland are part of the overall Nevis Peak National Park / Camps Watershed Protected Area/ • Bath Bogs and Gallows Bay Bog are part of the Bath Bogs Protected Area. • Pinney's Pond, Parris Pond and Nelson's Spring are all part of a proposed protected area, Pinney's Beach Conservation Area in the draft Nevis Physical Development Plan.

ITEM	COMMENT
Legal Status (Cont'd)	<ul style="list-style-type: none"> • Jessup's Pond is located within the proposed Pinney's Beach Conservation Area according to the map attached to the Nevis Development Plan although it is not identified as a part of the Conservation Area in the actual plan. • New River Springs (which is part of a larger area being proposed as a protected area) has no legal designation at this time.
Features	<ul style="list-style-type: none"> • Nelson Springs, Camps Springs and New River Springs are known to provide water to their respective Parishes. • There is predominantly coconut plantation in the vicinity of some lagoons. • There are also areas of mangrove around others. • Within some of the smaller, shallower lagoons there are prominent reeds and sedges. • These lagoons provide habitats for many migratory seabirds and shorebirds in the Northern Autumn and Spring seasons.
Pressures and Threats	<ul style="list-style-type: none"> • Disease. • Pollution from nearby restaurants and built up areas. • Non-native species; • Filling-in; • Marinas; • Illegal dumping; • Overfishing; and • Harvesting of Mangroves.
Management Structure and Challenges	<p>The management structure related to the Freshwater Lagoons is unclear at this time. There is some control on built development around freshwater lagoons by The Physical Planning Department of the Nevis Island Administration.</p> <p>Management challenges include:</p> <ul style="list-style-type: none"> • Controlling the ease of access to these freshwater lagoons; • Preventing the overexploitation of these resources; and • Challenges in preventing the development of land in these areas.
THE GHAUTS	
Location and Extent	Ghauts are distributed around both islands. The size of each ghaut depends on the area which it drains.

ITEM	COMMENT
Legal Status	Ghauts on St. Kitts and Nevis are listed as areas of special concern in the NCEPA and NCEMA Acts.
Features	<ul style="list-style-type: none"> • The primary importance of ghauts is effective drainage. • The reduction in the potential for localized flooding. • Ghauts also serve as vegetated corridors which host several species of plants and animals. • Legal and regulated sand mining in Wash, Tabernacle and Mansion Ghauts.
Pressures and Threats	<ul style="list-style-type: none"> • Illegal sand mining. • Unauthorized development. • Agricultural encroachment. • Squatting. • Indiscriminate dumping of garbage and other types of solid waste.
Management Structure and Challenges	<p>The management of sand mining in the Ghauts in St. Kitts is the responsibility of the Ministry of Public Works. On both islands, the control of built development very close to or within the ghauts is the responsibility of the respective Physical Planning agency.</p> <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring illegal activities such as sand mining, illegal dumping, unauthorized construction and livestock grazing/farming; • Controlling the ease of access to these ghauts; and • Managing the sustainable use of the resources which ghauts have to offer.
DRY FOREST	
Location and Extent	<p>Small areas of dry forest are found at the following locations:</p> <ul style="list-style-type: none"> • The slopes of Brimstone Hill in St. Kitts; • On selected peaks on the Southeast Peninsula of St. Kitts; and • The northernmost, southeast and southwest slopes of Nevis Peak.

ITEM	COMMENT
Legal Status	<ul style="list-style-type: none"> • The dry forest on the slopes of Brimstone Hill is protected as part of the BHFNP. • The dry forests on the slopes of Nevis Peak are protected as part of the Nevis Peak National Park. • The status of the dry forest on the small peaks on the Southeast Peninsula is subject to some question.
Features	<ul style="list-style-type: none"> • Dry forests are a diverse system consisting mainly of deciduous trees which shed their foliage in the dry season. • Dry forest plants have multiple adaptations to dry conditions, including drought avoidance and resistance through a variety of morphological and behavioural characteristics. • Common species include Silk Cotton and the shrub <i>Bouyeria succulenta</i> in St. Kitts. • On the island of Nevis common species include White Cedar, Black Mast and Loblolly.
Pressures and Threats	<ul style="list-style-type: none"> • Erosion / Landslides; • Extraction of Ornamental and Medicinal Plants; • Illegal Farming; • Invasive Species; • Charcoal Production; • Livestock Grazing; and • Illegal dumping of waste.
Management Structure and Challenges	<ul style="list-style-type: none"> • Management of the dry forests in the Brimstone Hill National Park and the Nevis Peak National Park is as described above for these sites. • There is no formal management structure for other areas of dry forests. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring illegal activities; • Controlling overexploitation of the valuable resources found in the area; and • Controlling the ease of access to these forested areas;
HISTORIC CHARLESTOWN	
Location and Extent	<ul style="list-style-type: none"> • The town of Charlestown is located on the west coast of the island. • At present the town is approximately 490 acres in extent.

ITEM	COMMENT
Legal Status	<ul style="list-style-type: none"> • The draft Nevis Physical Development Plan identifies Charlestown as a Priority Area and recommended the development of a Physical Action Plan. • The legal status of individual units is not as clear cut.
Features	<ul style="list-style-type: none"> • It is compact and easily walkable, • Its historic urban structure is largely intact and suffers few alien changes, • Its historic buildings are both charming and, for the most part, pleasant and comfortable with several 'special spaces', many fine trees and old stonewalls, • It enjoys views out to sea and, inland, dramatic glimpses of Mount Nevis. • There is also architectural display of the 'skirt and blouse' style, timber balconies, gingerbread or scrollwork, jalousie windows and hurricane shutters, lapped wood or shingled walls, hipped roofs largely in corrugated steel, distinctive paintwork and signboards, and arches, breezeways and courtyards.
Pressures and Threats	<ul style="list-style-type: none"> • Neglect of sites and buildings. • Poor repairs and restoration, • Ill-considered redevelopment; • Exceeding carrying capacity; • Property Theft and Destruction; • Littering; and • Graffiti.
Management Structure and Challenges	<ul style="list-style-type: none"> • At present there is no formal management structure associated with Historic Charlestown. • There is some protection of historic sites through the system of planning permission administered by the Physical Planning Department. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Monitoring of illegal activities such as graffiti; • Lack of clear internal organization; • Lack of transparency in decision-making; • Lack of communication with the community in decision-making; • Ongoing disputes due to land tenure or use rights; and • Lack of adequate financial resources to conduct critical law enforcement.

ITEM	COMMENT
Location and Extent	<p style="text-align: center;">HISTORIC SITES</p> <ul style="list-style-type: none"> • Petroglyphs at Old Road Town, St. Kitts <ul style="list-style-type: none"> ○ Size of a household lot. • Stonefort, St. Kitts; <ul style="list-style-type: none"> ○ Extends 200 m on both sides of the ravine and 500 m from the Island Main Road. • Belmont Estate, St. Kitts; <ul style="list-style-type: none"> ○ 3 acres • Mansions Estate, St. Kitts; <ul style="list-style-type: none"> ○ 3 acres • Spooner’s Ginnery, St. Kitts; <ul style="list-style-type: none"> ○ 1.8 acres • Black Rocks, St. Kitts; <ul style="list-style-type: none"> ○ 30 m coastal strip • Charles Fort, St. Kitts; <ul style="list-style-type: none"> ○ 7 acres • Indian Castle Protected Area, Nevis; <ul style="list-style-type: none"> ○ 15 acres • Fort Ashby, Nevis; <ul style="list-style-type: none"> ○ Household lot • Bath Hotel, Nevis; <ul style="list-style-type: none"> ○ Part of a larger 57 acre site • New River Estate, Nevis; and <ul style="list-style-type: none"> ○ Unclear • Fort Charles, Nevis <ul style="list-style-type: none"> ○ 3 acres
Legal Status	<ul style="list-style-type: none"> • Petroglyphs at Old Road Town, St. Kitts <ul style="list-style-type: none"> ○ Ministry of Tourism • Stonefort, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher National Trust • Belmont Estate, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher national Trust • Mansions Estate, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher National Trust • Spooner’s Ginnery, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher National Trust • Black Rocks, St. Kitts; <ul style="list-style-type: none"> ○ Ministry of Tourism • Charles Fort, St. Kitts <ul style="list-style-type: none"> ○ Crown lands

ITEM	COMMENT
Legal Status (Cont'd)	<ul style="list-style-type: none"> • Indian Castle Protected Area, Nevis; <ul style="list-style-type: none"> ○ Ministry of Agriculture • Fort Ashby, Nevis; <ul style="list-style-type: none"> ○ Ministry of Tourism • Bath Hotel, Nevis; <ul style="list-style-type: none"> ○ Ministry of Tourism • New River Estate, Nevis; and <ul style="list-style-type: none"> ○ Ministry of Tourism • Fort Charles, Nevis; <ul style="list-style-type: none"> ○ Private land
Features	<ul style="list-style-type: none"> • Petroglyphs at Old Road Town, St. Kitts; <ul style="list-style-type: none"> ○ Amerindian rock carvings • Petroglyphs at Stonefort, St. Kitts <ul style="list-style-type: none"> ○ Amerindian rock carvings amounting to 115 numbered inscriptions. • Belmont Estate, St. Kitts <ul style="list-style-type: none"> ○ Remnants of 18th and 19th sugar plantation including chimneys, Great House, windmill, factory and old plantation buildings. • Mansions Estate, St. Kitts <ul style="list-style-type: none"> ○ Remnants of 18th and 19th sugar plantation including chimneys and old plantation buildings such as the Manager's House, Overseer's House, windmill, factory, cistern, pen, stables and privy. • Spooner's Ginney, St. Kitts <ul style="list-style-type: none"> ○ Remnants of cotton ginney including equipment as well as 19th century Great House, 19th century stone factory and chimney, 18th century mill and factory and 1940's manager's house. • Black Rocks, St. Kitts <ul style="list-style-type: none"> ○ Volcanic rocks in a scenic setting. • Charles Fort, St. Kitts <ul style="list-style-type: none"> ○ Remnants of old fort including cistern, guard room, cannons etc. • Indian Castle Protected Area, Nevis <ul style="list-style-type: none"> ○ Amerindian artefacts and remnants of Fort George.

ITEM	COMMENT
Features (cont'd)	<ul style="list-style-type: none"> • Fort Ashby, Nevis <ul style="list-style-type: none"> ○ Remnants of Old Fort including cannons, building. • Bath Hotel, Nevis <ul style="list-style-type: none"> ○ Bath Hotel which has been maintained, original bath house, thermal springs, newly constructed bath houses. • New River Estate, Nevis <ul style="list-style-type: none"> ○ Amerindian artefacts, springs, water wheel. • Fort Charles, Nevis <ul style="list-style-type: none"> ○ Stone walls, cistern and cannons.
Pressures and Threats	<ul style="list-style-type: none"> • Inappropriate Development; • Squatting; • Exceeding Carrying Capacity; • Property Theft and Destruction; • Littering; • Destructive Earthquake / Volcanic Eruption; • Hurricanes / Storm Surges and Flooding; • Deterioration of Structures; • Vandalism; • Abandonment of Buildings; • Fires; and • Traffic Congestion and Inadequate Parking.
Management Structure and Challenges	<ul style="list-style-type: none"> • There is no organized management structure for all sites. • There is some management under the Physical Planning department as part of the planning approvals process. • Some of the sites are loosely managed by the Nevis Historical and Conservation Society and the St. Christopher National Trust. • Some of the sites are also managed by various Government ministries such as the Ministry of Tourism and the Ministry of Agriculture. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring illegal activities such as the removal of facing stone and theft of artefacts and equipment; • Difficulty in managing the use of the resources.

DEVELOPMENT STRATEGY FOR PA SYSTEM

ITEM	ACTUAL OR SUGGESTED
Brimstone Hill Fortress National Park	
Area / Layout	<ul style="list-style-type: none"> As presently defined, the hill and a quarter-mile buffer zone around it.
NCEMA Categories	<ul style="list-style-type: none"> National Park (Category I). Also listed as a World Heritage Site.
Management Agency	Existing: <ul style="list-style-type: none"> Brimstone Hill Fortress National Park Society
Financing Strategies	<ul style="list-style-type: none"> User Fees and Government Subvention for recurrent expenses. Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Includes areas of Dry Forest.
Central Forest Reserve National Park	
Area / Layout	Areas in excess of 1,000 feet above mean sea level (needs to be marked in the field).
NCEMA Categories	National Park (Category I).
Management Agency	Proposed: <ul style="list-style-type: none"> Department of Physical Planning and Environment, with inputs from Water Department, Department of Tourism and Department of Agriculture.
Financing Strategies	<ul style="list-style-type: none"> Public Service Salaries for management expenses. Public Service Salaries, User Fees and Government Subventions for recurrent expenses. Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Very important to the public water supply.
Nevis Peak and Camps River National Park	
Area / Layout	Areas in excess of 1,000 feet above mean sea level, and extending down the Camps River Valley to the coast (needs to be marked in the field).
NCEMA Categories	National Park (Category I).
Management Agency	Proposed: <ul style="list-style-type: none"> Nevis Physical Planning Department with inputs from Nevis Water Department, Nevis Tourism Authority and the Nevis Department of Agriculture.

ITEM	ACTUAL OR SUGGESTED
Financing Strategies	<ul style="list-style-type: none"> Public Service Salaries for management expenses. Public Service Salaries, User Fees and Government Subventions for recurrent expenses. Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	<ul style="list-style-type: none"> Very important to the public water supply. Includes an area of Dry Forest.
Basseterre Valley Aquifer National Park	
Area / Layout	197 ha east of the town of Basseterre and west of the Conaree Hills
NCEMA Categories	<ul style="list-style-type: none"> National Park (Category I). Botanic Gardens (Category VII).
Management Agency	Proposed: <ul style="list-style-type: none"> Basseterre Project Steering Committee.
Financing Strategies	<ul style="list-style-type: none"> User Fees and Government Subventions for recurrent expenses. Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Very important to the public water supply.
Marine Management Areas	
Area / Layout	<ul style="list-style-type: none"> Southeast Peninsula and The Narrows. Sandy Point Marine Management Area.
NCEMA Categories	<ul style="list-style-type: none"> Marine Reserves (Category IV). Nature Reserves (Category III). Areas of Special Concern (Category V).
Management Agency	Proposed: <ul style="list-style-type: none"> Fisheries Departments of both islands with inputs from other Government Departments, conservationists, water sports operators and representatives from nearby communities.
Financing Strategies	<ul style="list-style-type: none"> Public Service Salaries for Planning Controls. User Fees and Public Service Salaries for recurrent expenses. Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	These areas include salt ponds and turtle nesting beaches.
Turtle Nesting Beaches	
Area / Layout	<ul style="list-style-type: none"> Within the proposed Marine Protected Areas at Southeast Peninsula and the Narrows and at Sandy Point. Other locations around St. Kitts and Nevis.
NCEMA Categories	Areas of Special Concern (Category V).

ITEM	ACTUAL OR SUGGESTED
Management Agency	Existing: <ul style="list-style-type: none"> Fisheries Departments in St. Kitts and Nevis with inputs from the St. Kitts Sea Turtle Monitoring Network and the Nevis Turtle Group.
Financing Strategies	<ul style="list-style-type: none"> User Fees and Public Service Salaries for recurrent expenses.
Other Comments	Keys Turtle Nesting Beach is part of a proposal for the St. Mary's Biosphere Reserve under the UNESCO Man and the Biosphere Reserve Program.
Salt Ponds	
Area / Layout	<ul style="list-style-type: none"> Within the proposed Southeast Peninsula and the Narrows Marine Management Area. Other locations around St. Kitts.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Existing: <ul style="list-style-type: none"> Department of Physical Planning and the Environment in St. Kitts.
Financing Strategies	<ul style="list-style-type: none"> Public Service Salaries for planning controls. Grants from International Donor Agencies and proposed Environmental Trust Fund for enhancement and rehabilitation of two Ponds (in the first instance) for ecotourism and educational purposes.
Other Comments	Ponds with existing planning permission to be radically modified were not included in this analysis.
Freshwater Lagoons	
Area / Layout	<ul style="list-style-type: none"> Within the proposed Nevis Peak and Camps River National Park. Other locations around Nevis.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Existing: <ul style="list-style-type: none"> Nevis Department of Physical Planning, Nevis Tourism Department and Nevis Water Department.
Financing Strategies	Public Service Salaries for planning controls.
Other Comments	Some of these lagoons provide potable water to nearby parishes. These lagoons are part of larger protected areas as recommended in the Nevis Physical Development Plan.
The Ghauts	
Area / Layout	<ul style="list-style-type: none"> Throughout both islands. 81 in St. Kitts and 33 Ghauts in Nevis.
NCEMA Categories	Areas of Special Concern (Category V).

ITEM	ACTUAL OR SUGGESTED
Management Agency	Existing: <ul style="list-style-type: none"> • Department of Physical Planning on both islands. • Ministry of Works for legal sand mining in Ghauts.
Financing Strategies	Public Service Salaries for planning controls. Government subvention or Grants from International Donor Agencies for conduct of a Strategic Impact Assessment. Government subvention for restoration works deemed necessary.
Other Comments	There is some question as to the agency responsible for policing illegal sand mining.
Dry Forests	
Area / Layout	<ul style="list-style-type: none"> • Within Brimstone Hill Fortress National Park, • A new area on the Southeast Peninsula of St. Kitts to be included in the CFRNP. • Within Nevis Peak and Camps River National Park.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Proposed: <ul style="list-style-type: none"> • Brimstone Hill Fortress National Park Society. • Nevis Physical Planning Department.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for management expenses. • Public Service Salaries, User Fees and Government Subventions for recurrent expenses. • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	--
Historic Charlestown	
Area / Layout	Within the town of Charlestown.
NCEMA Categories	Historic Site (Category II).
Management Agency	Existing: <ul style="list-style-type: none"> • Nevis Physical Planning Department. • Nevis Historical and Conservation Society. • Nevis Tourism Authority.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for planning controls. • Government Subventions for recurrent expenses (User Fees may also be considered). • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Other sites / buildings may be added after the designation of the initial listing of sites / buildings.
Other Historic Sites	
Area / Layout	Throughout St. Kitts and Nevis.

ITEM	ACTUAL OR SUGGESTED
NCEMA Categories	Historic Sites (Category II). Scenic Sites (Category VI)
Management Agency	Existing: <ul style="list-style-type: none"> • St. Kitts Tourism Department. • Nevis Tourism Authority. • St. Christopher National Trust. • Nevis Historical and Conservation Society.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for planning controls. • Government Subventions for recurrent expenses (User Fees may also be considered). • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Some of these historic sites are part of larger protected areas as recommended in the Nevis Physical Development Plan.

THE WAY FORWARD

In order to implement the Protected Areas Systems Plan for St. Kitts and Nevis a number of steps must be taken. These are discussed under the following headings:

- Approval of the Plan,
- Prioritizing Individual Sites,
- Organizational Arrangements,
- Further Studies,
- Training, and
- Updating the Systems Plan.

Firstly, the Plan requires approval at the highest level of decision-making: the Government of St. Kitts and Nevis as well as the Nevis Island Administration. Next there is the need to prioritize the various actions recommended in the Plan. These action items have been prioritized into the following categories:

- Highest - Those actions which should be taken as soon as practical.
- High - Those actions that should be taken within the next 3 years; and
- Medium - Those actions which should be taken within the next 5 years.

While there are no actions that will be described as having low priority, there are some that will take a longer period of time to implement either due to restrictions in time, money or other resources.

Highest Priority

The following actions are to be given the highest priority:

- Acceptance of this National Protected Areas Systems Plan.
- Enact and Assent to the National Conservation and Environmental Management Act (NCEMA).
- Operationalize the Environmental Trust Fund as envisaged under the NCEMA.
- Establish the National Conservation Commission as envisaged under the NCEMA.
- Declaration of Nevis Peak and Basseterre Aquifer as National Parks under the NCEMA Act, 2009.
- Revision of the Management Plan for the Central Forest Reserve to include joint management of the four key agencies (Physical Planning and Environment, Water Department, Tourism Department and Agriculture Department).
- Revision of the Management Plan for the Nevis Peak and Camps River Watershed to include joint management of the four key agencies (Physical Planning, Water Department, Nevis Tourism Authority and Nevis Department of Agriculture).
- Declaration of Booby Island as a Nature Reserve in accordance with the NCEMA Act.
- Conduct of ecological studies to determine the extent of Nag's Head Nesting Site.
- Conduct of fisheries studies to determine the boundaries of fish and shellfish propagation areas to be included in the SEPNMMA.
- Declare Keys Turtle Nesting Beach (St. Kitts) as a beach of "Special Concern" under the NCEPA Act.
- Declare Sea Haven Turtle Nesting Beach (Nevis) as a beach of "Special Concern" under the NCEPA Act.
- Completion of an assessment of the structures and a determination of the boundaries at Spooner's Ginnery, Mansions Estate, Belmont Estate, Charles Fort, Indian Castle, Fort Charles and Fort Ashby to determine any restoration works that will be needed.

High Priority

The following actions are to be given high priority:

- Adjustment of the Admission Fees for the BHFNP.
- Declaration of Nag's Head as a Nature Reserve in accordance with the NCEMA Act.
- Enhancement and Rehabilitation of Frigate Bay and Half Moon Bay Salt Ponds.
- Conduct ecological studies to determine the extent of dry forest on the S. E. Peninsula that is considered suitable for protection.
- Conduct fisheries studies to determine the boundaries of fish and shellfish propagation areas to be included in the SPMMA.
- Declaration of Marine Reserves within the SEPNMMA and SPMMA under the Fisheries Act, 1984.
- Review regulations on closed season for turtle harvesting with a view to recommending a moratorium on all harvesting of turtles and eggs both onshore and in the marine environment.
- Declaration of Muddy Point Salt Pond and Greatheeds Pond as protected areas where no additional development will be permitted.

Medium Priority

The following actions are to be given medium priority:

- Conduct a Strategic Environmental Impact Assessment to identify specific locations for legal sand mining.
- Amalgamation of identified areas of dry forest on the S. E. Peninsula into the CFRNP.
- Conduct restoration works at New River Estate to bring the trails and associated infrastructure up to a level suitable for use by tourists.

Organizational Arrangements

A number of institutional arrangements need to be put in place as part of the implementation of the Protected Areas Systems Plan for St. Kitts and Nevis:

- Establishment of the proposed National Conservation Commission.
- Establishment of a working relationship between the St. Kitts Department of Physical Planning and the Environment, Water Department, Department of Tourism and Department of Agriculture relative to the management of the Central Forest Reserve National Park.
- Establishment of the proposed Basseterre Valley Project Steering Committee.
- Establishment of a working relationship between the Nevis Peak National Park Advisory Committee to manage the Nevis Peak and Camps Valley National Park.
- Establishment of a management authority to manage marine management areas which should comprise of Fisheries Departments of both islands, other Government Departments, conservationists, water sports operators and representatives from nearby communities.

Training

There is of course the need for training on two levels in order for the effective implementation of Systems Plan. The first is a training workshop with key stakeholder in order to present and explain various aspects of the approved Systems Plan. The second is focussed on in-depth training needs as highlighted in the Training Needs Assessment conducted under the OPAAL project.

Updating the Systems Plan

This systems plan is intended to be a “living document” which is updated on a regular basis as new information comes to hand. Specifically, it is envisaged that a major update will be taken after about 36 months, when the results of Further Studies have been completed and routine updates will be taken every 5 years thereafter.

THIS PAGE LEFT INTENTIONALLY BLANK

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Background.....	2
1.2	Rationale.....	3
1.3	Objectives of PA Plan	3
1.4	Scope of Study.....	4
1.5	Limitations.....	4
1.5.1	Unavailability of Site-Specific data on Biological Diversity.....	5
1.5.2	Limitation on Site Visits.....	5
1.5.3	Unclear Rationale for Consideration.....	5
1.5.4	Timing of Parallel OECS Studies.....	5
2	PROCESS OF PLAN PREPARATION.....	7
2.1	Workplan.....	7
2.2	Review of Data.....	8
2.2.1	Documents listed in the Terms of Reference.....	8
2.2.2	Published Documents and Internet Sources.....	9
2.3	Site Visits	9
2.4	Workshops	10
2.4.1	Ecological Gap Assessment.....	10
2.4.1.1	Overview	10
2.4.1.2	Summary of Workshop Objectives.....	10
2.4.1.3	Limitations.....	11
2.4.2	RAPPAM	11
2.4.2.1	Overview	11
2.4.2.2	Summary of Workshop Objectives.....	11
2.4.2.3	Limitations.....	12
2.5	Data Analysis	13
2.5.1	Ecological Gap Assessment.....	13
2.5.2	RAPPAM Workshop	13
2.6	Public Participation.....	13
2.6.1	Document Review	14
2.6.2	Site Assessment and Consultation with Stakeholders.....	14
2.6.3	Presentation of Draft Systems Plan.....	14

3	FRAMEWORK FOR THE PA SYSTEM	17
3.1	Legal Framework	17
3.1.1	National Conservation and Environmental Protection Act, 1987	18
3.1.2	The National Conservation and Environmental Management Bill, 2009....	19
3.1.3	Fisheries Act, 1984	21
3.1.4	South-East Peninsula Land Development and Conservation Act, 1986	22
3.1.5	Development Control and Planning Act, 2000	22
3.2	International Obligations	22
3.2.1	The United Nations Convention on Biological Diversity (CBD)	23
3.2.2	The United Nation Framework Convention on Climate Change	23
3.2.3	The Convention on International Trade in Endangered Species (CITES) ..	24
3.2.4	The Convention for the Prevention of Pollution from Ships (MARPOL).....	24
3.3	OECS Protected Areas and Associated Livelihoods Project (OPAAL).....	25
3.3.1	Regulatory Reforms.....	25
3.3.2	Alternative Livelihoods.....	25
3.3.3	Capacity Building.....	25
3.3.4	OECS Policy on Protected Areas Systems.....	26
3.3.5	The OECS Model Protected Areas System Act.....	26
3.4	Basis for Consideration of Proposed PAs	27
3.4.1	Biological / Natural Heritage	27
3.4.2	Historical / Cultural	30
3.5	Linkage with other National Planning Initiatives	31
3.5.1	National Biodiversity Strategy and Action Plan (NBSAP)	31
3.5.2	National Environmental Management Strategy and Action Plan (NEMS)..	31
3.5.3	St. Christopher Physical Development Plan	32
3.5.3.1	Coastal Area Management	33
3.5.3.2	Watershed Management.....	33
3.5.3.3	Management of Protected Areas	33
3.5.3.4	Conservation of the Built Development.....	34
3.5.4	Nevis Physical Development Plan	34
3.6	Funds, Fees and Levies	35
3.6.1	Environmental Trust Fund	35
3.6.2	Other Taxes, Fees and Levies.....	35
4	ECOLOGICAL DIVERSITY OF ST. KITTS AND NEVIS	37
4.1	Terrestrial Resources.....	37
4.1.1	Vegetation	37
4.1.2	Invertebrates.....	40
4.1.3	Vertebrates	40

4.1.3.1	Mammals	41
4.1.3.2	Freshwater Fish	41
4.1.3.3	Amphibians	42
4.1.3.4	Reptiles	42
4.1.3.5	Avifauna	43
4.1.3.5.1	Country Diversity	43
4.1.3.5.2	Diversity of St. Kitts Central Forest Reserve.....	45
4.1.3.5.3	Diversity of S. E. Peninsula Ponds.....	45
4.1.3.5.4	Diversity of Booby Island	45
4.2	Coastal Resources.....	46
4.2.1	Beaches.....	46
4.2.2	Freshwater and Salt Water Lagoons	46
4.2.3	Mangroves.....	47
4.3	Marine Resources	49
4.3.1	Coral Reefs and Seagrass Beds	49
4.3.2	Marine Mammals	50
4.3.3	Marine Fish.....	50
4.3.4	Marine Reptiles.....	51
4.4	Invasive Species	52
5	STATUS OF THE ECOLOGICAL AND HISTORICAL / CULTURAL BASE	53
5.1	Layout of Chapter.....	53
5.2	Brimstone Hill Fortress National Park	54
5.3	Central Forest Reserve National Park.....	55
5.4	Nevis Peak National Park and Camps River Watershed.....	56
5.5	Basseterre Valley Aquifer National Park	57
5.6	Marine Management Areas.....	58
5.7	Turtle Nesting Beaches	60
5.8	Salt Ponds.....	61
5.9	Freshwater Lagoons	62
5.10	The Ghauts	63
5.11	Dry Forest	64
5.12	Historic Charlestown	65
5.13	Historic Sites.....	67
5.14	Summary	70

6	UNITS OF NATIONAL PROTECTED AREAS SYSTEM.....	73
6.1	Scope of Chapter	73
6.2	Marine Areas.....	74
6.2.1	Resources / Assets.....	75
6.2.1.1	South East Peninsula Marine Area	75
6.2.1.2	Sandy Point Marine Area	75
6.2.2	Pressures / Threats	76
6.2.2.1	South East Peninsula Marine Area	76
6.2.2.2	Sandy Point Marine Management Area	77
6.2.3	Suitability of Units	78
6.2.3.1	S.E. Peninsula	78
6.2.3.1.1	Status / Representiveness.....	78
6.2.3.1.2	Ecological Gap Analysis.....	79
6.2.3.1.3	Boundaries and Extent	79
6.2.3.1.4	Level of Protection	80
6.2.3.1.5	Challenges to Protection.....	81
6.2.3.2	Sandy Point Marine Management Area	81
6.2.3.2.1	Status / Representiveness.....	82
6.2.3.2.2	Ecological Gap Analysis.....	82
6.2.3.2.3	Boundaries and Extent	82
6.2.3.2.4	Level of Protection	83
6.2.3.2.5	Challenges to Protection.....	84
6.2.4	Proposals.....	84
6.3	Turtle Nesting Sites.....	84
6.3.1	Resources / Assets.....	85
6.3.1.1	Keys Turtle Nesting Beach.....	85
6.3.1.2	Sea Haven Turtle Nesting Beach.....	85
6.3.2	Pressures and Threats	86
6.3.2.1	Keys Turtle Nesting Beach.....	86
6.3.2.2	Sea Haven Turtle Nesting Beach.....	87
6.3.3	Suitability of Site	88
6.3.3.1	Keys Turtle Nesting Beach.....	88
6.3.3.1.1	Status / Representiveness.....	88
6.3.3.1.2	Ecological Gap Analysis.....	88

6.3.3.1.3	Boundaries and Extent	89
6.3.3.1.4	Challenges to Protection	89
6.3.3.2	Sea Haven Turtle Nesting Beach	90
6.3.3.2.1	Status / Representiveness	90
6.3.3.2.2	Ecological Gap Analysis	90
6.3.3.2.3	Boundaries and Extent	91
6.3.3.2.4	Challenges to Protection	91
6.3.4	Level of Protection	92
6.3.5	Proposals	92
6.4	Salt Ponds	92
6.4.1	Resources and Assets	93
6.4.1.1	Greatheeds Pond	93
6.4.1.2	Muddy Point Salt Pond	94
6.4.1.3	Half Moon Bay Salt Pond	94
6.4.1.4	Frigate Bay Salt Pond	95
6.4.1.5	Friar's Bay Salt Pond	96
6.4.2	Pressures and Threats	96
6.4.2.1	Greatheeds Pond	96
6.4.2.2	Muddy Point Salt Pond	96
6.4.2.3	Half Moon Bay Salt Pond	97
6.4.2.4	Frigate Bay Salt Pond	97
6.4.2.5	Friar's Bay Salt Pond	97
6.4.3	Suitability	97
6.4.3.1	Greatheeds Pond	98
6.4.3.1.1	Status and Representiveness	98
6.4.3.1.2	Ecological Gap Analysis	98
6.4.3.1.3	Boundaries and Extent	98
6.4.3.1.4	Challenges to Protection	98
6.4.3.2	Muddy Point Salt Pond	99
6.4.3.2.1	Status and Representiveness	99
6.4.3.2.2	Ecological Gap Analysis	99
6.4.3.2.3	Boundaries and Extent	99
6.4.3.2.4	Challenges to Protection	99
6.4.3.3	Half Moon Pond	100

6.4.3.3.1	Status / Representiveness	100
6.4.3.3.2	Ecological Gap Analysis	100
6.4.3.3.3	Boundaries and Extent	100
6.4.3.3.4	Challenges to Protection	100
6.4.3.4	Salt Ponds of the S. E. Peninsula	101
6.4.4	Level of Protection	101
6.4.5	Proposal	102
6.5	Freshwater Lagoons	102
6.5.1	Resources / Assets	103
6.5.1.1	Bath Bogs Protected Area	103
6.5.1.2	Nelson Springs	104
6.5.1.3	Jessup's Pond	104
6.5.1.4	New River Estate and Springs	104
6.5.1.5	Pinney's and Parris Ponds	105
6.5.2	Pressures / Threats	106
6.5.2.1	Bath Bogs Protected Area	106
6.5.2.2	Nelson Springs	106
6.5.2.3	Jessup's Pond	106
6.5.2.4	New River Estate and Springs	107
6.5.2.5	Pinney's and Parris Ponds	107
6.5.3	Suitability of Units	107
6.5.3.1	Bath Bogs Protected Area	107
6.5.3.1.1	Status / Representiveness	107
6.5.3.1.2	Ecological Gap Analysis	107
6.5.3.1.3	Boundaries and Extent	108
6.5.3.1.4	Challenges to Protection	108
6.5.3.2	Nelson Spring	108
6.5.3.2.1	Status / Representiveness	108
6.5.3.2.2	Ecological Gap Analysis	109
6.5.3.2.3	Boundaries and Extent	109
6.5.3.2.4	Challenges to Protection	109
6.5.3.3	Jessup's Pond	109
6.5.3.3.1	Status / Representiveness	109
6.5.3.3.2	Ecological Gap Analysis	110

6.5.3.3	Boundaries and Extent	110
6.5.3.3.4	Challenges to Protection	110
6.5.3.4	New River Estate and Springs	110
6.5.3.4.1	Status / Representiveness	110
6.5.3.4.2	Ecological Gap Analysis.....	111
6.5.3.4.3	Boundaries and Extent	111
6.5.3.4.4	Challenges to Protection	111
6.5.3.5	Pinney's and Parris Ponds	111
6.5.3.5.1	Status / Representiveness	111
6.5.3.5.2	Ecological Gap Analysis.....	112
6.5.3.5.3	Boundaries and Extent	112
6.5.3.5.4	Challenges to Protection	112
6.5.4	Level of Protection	112
6.5.5	Proposal	113
6.6	The Ghauts	113
6.6.1	Resources / Assets.....	113
6.6.2	Pressures / Threats	114
6.6.3	Suitability of Units	114
6.6.3.1	Status / Representiveness	114
6.6.3.2	Ecological Gap Analysis.....	115
6.6.3.3	Boundaries and Extent.....	115
6.6.3.4	Level of Protection	115
6.6.3.4.1	St. Kitts.....	115
6.6.3.4.2	Nevis	116
6.6.3.5	Challenges to Protection	116
6.6.4	Proposal	117
6.7	Dry Forest	117
6.7.1	Resources / Assets.....	117
6.7.2	Pressures / Threats	118
6.7.3	Suitability of Units	118
6.8	Historic Charlestown	119
6.8.1	Resources / Assets.....	119
6.8.2	Pressures and Threats	119
6.8.3	Suitability of Units	119
6.8.3.1	Status / Representiveness	119

6.8.3.2	Boundaries and Extent.....	120
6.8.3.3	Level of Protection	120
6.8.3.4	Challenges to Protection	121
6.8.3.5	Proposal.....	121
6.9	Historic / Cultural Sites	121
6.9.1	Resources / Assets.....	122
6.9.2	Pressures / Threats	123
6.9.3	Suitability of Units	124
6.9.3.1	Status / Representiveness	124
6.9.3.2	Boundaries and Extent.....	125
6.9.3.3	Level of Protection	126
6.9.3.4	Challenges to Protection	126
6.9.4	Proposal	127
7	DEVELOPMENT STRATEGY FOR PROTECTED AREAS SYSTEM	129
7.1	Overall Structure	129
7.1.1	NCEMA Categories	129
7.1.2	Management.....	129
7.1.2.1	Overall Management Structure	129
7.1.2.2	Site Specific Management Structure	131
7.1.3	Financing Strategies.....	131
7.2	Brimstone Hill Fortress National Park	132
7.2.1	NCEMA Categories	132
7.2.2	Management Strategies.....	133
7.2.2.1	Management Structure.....	133
7.2.2.2	Management Plan.....	133
7.2.2.3	Staffing.....	133
7.2.3	Financing Strategies.....	133
7.3	Central Forest Reserve National Park.....	134
7.3.1	NCEMA Categories	134
7.3.2	Management Strategies.....	135
7.3.2.1	Management Structure.....	135
7.3.2.2	Management Plan.....	135
7.3.2.3	Staffing.....	135
7.3.3	Financing Strategies.....	136
7.4	Nevis Peak and Camps River National Park.....	137
7.4.1	NCEMA Categories	137
7.4.2	Management Strategies.....	138
7.4.2.1	Management Structure.....	138

7.4.2.2	Management Plan	138
7.4.2.3	Staffing	138
7.4.3	Financing Strategies	139
7.5	Basseterre Valley Aquifer National Park	139
7.5.1	NCEMA Categories	139
7.5.2	Management Strategies	140
7.5.2.1	Management Structure	140
7.5.2.2	Management Plan	140
7.5.2.3	Staffing	141
7.5.3	Financing Strategies	141
7.6	Marine Management Areas	141
7.6.1	NCEMA Categories	142
7.6.2	Management Strategies	143
7.6.2.1	Management Structure	143
7.6.2.2	Management Plan	144
7.6.2.3	Staffing	144
7.6.3	Financing Strategies	144
7.7	Turtle Nesting Beaches	145
7.7.1	NCEMA Categories	145
7.7.2	Management Strategies	146
7.7.3	Financing Strategies	146
7.8	Salt Ponds	147
7.8.1	NCEMA Categories	147
7.8.2	Management Strategies	147
7.8.3	Financing Strategies	148
7.9	Freshwater Lagoons	148
7.9.1	NCEMA Categories	148
7.9.2	Management Strategies	149
7.9.3	Financing Strategies	149
7.10	The Ghauts	150
7.10.1	NCEMA Categories	150
7.10.2	Management Strategies	150
7.10.3	Financing Strategies	151
7.11	Dry Forests	152
7.11.1	NCEMA Categories	152
7.11.2	Management Strategies	152
7.11.3	Financing Strategies	153
7.12	Historic Charlestown	153
7.12.1	NCEMA Categories	154
7.12.2	Management Strategies	154

7.12.3	Financing Strategies.....	155
7.13	Other Historic Sites.....	155
7.13.1	NCEMA Categories.....	156
7.13.2	Management Strategies.....	156
7.13.2.1	St. Kitts.....	156
7.13.2.2	Nevis.....	157
7.13.3	Financing Strategies.....	157
7.13.3.1	St. Kitts.....	158
7.13.3.2	Nevis.....	158
8	The WAY FORWARD.....	159
8.1	Approval of the Plan.....	159
8.2	Prioritizing Individual Units.....	164
8.2.1	Highest Priority.....	164
8.2.2	High Priority.....	165
8.2.3	Medium Priority.....	166
8.3	Organizational Arrangements.....	167
8.4	Further Studies.....	167
8.4.1	Implementation of Systems Plan.....	167
8.4.2	Site Specific Plans.....	168
8.5	Training.....	169
8.5.1	Workshop.....	169
8.5.2	In-depth Training.....	169
8.6	Updating the Systems Plan.....	171

LIST OF APPENDICES

APPENDIX A:	FIGURES
APPENDIX B:	RESULTS OF ECOLOGICAL GAP ASSESSMENT
APPENDIX C:	RESULTS OF RAPPAM WORKSHOP
APPENDIX D:	NOTES OF FINAL CONSULTATION MEETINGS
APPENDIX E:	FRAMEWORK OF THE PA SYSTEM
APPENDIX F:	SPECIES LISTS
APPENDIX G:	STATUS OF THE ECOLOGICAL AND HISTORICAL / CULTURAL BASE

LIST OF TABLES

TABLE NO.	TABLE NAME	PAGE
2-1	SITES VISITED IN JUNE	9
3-1	IUCN LIST OF PROTECTED AREAS	38
3-2	ST. KITTS AND NEVIS CATEGORIES OF PROTECTED AREAS	41
3-3	CATEGORIES OF HERITAGE SITES	43
4-1	VEGETATION ZONES, (AS IDENTIFIED BY BEARD, 1949) IN ST. KITTS AND NEVIS	57
5-1	SUMMARY OF SITES AND GROUPS OF SITES	111
6-1	STATUS OF HISTORIC BUILDINGS	161
6-2	RESOURCES OF HISTORIC SITES	163
6-3	PRESSURES AND THREATS ASSOCIATED WITH HISTORIC SITES	164
6-4	STATUS OF HISTORIC SITES	165
6-5	BOUNDARIES OF HISTORIC SITES	166
6-6	LEVEL OF PROTECTED PROPOSED FOR HISTORIC SITES	167
6-7	CHALLENGES TO PROTECTION OF HISTORIC SITES	167
8-1	SUMMARY OF SYSTEMS PLAN PROPOSALS	197

LIST OF FIGURES

NO.	FIGURE NAME
ALL FIGURES ARE CONTAINED IN APPENDIX A TO THIS REPORT	
6-1	ENVIRONMENTAL ASSETS OF THE S. E. PENINSULA
6-2	THREATS TO ENVIRONMENTAL ASSETS ON THE S.E. PENINSULA
6-3	ECOLOGICAL GAP ANALYSIS RESULTS FOR THE S. E. PENINSULA (RUN A)
6-4	ECOLOGICAL GAP ANALYSIS RESULTS FOR THE S. E. PENINSULA (RUN B)
6-5	PROPOSED BOUNDARIES FOR THE S. E. PENINSULA MARINE PROTECTED AREA
6-6	LAND TENURE ON THE S. E. PENINSULA
6-7	ENVIRONMENTAL ASSETS OFF SANDY POINT
6-8	ECOLOGICAL GAP ANALYSIS RESULTS FOR SANDY POINT MARINE AREA (RUN A)
6-9	ECOLOGICAL GAP ANALYSIS RESULTS FOR SANDY POINT MARINE AREA (RUN B)
6-10	PROPOSED BOUNDARIES FOR THE SANDY POINT MARINE PROTECTED AREA
6-11	ENVIRONMENTAL ASSETS ASSOCIATED WITH KEYS TURTLE NESTING BEACH
6-12	ECOLOGICAL GAP ANALYSIS RESULTS FOR KEYS TURTLE NESTING BEACH (RUN A)
6-13	ECOLOGICAL GAP ANALYSIS RESULTS FOR KEYS TURTLE NESTING BEACH (RUN B)
6-14	PROPOSED BOUNDARIES FOR THE KEYS TURTLE NESTING BEACH PROTECTED AREA
6-15	ENVIRONMENTAL ASSETS ASSOCIATED WITH SEA HAVEN TURTLE NESTING BEACH
6-16	ECOLOGICAL GAP ANALYSIS RESULTS FOR SEA HAVEN TURTLE NESTING BEACH (RUN A)
6-17	ECOLOGICAL GAP ANALYSIS RESULTS FOR SEA HAVEN TURTLE NESTING BEACH (RUN B)

NO.	FIGURE NAME
6-18	LOCATION OF SALT PONDS ON ST. KITTS
6-19	ENVIRONMENTAL ASSETS ASSOCIATED WITH SALT PONDS
6-20	THREATS TO SALT PONDS
6-21	ECOLOGICAL GAP ANALYSIS RESULTS FOR SALT PONDS (RUN A)
6-22	ECOLOGICAL GAP ANALYSIS RESULTS FOR SALT PONDS (RUN B)
6-23	PROPOSED BOUNDARIES FOR THE GREAT HEEDS SALT POND PROTECTED AREA
6-24	PROPOSED BOUNDARIES FOR THE MUDDY POINT SALT POND PROTECTED AREA
6-25	PROPOSED BOUNDARIES FOR THE HALF MOON BAY SALT POND PROTECTED AREA
6-26	ENVIRONMENTAL ASSETS ASSOCIATED WITH FRESHWATER LAGOONS
6-27	THREATS TO FRESHWATER LAGOONS
6-28	ECOLOGICAL GAP ANALYSIS RESULTS FOR BATH BOGS PROTECTED AREA (RUN A)
6-29	ECOLOGICAL GAP ANALYSIS RESULTS FOR BATH BOGS PROTECTED AREA (RUN B)
6-30	PROPOSED BOUNDARIES FOR THE BATH BOGS PROTECTED AREA
6-31	ECOLOGICAL GAP ANALYSIS RESULTS FOR PINNEY'S ESTATE PROTECTED AREA (RUN A)
6-32	ECOLOGICAL GAP ANALYSIS RESULTS FOR PINNEY'S ESTATE PROTECTED AREA (RUN B)
6-33	PROPOSED BOUNDARIES FOR THE PINNEY'S ESTATE PROTECTED AREA
6-34	ENVIRONMENTAL ASSETS ASSOCIATED WITH GHAUTS (ST. KITTS)
6-35	ENVIRONMENTAL ASSETS ASSOCIATED WITH GHAUTS (NEVIS)
6-36	THREATS TO GHAUTS (ST. KITTS)
6-37	THREATS TO GHAUTS (NEVIS)
6-38	VEGETATION CLASSIFIED AS "DRY FORESTS"
6-39	HISTORIC CHARLESTOWN
6-40	OTHER HISTORIC SITES

GLOSSARY

Antiquity	Refers to objects surviving from ancient cultures
Artefacts	Anything made or used by mankind
Brackish	Brackish water is water that has more salinity than fresh water, but not as much as seawater. It is mostly the result of mixing of seawater with fresh water, as in estuaries
Catchment	An extent of land where water from precipitation drains into a body of water
Cotton Ginnery	A cotton gin (short for cotton engine) is a machine that quickly and easily separates the cotton fibres from the seeds, a job previously done by hand. These seeds are either used again to grow more cotton or, if badly damaged, are disposed of. It uses a combination of a wire screen and small wire hooks to pull the cotton through the screen, while brushes continuously remove the loose cotton lint to prevent jams.
Endangered	A taxon is Endangered when the best available evidence indicates that it is therefore considered to be facing a very high risk of extinction in the wild.

Endemic	An organism being "endemic" means exclusively native to a place or biota
Eutrophication	Eutrophication is an increase in the concentration of chemical nutrients in an ecosystem to an extent that increases the primary productivity of the ecosystem. Depending on the degree of eutrophication, subsequent negative environmental effects such as anoxia and severe reductions in water quality, fish, and other animal populations may occur.
Ghaut	Deeply incised drainage channels that are the primary means of channelling runoff to the sea.
Hydrology	Hydrology is the study of the movement, distribution, and quality of water throughout Earth, and thus addresses both the hydrologic cycle and water resources.
Microfauna	Small, often microscopic animals, especially those inhabiting the soil, an organ, or other localized habitat. Single-celled protozoans, small nematodes, small unsegmented worms, and tardigrades (eight-legged arthropods) are the most common components of microfauna. Many inhabit water films or pore spaces in leaf litter and in the soil, feeding on smaller microorganisms that decompose organic material.
Migratory	Migratory birds are birds that undertake a regular seasonal journey. Bird movements include those made in response to changes in food availability, habitat or weather. These however are usually irregular or in only one direction and are termed variously as nomadism, invasions, dispersal or irruptions. Migration is marked by its annual seasonality
Monospecific	Refers to a taxon (at any rank) that includes only one species.
Threatened	Threatened species are any species (including animals, plants, fungi, etc.) which are vulnerable to extinction in the near future. World Conservation Union (IUCN) is the foremost authority on threatened species, and treats threatened species not as a single category, but as a group of three categories: vulnerable, endangered, and critically endangered, depending on the degree to which they are threatened.
Watershed	a watershed refers to a divide that separates one drainage area from another drainage area

ACRONYMS

BPOA	Barbados Programme of Action
BHFNP	Brimstone Hill Fortress National Park
BVANP	Basseterre Valley Aquifer National Park
CCA	Caribbean Conservation Association
CFRNP	Central Forest Reserve National Park
CNPPA	Commission on National Parks and Protected Areas
CZMP	Coastal Zone Management Plan
ED	Enumeration District
EDDR	Early Detection and Rapid Response
EGA	Ecological Gap Analysis
EIA	Environmental Impact Assessment
ERDMP	Emergency Recovery & Disaster Management Project
ESDU	Environment and Sustainable Unit
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographical Information System
GOSKN	Government of St Kitts & Nevis
HCL	Hyder Consulting Limited
ICC	International Cricket Council
ICZM	Integrated Coastal Management
IUCN	International Union for Conservation of Nature
IWCAM	Integrating Watershed and Coastal Areas Management
KAP	Knowledge Attitude Practice
MPA	Marine Protected Area
NBSAP	National Biodiversity Strategy and Action Plan
NCEPA	National Conservation and Environmental Protection Act
NCEMA	National Conservation and Environmental Management Act
NDPD	National Draft Physical Development Plan
NHCS	Nevis Historic & Conservation Society
NIA	Nevis Island Administration
NICE	National Implementation Coordinating Entity
NNE	North North East
NPDP	National Physical Development Plan
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
OPAAL	OECS Protected Areas and Associated Livelihoods
PA	Protected Area
PERB	Protecting the Eastern Caribbean Region's Biodiversity
PMS	Participating Member States
RAPPAM	Rapid Assessment and Prioritization of Protected Areas Management
SCHS	St. Christopher Heritage Society
SCNT	St. Christopher National Trust
SEP	South East Peninsula

SEPMPA	South East Peninsula and Narrows Marine Protected Area
SGD	St. George's Declaration
SIDS	Small Island Developing States
SKN	St Kitts & Nevis
SKTA	St Kitts Tourism Authority
SPMMA	Sandy Point Marine Management Area
TOR	Terms of Reference
UNDP	United Nations Development Programme
US	United States
USA	United States of America
WHO	World Health Organisation

LIST OF ACKNOWLEDGEMENTS

Planning Unit, Nevis

Ms. Rene Walters
Ms. A. Delpeche
Mr. L. Newton
Ms. Claudia Walwyn
Mr. Titlon Douglas

Department of Planning and Environment, St. Kitts

Mr. Randolph Edmead
Ms. June Hughes
Mr. A. Blanchette
Mr. R. Browne
Mr. E. Mattenet
Mr. A. J. Farier
Mr. Sylvester Belle

OPAAL Site Coordinator

Ilis Watts

Nevis Historical Conservation Society

Mr. John Guilbert
Ms. E. Hanley
Mr. G. De Vries

St. Christopher National Trust

Ms. Jacqueline Armony
Mr. L. Armony
Ms. D. Mottram
Ms. G. Challenger Bird
Ms. Kathleen Orchard

Agricultural Department, St. Kitts

Ms. Raquel Williams
Mr. P. Benjamin

Department of Agriculture, Nevis
Mr. E. Evelyn
Ms. Althea Arthurton

Department of Fisheries, St. Kitts
Mr. Joseph Simmons

Department of Fisheries (Nevis)
Mr. E. Pemberton

Fishers of Nevis
Mr. M. Daniel
Mr. C. Christmas

Kenneth Dive Center (SKT)
Mr. K. Samuel

Greg's Safaris
Gregory Pereira

Department of Maritime Affairs
Mr. J. Greene

Water Department, St. Kitts
Mr. E. Stevens
Mr. E. Ible

Nevis Water Department
Mr. G. Morris

St. Kitts Tourism Authority
Mr. R. Hamilton
Ms. Goldha Franks

Ministry of Tourism – Nevis
Mr. C. Williams

Biology Department C.F.B. College
Mr. S. LaPlace

Nevis C.I.C
Mr. K. Evelyn

The Nature Conservancy
S. Margles
J. Knowles
R. Blyther

Ministry of Community Development (St. Kitts)
Mr. Cuthbert Caines

**THIS DOCUMENT IS FORMATTED FOR TWO SIDED PRINTING.
BLANK PAGES ARE INSERTED WHERE REQUIRED TO START NEW CHAPTERS
ON AN ODD-NUMBERED PAGE. SUCH PAGES ARE MARKED:**

THIS PAGE IS LEFT INTENTIONALLY BLANK



This activity is funded by the Global Environment Facility (GEF) through the World Bank and the Fond Français de L'Environnement Mondial (FFEM) and the Organization of American States (OAS).

The views expressed herein are those of the author(s) and do not necessarily reflect the views of the donor agencies supporting the activity or of the OECS”.

THIS PAGE LEFT INTENTIONALLY BLANK



Ecoengineering Caribbean Limited

**62 Eastern Main Road
St. Augustine, Trinidad, West Indies**

Phone: (868) 645 4420

Fax: (868) 662 7292

e-mail: ecocaribe@mail.tt

ECO REPORT No. 43/2009

April 07, 2010

**ORGANISATION OF EASTERN CARIBBEAN STATES
ENVIRONMENT AND SUSTAINABLE DEVELOPMENT UNIT**

**PROTECTED AREAS SYSTEMS PLAN FOR
ST. KITTS AND NEVIS**

SYSTEMS PLAN REPORT

1 INTRODUCTION

This Systems Plan was prepared by Ecoengineering Caribbean Limited for the Environment and Sustainable Development Unit of the Organisation of Eastern Caribbean States (OECS-ESDU). It was conducted in accordance with our proposal dated December 22, 2008, submitted to OECS-ESDU.

This report contains 8 chapters. The remainder of this chapter provides a brief background and the rationale for the proposed project, indicates the scope of the report, provides the objectives of the proposed project, and finally lists limitations for the use of the Plan. Chapter 2 describes the process by which this Plan was prepared and lists the sources of the information used while Chapter 3 discusses the framework for the PA System including the legal framework, international obligations, the OPAAL Project, the basis for considering the proposed PAs and finally how this plan is linked to other national planning strategies. Chapter 4 summarizes the ecological status of the two islands that make up the Federation of St. Kitts and Nevis while Chapter 5 describes the present status of the Ecological and Historical / Cultural Base of the proposed protected areas.

Chapter 6 describes the units of the National Protected Areas System on the basis of resources / assets, pressures / threats and suitability of units. Chapter 7 presents the development strategy for the Protected Areas System with respect to the NCEMA Act, existing and proposed management strategies and existing and proposed financing strategies.

Finally, Chapter 8 comments on the way forward and outlines the priorities for individual units of the PA System, makes some comments on organizational arrangements and recommends further studies and training.

For ease of reading and to make the document more manageable all figures are included as Appendix A to this report. Additionally, more detailed data or supporting studies are contained in the following additional appendices:

APPENDIX B:	RESULTS OF ECOLOGICAL GAP ASSESSMENT
APPENDIX C:	RESULTS OF RAPPAM WORKSHOP
APPENDIX D:	NOTES OF FINAL CONSULTATION MEETINGS
APPENDIX E:	FRAMEWORK OF THE PA SYSTEM
APPENDIX F:	SPECIES LISTS
APPENDIX G:	STATUS OF THE ECOLOGICAL AND HISTORICAL / CULTURAL BASE

1.1 Background

The OECS Secretariat through its Environment and Sustainable Development Unit (ESDU) is implementing the OECS Protected Areas and Associated Sustainable Livelihoods (OPAAL) Project.

Recognizing the importance of the sustainable management of its natural resources and rich biodiversity, the Governments of the OECS Participating Member States (PMS) have made significant commitments to protecting their countries' resources as signatories to international conventions and through policy statements, legal and institutional instruments, recent environmental programs, and financial support of conservation activities through budget allocations. They have also recognised the importance of establishing protected areas as the primary method of preserving biodiversity and conserving valuable natural resources assets.

Nonetheless, significant impediments continue to exist in terms of an effective framework for establishing and managing protected areas (PAs) if they are to function effectively to prevent further biodiversity degradation. Existing institutional arrangements within PMSs are weakened by gaps in the present policy framework, including limited incorporation of environmental and social costing into economic decision making and inadequate systems in support of integrated planning, information sharing and collaboration among agencies and other stakeholders. As a result, tourism and coastal development, upstream construction and rural development continue to cause detrimental levels of coastal sedimentation and erosion, and unsustainable exploitation of both living and non-living resources with inadequate planning and coordination continue to pose significant threats to biodiversity conservation.

In terms of planning for PAs, only some of the PMSs have Systems Plans in place, most of which are outdated and do not encompass existing and proposed terrestrial and marine areas in a comprehensive nor cohesive manner. The projected outputs for Component 1 of the OPAAL Project address Policy, Legal and Institutional Arrangements Reform within PMSs and include eight goals. This National Protected Areas Systems Plan for St. Kitts and Nevis is being implemented under Goal v: “updated or new national PA System Plans”.

1.2 Rationale

The development of this Systems Plan is a direct result of the recognition of the importance of establishing protected areas as the primary method of preserving biodiversity and conserving valuable natural resources assets and historical / archaeological sites. The establishment of this System of Protected Areas also puts the Federation of St. Kitts and Nevis in line with other OECS Member States which already have Systems Plans in place. Finally, this Systems Plan was written to integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity and cultural heritage into relevant sectoral or cross-sectoral plans, programs and policies.

1.3 Objectives of PA Plan

The following are the objectives of this study and report:

- To present a practical, time-frame specific phased approach to implementation of the PA Plan;

- To provide the full range of required resources and capacity building for establishing and managing the system;
- To recommend means of financing the operationalisation of the plan;
- To indicate the level of priority for each of the proposed system components;
- To provide a means to monitor and evaluate the system and its effectiveness over the timeframe of the plan; and
- To provide the proposed boundaries of the sites being proposed.

1.4 Scope of Study

This Systems Plan represents the fifth in a series of report deliverables under the contract for the preparation of a Protected Areas Systems Plan for St. Kitts and Nevis. This report is written in compliance with Task 4: Drafting of the Systems Plan under the Scope of Services required as part of the Terms of Reference for this project.

1.5 Limitations

There were a number of limitations encountered while drafting this Systems Plan, including the following:

- Unavailability of Site Specific Data on Biological Diversity;
- Limitation of Site Visits;
- Unclear Rationale for consideration of Specific Sites; and
- Timing of Parallel OECS Studies.

Each of these limitations will be discussed below. Based on that discussion, it will be clear that the available information is somewhat lower in extent and quality than would be desirable for preparing a Protected Areas Systems Plan. Notwithstanding this, the available information does provide a basis for preparing an initial System Plan. However, as will be discussed in the concluding chapter, it will be necessary to revise this Plan as soon as additional data becomes available.

1.5.1 Unavailability of Site-Specific data on Biological Diversity

At the majority of sites being considered for this Systems Plan, biodiversity was cited as a key factor. Unfortunately, biological data on individual sites (and indeed for the country) as a whole was very limited. Where data was available, it was patchy and there was also some inconsistency in the data (that is, one paper would often times contradicted another).

1.5.2 Limitation on Site Visits

Early in the life of this study, a lengthy listing of potential sites was identified for potential inclusion in this Systems Plan. In the absence of comprehensive data on all of these sites (see Section 1.5.1, above), site visits were the most important data-gathering mechanism for determining whether a specific site would, in fact, be included in the Systems Plan. Unfortunately, the schedule and budget for this assignment precluded visits to all of those sites. While this was a reasonable approach to preparing this initial Systems Plan, it must be cautioned that recommendations related to specific sites may be subject to revision when more site-specific information becomes available .

1.5.3 Unclear Rationale for Consideration

As indicated in Section 1.5.2, above, a lengthy listing of potential sites was identified for potential inclusion in this Systems Plan. To do this, Ecoengineering relied on information and suggestions from various in-country agencies (Government Agencies and other Key Stakeholders). We consider this to be a very effective approach, since in-country personnel inevitably have a firmer grasp of the issues involved than our staff can be expected to develop in a relatively short assignment. There was clear consensus among stakeholders as to the rationale for including many of the larger sites. It must be noted, though, that the rationale for suggesting some of the smaller sites was not always clear. In such cases, the sites were not eliminated from the listing. Instead, Ecoengineering described the rationale based on our own evaluation of the site.

1.5.4 Timing of Parallel OECS Studies

This System Plan study was one of several similar studies being conducted in St. Kitts and Nevis and the wider OECS at roughly the same time. This resulted in two challenges: apparent lack of effective co-ordination and availability of outputs.

Ecoengineering did not receive adequate information on parallel studies that were being undertaken, even where we asked for this; and it appears that stakeholders and other consultants had a similar problem. For example, on one occasion a consultant on one study received an email from a stakeholder requesting clarification on another study. While parallel studies may have some very important benefits (see below), that approach also has some drawbacks. In countries as small as St. Kitts and Nevis, stakeholders may become “fatigued” by requests (often for similar information) from different consultants in a relatively short space of time. The same holds true for requests to devote time to Workshops, etc.

Related to this comment is the sequencing of particular studies. The Ecological Gap Assessment and the Sustainable Financing Study preceded the Systems Plan study, and so outputs from those studies formed useful inputs to this study. Unfortunately, the outputs from other studies (such as the Ecological and Socio-Economic Studies for the Central Forest Reserve) were not available to this study, which contributed to the unavailability of information on biological diversity discussed in Section 1.5.1, above.

2 PROCESS OF PLAN PREPARATION

This chapter outlines the process by which this Systems Plan was prepared. The plan was drafted, in consideration of the objectives stated in the Terms of Reference provided by the OECS-ESDU such that:

The plan is to be practical, time-frame specific (and is to cover a minimum period of 10 years) and should specify a phased approach to implementation. The scope of the plan and its approach to systems management will reflect the intent of the OECS Model PA Systems Plan Act and Policy. It should detail the full range of required resources and capacity building for establishing and managing the system and recommend means of financing its operationalisation, and indicate the level of priority for each of these aspects. The plan must prescribe a means to monitor and evaluate the system and its effectiveness over the timeframe of the plan. The plan must include geo-referenced maps of the specific areas being recommended for inclusion in the Plan, identifying their proposed boundaries, topography, distribution of resources and habitats, existing infrastructure, settlements, existing management zones, and whatever else is deemed necessary to complete the various site profiles.

This chapter is sub-divided into the following headings:

- Workplan;
- Review of Data;
- Site Visits;
- Workshops;
- Data Analysis; and
- Public Participation.

2.1 Workplan

The workplan developed for this assignment was as follows:

- Inception Meeting / Conference Call and Finalization of Work Plan,
- Review of Relevant Documents,
- Site Visits,

- Conduct of Ecological Gap Analysis and RAPPAM Workshops,
- Preparation of Draft Systems Plan,
- Presentation of Draft Plan to NICE, Steering Committee and National Technical Advisory Committee, and
- Submission of Finalized Systems Plan and Final Report to ESDU.

The first output of this assignment was a report detailing this workplan. This document was submitted to OECS-ESDU on March 31, 2009.

2.2 Review of Data

Three sources of information were accessed for this review:

- Documents listed in the Terms of Reference,
- Published Documents, and
- Internet Sources.

2.2.1 Documents listed in the Terms of Reference

The documents listed in the TOR (where available) were accessed from two sources:

- OECS-ESDU; and
- Governmental and Non-Governmental Agencies in St. Kitts and Nevis.

As part of the overall OPAAL project, OECS-ESDU assembled a number of reports and other documents. These documents (where available) were made available to Ecoengineering for use on this assignment.

In addition, Ecoengineering circulated a data request to a number of agencies in St. Kitts and Nevis for any information on the protected areas being proposed. The receipt of data by this method proved to be slow and a decision was therefore taken to send an Ecoengineering staff member to St. Kitts and Nevis to meet with the various agencies and gather data. This method proved more fruitful and the data gathered were used to assemble a Literature and Information Review Report which was submitted to OECS-ESDU on August 20, 2009.

2.2.2 Published Documents and Internet Sources

A number of documents on the following topics were also accessed for use in developing this Systems Plan:

- Existing Systems Plans in the Wider Region;
- RAPPAM Methodology; and
- System Planning Guidance documents.

Again, as noted in Section 2.2.1 the output of this review of documents was a Literature and Information Review Report.

2.3 Site Visits

One of the first activities undertaken in-country was a visit to a representative number of existing and proposed protected areas to verify their nature and status. These site visits were conducted over a period of 2 days on June 19 and 20, 2009. We were guided by the NICE as well as our review of the available documents to determine which PAs were considered representative of a wide range of habitat types and were therefore suitable for visiting. The actual sites to be visited and the schedule for these visits were finalized in conjunction with the NICE. These are listed in Table 2-1.

TABLE 2-1: SITES VISITED IN JUNE 2009

ST. KITTS	NEVIS
BASSETERRE VALLEY AQUIFER NATIONAL PARK	BATH PROTECTED AREA
SOUTH-EAST PENINSULA MARINE PARK	NEVIS PEAK NATIONAL PARK
FRIGATE BAY SALT POND	INDIAN CASTLE PROTECTED AREA
HALF MOON POND	FORT ASHBY
OLD ROAD TOWN PETROGLYPH	NELSON SPRINGS
CENTRAL FOREST RESERVE NATIONAL PARK	PINNEY'S ESTATE
BRIMSTONE HILL FORTRESS NATIONAL PARK	NEW RIVER ESTATE
BELMONT ESTATE	NEW RIVER SPRINGS
BLACK ROCKS	SEA HAVEN
SPOONER'S GINNERY	HISTORIC CHARLESTOWN

At each site visit a checklist was filled out to note the status of the sites. The observations made during the site visits were contained in a Report on the Site Visit which was submitted to OECS-ESDU on July 27, 2009. The information in these checklists as well as other documents received during the data collection phase was used to draft Chapters 5 and 6 of this Systems Plan.

2.4 Workshops

Two workshops were held to gather information for drafting this Systems Plan:

- An Ecological Gap Assessment Workshop (June 22 & 23, 2009); and
- A Rapid Assessment and Prioritization of Protected Areas Management Workshop (RAPPAM) {June 25 & 26, 2009}.

2.4.1 Ecological Gap Assessment

2.4.1.1 Overview

As part of a parallel study of protected areas in St. Kitts and Nevis, The Nature Conservancy facilitated an Ecological Gap Assessment workshop on June 22 and 23, 2009 at the Nevis Cooperative Credit Union building. This workshop's objective was to inform the plan content in terms of key threats and needs for existing and proposed PAs, management needs, priorities and strategies. This workshop was a follow-up to an initial Gap Assessment Workshop held on November 13 & 14, 2008. Appendix B provides a full description of the Ecological Gap Assessment Workshop.

2.4.1.2 Summary of Workshop Objectives

The first workshop (held on November 13 & 14, 2008) was focussed on identifying the terrestrial, freshwater and marine key species and ecological systems that need protection, setting conservation goals for each target, and documenting the associated threats to the targets. This listing of targets and threats was reviewed during the second workshop held on June 22 & 23, 2009.

At the second workshop a significant amount of time was also spent verifying data pertaining to Nevis since this data had been difficult to come by in the period between the first and second workshop.

2.4.1.3 Limitations

The following limitations were identified either during the workshop or during the model runs:

- In some cases, critical species were listed as potential conservation targets. However, either due to lack of supporting GIS data, or lack of information on specific habitats, they were not selected as conservation targets.
- In other cases, although the species were deemed significant, the inability to map specific locations due to widespread occurrences resulted in them not being included on the target list.

2.4.2 RAPPAM

2.4.2.1 Overview

A Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM) workshop was conducted on June 25 and 26, 2009. The workshop was initially planned for St. Kitts but the facilitators (Ecoengineering Caribbean Limited) decided to host the first day in St. Kitts (June 25th) and to host the second day in both St. Kitts and Nevis (June 26th). This was considered a “lesson learnt” from the drop-off in attendance on the second day of the Gap Assessment workshop.

2.4.2.2 Summary of Workshop Objectives

The objective of the RAPPAM workshop was to receive inputs from key stakeholders concerning present and proposed protected areas in St. Kitts and Nevis by responding to the following categories of questions:

- Threats to Protected Areas;
- Vulnerability of Protected Areas;
- Planning Objectives;
- Management Decision-Making;
- Finances;
- Legal Security;
- Socio-Economic Context;
- Management Processes;

- Infrastructure;
- Staffing; and
- Communication and Information.

2.4.2.3 Limitations

There were a number of limitations encountered in conducting the RAPPAM Workshop. These included the following:

- Time Availability,
- Undeveloped Sites, and
- Terrestrial as opposed to Marine Sites.

The full RAPPAM Methodology involves a large number of questions which are time-consuming to answer if there is lively discussion on specific points. Rather than limit the discussion time, Ecoengineering selected a number of questions which could be answered using independently gathered data, and others which were not relevant to St. Kitts and Nevis. Those were excluded from the workshop. Even with that approach, the participants from Nevis were not able to complete all of the questions during the workshop and so had to answer some of the questions by way of follow-up e-mails.

Some of the questions in the RAPPAM Methodology clearly relate to established sites (for example, questions on staffing, availability of management plans, etc) as opposed to sites that are only proposed. Such questions were marked as “not applicable” by the participants when discussing proposed sites.

Several of the participants at the Workshop were more familiar with the terrestrial sites than the marine sites. Where that was the case, the participants identified the persons who were most knowledgeable about the marine sites and elected to adopt their opinions for the entire group. Similarly, the participants identified some persons as being more knowledgeable about the historical sites, and again elected to adopt their opinions for the entire group.

2.5 Data Analysis

2.5.1 Ecological Gap Assessment

The data collected at both the initial workshop and the second workshop were used as input data for the Marxan model runs (see Appendix B).

2.5.2 RAPPAM Workshop

The information collected from the RAPPAM workshop and follow-up collection of data from Nevis participants, was analysed to show the trends in the data in relation to the following main headings:

- Context,
- Planning,
- Inputs, and
- Processes.

A full description of the methods used to analyze the data as well as the results and charts showing trends are included as Appendix C to this report.

2.6 Public Participation

Public participation is an integral aspect of developing this Systems Plan. In fact, the Terms of Reference provided for this assignment identified several occasions where public participation was recommended. Consultation for this assignment was undertaken at the following times:

- Document Review,
- Site Assessment and Consultation with Stakeholders, and
- Presentation of Draft Systems Plan.

2.6.1 Document Review

As noted in Section 2.3 above, the initial approach to document collection was to send a letter requesting information to a number of agencies and perceived stakeholders based on initial discussions with the Department of Physical Planning and the Environment. This approach was found to be lacking and the decision was taken to visit St. Kitts and Nevis to meet with the various agencies. Meetings were held with the following agencies / organizations:

DATE	AGENCY	CONTACT PERSON
May 19, 2009	Planning Unit, Nevis	Rene Walters
May 19, 2009	Nevis Historical and Conservation Society	John Guilbert
May 20, 2009	Agricultural Department, St. Kitts	Raquel Williams
May 20, 2009	Brimstone Hill National Park	Kathleen Orchard
	St. Christopher Heritage Society	Jacqueline Armony D. Mottram
May 21, 2009	Planning and Environment	June Hughes
May 21, 2009	Department of Fisheries	Joseph Simmons

2.6.2 Site Assessment and Consultation with Stakeholders

The second phase of consultation was undertaken during the second in-country visit. This consultation took the form of two workshops as described in Section 2.4 above. These workshops brought together a cross section of agencies and other stakeholders to discuss various aspects of the proposed protected areas as well as to provide information for later analysis. The lists of attendees for both workshops are included in Appendices B and C.

2.6.3 Presentation of Draft Systems Plan

A first draft of the Protected Areas Systems Plan was submitted to the OECS-ESDU on December 17, 2009. A second draft of the Protected Areas Systems Plan was prepared and circulated to the in-country stakeholders on February 01, 2010. Subsequent to this, four in-country meetings were held to present the second draft Protected Areas Systems Plan as follows:

- | | | |
|---------------------|---|---------------------------------------|
| March 01, 2010 (PM) | - | NICE members / St. Kitts Stakeholders |
| March 02, 2010 (AM) | - | Nevis Stakeholders |
| March 02, 2010 (PM) | - | St. Kitts Stakeholders |
| March 04, 2010 (AM) | - | Decision-makers |

Appendix D contains an overview of each meeting as well as the lists of the attendees at each meeting. The feedback received from these meetings was incorporated into the Systems Plan report.

THIS PAGE LEFT INTENTIONALLY BLANK

3 FRAMEWORK FOR THE PA SYSTEM

This chapter highlights the context within which this Protected Areas System will be implemented. It summarizes a more detailed discussion of local, national, regional and international instruments contained in Appendix E. For convenience, this chapter is arranged under the following headings:

- Legal Framework;
- International Obligations;
- OECS Protected Areas and Associated Livelihoods Project (OPAAL);
- Basis for Consideration of Proposed PAs;
- Linkage with other National Planning Initiatives; and
- Funds, Fees and Levies.

3.1 Legal Framework

The following existing and draft laws contain requirements for the establishment and / or the management of protected areas:

- National Conservation and Environmental Protection Act, 1987;
- The National Conservation and Environmental Management Bill (Draft Act), 2009;
- Fisheries Act, 1984
- South-East Peninsula Land Development and Conservation Act, 1986; and
- Development Control and Planning Act, 2000.

3.1.1 National Conservation and Environmental Protection Act, 1987

This Act (NCEPA) was first enacted in 1987 and amended in 1996 and 2001. Its objective is *“to provide for better management and development of the natural and historic resources of Saint Christopher and Nevis for purposes of conservation; the establishment of national parks, historic and archaeological sites and other protected areas of natural and cultural importance including the Brimstone Hill Fortress National Park; the establishment of a Conservation Commission; and for other matters connected thereto.”*

Specific aspects of this Act with regard to Protected Areas are as follows:

- i. The Minister of Physical Planning may designate any land or marine area as a protected area. The purposes and objectives of each protected area must be gazetted. Private lands needed for a protected area may either be acquired or right of access or control of the land may be obtained through a written agreement with the private land owner.
- ii. The Minister or anyone he / she may designate can select, manage and administer a protected area.
- iii. A National Conservation Commission may be appointed and the Act provides for funding of the work of the Conservation Commission.
- iv. The Act establishes the following Protected Areas –
 - Brimstone Hill Fortress National Park; and
 - Bath Hotel (Nevis) historic site.
- v. A licence is required before digging or searching for an antiquity (even on private property). A list of special buildings to be preserved for their historic and cultural value may be developed, and incentives may be provided to owners for the restoration of such buildings.
- vi. The 1996 amendment creates the Department of the Environment.
- vii. The 2001 amendment concerns public beach access, preservation of beaches, pollution of the coastal zone, and damage or destruction to any historic building, site or monument.

The Act ends with Schedules concerning:

- Constitution of the Conservation Commission;
- Legal Description of the Brimstone Hill Fortress National Park;
- Wild Animals and Wild Birds;
- Description of Bath Hotel; and
- International Conventions.

3.1.2 The National Conservation and Environmental Management Bill, 2009

This bill represents a revision of the NCEPA Act and amendments, and will form the primary basis for creating, managing and regulating Protected Areas in St. Kitts and Nevis once it is enacted and proclaimed. Its purpose will be *“to provide for the conservation of the natural and cultural heritage of St. Christopher and Nevis, the prevention of pollution and the management of the environment, for the purpose of ensuring that the development of the country is sustainable, and for other connected matters.”*

The objectives of the Act are:

- a) the conservation and sustainable use of the natural heritage of Saint Christopher and Nevis (including conservation of biological diversity);
- b) the designation, continuation and management of National Parks and other protected areas;
- c) the prevention and mitigation of pollution of the environment (including the control of hazardous substances) and the protection of human health;
- d) the allocation of administrative responsibilities for environmental management;
- e) the implementation of multilateral environmental agreements;
- f) the regulation of the trade in indigenous biological resources;
- g) the provision of stable, adequate, secure and sustainable funding to finance the conservation and management of the environment; and
- h) any other matter related or ancillary to the foregoing purposes.

Specific aspects of this Bill with regard to Protected Areas are as follows:

- i. As with the NCEPA, the Minister of Physical Planning may designate any land or marine area as a protected area. The purposes and objectives of each protected area must be gazetted. Private lands needed for a protected area may either be acquired or right of access or control of the land may be obtained through a written agreement with the private land owner.
- ii. The Minister is to coordinate with other ministers and the Nevis Island Administration to secure consistency in the implementation of this Bill.
- iii. The composition, functions and Funding of the National Conservation Commission are all addressed.
- iv. The Minister in collaboration with the Commission is responsible for the management of protected areas. The Minister may delegate this to a competent authority (which may include a non-governmental organisation).
- v. A Management Plan is needed for each protected area, prepared in consultation with key stakeholders and reviewed at least once in every 10 years.
- vi. The Act establishes the following Protected Areas –
 - Brimstone Hill Fortress National Park;
 - Bath Hotel (Nevis) National Park; and
 - Booby Island Nature Reserve.
- vii. The Department of Environment as responsible for the development of a national strategy, plan and programme for the conservation of biological diversity.
- viii. All beaches are vested in the crown and that the public has a right to use the beaches for recreational purposes, so there must be at least one public access to all beaches. The Department of Environment is responsible for developing a Coastal Zone Management Plan which must be reviewed at least every ten years.
- ix. Pollution of any beach is prohibited and protected beaches may be declared.
- x. As with the NCEPA, a licence is required before digging or searching for an antiquity (even on private property). A list of special buildings to be preserved for their historic and cultural value may be developed, and incentives may be provided to owners for the restoration of such buildings.

- xi. The Minister may designate substances as pollutants, and a Register of Sources of Pollutants is to be developed. Standards regarding releases of pollutants are also to be developed.
- xii. Hazardous substances may be designated; and standards and procedures for handling, re-cycling and re-using, treatment and disposal of waste established.

The Bill also provides for an Environmental Trust Fund, which will be discussed in more detail in Section 3.6.1. It ends with a number of Schedules as follows:

- Categories of Protected areas;
- Description of the Brimstone Hill Fortress National Park;
- Description of Bath Estate National Park;
- Threatened or Endangered Species;
- Game Animals;
- Pests;
- Purpose For Which Trust Funds May/ May Not Be Used;
- Amendments and Repeals;
- National Conservation Commission - membership and procedures;
- Wild Animals and Wild Birds; and
- Multilateral Environmental Agreement to which St. Christopher and Nevis is a party.

3.1.3 Fisheries Act, 1984

This Act provides for the management of the fishery resources of St. Kitts and Nevis, and makes provision for the declaration of marine reserves with the following objectives:

- Protection of flora and fauna;
- Protection of natural breeding grounds and habitats of aquatic life (particularly those in danger of extinction);
- Allow for natural regeneration of aquatic life;
- Promote scientific study; or preserve and enhance natural beauty of these areas.

3.1.4 South-East Peninsula Land Development and Conservation Act, 1986

This Act designates the entire South-East Peninsula a conservation area, to focus on the protection of wildlife and its habitat. It requires that an environmental protection plan be developed to advise land use planning, which should also include proposals for the “preservation and management of the scenic and other natural resources”. Unfortunately, these provisions do not appear to have been implemented. On reviewer notes a lack of evidence of any serious planning for protected areas, coastal conservation, or the maintenance of environmental quality, as required by the Act. As such, critical natural resources and fragile wildlife habitat continues to be threatened (Environmental Support Services, 2006).

3.1.5 Development Control and Planning Act, 2000

This Act provides for the orderly development of land, and recognizes the need for conservation and protected areas. It supports the National Conservation and Environmental Protection Act (1987) through the mechanism of interim preservation orders to protect sites and immovable assets and plant protection orders to protect a group of plants, sites, or landscapes. The provision for environmental protection areas under this Act implies that specially demarcated areas require special treatment.

3.2 International Obligations

The Government of St. Kitts and Nevis has several obligations under a number of multilateral environmental agreements (MEAs). These include:

- The United Nations Convention on Biological Diversity (CBD),
- The United Nation Framework Convention on Climate Change (UNFCCC),
- The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), and
- The Convention for the Prevention of Pollution from Ships (MARPOL).

3.2.1 The United Nations Convention on Biological Diversity (CBD)

The CBD aims to make the best use of and mitigate threats to biological diversity. As a party to the CBD, the government of St. Kitts and Nevis is required to:

- Integrate conservation and sustainable use of the products of biodiversity into national planning.
- Identify, monitor, regulate and conserve biological diversity.
- Where appropriate, establish and manage a system of protected areas.
- Practice principles of conservation and sustainability both within and outside of protected areas.
- Take measures to rehabilitate endangered species, prevent introduction of alien species and control / eliminate those which threaten ecosystems or species.
- Maintain local knowledge & practices relevant to sustainable use of biodiversity.
- Implement a legal / regulatory framework to protect endangered species and enhance their recovery.

The St. Kitts and Nevis Government has emphasized the provisions of the CBD in two crucial articles in the National Biodiversity Strategy and Action Plan. These will be discussed in Section 3.5.1, below.

3.2.2 The United Nation Framework Convention on Climate Change

The UNFCCC aims to control and reduce the effects on the environment of greenhouse gas emissions. As a party to this agreement, the Government of St. Kitts and Nevis is required to consider issues of climate change in overall national planning, enact national programmes to mitigate (or adapt to) climate change, and promote sustainable management and conservation. Since large forested areas constitute “carbon sinks”, protected areas such as the Central Forest Reserve and Nevis Peak and Camps River would constitute areas which mitigate against climate change. And many of the other proposed protected areas will promote sustainable management and conservation.

3.2.3 The Convention on International Trade in Endangered Species (CITES)

The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) is an international agreement between Governments which aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It now accords varying degrees of protection to more than 30,000 species, the following are found in St. Kitts and Nevis: Green Turtle (*Chelonia mydas*), Hawksbill Turtle (*Eretmochelys imbricata*) and Leatherback Turtle (*Dermochelys coriacea*).

Relevant to this System Plan are the Leatherback Turtle which are known to nest particularly on the Northern Beaches such as Cayon River, Friars Bay Beach and North Frigate Bay; the Hawksbill Turtle which nests primarily on the Southeast Peninsula on beaches such as Major's Bay, Banana Beach and Cockleshell Bay and the Green Turtle which usually nest at North Frigate Bay, Half Moon Bay and around Conaree.

3.2.4 The Convention for the Prevention of Pollution from Ships (MARPOL).

The MARPOL Convention is the main international convention covering prevention or pollution of the marine environment by ships from operational or accidental causes. Specifically, it seeks to:

- generally control the discharging of oil and oily ballast from ships;
- prohibit the discharging of any oil from a tanker within 50 miles of the nearest land;
- prohibit the discharging of residues containing noxious substances within 12 miles of the nearest land;
- generally control the discharging of sewage from ships;
- prohibit the discharging comminuted and disinfected sewage within three nautical miles from the nearest land; and
- prohibit the discharging sewage which is not comminuted or disinfected within 12 nautical miles from the nearest land.

A serious problem associated with marine protected areas throughout the region is pollution, and the enforcement of this convention will go some way toward reducing marine pollution.

3.3 OECS Protected Areas and Associated Livelihoods Project (OPAAL)

The OECS OPAAL Project consists of three main components:

- Protected Areas, Policy, Legal and Institutional Arrangements Reform;
- Protected Areas management and Associated alternative Livelihoods; and
- Building Capacity for biodiversity Conservation.

This section discusses each of these components and then summarizes the OECS Policy on Protected Areas and the OECS Model Protected Areas System Act.

3.3.1 Regulatory Reforms

The first component seeks to establish more effective institutional frameworks for conservation management and seeks to adopt a harmonized approach to the creation and management of protected areas (PA) in the OECS Region.

3.3.2 Alternative Livelihoods

The second component focuses on establishing and enhancing protected areas. Six sites have been selected and designated as OPAAL Sites, including the Central Forest Reserve on the island of St. Kitts. Support is being given to baseline studies, management plans, and micro-financing.

3.3.3 Capacity Building

The third component focuses on training, capacity-building and awareness, not only at the OPAAL sites but elsewhere in all countries.

3.3.4 OECS Policy on Protected Areas Systems

The purpose of the OECS Policy on Protected Areas Systems is to provide member states with a policy document outlining the international obligations, vision, goals, objectives and principles of a common policy regarding the management of protected areas. It is a precursor to adopting a Protected Areas System Act and as such, provides the overall direction for the Act. Key Principles which guide the Policy include:

1. A consultative, representative and participatory approach.
2. Biological systems are best managed as a whole.
3. Harmonization of protected areas systems beyond national borders.
4. Cooperation and collaboration among institutions and individuals.
5. Transparency in decision-making.
6. Decision-making based on sound science.
7. The precautionary principle should be applied where all scientific information is not available.
8. Conservation is indispensable for equitable and sustainable development.

3.3.5 The OECS Model Protected Areas System Act

The objects and purposes of this model Act are to:

- Support the long-term growth and sustainable development in business, tourism, recreation, education, and scientific research;
- Provide for the sustainability of biodiversity, culture, livelihoods, heritage, watershed protection and other ecosystem services;
- Protect wilderness areas;
- Facilitate the implementation of the requirements, goals, and aims of applicable international agreements;

- Assist in the mitigation of natural and anthropogenic disasters; and
- Prepare for and respond to the impacts of climate change.

This Act envisages both a Protected Areas Coordinating Body and a Management Authority. It identifies the need for management planning, and also addresses coordination with other entities. In addition, it provides the criteria for Management Plans and addresses the implementation of management plans by means of annual operational plans.

3.4 Basis for Consideration of Proposed PAs

The proposed protected areas can be divided into two main categories:

- Biological / Natural Heritage Sites; and
- Historical / Cultural Sites.

3.4.1 Biological / Natural Heritage

The basis for the consideration of proposed Protected Areas in St. Kitts and Nevis stem from the IUCN's international guidance on the categorization of protected areas. The 1992 version of this listing consists of six categories, as shown in Table 3-1. The central principle of the IUCN's guidelines is that categories should be defined by the objectives of management (and not simply by the title of the area) or by the effectiveness of management in meeting those objectives. For example, areas could be managed for:

- Strict Protection,
- Ecosystem Conservation and Recreation,
- Conservation of Natural Features,
- Conservation through Active Management,
- Landscape / Seascape Conservation and Recreation, or
- Sustainable Use of Natural Ecosystems.

The island of St. Kitts and Nevis has prepared a National Conservation and Environmental Management Act, 2009 (Draft) {see Section 3.1.2} which, under its first Schedule, has implemented categories of protected areas. These categories are based on IUCN's list and are presented in Table 3-2 below.

TABLE 3-1: IUCN LIST OF PROTECTED AREAS

IUCN CATEGORY	DEFINITION
Ia – Strict Nature Reserve: Protected area managed mainly for science	Area of land and/or sea possessing some outstanding or representative ecosystem, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.
Ib – Wilderness Area: Protected area managed mainly for wilderness protection	Large area of unmodified land and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.
II – National Park: Protected Area Managed Mainly for Ecosystem Protection and Recreation	Natural area of land and/or sea, designated to: (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area, and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.
III – Natural Monument: Protected Area Managed Mainly for Conservation of Specific Natural Features	Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.
IV – Habitat/Species Management Area: Protected Area Managed Mainly for Conservation through Management Intervention	Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species
V – Protected Landscape/Seascape: Protected Area Managed Mainly for Landscape/Seascape Conservation and Recreation	Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity.

IUCN CATEGORY	DEFINITION
VI – Managed Resource Protected Area: Protected Area Managed Mainly for the Sustainable Use of Natural Ecosystems	Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural produces and services to meet community needs.

TABLE 3-2: ST. KITTS AND NEVIS CATEGORIES OF PROTECTED AREAS

CATEGORY	DEFINITION
I – NATIONAL PARK	An area consisting of a relatively large land or marine area or some combination of land or sea, containing natural and cultural features or scenery of national or international significance and managed in a manner to protect such resources and sustain scientific, recreational and educational activities on a controlled basis.
II – HISTORIC SITE	A place or site which is historic by reason of an association with the past and its part of the cultural or historical heritage of Saint Christopher and Nevis, and such a classification may include archaeological sites, historic landmarks, and areas of special historic or cultural interest.
III – NATURE RESERVE	An area containing outstanding or fragile natural features or life forms of national importance that need protection in an undisturbed state where the only permitted activities are management measures, controlled scientific research and educational study.
IV – MARINE RESERVE	An area as provided in Section 23 of the Fisheries Act, 1984.
V – AREA OF SPECIAL CONCERN	A place or site needing special protection and controlled use in order to stabilize or restore important ecological features or functions.
VI – SCENIC SITE	An area containing a scenic feature of national or local importance.
VII – BOTANIC GARDEN	A garden established for the preservation display and propagation of the national botanical resources.

3.4.2 Historical / Cultural

The Tourism Master Plan (1993) separates heritage sites into four categories, as shown in Table 3-3. The Tourism Master Plan recommends that all category 1 sites should be designated as “protected areas”, and that protected area designation should also be considered for all Category 2 sites. Sites located at Bloody Point, Palmetto Point, and Black Rocks are priorities in terms of conservation and research and as tourist attractions. Archaeological sites on the southeast peninsula should be protected and incorporated into the development and tourism planning for that region.

TABLE 3-3: CATEGORIES OF HERITAGE SITES

CATEGORY	DEFINITION
CATEGORY 1	Sites or complexes of exceptional historical and/or architectural value, which are presently or potentially essential to the tourism activity and must be preserved and treated with great sensitivity.
CATEGORY 2	Sites of considerable historical and/or architectural merit, with high potential for enhancing the tourism product. These sites should be protected but could be renovated for an adaptive use consistent with their use in tourism (major plantation inns, important historic churches, government and commercial buildings in current use.
CATEGORY 3	Windmills and chimneys (which represent two different technological eras in the history of plantation sugar production) and other important landmarks. These stone structures dot the countryside of St. Kitts and should be protected, stabilized and maintained.
CATEGORY 4	Other cultural and historical sites with limited importance and/or integrity that should be preserved with appropriate development and can be used to enhance the tourism program.

3.5 Linkage with other National Planning Initiatives

This Protected Areas System Plan cannot exist in isolation. Instead, it must be in harmony with other national planning initiatives to ensure that resources and capacity are allocated toward the same or similar national goals. Some of those are discussed below.

3.5.1 National Biodiversity Strategy and Action Plan (NBSAP)

The St. Kitts and Nevis National Biodiversity Strategy and Action Plan (NBSAP) constitutes the first of a set of actions by St. Kitts and Nevis to fulfil its obligations under the CBD Convention. It seeks to present a focused and dynamic report on strategies for the conservation of the biological resources of the country through:

- The specification of goals and objectives;
- Defining the current known range and status of biodiversity;
- Describing the probable sources of biodiversity losses;
- Analysis of gaps between current reality and aspirations; and
- Identification of actions that can address these gaps;

The NBSAP outlines a total of twenty three (23) projects to be executed by Government Agencies, NGO's and research groups, in a time frame of eleven (11) months to five (5) years.

3.5.2 National Environmental Management Strategy and Action Plan (NEMS)

The preparation of this plan for St. Kitts and Nevis (SKN) is a requirement of the government under the St. Georges Declaration (SGD) of Principles for Environmental Sustainability in the Organization of Eastern Caribbean States (OECS). The NEMS covers obligations under Principle 11 of SGD: Ensure the Sustainable Use of Natural Resources. This principle involves five (5) strategies:

- Manage terrestrial, marine and atmospheric resources, organisms and ecosystems in an appropriate manner to obtain the optimum sustainable productivity, while maintaining the integrity of natural and ecological processes and inter relationships.
- Design, promote and implement measures to prevent, mitigate and control degradation of aquatic, terrestrial and atmospheric environmental quality and processes conducive to desertification.
- Work together with Civil Society Organization to promote and facilitate improved national capability for the management of natural resources.
- Take all necessary measures within its legal and policy framework, including enactment of new legislation where appropriate, to ensure that conservation and management of natural resources are treated as an integral part of development planning at all stages and levels.
- Develop a schedule of development activities for which environmental impact assessment will be required as part of project definition and design, and the results of which will be considered in determining whether how a project will proceed.

3.5.3 St. Christopher Physical Development Plan

The 2006 National Physical Development Plan (NPDP) provides a framework to guide activities that are aimed at achieving strategic goals through the concrete implementation of projects that further economic growth and social progress on the island of St. Kitts. It states that the Government of St. Kitts and Nevis holds the strong conviction that conservation policies seek to protect and enhance landscapes as natural assets for recreational, aesthetics, economic and ecological reasons. The facets of the natural landscape that are of main conservation interest include national parks, special landscape features, trees and other sites of scenic value. Arising out of this Plan are the following:

- Coastal Area Management;
- Watershed Management;
- Management of Protected Areas; and
- Conservation of the Built Development.

3.5.3.1 Coastal Area Management

Beaches, coral reefs, sea grass beds and other endangered species found in the nearshore waters of St. Kitts are a major attraction to tourists, and these must be preserved if their contribution to tourism is to continue. Development and natural disasters (primarily storms) are the main factors that threaten these resources. Vulnerable sites include Conyers, Parsons, Frigate Bay, Irish Town Bay Road and Fortlands which require coastal protection works. The Plan envisages the preparation of a comprehensive Coastal Zone Management Plan, which will include specific measures to protect the Coastal Areas of St. Kitts.

3.5.3.2 Watershed Management

Key watershed areas and coastal aquifers are of vital importance to sustainable development, particularly in relation to water supply, fuel wood and the prevention of erosion and landslides. However, these areas are being threatened by development activities and unsustainable use of the resources which they have to offer. The Plan proposes to implement a comprehensive reforestation program; establish suitable tree crop plantations (silviculture); declare the Wingfield, Frankland, Stonefort, Greenhill, Phillips and Lodge catchment areas as Protected Areas; and adopt other measures to protect these valuable resources.

3.5.3.3 Management of Protected Areas

The environmental strategies proposed by the NPDP seek to protect and enhance landscapes as natural assets for recreation, aesthetic, economic and ecological reasons. Unique terrestrial habitats such as forests, ponds, mangroves, sand dunes, coral reefs, seagrass beds and beaches need to be designated for preservation. The NPDP therefore proposes to develop a Park and Protected Areas System Plan; restrict development on the Basseterre Valley Aquifer; establish marine reserves to protect coastal resources (Southeast Peninsula and Sandy Shoal); and declare other national parks and exercise controls on built development in inappropriate areas.

3.5.3.4 Conservation of the Built Development

The NPDP recognises the value of using the country's heritage resources as tourist attractions and educational tools. Some of the objectives of the NPDP in the conservation of built development include establishing a National Trust; preparing an Urban Revitalization Master Plan for the city of Basseterre; expediting projects for Spooner's Estate Yard, The De Poincy Chateau and Old Road Town; and seeking UNESCO World Heritage designation for Fort Charles.

3.5.4 Nevis Physical Development Plan

The main purpose for preparing an Island Physical Development Plan is to improve spatial planning for the enhancement of economic, social and environmental conditions for residents and for visitors to Nevis, and to sustain the Island for future generations. Under this Plan four areas have been identified where conservation and enhancement of the natural environment should take precedence over development:

- Nevis Peak Protected Area;
- Bath Bogs Protected Area;
- Camps River Wetland Protected Area; and
- Indian Castle Protected Area.

In addition to the four Protected Areas mentioned above, two Coastal Conservation Areas have been identified:

- Pinney's Beach Conservation Area; and
- Sea Haven Conservation Area.

Development may be allowed within these areas, but it must respect the natural quality of the area in its design, scale and type of use.

3.6 Funds, Fees and Levies

This section summarizes information on the Environmental Trust Fund envisaged under the draft NCEMA, as well as a number of other environmental fees and levies which are presently collected in St. Kitts and Nevis. The purpose of this presentation is to demonstrate that such fees and levies are not a new concept, and that there is precedent for collecting funds specifically for environmental purposes.

3.6.1 Environmental Trust Fund

NCEMA makes provision for an Environmental Trust Fund (see Section E.1.2.13 in Appendix E), administered by a Board of Trustees appointed by the Governor General. The resources of the fund will include allocations from Parliament; collections from relevant taxes, charges or fees; grants from foreign states of regional or international organizations and agencies; earnings on investments of the Fund, etc. The fund may be used to make grants for environmental programs or projects, and also to defray expenses of the Board. The Fund is exempt from all taxes, duties, fees levies, etc.

It is envisaged that this Fund will be a primary source of funding for programs and projects to be undertaken as part of this Protected Areas Systems Plan.

3.6.2 Other Taxes, Fees and Levies

Other environmental taxes, fees and levies presently collected in St. Kitts and Nevis are:

- Environmental Levy for Solid Waste,
- Environmental Levy on Used Motor Vehicles,
- Bottles and Cans Deposit Levy, and
- Fee for Tours.

An Environmental Levy of \$EC 5.00 is charged on departure from the Federation. This is intended to defray the cost disposing solid waste generated by visitors, and is deposited to the Solid Waste Management Company.

An Environmental Levy is also charged on the importation of used motor vehicles. This is also intended to defray the eventual cost of disposing of these vehicles, but is deposited to the Consolidated Fund. The levy is \$EC 5,000.00 for vehicles more than 5 years old, \$EC 3,000.00 for vehicles between 3 and 5 years old, and \$EC 1,000.00 for vehicles between 1 and 3 years old.

The Bottles and Cans Deposit Levy is paid on importation of non-returnable bottles and cans of beer, stout, malt and other drinks. Finally, information received during one of the consultation meetings is that an Environmental Tax Levy of \$1.50 is charged on all tourism related activities. Efforts to get further information on this levy proved futile.

4 ECOLOGICAL DIVERSITY OF ST. KITTS AND NEVIS

The small size and geographic location of St. Kitts and Nevis, as well as the climatic conditions experienced influences the terrestrial ecology and contribute to the relatively high endemism and vulnerability of its biota. The country borders the American continent which provides a stopover for migratory avian species during the winter months. In addition, some of the country's beaches are known to be nesting sites for various species of marine turtles. This chapter discusses the general biodiversity of the island of St. Kitts and Nevis under the following sub-headings:

- ▶ Terrestrial Resources,
- ▶ Coastal Resources, and
- ▶ Marine Resources.

The last section in this chapter discusses invasive species that have been observed in St. Kitts and Nevis and also provides some indication of their impact on the biodiversity of the islands.

4.1 Terrestrial Resources

This section on terrestrial resources will be discussed under the following headings:

- Vegetation,
- Invertebrates,
- Vertebrates,
- Amphibians,
- Reptiles, and
- Avifauna.

4.1.1 Vegetation

During the 1940's, J.S. Beard began field work and mapping to identify the various vegetation types which are found on the islands of St. Kitts and Nevis. As identified by Beard (1949), the vegetation types are discussed in Table 4-1 below. Approximately 121 species of trees are found in St. Kitts and Nevis (Horwith and Lindsay, 1999).

**TABLE 4-1: VEGETATION ZONES, (AS IDENTIFIED BY BEARD, 1949)
IN ST. KITTS AND NEVIS**

(Adapted from: *St. Kitts and Nevis Environmental Profile, 1991 and Vegetation Classification of St. Kitts and Nevis, 1999*)

VEGETATION ZONE	DESCRIPTION
ST. KITTS	
Rainforest	This forest type is located at two areas in St. Kitts: one lying in the headwaters of the Wingfield River and the other above Mansion Estate. The principal species in these areas are the relatively undisturbed Gommier (<i>Acryodes excelsa</i>) with under-story trees of Gommier and Palms.
Dry Evergreen Forest	Beard identified this as secondary forest, consisting of mainly intolerant pioneer species, occupying the lands below the rain forest. Some species include the Silk Cotton Tree (<i>Ceiba pentandra</i>) and the shrub <i>Bourreria succulenta</i> .
Palm Brake	This type of vegetation is found above elevations ranging from 1,200 to 1,800 feet. The dominant trees are the Mountain Palm (<i>Euterpe globosa</i>) which forms over 60 per cent of the total crop. Tree ferns and small trees make up the balance of the vegetation.
Elfin Woodland	This vegetative type occurs above the 2,000 foot contour. Beard describes it as a low, tangled growth, approximately 12 feet high with mosses and epiphytes. There is no distinct stratification, but for this classification system, this forest system is divided into a tree layer and a herbaceous layer. Species include the shrub Sardine (<i>Miconia spp.</i>), Wild Pine (<i>Podocarpus coriaceus</i>) and grasses such as <i>Isachne angustifolia</i> .
Dry Scrub Woodland	This type of vegetation (which was originally a deciduous seasonal forest) is concentrated in the Southeast Peninsula. There are 39 species identified in this area. Some species include Logwood (<i>Haematoxylon campechianum</i>) and <i>Comocladia dodonaea</i> .
NEVIS	
Rain Forest and Humid Forest	<p>The northwestern side of the mountain above Jessup's has abundant rainfall conditions and ample protection from prevailing winds. These conditions allow for the establishment of the only substantial stand of tall forest on the island. The dominant species in this forest type are the Mountain Cabbage (<i>Euterpe globosa</i>), Gumlin (<i>Dacryodes excelsa</i>) and Burrwood (<i>Slonea truncate</i>), which forms a thick dense canopy.</p> <p>The humid forest zone is the surrounding forest which resembles rain forest in terms of species content. The only difference is that the trees are smaller and do not form a thick dense canopy since they are exposed to high wind exposure. The prominent vegetation here is the Redwood (<i>Coccolobis diversifolia</i>).</p>
Elfin Woodland	This forest type is found on the summit of Nevis Peak and contains low (<3 meters), gnarled, tangled growth due to high wind exposure. Low woody plants and herbaceous plants are common here. Orchids (<i>Maxillaria coccinea</i>), mosses, ferns, anoids and grasses (<i>Isachne angustifolia</i>) are also abundant.

VEGETATION ZONE	DESCRIPTION
Montane Thicket	Located just above the rain forest and found only on the west side of the mountain, this forest type is dominated by Weedee (<i>Podocarpus coriceus</i>) and Mountain Cabbage Palm (<i>Euterpe globosa</i>).
Palm Brake	Palm brake is a band of Montane Forest that is located on very steep slopes where there are high winds (>550 meters on the eastern and southern slopes and >700 m on the northern and western slopes). This zone is dominated by Mountain Cabbage Palm (<i>Euterpe globosa</i>) and the rest of the forest consists of tree ferns (<i>Cyathea arborea</i>) and small trees.
Dry Scrub Woodland	This forest type is found on the low hills of the island and the dominant trees are various species of Acacia and Cassia. Other tree species include: Century Plant (<i>Agave americana</i>), Prickly Pear Cactus (<i>Opuntia rubescens</i>) and Pope's Head or Barrel Cactus (<i>Euphorbia pulcherrima</i>).
Dry Evergreen Forest	This forest type is found on the lower slopes of Nevis Peak. The dominant trees are White Cedar (<i>Tebuia heterophylla</i>), Black Mast (<i>Diosyros ebenaster</i>) and Loblolly (<i>Pisconia fragrans</i>).
Mangrove Woodlands	On the western and northern coastal regions of the island, there exists a series of White Mangrove Stands (<i>Lagunclaria racemosa</i>) which surround the fresh or brackish water lagoons.
Littoral Woodland	In the unaltered areas of Nevis's coastline, there exists a thin band of coastal vegetation, which functions as a barrier that prevents wave and wind erosion. Species which occur here are Seagrape (<i>Coccoloba uvifera</i>), Red Mangrove (<i>Rhizophora mangle</i>), White Mangrove (<i>Laguncularia racemosa</i>) and a type of Black Mangrove (<i>Avicennia nitida</i>).
Dry Zone Flora	This vegetation type is found in most of the island and is the result of disturbance for agricultural purposes. Very little of the original vegetation still exists, however it has been found that in recent years, most of the agricultural land has been abandoned and most of the vegetation is bushy pioneer forest. The dominant species are Logwood (<i>Haematoxylum camechianum</i>), Wild Tamarind (<i>Leucaena leucocephala</i>), Loblolly (<i>Pisconia fragrans</i>), Acacia (<i>Acacia sp.</i>), Genip and Clammy Cherry (<i>Cordia collococca</i>). Many agricultural and ornamental species have also become wild and can now be considered part of the natural vegetation.

Based on recent biodiversity studies (Horwith and Lindsay, 1999) St. Kitts and Nevis has 145 Pteridophyte species (fern and fern-allies), 22 of which occur on Nevis but not in St. Kitts and 41 of which occur in St. Kitts, but not on Nevis. Eighty-two species occur on both islands. There are also 45 plant species known to be endemic to the country or to the Lesser Antilles (Horwith and Lindsay, 1999). It should be noted that there are far more numbers of plant species which should be given conservation concern, however, the inadequacy of botanical data proves to be a hindrance in this matter. The list of endemic species in St. Kitts and Nevis, according to the list generated by R. Howard is presented in Table F-1 of Appendix F.

4.1.2 Invertebrates

Worldwide, invertebrates comprise far more taxa than the better studied vertebrate animals. However, for most taxa, no country-specific data on invertebrate diversity are well documented (Horwith and Lindsay, 1999). On the island of Nevis, some work has been done for invertebrate species that are of some importance, prominence or pose a hazard (CCA, 1991). These include:

- ▶ Poisonous Centipede (*Scolopendra dromorpha*)
- ▶ Wolf Spiders (*Lycosidae*)
- ▶ Donkey Spiders (*Theraphosidae*)
- ▶ Scorpions (*Scorpionida*)
- ▶ Crayfish (*Macrobrachium acanthurus*)
- ▶ Lesser Blue Crab (*Callinectes similes*)
- ▶ Caribbean Mud Fiddler Crabs (*Uca rapax*)
- ▶ Great Land Crab (*Cardisoma guanhumi*)
- ▶ Ghost Crab (*Ocypode quadrata*)
- ▶ Land Hermit Crab (*Icoenabita clypeatus*)
- ▶ Sally Lightfoot Crab (*Grapsus grapsus*);
- ▶ Honeybees (*Apis mellifera*)

Based on information compiled from various researchers and reports generated for the Caribbean Region, Table F-2 of Appendix F provides information on the invertebrates found globally and in the Caribbean.

4.1.3 Vertebrates

The vertebrates in St. Kitts and Nevis are discussed under the following subsections:

- ▶ Mammals
- ▶ Freshwater Fish
- ▶ Amphibians
- ▶ Reptiles
- ▶ Avifauna

4.1.3.1 Mammals

Bats are the only terrestrial mammals native to St. Kitts and Nevis, and they constitute the largest mammalian group. Six species in total for the country (see Table F-3 of Appendix F) have been recorded (Horwith and Lindsay, 1999). However, two others were documented during recent research (Horwith and Lindsay, 1999). Of these bats, the Long-tongued Fruit Bat (*Monophyllus plethodon*) is listed as 'Near Threatened' and the Dominican Myotis (*Myotis dominicensis*) is listed as 'Vulnerable' according to the IUCN's Red List of Threatened Species. All other species are of 'Least Concern'.

Based on information from the St. Kitts and Nevis Country Profile (1991) and the Biodiversity Profile for St. Kitts and Nevis (1999), other mammals in the country include:

- ▶ Agouti (*Dasyprocta agouti*): believed to be an Amerindian introduction, however, this animal is no longer reported to be on either island.
- ▶ White-tailed Deer (*Odocoileus virginianus*): introduced from Puerto Rico in 1931 to the Lodge Estate in St. Kitts.
- ▶ Indian Mongoose (*Herpestes javanicus*): introduced in the late 1800s to control rats that infested sugar cane plantations.
- ▶ Rats (*Rattus rattus* and *R. norvegicus*): inadvertently introduced since 1600s or earlier.
- ▶ Mouse (*Mus muscalus*): inadvertently introduced since 1600s or earlier.
- ▶ African Green (or Vervet) Monkey (*Cercopithecus aethiops*): introduced from West Africa approximately 300 years ago as a pet, escaped and naturalized.

4.1.3.2 Freshwater Fish

There are 9 species of freshwater fish reported for St. Kitts and 5 reported for Nevis. Mountain Mullet (*Agonostomus monticola*) and Mudfish (*Gobiidae*) occur in ephemeral pools or streams after prolonged periods of rain. *Poecelia reticulata* can be found in the streams on St. Kitts' southwestern side. The *Gambusia* species, Trout, Tilapia and Goldfish species were introduced to the islands, however, the Trout species did not survive and the status of the Tilapia species is not known (Horwith and Lindsay, 1999) although there are some indications that the species is still farmed in St. Kitts.

Freshwater fish are abundant in both coastal lagoons and mountain streams of Nevis, however there is limited identification of the species found there (CCA, 1991). The island is known to have the *Gambusia* species, Mudfish (*Gobiidae*) and one or two species of Tilapia. Mountain Mulletts (*Agonostomus monticola*) are also found on the island, however their current status is unknown (Horwith and Lindsay, 1999). Table F-4 in Appendix F gives a list of the Freshwater Fishes for St. Kitts and Nevis (Fishbase, 2008).

4.1.3.3 Amphibians

Only two species of amphibians are found on the islands of St. Kitts and Nevis. Firstly, the small Piping Tree Frog (*Eleutherodactylus johnstonei*) is native to St. Kitts and Nevis and is a Lesser Antillean Endemic (Horwith and Lindsay, 1999). They are primarily found in moist forests or similar habitats in bromeliads (CCA, 1991). Secondly, the Marine Toad (*Bufo marinus*) was introduced on the islands as a biological control for rats and mice (CCA, 1991). The Crapaud or Mountain Chicken (*Leptodactylus fallax*), a native to St. Kitts and Nevis became extirpated through habitat modification and overexploitation for food (CCA, 1991).

A recent introduction to the island of Nevis is the Cuban Tree Frog (*Ostopilus septentrionalis*) which was discovered on the property of the Four Seasons Resort in Nevis. This frog is confined to areas of permanent freshwater and reports indicated that it may have colonized Jessup's, just above the resort (Horwith and Lindsay, 1999).

4.1.3.4 Reptiles

The islands of St. Kitts and Nevis are home to ten (possibly eleven) recorded species or sub-species of terrestrial reptiles (Horwith and Lindsay, 1999). They include:

- ▶ Tortoise (*Geochelone carbonaria*): presumed to be introduced by the Amerindians. This tortoise occurs on both islands, although it is very wild.
- ▶ Common Woodslave Gecko (*Hemidactylus mabouia*): occurs throughout the Lesser Antilles.
- ▶ Giant Woodslave Gecko (*Thecadactylus rapicauda*): occurs throughout the Lesser Antilles.

- ▶ Lesser Antillean Iguana (*Iguana delicatissima*): thought to be extirpated in St. Kitts but may still exist on Nevis and the St. Eustatius Bank on the island of St. Eustatius.
- ▶ Green Iguana (*Iguana iguana*): recent sightings of this species in St. Kitts may be escaped pets.
- ▶ Green Lizard (*Anolis bimaculatus bimaculatus*): a subspecies endemic to St. Kitts, Nevis and St. Eustatius.
- ▶ Brown Lizard (*Anolis wattsi schwartzi*): also endemic to St. Kitts, Nevis and St. Eustatius.
- ▶ Ground Lizard (*Ameiva erythrocephala*): endemic to St. Kitts, Nevis and St. Eustatius.
- ▶ Blind Snake (*Typhlops monastus*): fairly common in both St. Kitts and Nevis. Found on wetter habitats on the slopes of moist forests.
- ▶ *Typhlops monastus geotomus*: is a subspecies of the Blind Snake also occurring on both islands.
- ▶ Racer Snake (*Alsophis rufiventris*): recorded for both islands, however, there have been no confirmed sightings for several years and it is suspected that the species has been extirpated by the mongoose.

4.1.3.5 Avifauna

This section begins with a description of the avian diversity of the entire country as derived from several sources and follows with a brief overview of the avian diversity of three Important Bird Areas as defined by Bird Life International.

4.1.3.5.1 Country Diversity

The forested areas, salt ponds, wetland areas and coastal areas of St. Kitts and Nevis are known for their rich avifaunal diversity. Previous literature from St. Kitts and Nevis have documented that St. Kitts and Nevis support less than 100 bird species, however, recent research has increased this number to 116 species (Horwith and Lindsay, 1999). Of the 116 species of birds found in St. Kitts and Nevis, 113 are indigenous species (at least 41 currently or formerly breeding on the island) and 3 are non-native species. Of

the 72 native, non resident species, 22 are seabirds, waterfowl or other aquatic species, 26 are shorebirds, 7 are non-passerine landbirds and 17 are passerine landbirds (Steadman, et. al., 1997). Fieldwork conducted in 1997-1998 has documented several new sightings of birds in St. Kitts and Nevis:

ST KITTS

- ▶ Sandwich Tern (*Sterna sandvicensis*)
- ▶ Blue Grosbeak (*Guiraca caerulea*)
- ▶ House Sparrow (*Passer domesticus*)

NEVIS

- ▶ Pied-Bill Grebe (*Podilymbus podiceps*)
- ▶ American Wigeon (*Anas Americana*)
- ▶ Purple Gallinule (*Porphyryla martinica*)
- ▶ Mangolia Warbler (*Dendroica magnolia*)
- ▶ Prothonotary Warbler (*Protonotaria citrea*)
- ▶ Kentucky Warbler (*Oporornis formosus*)
- ▶ Summer Tanager (*Piranga rubra*)

Several surveys and projects were conducted over the years on the biodiversity of the country. Based on three of these reports, Table F-5 of Appendix F compares the bird species identified for these reports.

Generally, the species of birds present in previous studies are also present in recent studies. The health and status of the populations of some of the species are yet to be determined. However, Alan Vittery's 2006 survey did reveal healthy populations of certain bird species such as the Black-necked Stilt (*Himantopus mexicanus*), which is noted in the book 'The Birds of the West Indies' as 'Uncommon in Northern Lesser Antilles.' Vittery, (2006) also saw healthy populations (up to 24 birds) of the endangered White-Cheeked Pintail (*Anas bahamensis*). In addition, Mr. Vittery has sighted several new bird species on the island such as the Pacific Golden Plover (*P. fulva*) and has heard from resident bird watchers, that the Red-capped Bullfinch (*Pyrrhula erythrocephala*) {once thought to be extinct} probably still exists in the high forests on the volcano.

4.1.3.5.2 Diversity of St. Kitts Central Forest Reserve

Bird Life International lists 10 species that are considered range-restricted to the Central Forest Reserve. These are: Bridled Quail-dove (*Geotrygon mustacea*), Lesser Antillean Flycatcher (*Myiarchus oberi berlepshii*), Purple-throated Carib (*Eulampis jugularis*), Green-throated Carib (*Eulampis holosericeus*), Antillean Crested Hummingbird (*Orthorhyncus cristatus*), Brown Trembler (*Cinclocerthia ruficauda pavidus*), Pearly-eyed Thrasher (*Margarops fuscatus*), Scaly-breasted Thrasher (*Margops fuscus*), Lesser Antillean Bullfinch (*Loxigilla noctis*), and Antillean Euphonia (*Euphonia musica*).

4.1.3.5.3 Diversity of S. E. Peninsula Ponds

The ponds of the South East Peninsula are also listed as an Important Bird Area by Bird Life International. The website lists the following ponds as important to birds on the peninsula: Greatheeds Pond and beach, Half Moon, Friar's Bay, Great Salt, Major's Bay, Mosquito Bay, Little Salt, and Frigate Bay Ponds. The boundaries would be limited by an area thirty meters from the high water line of each pond.

Least Terns (*Sterna antillarum*) nest at three sites on the Southeast Peninsula. A survey in 2004 revealed that Mosquito Bay Pond has 20 Least Tern pairs, Great Salt Pond has 27 pairs, and Greatheeds Beach (which is just north of the peninsula) has 18 pairs. Although St. Kitts' population of 65 pairs meets the Important Bird Area requirements, there is no one site where concentrations are sufficient to classify as an IBA. It is important to note that Least Tern colonies have previously been recorded at other nearby sites, indicating possible movement between breeding sites.

4.1.3.5.4 Diversity of Booby Island

Booby Island, which is located approximately halfway between St. Kitts and Nevis is the only remaining breeding location for a number of species including: Red-billed Tropicbird (*Phaethon aethereus*) (2 pairs), Laughing Gull (*Larus atricilla*) (125 pairs), Roseate Tern (*Sterna dougallii*) (6 pairs), Bridled Tern (*Sterna anaethetus*) (60 nests), Sooty Tern (*Sterna fuscata*) (225 nests), and Brown Noddy (*Anous stolidus*) (8 pairs). This island is also listed as an Important Bird Area by Bird Life International.

4.2 Coastal Resources

Freshwater lagoons, saltwater lagoons, mangrove systems, coral reefs and seagrass beds are the five coastal habitats which are of critical importance to the nearshore tropical marine ecosystems of St. Kitts and Nevis (Planning Unit, 2004). The sandy beaches of the island also play an important role in the country's tourism.

4.2.1 Beaches

The island of St. Kitts has a total coastline of 78.1 km, consisting of 34.7 km of cliff rocks, 10.8 km of cobble, 6.3 km of boulders and rocks, 13.1 km of black volcanic sand and 13.2 km of golden sand (coralline and shell) {Planning Unit, 2004}. These coralline and shell sand golden beaches occur at Frigate Bay (north and south) and the beaches of the Southeast Peninsula, including: Friars Bay, Turtle Bay, Canoe Bay, Mosquito Bay (Turtle Beach), Majors Bay, Cockleshell Bay, Sandbank Bay and Banana Bay. Beaches at Sandy Point, Dieppe Bay and Conaree are mixed terrigenous and marine. The rest of the beaches are mostly volcanic black sand (HCL, 2003).

Nevis also has sandy beaches, rocky shores and massive sea cliffs. The most prominent sandy beach is a 4 km stretch of coastline north from Charlestown to Cades Bay, called Pinney's Beach. It is composed of both coral fragments and terrestrial soils that give it a yellow appearance and is typical of a number of beaches found along the leeward coast of the island (Planning Unit, 2004). South of Charlestown, there is a progression to black sand beaches which have been formed from volcanic materials. Black sand beaches are more typical of the east coast and are generally less extensive (HCL, 2003).

The golden sand beaches of the island are notorious for their influx of tourists. St. Kitts and Nevis's tourism is primarily sun, sand and sea and tourism on the island contributes approximately 6.4% to the GDP (1993-2002) {Planning Unit, 2004}.

4.2.2 Freshwater and Salt Water Lagoons

On the island of St. Kitts, there are number of saltwater ponds located on the Southeast Peninsula. The largest of these natural salt ponds is The Great Salt Pond which covers 1.6 km in diameter. The other ponds of the Peninsula include The Little Salt Pond,

Friars Bay Salt Pond (saline to brackish water) and the salt ponds at Major's Bay and Cockleshell Bays. Saltwater ponds are a body of water of varying surface area with characteristic high salinity as a result of high evaporation of runoff waters from catchment basins. These ponds are not being used for salt production as a result of a number of economic factors. Nevertheless, they possess great diversity with the production of brine shrimps at certain times of the year (Biodiversity Action Plan and Steadman, et.al, 1997).

Two small ponds located northeast of Basseterre are the only freshwater ponds on the island of St. Kitts. One of them, the Greatheeds Pond is described as a natural freshwater ecosystem which also functions as a sink for both natural and man-induced sediment runoff. The pond has no visible connection to the sea (Walters, 1995 and US Army Corps of Engineers, 2004).

Nevis has a system of freshwater lagoons located throughout the island, some of which are along the coast and are therefore subject to saltwater intrusion (US Army Corps of Engineers, 2004). These lagoons may be as a result of either mountain ghaut (stream) run-off, as in the case of Pinney's Estate Lagoons, or underground springs as evidenced at Nelson Spring in Cotton Ground (Planning Unit, 2004).

These ponds provide habitats for many migratory seabirds and shorebirds in the fall and spring such as the Great Blue Heron (*Ardea herodias*) and the Western Sandpiper (*Calidris mauri*). Three local nesting shorebirds have been documented: Black-necked Stilt (*Himantopus mexicanus*), Wilson's Plover (*Charadrius wilsonia*) and Snowy Plover (*Charadrius alexandinus*). Other waterbirds such as ducks and coots such as the American Coots (*Fulica americana*), Caribbean Coots (*Fulica caribaea*) and the Blue-winged Teal (*Anas discors*) use the local salt ponds as wintering habitats (Planning Unit, 2004). The lagoons and ponds also support mangrove systems (see Section 4.2.3).

4.2.3 Mangroves

Mangrove systems are known to be of ecological importance since they:

- ▶ Provide the primary habitat for various species of waterfowl, other migratory shorebirds and seabirds, fish, mammals and insects. These areas are also known to be popular breeding ground for waterfowl as well as a nursery for various species of fish and shellfish;

- ▶ Act as a sieve that naturally filters and recharges the water that comes from upstream rivers and catchments. They act as giant sponges, slowing the flow of surface waters and reducing the impact of flooding; and
- ▶ Prevent soil and coastal erosion. They buffer water bodies from potentially damaging land use activities such as agriculture and industrial activities.
- ▶ Protect the coastline from damaging storm surges and tidal waves.

Generally, the mangroves are not abundant on the island of St. Kitts. The most extensive mangrove systems occur on the Southeast Peninsula (Planning Unit, 2004). According to Beard (1949), the main mangrove types are Red (*Rhizophora mangle*), White (*Laguncularia racemosa*) and Black Mangroves (*Avicennia nitida*). The red mangroves are usually dominant and the black and white mangroves occupy the landward margins of the pond systems.

On the island of Nevis, red and black mangroves no longer occur naturally in any of the mangrove systems, although they were present less than 20 years ago (HCL, 2003). Stands of white mangroves are dominant on the island, accompanied by fewer buttonwood species. These mangrove systems can be found at:

- ▶ Bath Bogs / Bath Stream (Southwest coast adjacent to the Gallows Bay immediately south of Charlestown)
- ▶ Parris Pond (Southern extremity of Pinney's Pond immediately north of Pinney's Beach Hotel)
- ▶ Pinney's Pond (About ½ km north of Parris Pond along Pinney's Beach)
- ▶ Jessup's Bogs / Bowrin Pond (West of Jessup's along Pinney's Beach)
- ▶ Fort Ashby Lagoon (Northwest coast next to the ruins of Fort Ashby)
- ▶ Mariners Pub Lagoon / Lawrence's Pond (Northwest coast next to the Cla-chadel Restaurant)
- ▶ Cades Bay (Northwest coast close to Prinderella's Restaurant)
- ▶ Jones Bay (Northwest coast north of Cliff Dwellers)

- ▶ Oualie Beach (Northwest coast in Mosquito Bay)
- ▶ Newcastle (Adjacent to eastern end of Newcastle Bay on north coast)
- ▶ Nisbet's (Nisbet's Beach on the north coast [western end])
- ▶ Long Haul Bay (Long Haul Bay on north coast)
- ▶ Indian Castle / White Bay (Southeast coast) {Nevis Physical Planning Unit, 1998}

4.3 Marine Resources

Marine resources of St. Kitts and Nevis include:

- Coral Reefs and Seagrass Beds,
- Marine Mammals,
- Marine Fish, and
- Marine Reptiles.

4.3.1 Coral Reefs and Seagrass Beds

The islands of St. Kitts and Nevis are surrounded by the warm, shallow waters of the Caribbean Sea which provide ideal conditions for the growth of coral reefs and seagrass beds. Globally, these are considered critical habitats as they provide healthy ecosystems in which a rich diversity of marine organisms thrives. Seagrass and coral reef communities provide a habitat for commercially important species such as the spiny lobster (*Panulirus argus*) and conch, nurseries for delicate juvenile organisms and act as a barrier during periods of heavy wave attack (HCL, 2003). In St. Kitts and Nevis, coral reefs and seagrass beds occur primarily along:

- ▶ The Southwest coast between Nag's Head and the southern end of Basseterre Bay;
- ▶ The Northwest coast between Sandy Point and Dieppe Bay;
- ▶ The East coast between Conaree and Friar's Bay;
- ▶ The Southeast coast adjacent to the Narrows;

- ▶ The island of Nevis (reasonable balance of coral reefs surrounding the island); and
- ▶ The Northwestern and southern coasts of Nevis (Seagrass Beds)

The species of coral found in the waters of the islands virtually span the entire spectrum of tropical coral diversity from the finger coral (*Porites porites*) to the Staghorn and Elkhorn corals (*Acropora formosa* and *A. palmate*). Other species such as sponges and soft corals usually accompany these stony hard corals. Unfortunately, there have also been many reports of the deterioration of the coral reefs around both islands as a result of human activities. Seagrass communities are typically co-dominated by Turtle Grass (*Thalassia testudinum*) and Manatee Grass (*Syringodium filiforme*) (CCA, 1991).

4.3.2 Marine Mammals

For the Caribbean, 26 species of Cetaceans have been recorded. Of this, one third have been sighted (or are expected to occur) in Kittitian-Nevisian waters during migrations (Horwith and Lindsay, 1999). Migrant mammals include:

- ▶ Humpback Whale (*Megaptera novangliea*);
- ▶ Sperm Whale (*Physeter catodon*);
- ▶ Bottled nosed Dolphins (*Tursiops truncatus*);
- ▶ Rough-toothed Dolphins (*Steno bredanensis*); and
- ▶ Spinner Dolphins (*Stenella longirostris*).

Of these mammals, the Sperm Whale is listed as 'Vulnerable' according to the IUCN's Red List of Threatened Species.

4.3.3 Marine Fish

Marine fishes in St. Kitts and Nevis, are those typical of the Lesser Antillean Region, and have played a prominent role in fishing activities around the islands for a long time (CCA, 1991). According to Fishbase, there are 462 species of marine fish tabulated for St. Kitts and Nevis. Of these 462 species, 16 species are deemed threatened (see Table F-6 of Appendix F).

4.3.4 Marine Reptiles

There are three species of sea turtles that are known to nest in St. Kitts and Nevis:

- ▶ Hawksbill Turtle (*Eretmochelys imbricate*);
- ▶ Green Turtle (*Chelonia mydas*); and
- ▶ Leatherback Turtle (*Dermochelys coriacea*)

The IUCN's Red List of Threatened Species classes these three species as endangered. The Loggerhead Turtle (*Caretta caretta*), which does not nest in St. Kitts and Nevis, is sometimes caught in open waters surrounding the islands. This species is also classified as endangered (Horwith and Lindsay, 1999).

Historically, the Leatherback Turtle has been known to nest on nearly all of the beaches in St. Kitts; however recent field observations indicate that several sites are critically important. Such areas are the Northern Beach from northwest of Cayon River, Friars Bay Beach, and the southeastern-most 2 km of North Frigate Bay (Horwith and Lindsay, 1999). In addition, information obtained from the St. Kitts Sea Turtle Monitoring Network website indicated that leatherbacks nest primarily on the Atlantic side of the island. The two major leatherback nesting beaches mentioned on this website are Keys to Cayon River and North Friar's Bay.

Hawksbill Turtle nests are most concentrated on the Southeast Peninsula on beaches such as Major's Beach, Banana Beach and Cockleshell Bay. Green Turtles usually nest at North Frigate Bay, Half Moon Bay and around Conaree (Horwith and Lindsay, 1999).

On Nevis, the highest density of nesting (Hawksbills) occurs on Lover's / Sea Haven Beach. Apart from Sea Haven, nesting occurs on Jones Bay, Cades Bay, Pinney's Beach, Gallows Bay, Beach Lands, Long Haul Beach, Black Bay and Dog Bay.

4.4 Invasive Species

Invasive alien species are a significant threat to native biodiversity, natural ecosystems and ecosystem services. The Global Invasive Species Database recognises that these species are particularly devastating to island ecosystems due to the relative isolation of populations. St. Kitts and Nevis has also experienced the effects of invasive species on its biodiversity but significantly on the agricultural sector where economic losses have been severe.

Eighteen invasive species have been identified for St. Kitts and Nevis on the Global Invasive Species Database. These include ten species considered alien, one whose biological status is unknown and 7 that are considered invasive but are native. Table F-7 of Appendix F provides a brief description of these species.

5 STATUS OF THE ECOLOGICAL AND HISTORICAL / CULTURAL BASE

This chapter summarizes the present status of the ecological and historical-cultural base in St. Kitts and Nevis.

5.1 Layout of Chapter

Information is firstly provided on four sites which have already been assigned (or will shortly be assigned) protected area status:

- ▶ Brimstone Hill Fortress National Park,
- ▶ Central Forest Reserve National Park,
- ▶ Nevis Peak National Park and Camps River Watershed, and
- ▶ Basseterre Valley Aquifer National Park.

The remainder of the chapter focuses on groups of sites which may not presently be protected but should be considered for inclusion in a wider protected areas system:

- ▶ Marine Areas,
- ▶ Turtle Nesting Beaches,
- ▶ Salt Ponds,
- ▶ Freshwater Lagoons,
- ▶ The Ghauts,
- ▶ Dry Forest,
- ▶ Historic Charlestown, and
- ▶ Historic Sites.

Rain forest is not discussed as a separate group since there are significant areas of this forest type in the Central Forest Reserve National Park and Nevis Peak National Park and Camps River Watershed

In each case, information is provided on:

- ▶ Location and Extent,
- ▶ Legal Status,
- ▶ Features,
- ▶ Pressures and Threats, and
- ▶ Management Structure and Challenges

A full description of the status of existing sites and groups of sites is provided in Appendix G to this Protected Areas Systems Plan Report.

5.2 Brimstone Hill Fortress National Park

The following is a summary of the present status of the Brimstone Hill Fortress National Park:

ITEM	COMMENT
BRIMSTONE HILL FORTRESS NATIONAL PARK	
Location and Extent	Brimstone Hill Fortress National Park (BHFNP) is situated on the West Coast of St. Kitts, between Half Way Tree and Sandy Point Town. It occupies an area of approximately 15 ha including a buffer zone of approximately 400 m.
Legal Status	BHFNP is a National Park under both the NCEPA and draft NCEMA Acts of St. Kitts and Nevis and a World Heritage Site listed by UNESCO.
Features	<p>Heritage Outstanding British fortress.</p> <p>Exceptional example of 17th and 18th century British Military architecture.</p> <p>Ecological Nesting site for eight species of birds.</p> <p>Geological Emerged as a result of underlying volcanic activity some 6000 years ago.</p>
Pressures and Threats	<ul style="list-style-type: none"> • Exceeding carrying capacity. • Fires, which originate in the surrounding cane fields and grassland. • Hurricanes have weathered walls in this Century. • Heavy and prolonged rainfall can produce rock and land slides. • Dirt and grime can affect external walls over time. • Earthquake and volcanic eruption are potential dangers in these Caribbean islands. • Inappropriate Development; • Potential for Geothermal Energy Power; and • Livestock Grazing.

ITEM	COMMENT
Management Structure and Challenges	The Society for the Restoration of Brimstone Hill was managed the fortress until 1987 when the NCEPA Act gave management authority to the Brimstone Hill Fortress National Park Society.

5.3 Central Forest Reserve National Park

The following is a summary of the present status of the Central Forest Reserve National Park:

ITEM	COMMENT
CENTRAL FOREST RESERVE NATIONAL PARK	
Location and Extent	The Central Forest Reserve National Park (CFRNP) is situated in the centre of the island of St. Christopher, and occupies all lands above the 1,000ft contour. The CFRNP occupies approximately 50 km ² of land, or 12,500 acres.
Legal Status	The Central Forest Reserve was designated a National Park by the Government of St. Kitts and Nevis on 23 October 2006, and officially gazetted on 29 March 2007.
Features	<ul style="list-style-type: none"> • Various vegetation types including, Elfin Sierra Palm Cloud Forest, Evergreen Forest Sierra Palm Forest, Sierra Palm Transitional Tall Cloud Forest, and Steep Montane Non-Forest Vegetation. • It represents the primary source of water for human consumption on the island of St. Christopher. • The CFRNP houses a series of nature and scenic trails which support eco-tourism ventures as well as recreational and educational programmes.
Pressures and Threats	<ul style="list-style-type: none"> • Erosion; • Overcrowding; • Extraction of Ornamental and Medicinal Plants; • Illegal Farming; • Hurricanes / Natural Disasters; • Damage to Water Resources; and • Invasive Species.
Management Structure and Challenges	<ul style="list-style-type: none"> • Management responsibility for the CFRNP is vested in the Department of Physical Planning and the Environment (DPPE). • The lack of capacity and practical experience presently impedes the proper management of the CFRNP.

ITEM	COMMENT
Management Structure and Challenges (Cont'd)	<ul style="list-style-type: none"> • There is also currently a poor relationship between the stakeholders involved in CFRNP and the DPPE. • The lack of a defined (on the ground) boundary for the CFRNP. • High difficulty in monitoring of illegal activities such as illegal growth of marijuana, plant extraction and littering; • Difficulty in monitoring or preventing agricultural encroachment, unsanctioned development and trail cutting; • Law enforcement is low; and • Recruitment and retention of managers is difficult.

5.4 Nevis Peak National Park and Camps River Watershed

The following is a summary of the present status of the Nevis Peak National Park and Camps River Watershed:

ITEM	COMMENT
NEVIS PEAK NATIONAL PARK AND CAMPS RIVER WATERSHED	
Location and Extent	<ul style="list-style-type: none"> • The Nevis Peak National Park includes all land on the island above the 1,000 foot contour, ascending to the top of the 3,232 foot tall Mount Nevis. • This protected area links the Camps River Watershed to the north north-east, via Camps Ghaut and wetlands to the coast.
Legal Status	The NPNP is earmarked under the Draft Nevis Physical Development Plan as a protected area.
Features	<ul style="list-style-type: none"> • Volcanic formations, • Vegetative zones such as Elfin Woodland, Rainforest, Montane Thicket, Palm Brake, and Riparian Forests. • The island's major watershed and springs • A freshwater lagoon, and • The largest living reef system around Nevis.
Pressures and Threats	<ul style="list-style-type: none"> • Charcoal Production; • Built Development; • Overharvesting of Plants; • Clearing for Farming; • Livestock Grazing; • Water Contamination from Farming; • Water Contamination from Wild Monkeys; • Water Contamination from Domestic Sources;

ITEM	COMMENT
Pressures and Threats (Cont'd)	<ul style="list-style-type: none"> • Dumping of Industrial and Construction Wastes. • The lack of proper (on the ground) boundary demarcation.
Management Structure and Challenges	<p>The management plan envisages that:</p> <ul style="list-style-type: none"> • The Ministry of the Environment (Physical Planning Department) has the overall responsibility for the management of the Nevis Peak National Park; • The Nevis National Trust has been created as a statutory corporation under the draft Nevis National Trust Ordinance, 2007 to administer its affairs; and • The Nevis Peak National Park Advisory Committee is responsible for advising the National Trust Council on matters specifically pertaining to the proposed park. <p>Management Challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring or preventing agricultural encroachment, • Unsanctioned development; • Trail cutting; • Low enforcement is low; and • Difficulty in securing the sites.

5.5 Basseterre Valley Aquifer National Park

The following is a summary of the present status of the Basseterre Valley Aquifer National Park:

ITEM	COMMENT
BASSETERRE VALLEY AQUIFER NATIONAL PARK	
Location and Extent	The Basseterre Valley Aquifer National Park (BVANP) is situated generally to the east of the town of Basseterre, occupying an area of approximately 197 ha.
Legal Status	The St. Kitts National Physical Development Plan, 2006 lists the BVANP as a proposed Protected Area.
Features	A significant portion of the public supply of potable water in St. Kitts comes from this aquifer.

ITEM	COMMENT
Pressures and Threats	<ul style="list-style-type: none"> • Climate variability and the recurrence of drought. • Effects of previous fertilizer application to cane fields, • Sewage treatment and disposal • Storm water run off along major roads which cross the aquifer. • Inappropriate Development; • Stray Animals; • Illegal Dumping; • Agrochemical Contamination; • Industrial Waste; • Contaminated Airport Runoff; • Illegal Topsoil Removal; • Fires; and • Toilet Waste / Sewage.
Management Structure and Challenges	<p>The Basseterre Valley Aquifer Protected Area project falls under the jurisdiction of the Basseterre Valley Advisory Committee.</p> <p>Management Challenges include:</p> <ul style="list-style-type: none"> • Managing the resources (water) given the high demand for it; and • Difficulty in managing illegal activities such as arson and illegal dumping.

5.6 Marine Management Areas

The following is a summary of the present status of the Marine Management Areas:

ITEM	COMMENT
MARINE MANAGEMENT AREAS	
Location and Extent	<ul style="list-style-type: none"> • The South East Peninsula Marine Management wraps around the South-east Peninsula of St. Kitts and extends to the north coast of Nevis. • Sandy Shoal Coral Reef can be found on the north-west corner and leeward side of the island at the town of Sandy Point.
Legal Status	The Southeast Peninsula Marine Management Area and Sandy Point Marine Management Area are designated as protected areas in the St. Kitts National Physical Development Plan, 2006.

ITEM	COMMENT
Features	<ul style="list-style-type: none"> • Sea grass and calcareous algae. • Salt ponds which possess a mangrove fringe. • Three species of endangered sea turtles, the green, hawksbill and leatherback turtle, nest at the South-east Peninsula beaches. • Local fisheries such as finfish, conch and lobster. • Two bird nesting sites at Booby Island and Nag's Head.
Pressures and Threats	<ul style="list-style-type: none"> • Uncontrolled diving and indiscriminate anchoring of boats, • Overfishing; • Climate Change; • Closure of Sugar Industry; • Tourism Development; • Theft of Cultural Resources; • Sand Mining; • Anchor Damage to Reefs and Seagrass Beds; • Geothermal Pipeline / Cable Construction; • Invasive Species; and • Solid Waste including International Garbage.
Management Structure and Challenges	<p>The SEPMMMA will be under the responsibility of the Ministry of Sustainable Development. Management will be in the form of a Management Committee comprising of Fisheries Management Unit, Dive operators, fishers organizations, Port Authority, Coast Guard, the St. Christopher Heritage Society and the Department of Physical Planning and Environment.</p> <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring the harvesting of juvenile / undersized species, • Poaching of turtles and their eggs, • Poaching of Bobby eggs and • The extraction of marine artefacts.

5.7 Turtle Nesting Beaches

The following is a summary of the present status of the Turtle Nesting Beaches:

ITEM	COMMENT
TURTLE NESTING BEACHES	
Location and Extent	<ul style="list-style-type: none"> • Sea Haven Turtle Nesting Beach is situated on the north coast of Nevis overlooking The Narrows. • Keys Turtle Nesting Beach is situated on the windward coast, between Barker's Point and Cayon.
Legal Status	<ul style="list-style-type: none"> • Sea Haven Beach is identified as a Coastal Conservation Area under the Nevis Physical Development Plan, 2008. • Keys Turtle Nesting Beach is a proposed protected area.
Features	<p>Both beaches have one or a combination of the features below making them suitable for nesting:</p> <ul style="list-style-type: none"> • Flatter slopes to make it easier for the turtles to cross the beach. • Firm sand to allow for the flippers to gain "purchase" to drag the turtle up the beach • Clear beach area without debris. • Back beach vegetation suitable for nesting Hawksbill turtles • Stable sand conditions for successful hatching.
Pressures and Threats	<ul style="list-style-type: none"> • Inappropriate Development; • Human Activity (Driving, Horseback Riding, Littering and Sand Mining); • Poaching; • Light Pollution; and • Predation.
Management Structure and Challenges	<ul style="list-style-type: none"> • Sea Haven Beach is currently monitored by the Nevis Turtle Group. • Keys Beach is monitored by the St. Kitts Sea Turtle Monitoring Network. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in controlling the poaching of eggs and animals, • Monitoring and controlling sand mining (legal and illegal), • Unsanctioned development (creating light sources), and • The removal of vegetation.

5.8 Salt Ponds

The following is a summary of the present status of the Salt Ponds:

ITEM	COMMENT
SALT PONDS	
Location and Extent	<ul style="list-style-type: none"> • On the island of St. Kitts there are a number of saltwater ponds, many of which are concentrated on the Southeast Peninsula. • Pond size varies greatly. For example, Great Salt Pond covers an area of 200 ha while Friars Bay Salt Pond is approximately 20 acres of which approximately 10 acres is actual pond.
Legal Status	Salt Ponds are considered owned by the person that owns the surrounding lands.
Features	<ul style="list-style-type: none"> • Salt ponds are usually located close to the sea, just landward of the beach berm (dunes). • They function as part of the surface drainage system, with some surface water entering the ponds from the landward side before being discharged to the sea. • Variable hydrology with the dry and wet seasons. • As the dry season progresses the water in the ponds can become hypersaline, supporting a specialized fauna and microfauna. • Many support a mangrove fringe and diverse and abundant bird life.
Pressures and Threats	<ul style="list-style-type: none"> • Tourism development, • cutting of the dune barrier, • dumping of rubble and garbage, • removal of the vegetative screen, and • eutrophication as a result of continuous run-off from the golf course.
Management Structure and Challenges	<ul style="list-style-type: none"> • The management structure related to the Salt Ponds is unclear at this time. • The DPPE appears to exercise some control on the modification of these ponds under the planning approvals process. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Monitoring illegal dumping at the ponds. • Removal of mangrove vegetation.

5.9 Freshwater Lagoons

The following is a summary of the present status of the Freshwater Lagoons:

ITEM	COMMENT
FRESHWATER LAGOONS	
Location and Extent	Nevis has a system of freshwater lagoons (ponds and wetlands) located throughout the island, some of which are along the coast.
Legal Status	<ul style="list-style-type: none"> • Camps Springs and the Associated Wetland are part of the overall Nevis Peak National Park / Camps Watershed Protected Area/ • Bath Bogs and Gallows Bay Bog are part of the Bath Bogs Protected Area. • Pinney’s Pond, Parris Pond and Nelson’s Spring are all part of a proposed protected area, Pinney’s Beach Conservation Area in the draft Nevis Physical Development Plan. • Jessup’s Pond is located within the proposed Pinney’s Beach Conservation Area according to the map attached to the Nevis Development Plan although it is not identified as a part of the Conservation Area in the actual plan. • New River Springs (which is part of a larger area being proposed as a protected area) has no legal designation at this time.
Features	<ul style="list-style-type: none"> • Nelson Springs, Camps Springs and New River Springs are known to provide water to their respective Parishes. • There is predominantly coconut plantation in the vicinity of some lagoons. • There are also areas of mangrove around others. • Within some of the smaller, shallower lagoons there are prominent reeds and sedges. • These lagoons provide habitats for many migratory seabirds and shorebirds in the Northern Autumn and Spring seasons.
Pressures and Threats	<ul style="list-style-type: none"> • Disease. • Pollution from nearby restaurants and built up areas. • Non-native species; • Filling-in; • Marinas; • Illegal dumping; • Overfishing; and • Harvesting of Mangroves.

ITEM	COMMENT
Management Structure and Challenges	<p>The management structure related to the Freshwater Lagoons is unclear at this time.</p> <p>There is some control on built development around freshwater lagoons by The Physical Planning Department of the Nevis Island Administration.</p> <p>Management challenges include:</p> <ul style="list-style-type: none"> • Controlling the ease of access to these freshwater lagoons; • Preventing the overexploitation of these resources; and • Challenges in preventing the development of land in these areas.

5.10 The Ghauts

The following is a summary of the present status of the Ghauts:

ITEM	COMMENT
THE GHAUTS	
Location and Extent	Ghauts are distributed around both islands. The size of each ghaut depends on the area which it drains.
Legal Status	Ghauts on St. Kitts and Nevis are listed as areas of special concern in the NCEPA and NCEMA Acts.
Features	<ul style="list-style-type: none"> • The primary importance of ghauts is effective drainage. • The reduction in the potential for localized flooding. • Ghauts also serve as vegetated corridors which host several species of plants and animals. • Legal and regulated sand mining in Wash, Tabernacle and Mansion Ghauts.
Pressures and Threats	<ul style="list-style-type: none"> • Illegal sand mining. • Unauthorized development. • Agricultural encroachment. • Squatting. • Indiscriminate dumping of garbage and other types of solid waste.

ITEM	COMMENT
Management Structure and Challenges	<p>The management of sand mining in the Ghauts in St. Kitts is the responsibility of the Ministry of Public Works. On both islands, the control of built development very close to or within the ghauts is the responsibility of the respective Physical Planning agency.</p> <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring illegal activities such as sand mining, illegal dumping, unauthorized construction and livestock grazing/farming; • Controlling the ease of access to these ghauts; and • Managing the sustainable use of the resources which ghauts have to offer.

5.11 Dry Forest

The following is a summary of the present status of the Dry Forest:

ITEM	COMMENT
DRY FOREST	
Location and Extent	<p>Small areas of dry forest are found at the following locations:</p> <ul style="list-style-type: none"> • The slopes of Brimstone Hill in St. Kitts; • On selected peaks on the Southeast Peninsula of St. Kitts; and • The northernmost, southeast and southwest slopes of Nevis Peak.
Legal Status	<ul style="list-style-type: none"> • The dry forest on the slopes of Brimstone Hill is protected as part of the BHFNP. • The dry forests on the slopes of Nevis Peak are protected as part of the Nevis Peak National Park. • The status of the dry forest on the small peaks on the Southeast Peninsula is subject to some question.
Features	<ul style="list-style-type: none"> • Dry forests are a diverse system consisting mainly of deciduous trees which shed their foliage in the dry season. • Dry forest plants have multiple adaptations to dry conditions, including drought avoidance and resistance through a variety of morphological and behavioural characteristics.

ITEM	COMMENT
Features (Cont'd)	<ul style="list-style-type: none"> • Common species include Silk Cotton and the shrub <i>Boufferea succulenta</i> in St. Kitts. • On the island of Nevis common species include White Cedar, Black Mast and Loblolly.
Pressures and Threats	<ul style="list-style-type: none"> • Erosion / Landslides; • Extraction of Ornamental and Medicinal Plants; • Illegal Farming; • Invasive Species; • Charcoal Production; • Livestock Grazing; and • Illegal dumping of waste.
Management Structure and Challenges	<ul style="list-style-type: none"> • Management of the dry forests in the Brimstone Hill National Park and the Nevis Peak National Park is as described above for these sites. • There is no formal management structure for other areas of dry forests. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Difficulty in monitoring illegal activities; • Controlling overexploitation of the valuable resources found in the area; and • Controlling the ease of access to these forested areas;

5.12 Historic Charlestown

The following is a summary of the present status of Historic Charlestown:

ITEM	COMMENT
HISTORIC CHARLESTOWN	
Location and Extent	<ul style="list-style-type: none"> • The town of Charlestown is located on the west coast of the island. • At present the town is approximately 490 acres in extent.
Legal Status	<ul style="list-style-type: none"> • The draft Nevis Physical Development Plan identifies Charlestown as a Priority Area and recommended the development of a Physical Action Plan. • The legal status of individual units is not as clear cut.
Features	<ul style="list-style-type: none"> • It is compact and easily walkable, • Its historic urban structure is largely intact and suffers few alien changes,

ITEM	COMMENT
Features (Cont'd)	<ul style="list-style-type: none"> • Its historic buildings are both charming and, for the most part, pleasant and comfortable with several 'special spaces', many fine trees and old stonewalls, • It enjoys views out to sea and, inland, dramatic glimpses of Mount Nevis. • There is also architectural display of the 'skirt and blouse' style, timber balconies, gingerbread or scrollwork, jalousie windows and hurricane shutters, lapped wood or shingled walls, hipped roofs largely in corrugated steel, distinctive paintwork and signboards, and arches, breezeways and courtyards.
Pressures and Threats	<ul style="list-style-type: none"> • Neglect of sites and buildings. • Poor repairs and restoration, • Ill-considered redevelopment; • Exceeding carrying capacity; • Property Theft and Destruction; • Littering; and • Graffiti.
Management Structure and Challenges	<ul style="list-style-type: none"> • At present there is no formal management structure associated with Historic Charlestown. • There is some protection of historic sites through the system of planning permission administered by the Physical Planning Department. <p>Management challenges include:</p> <ul style="list-style-type: none"> • Monitoring of illegal activities such as graffiti; • Lack of clear internal organization; • Lack of transparency in decision-making; • Lack of communication with the community in decision-making; • Ongoing disputes due to land tenure or use rights; and • Lack of adequate financial resources to conduct critical law enforcement.

5.13 Historic Sites

The following is a summary of the present status of the Other Historic Sites:

ITEM	COMMENT
HISTORIC SITES	
Location and Extent	<ul style="list-style-type: none"> • Petroglyphs at Old Road Town, St. Kitts <ul style="list-style-type: none"> ○ Size of a household lot. • Stonefort, St. Kitts; <ul style="list-style-type: none"> ○ Extends 200 m on both sides of the ravine and 500 m from the Island Main Road. • Belmont Estate, St. Kitts; <ul style="list-style-type: none"> ○ 3 acres • Mansions Estate, St. Kitts; <ul style="list-style-type: none"> ○ 3 acres • Spooner’s Ginnery, St. Kitts; <ul style="list-style-type: none"> ○ 1.8 acres • Black Rocks, St. Kitts; <ul style="list-style-type: none"> ○ 30 m coastal strip • Charles Fort, St. Kitts; <ul style="list-style-type: none"> ○ 7 acres • Indian Castle Protected Area, Nevis; <ul style="list-style-type: none"> ○ 15 acres • Fort Ashby, Nevis; <ul style="list-style-type: none"> ○ Household lot • Bath Hotel, Nevis; <ul style="list-style-type: none"> ○ Part of a larger 57 acre site • New River Estate, Nevis; and <ul style="list-style-type: none"> ○ Unclear • Fort Charles, Nevis <ul style="list-style-type: none"> ○ 3 acres
Legal Status	<ul style="list-style-type: none"> • Petroglyphs at Old Road Town, St. Kitts <ul style="list-style-type: none"> ○ Ministry of Tourism • Stonefort, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher National Trust • Belmont Estate, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher national Trust • Mansions Estate, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher National Trust • Spooner’s Ginnery, St. Kitts; <ul style="list-style-type: none"> ○ St. Christopher National Trust

ITEM	COMMENT
Legal Status (Cont'd)	<ul style="list-style-type: none"> • Black Rocks, St. Kitts; <ul style="list-style-type: none"> ○ Ministry of Tourism • Charles Fort, St. Kitts <ul style="list-style-type: none"> ○ Crown lands • Indian Castle Protected Area, Nevis; <ul style="list-style-type: none"> ○ Ministry of Agriculture • Fort Ashby, Nevis; <ul style="list-style-type: none"> ○ Ministry of Tourism • Bath Hotel, Nevis; <ul style="list-style-type: none"> ○ Ministry of Tourism • New River Estate, Nevis; and <ul style="list-style-type: none"> ○ Ministry of Tourism • Fort Charles, Nevis; <ul style="list-style-type: none"> ○ Private land
Features	<ul style="list-style-type: none"> • Petroglyphs at Old Road Town, St. Kitts; <ul style="list-style-type: none"> ○ Amerindian rock carvings • Petroglyphs at Stonefort, St. Kitts <ul style="list-style-type: none"> ○ Amerindian rock carvings amounting to 115 numbered inscriptions. • Belmont Estate, St. Kitts <ul style="list-style-type: none"> ○ Remnants of 18th and 19th sugar plantation including chimneys, Great House, windmill, factory and old plantation buildings. • Mansions Estate, St. Kitts <ul style="list-style-type: none"> ○ Remnants of 18th and 19th sugar plantation including chimneys and old plantation buildings such as the Manager's House, Overseer's House, windmill, factory, cistern, pen, stables and privy. • Spooner's Ginnery, St. Kitts <ul style="list-style-type: none"> ○ Remnants of cotton ginnery including equipment as well as 19th century Great House, 19th century stone factory and chimney, 18th century mill and factory and 1940's manager's house.

ITEM	COMMENT
Features (cont'd)	<ul style="list-style-type: none"> • Black Rocks, St. Kitts <ul style="list-style-type: none"> ○ Volcanic rocks in a scenic setting. • Charles Fort, St. Kitts <ul style="list-style-type: none"> ○ Remnants of old fort including cistern, guard room, cannons etc. • Indian Castle Protected Area, Nevis <ul style="list-style-type: none"> ○ Amerindian artefacts and remnants of Fort George. • Fort Ashby, Nevis <ul style="list-style-type: none"> ○ Remnants of Old Fort including cannons, building. • Bath Hotel, Nevis <ul style="list-style-type: none"> ○ Bath Hotel which has been maintained, original bath house, thermal springs, newly constructed bath houses. • New River Estate, Nevis <ul style="list-style-type: none"> ○ Amerindian artefacts, springs, water wheel. • Fort Charles, Nevis <ul style="list-style-type: none"> ○ Stone walls, cistern and cannons.
Pressures and Threats	<ul style="list-style-type: none"> • Inappropriate Development; • Squatting; • Exceeding Carrying Capacity; • Property Theft and Destruction; • Littering; • Destructive Earthquake / Volcanic Eruption; • Hurricanes / Storm Surges and Flooding; • Deterioration of Structures; • Vandalism; • Abandonment of Buildings; • Fires; and • Traffic Congestion and Inadequate Parking.
Management Structure and Challenges	<ul style="list-style-type: none"> • There is no organized management structure for all sites. • There is some management under the Physical Planning department as part of the planning approvals process. • Some of the sites are loosely managed by the Nevis Historical and Conservation Society and the St. Christopher National Trust. • Some of the sites are also managed by various Government ministries such as the Ministry of Tourism and the Ministry of Agriculture.

ITEM	COMMENT
Management Structure and Challenges (Cont'd)	Management challenges include: <ul style="list-style-type: none"> • Difficulty in monitoring illegal activities such as the removal of facing stone and theft of artefacts and equipment; • Difficulty in managing the use of the resources.

5.14 Summary

The following are the salient points that summarize the rationale for selecting individual units or representatives from groups of sites for the Protected Areas Systems Plan:

- The Brimstone Hill Fortress National Park is an important heritage site which must form a key element of the St. Kitts and Nevis Protected Area System Plan. In addition to its heritage significance, it also offers the opportunity to protect a small area of dry forest. Finally, the geologic significance of the site also makes it worthy of protection.
- The Central Forest Reserve National Park is a large and important ecological site which must form a key element of the St. Kitts and Nevis Protected Area System Plan. Its present functions of protecting biodiversity, watershed protection and supporting ecotourism and recreation will continue to be important into the future.
- The Nevis Peak National Park / Camps River Watershed is a large and important ecological site which must form a key element of the St. Kitts and Nevis Protected Area System Plan. Its present functions of protecting biodiversity, watershed protection and supporting ecotourism and recreation will continue to be important into the future.
- The proposed BVANP is a novel approach to protecting a very important ground water resource, increasing the resource endowment to the country's tourism industry, and showcasing native plants as a means of enhancing conservation awareness.
- Given the status of St. Kitts and Nevis as a Small Island Developing State (SIDS) in the Caribbean, it is expected that marine protected areas will form an integral and important part of the System of Protected Areas. The SEPMP, in particular, provides an opportunity to establish a protected area which spans the narrows and is harmonized between the two islands.

- Turtle nesting is important for the preservation of biodiversity and the propagation of endangered or threatened species of marine turtles. Sea Haven Beach is the most important turtle nesting beach in the Federation, and Keys Beach is the most important in St. Christopher. These and other turtle nesting beaches may be considered for inclusion in the Protected Areas System.
- Salt ponds are important to biodiversity, and (at minimum) a number of carefully-selected examples would form an important part of the Protected Areas Systems Plan.
- Freshwater Lagoons are important to biodiversity, and a few are also important sources of potable water. A number of carefully-selected examples would form an important part of the Protected Areas Systems Plan.
- Ghauts are recognized as areas of special concern in the NCEPA and NCEMA. They play a key role in effective drainage (and hence the prevention of localized flooding). They also serve as vegetated corridors and (when done legally) as a resource for construction sand. The System Plan must therefore address the type of protection that is to be afforded to these features.
- Dry Forest is a distinct forest type from tropical rain forest and therefore makes a different contribution to the overall biodiversity of the Federation. Consideration must therefore be given to protecting selected areas of dry forest within the overall Protected Areas System Plan.
- The historic core of Charlestown is an important resource that can be managed as part of the tourism thrust of the island of Nevis. It provides recreational, educational and cultural opportunities. The restoration of select buildings in the past and the inclusion of this initial list of buildings for preservation will ensure that this historic centre continues to contribute to the character of the town of Charlestown.
- Historical Sites are important to both citizens of St. Kitts and Nevis and the Tourist Industry. Such sites provide recreational, educational and cultural opportunities, and selected examples should therefore be included under the System Plan

THIS PAGE LEFT INTENTIONALLY BLANK

6 UNITS OF NATIONAL PROTECTED AREAS SYSTEM

The previous chapter provided a description of the present status of the ecological and historical / cultural base in St. Kitts and Nevis. This chapter will draw on that information to present a comparison of the individual units that are being proposed and finally propose the best representation of these assets to include in the Protected Areas System. Two systems of classification are used in this chapter:

- ▶ for sites where the objective is primarily nature and biodiversity conservation, the classification system developed by the International Union for the Conservation of Nature (IUCN), and
- ▶ for sites where the objective is primarily preservation of the historical cultural heritage, the classification system adopted by the Tourism Department is used.

6.1 Scope of Chapter

In this chapter, the focus will be on the groups of sites (identified in Chapter 5) which are not presently protected but are being considered for the Protected Areas System. These include:

- Marine Areas,
- Turtle Nesting Sites,
- Salt Ponds,
- Freshwater Lagoons,
- The Ghauts,
- Dry Forests, and
- Historic Sites.

In each case we compare the units on the basis of resources and assets and on the basis of pressures and threats. Each Section ends with our proposals for the Protected Areas System. The only exception to this approach is in areas where all the examples of a particular class of site are proposed for consideration. This will be highlighted in the appropriate section.

The following four sites are already established or are almost established and therefore will not be discussed here:

- Brimstone Hill Fortress National Park, which would be classified as Category 1 under the system used by the Tourism Department;
- Central Forest Reserve National Park, which would be classified as Category II under the IUCN system;
- Nevis Peak National Park and Camps River Watershed, which would be classified as Category II under the IUCN system; and
- Basseterre Valley Aquifer National Park, which would be classified as Category VI under the IUCN System.

In addition, there are sites that are recommended which are included in a previous document such as the respective island Physical Development Plans that form part of larger areas proposed for protection. Where this occurs, the individual units will be discussed but the level of protection will take into consideration the larger area.

6.2 Marine Areas

As noted in Section 5.6, there are two marine areas which are being considered for the National Protected Areas System as Marine Protected Areas (MPAs):

- The marine area surrounding the South East Peninsula, and
- Sandy Point Marine Area.

Additionally, there is a marine component of the Nevis Peak National Park that encompasses the marine area to the north of Nevis. The integration of this marine area with the boundary of the proposed MPA for the S. E. Peninsula will be discussed in Section 6.2.3.1.3.

6.2.1 Resources / Assets

6.2.1.1 South East Peninsula Marine Area

The S.E. Peninsula marine area contains a number of environmental assets including (see Figure 6-1):

- Fringing Coral Reefs,
- Rocky Shores,
- Lobster Spawning Grounds (in the Narrows between St. Kitts and Nevis),
- Turtle Nesting Beaches,
- Salt Ponds, and
- Mangrove Systems.

The following salt ponds present on the peninsula also support a variety of bird species and they are listed as Important Bird Areas (IBAs) by Birdlife International:

- Friar's Bay Pond,
- Great and Little Salt Ponds,
- Major's Bay Salt Pond,
- Mosquito Bay Salt Pond, and
- Frigate Bay Salt Pond.

Additionally, Booby Island, an uninhabited island located approximately 2 km to the south east of the peninsula is also an important habitat for a number of species (see Section G.5.3 in Appendix G). The marine area supports the productivity of local fisheries as well as providing foraging grounds and nesting sites for endangered marine turtles.

6.2.1.2 Sandy Point Marine Area

At Sandy Point the important environmental assets include the following:

- Coral reefs (fringing and deep), and
- Seagrass Beds.

The data on the resources at Sandy Point is very patchy but all indications are that the reef system at Sandy Point is fairly diverse and includes a mixture of stony and encrusting corals. The corals in the area are distributed into a main coral ridge approximately 3 hectares in extent with a number of patches of coral outcrops scattered throughout. Apart from the corals, the reef system also includes a diverse collection of sponges. This reef system supports small populations of coral reef fishes. The information provided by a study conducted in 1995 suggests that the diversity of reef fish is low and at that time the population was dominated by juvenile species.

However, it should also be noted that the Sandy Point area has supported the local fishery for many years. A more detailed inventory of the resources is needed at the site level to determine the nature and diversity of the marine resources in the area.

The seagrass beds in the Sandy Point area are situated between the coral reef and the shoreline and consist of a mixture of turtle grass (*Thalassia testudium*) and manatee grass (*Syringodium filiforme*).

There are also a couple of turtle nesting beaches in the vicinity of Sandy Point at:

- Belle Tete; and
- Just north of Charles Fort.

6.2.2 Pressures / Threats

6.2.2.1 South East Peninsula Marine Area

Development on the terrestrial portion of the Peninsula continues to impact on the marine environment. There are several construction projects that are either ongoing or have been earmarked that have the potential to impact the marine area (see Figure 6-2 for identified threats on the S. E. Peninsula). These include the following proposals:

- Single family residential use north, south and east of Great Salt Pond;
- Marinas at Whitehouse Bay, Cockleshell Bay, Mosquito Bay, Major's Bay and Little Salt Pond;
- Public recreation areas at South Friar's Bay;
- Public parking at sites on Friar's Bay Beach and Cockleshell beach;

- Inns at Friar's Bay;
- Hotels at Sand bank, Cockleshell, Banana and Major's Bay; and
- Ferry Terminal at Major's Bay.

Additionally, as noted in Section G.5.4, there are a number of existing activities that continue to impact on the marine area of the Peninsula and will continue to be a threat if left to continue.

These activities have led to direct impacts such as:

- Clearing of vegetation,
- Loss of habitat,
- Contamination of water quality,
- Adverse changes to surface hydrology,
- Loss of nursery areas, and
- Degradation of nearshore seagrass and coral reefs.

Apart from the impacts associated with development activity, there are also impacts associated with use of existing resources such as:

- Depletion of fish stock,
- Damage to reefs by indiscriminate diving,
- Damage to reefs and scarring of seagrass beds through the dropping of anchors, and
- Contamination of water quality through the release of bilge water from overnight boaters.

6.2.2.2 Sandy Point Marine Management Area

At Sandy Point, the assets have already shown signs of deterioration due to past extreme weather as well as from the anchoring of boats associated with either fishing or diving. The marine area at Sandy Point has been and continues to be a source of conflict between fishermen and dive operators. While no specific information on future development projects in the Sandy Point area was made available for inclusion in this study, it is anticipated that any such activity will result in the potential impacts discussed above for the S. E. Peninsula.

6.2.3 Suitability of Units

In this section, the suitability of each unit is discussed under the following headings:

- Status / Representiveness,
- Ecological Gap Analysis,
- Boundaries and Extent,
- Level of Protection, and
- Challenges to Protection.

6.2.3.1 S.E. Peninsula

This discussion recognises the opportunity to create a Unit which spans the narrows to include the north coast of Nevis, thus linking the Proposed South East Peninsula Marine Protected Area with the area of living coral now included in the Nevis Peak / Camps River system. It also recognises that different levels of protection would be appropriate at different locations within the wider area.

6.2.3.1.1 Status / Representiveness

It is recommended that the S. E. Peninsula marine area be established as a protected area and included in the National System of Protected Areas since it contains the following:

- ▶ Beaches where endangered turtles come up to nest such as North Friar's Bay Beach, Major's Bay, Banana Bay, Cockleshell Bay and Turtle Bay;
- ▶ Coralline, sandy beaches which are important for tourism occur at Friar's Bay, Canoe Bay, Turtle Bay, Sand Bank Bay, Mosquito Bay, Major's Bay, Cockleshell Bay and Banana Bay.
- ▶ The coral reefs and seagrass beds support productivity of many commercial species such as Conch, Spiny Lobster (*Panulirus argus*) and finfish, which are more abundant in the vicinity of the Southeast Peninsula than on any other coasts of St. Kitts.
- ▶ The Southeast Peninsula is known to be the single most important commercial fishing and recreational diving area within the nation (CCA, 1991).

- ▶ The majority of salt ponds on the island of St. Kitts are found on the S. E. Peninsula. These ponds support a number of internationally important species and are listed as an Important Bird Area by Birdlife International.
- ▶ The only nesting sites for the Least Terns (*Sterna antillarum*) on the island.
- ▶ Booby Island which is the only remaining breeding location for a number of species including: Red-billed Tropicbird (*Phaethon aethereus*), Laughing Gull (*Larus atricilla*), Roseate Tern (*Sterna dougalli*), Bridled Tern (*Sterna anaethetus*), Sooty Tern (*Sterna fuscata*), Brown Noddy (*Anous stolidus*). The island is also listed as an Important Bird Area by Birdlife International.

6.2.3.1.2 Ecological Gap Analysis

As noted in Appendix B, the output of the Ecological Gap Analysis (EGA) were two model runs that best met the targets proposed for inclusion in the Protected Areas System. Both runs recommend the majority of the S. E. Peninsula marine area for inclusion into a System of Protected Areas since the majority of targets are met in this area (see Figures 6-3 and 6-4). The exception to this is the exclusion of Nag's Head and the nearshore marine area surrounding the headland in Run A. However, this area should be included since Nag's Head is an important nesting areas for a number of species. Another key output of the EGA was the importance placed on the lobster spawning area referred to locally as "the narrows". This area bridges the two islands and the importance of this area to the local fisheries is significant enough to justify its inclusion into any Marine Protected Area being considered for the peninsula.

6.2.3.1.3 Boundaries and Extent

Figure 6-5 shows the proposed boundaries of the Marine Management Area proposed for the S. E. Peninsula and extending across The Narrows (hereinafter loosely termed South East Peninsula and The Narrows Marine Management Area – SEPNMMA). These boundaries were drawn based on the combination of the results of the EGA and the proposed boundaries from past studies. It should be noted that the southern limit of the MMA is the northern coastline of Nevis, a part of which is delimited as the marine component of the Nevis Peak National Park. Given the nature of marine areas, there is no need for a buffer zone around the entire area. Instead buffering of the entire system will be achieved through the management of adjoining coastal areas through the approval and control of development via the planning approval process. Additionally, in

the case of the S.E. Peninsula, the associated salt ponds and mangroves which are considered transition zones and are proposed for inclusion in the SEPNMMPA will form their own buffer for the marine environment. It should be noted though that these systems of themselves are vulnerable to adverse impacts and should be buffered where land space is so available.

Within the SEPNMMA different levels of protection will be recommended (see Section 6.2.3.1.4) below. When these areas are so designed, some measure of a buffer will need to be considered especially where “use” areas abut areas recommended for strict protection.

6.2.3.1.4 Level of Protection

Based on the IUCN’s listing of protected areas categories, the overall level of protection recommended for the SEPNMMA is Category VI which refers to a Managed Resource Protected Area. In accordance with the definition of a Category VI system, the SEPNMMA should be managed for sustainable use of its natural ecosystems which includes those listed in Section G.5.3 in Appendix G.

Within this overall classification, it is envisaged that there will be a number of “management use” zones such as fishing, recreation, areas of strict protection, etc. While an exact definition of each of these management uses is outside the scope of this System Plan Report (since it will require more detailed study), the following general comments give an appreciation of what is to be established:

- Booby Island and Nag’s Head would be managed as Category Ia areas under the IUCN system, since they have been identified as being critical to bird nesting and should be strictly protected.
- The 6 turtle nesting sites located within the S. E. Peninsula as well as the major turtle nesting site at Sea Haven in Nevis would be managed as Category IV areas under the IUCN system, since they are nesting areas for endangered species and therefore require special protection. Specifically, there is the need for better enforcement of the regulations of 1995 that relate to turtles and prohibits harvesting of turtles including eggs during the period February to October.

- A suitable area may be defined for the protection of lobsters (and other economically important marine species) during the spawning season, and this would be managed as a Category IV area under the IUCN System. The management of this area may include the declaration of an off-season for the catching and sale of lobsters (for example). Such sites, as recommended in the National Physical Development Plan, 2006 includes Cockleshell Bay, Banana Bay, Mosquito bay and Major's Bay.
- Outside of the marine reserves (as described above), there is a recommendation in the National Physical Development Plan for designating Fish Priority Areas or managed resources protected areas which are Category VI sites under the IUCN classification system.
- The Salt Ponds on the peninsula would be managed as Category IV sites under the IUCN system. These are important to the biodiversity of the Federation, and require protection from development activities, in particular.
- Finally, the National Physical Development Plan also refers to areas for snorkelling and diving (an existing important use of the marine areas surrounding the S. E. Peninsula) as category V sites under the IUCN classification System.

6.2.3.1.5 Challenges to Protection

During discussions with the Physical Planning and Environment Department, it has been suggested that only the marine component of the S. E. Peninsula be considered for inclusion in the Systems Plan since the majority of land is privately owned (see Figure 6-6 and Section G.5.2 in Appendix G). However, it is difficult to protect the marine component in isolation of the many areas of connectivity to the terrestrial side such as at the salt ponds, the beaches and the mangroves. It is therefore recommended that the area to be included should also contain these assets.

6.2.3.2 Sandy Point Marine Management Area

This discussion of the proposed Sandy Point Marine Management Area (SPMMA) recognises the opportunity to create a unit that will serve the purpose of protecting the natural resources of the area as well as supporting the sustainable use of these resources by the many stakeholders.

6.2.3.2.1 *Status / Representiveness*

It is recommended that the Sandy Point marine area be established as a protected area and included in the National System of Protected Areas since it contains the following (see Figure 6-7):

- Beaches where endangered turtles come up to nest such as at Fig Tree and just north of Fort Charles.
- Extensive coral reefs (fringing and offshore) and seagrass beds which are already showing signs of damage.
- Fisheries resources that support the fishing industry which is the main income generator for the town of Sandy Point.
- The reefs which also support dive tourism.

6.2.3.2.2 *Ecological Gap Analysis*

Both runs of the EGA also proposed the Sandy Point marine area for inclusion in the System of Protected Areas (see Figures 6-8 and 6-9). Run B seen in Figure 6-9 shows only the northern section of the Sandy Point / Pump Bay area as suitable for inclusion into the Protected Areas System. Due to the lack of reliable information on the extent of the offshore reef, the EGA did not include the offshore reef, instead, only the fringing reef and the associated seagrass beds are included. Notwithstanding this, Ecoengineering recommends that this offshore reef be included in this proposed Marine Protected Area.

6.2.3.2.3 *Boundaries and Extent*

The proposed Sandy Point Marine Management Area will extend for approximately 5 km from Brimstone Hill in the south to Belle Tete in the north (see Figure 6-10). These boundaries comply with those proposed in the St. Christopher National Physical Development Plan for the Sandy Point Marine Management Area.

Given the nature of marine areas, there is no need for a buffer zone around the entire area. Instead buffering of the entire system will be achieved through the management of adjoining coastal areas through the approval and control of development via the planning approval process.

Within the SPMMA different levels of protection will be recommended (see Section 6.2.3.24) below. When these areas are so designed, some measure of a buffer will need to be considered especially where “use” areas abut areas recommended for strict protection.

6.2.3.2.4 Level of Protection

As with the SEPMMMA, the proposed SPMMA would accommodate a mixture of uses under a common management plan. The literature suggests the establishment of fish priority areas and marine reserves in accordance with the Fisheries Act. Given the significance of this marine area to the socio-economic livelihood of the nearby town it is unrealistic to manage the area for strict protection. Instead, it is envisaged that this marine protected area would include:

- Fish stock propagation areas classified as Category IV under the IUCN system. Fishing would be prohibited or seasonally restricted in those areas.
- Turtle nesting beaches as described above in Section 6.2.3.2.1. These would be classified as Category IV under the IUCN system.
- Tourism and recreation areas for snorkelling, diving, etc. These would be classified as Category V under the IUCN system.
- Fishing areas classified as Category VI under the IUCN system. Fishing areas may be further subdivided into areas for artisanal fishing and areas for sport fishing, if it is necessary to avoid conflict and preserve the rights of stakeholders.

It is critical that these areas / zones should be established only after meaningful consultation with all stakeholders.

6.2.3.2.5 Challenges to Protection

There have been a number of conflicts in the Sandy Point area between users of the resources for subsistence i.e. the fishermen and users of the resource for recreation, i.e. the dive operators. Any further work to be conducted for establishing the MMA at Sandy Point must be done in consultation with all stakeholders to ensure that no group is excluded. One of the most important lessons learnt in establishing protected areas throughout the region and elsewhere is the need to have “buy-in” from the local communities.

6.2.4 Proposals

In summary, three marine areas have been identified for protection:

- areas adjacent to the Southwest Peninsula,
- an area on the North East Coast of Nevis, and
- the Sandy Point Area.

The first two areas will be included in the proposed South East Peninsula and the Narrows Marine Management Area (SEPNMMA), while Sandy Point would be a separate Marine Management Area (SPMMA). In both cases, the proposed management areas will involve management for a variety of uses, ranging from strict conservation to recreational use and fishing.

6.3 Turtle Nesting Sites

As noted in Section 4.3.4, there are many turtle nesting sites throughout St. Kitts and Nevis. This section will focus on the two most important sites being considered for inclusion into the Protected Areas System Plan:

- Keys Turtle Nesting Beach (St. Kitts), and
- Sea Haven Turtle Nesting Beach (Nevis).

Sea Haven is included in the proposed SEPNMMA. Other turtle nesting beaches (North Frigate Bay, Frigate Bay, South Friar's Bay, Sand Bank Bay, Mosquito Bay, Cockleshell, Banana Bay and Major's Bay) are included within the proposed SEPNMMA (see Section 6.2.1.1), and yet others (Belle Tete and north of Charles Fort) within the SPMMA (see Section 6.2.1.2).

6.3.1 Resources / Assets

6.3.1.1 Keys Turtle Nesting Beach

The Cayon to Keys stretch of beach is approximately 4 km long and is the most important site for the nesting of leatherback turtles (*Dermochelys coriacea*). Monitoring on Keys Beach began in 2003 with the establishment of the St. Kitts Sea Turtle Monitoring Network as part of the Sea Turtle Recovery Action Plan for St. Kitts and Nevis. The main assets / resources on this beach and the surrounding area include (see Figure 6-11):

- Suitable beach characteristics for nesting;
- Fringing Coral Reefs; and
- Seagrass Beds.

As noted in Section G.6.3, the suitability of a beach for turtle nesting is related to its profile, condition, vegetation, sand stability and human factors. In the case of the leatherback turtles they prefer deep, unobstructed underwater access and a relatively steep beach profile.

No specific information was available on the status of the coral reefs and seagrass beds in this area. This is one area where more research needs to be conducted but this would be part of the site specific studies to be undertaken during the implementation of the National Systems Plan.

6.3.1.2 Sea Haven Turtle Nesting Beach

The Sea Haven Beach is a 1.2 km long stretch of beach located just west of the airport on the north of the island of Nevis. Monitoring on Sea Haven (also called Lovers Beach) Beach began in 2002 with the establishment of the Nevis Turtle Group. The main assets / resources on this beach and the surrounding area include:

- Suitable beach characteristics for nesting;
- Fringing Coral Reefs;
- Seagrass Beds; and
- Lobster spawning grounds.

As noted in Section G.6.3, the suitability of a beach for turtle nesting is related to its profile, condition, vegetation, sand stability and human factors. Three species of marine turtles nest at this beach: leatherback, hawksbill and green. In the past 3-5 years 80 hawksbill, 4 green and 6 leatherback turtles have been tagged although it is estimated that approximately 200 turtles have nested on the beach during this period.

Again, no specific information was available on the status of the coral reefs and seagrass beds in this area. This is again an area where more research needs to be conducted but this would be part of the site specific studies to be undertaken during the implementation of the National Systems Plan.

6.3.2 Pressures and Threats

6.3.2.1 Keys Turtle Nesting Beach

The turtles that nest on Keys Beach are listed as internationally endangered species and are very sensitive to activities that impact either their nesting beaches or their foraging or feeding habitats. The following activities are either ongoing or are proposed for the Keys Beach:

- Horseback Riding,
- Sand Mining,
- Removal of Beach Vegetation,
- Driving on Beach,
- Camp Fires,
- Dumping of garbage such as plastics; and
- Poaching.

These activities have led to direct impacts such as:

- Crushed eggs and hatchlings;
- Loss of habitat;
- Increased erosion and creation of dangerous pits which females and hatchlings fall into, become trapped, and perish;
- Compact sand, crushed eggs and creation of deep tracks that hatchlings cannot escape. Additionally, sand compaction causes decreased oxygen circulation and can suffocate developing embryos.
- Photo-pollution which can mislead hatchlings and adult females, causing them to wander around aimlessly on land and away from the ocean.
- Depletion of adult stock and loss of recruitment into adult population.

6.3.2.2 Sea Haven Turtle Nesting Beach

The beach is an important nesting area mainly for the hawksbill turtle with some nesting of leatherback turtles. The following activities are either ongoing or proposed for the Sea Haven Beach area:

- Construction of a Marina;
- Sand Mining;
- Removal of Beach Vegetation;
- Driving on Beach;
- Camp Fires; and
- Poaching.

The direct impacts as a result of these activities are the same as those discussed above in Section G.6.4.

6.3.3 Suitability of Site

In this section, the suitability of each unit is discussed under the following headings:

- Status / Representiveness,
- Ecological Gap Analysis,
- Boundaries and Extent,
- Level of Protection, and
- Challenges to Inclusion.

6.3.3.1 Keys Turtle Nesting Beach

6.3.3.1.1 Status / Representiveness

It is recommended that the Keys Turtle Nesting Beach be established as a protected area and included in the National System of Protected Areas for the following reasons (see Figure 6-11):

- It is a preferred nesting beach for the internationally endangered leatherback turtles;
- It is the index beach for monitoring leatherback turtles on the island;
- It is the subject of intensive monitoring and tagging of turtles since the formation of the St. Kitts Sea Turtle Monitoring Network.
- It is a nesting site for the Least Tern (*Sterna antillarum*).
- There are suitable foraging grounds in the form of coral reefs and seagrass beds offshore.

6.3.3.1.2 Ecological Gap Analysis

Both model runs that were chosen as those that best met the targets proposed for inclusion in the Protected Areas System included parts of the Keys Beach (see Figures 6-12 and 6-13). The target for turtle nesting beaches was just 60% and this was met by other nesting sites. It is however, recommended that the entire length of the Keys to

Cayon stretch of beach be protected. While no detailed information on the use of the coral and seagrass habitats located offshore is available, it is also recommended that these habitats being included for protection given the importance of protecting foraging grounds as well as nesting sites.

6.3.3.1.3 Boundaries and Extent

Figure 6-14 shows the proposed boundaries of the Keys Turtle Nesting Beach Protected Area. These boundaries are drawn based on the results of the EGA. It is recommended that a 30 m vegetated buffer be created adjacent to the actual beach area. Within this area it is expected that no development will take place. This buffer will be sufficient to ensure that activities of humans such as lighting and noise will be a sufficient distance away so as to have little impact on the nesting turtles or the hatchlings.

6.3.3.1.4 Challenges to Protection

One of the main challenges to protection of the Keys Turtle Nesting Beach is the cultural significance associated with the harvesting of turtles and the consumption of the meat and eggs. Although communication with members of the St. Kitts Sea Turtle Monitoring Network has revealed that the poaching of turtles at Keys and other beaches has been reduced, there is still evidence that it is ongoing. With the numbers of these internationally endangered species reducing, even a small amount of poaching is unacceptable.

Another challenge to protection is the use of the northern section of the Keys Beach for sand mining. The need for more aggregate and sand is only expected to increase with the increase in construction associated in part with the tourism sector. If alternative sources of sand are not found or the existing sources are not managed sustainably then there is little incentive to stop sand mining.

A third challenge is the use of the beach for horseback riding. This problem may only be solved when the beach is afforded protection under the National Protected Areas System Plan. At that time there may be resources available to ensure that continued use of the beach for horseback riding is stopped. It is also important to engage in dialogue with nearby communities and businesses to inform them of the harm their activities will have on these endangered species.

The final challenge is the enforcement of the existing regulations regarding turtles and their nesting beach which are highlighted in the Fisheries Act as well as in the National Conservation and Environmental Protection Act or the newly drafted National Conservation and Environmental management Bill (2009). In addition, it is recommended that the regulations related to the closed season for harvesting of turtles and their eggs be strengthened to recommend a moratorium on turtle harvesting.

6.3.3.2 Sea Haven Turtle Nesting Beach

6.3.3.2.1 Status / Representiveness

It is recommended that the Sea Haven Turtle Nesting Beach be established as a protected area and included in the National System of Protected Areas for the following reasons (see Figure 6-15):

- It is a preferred nesting beach for three internationally endangered marine turtles: Hawksbill, Green and Leatherbacks;
- It is the index beach for monitoring leatherback turtles on the island;
- It is the subject of intensive monitoring and tagging of turtles since the formation of the Nevis Turtle Group.
- There are suitable foraging grounds in the form of coral reefs and seagrass beds offshore.

6.3.3.2.2 Ecological Gap Analysis

Of the two best model runs obtained from the EGA, only Run A included the Sea Haven Turtle Nesting Beach as suitable for inclusion in the Protected Areas System (see Figures 6-16 and 6-17). Run B included only the western portion of the beach area. Both runs included the marine area associated with the beach, although this may be due to the importance of the “Narrows” as lobster spawning grounds and therefore this inclusion is associated with another target.

6.3.3.2.3 *Boundaries and Extent*

Figure 6-5 shows the proposed boundaries of the proposed Sea Haven Turtle Nesting Beach Protected Area. What should be noted here is that the marine area offshore this beach which is also recommended for inclusion in this protected area has already been included in the MPA associated with the S. E. Peninsula. It is recommended that a 30 m buffer be created adjacent to the actual beach area. Within this area it is expected that no development will take place. This buffer will be sufficient to ensure that activities of humans such as lighting and noise will be a sufficient distance away so as to have little impact on the nesting turtles or the hatchlings.

6.3.3.2.4 *Challenges to Protection*

One of the main challenges to protection of this very valuable turtle nesting beach is lack of political will. One of the outputs of the RAPPAM workshop for the island of Nevis was the apparent inability of regulators to enforce laws in the face of political pressure. Discussions with representatives of the Planning Department revealed that there were a few instances where the Planning Department may have decided against a particular development and have that decision overturned. For example, there is a proposal for a marina at this site that is being received favourably by some Government representatives even though such a development will result in the loss of the beach for turtles. If any of the protected areas being proposed in this report are to become more than “paper parks” there has to be “buy-in” by all sectors of Government.

Another challenge to protection of this beach is the support of the nearby local community. One of the main threats to the turtles that use this beach is poaching by villagers. There has to be a comprehensive educational campaign that would target the local community to show the adverse impacts of continued poaching of the turtles. One of the key factors is the fact that this poaching is seen as part of the culture of the area especially since poachers associate the activity with an almost spiritual feeling (looking for signs in the sky etc.).

6.3.4 Level of Protection

As noted in Sections 6.2.3.1.4 and 6.2.3.2.4, Turtle Nesting Beaches would be classified as Category IV sites under the IUCN system, because they are nesting areas for rare or endangered species. Therefore, they would be protected to ensure the maintenance of habitats for the requirements of the specific species (marine turtles) that use these areas.

6.3.5 Proposals

In summary, it is proposed that the following turtle nesting beaches be protected under the Protected Areas System Plan:

- Keys Beach in St. Kitts,
- Beaches on the South East Peninsula in St. Kitts,
- Beaches close to Sandy Point in St. Kitts, and
- Sea Haven in Nevis.

6.4 Salt Ponds

The salt ponds described in this section are all found on St. Kitts (see Figure 6-18):

- Greatheeds Pond,
- Muddy Point Salt Pond,
- Half Moon Bay Salt Pond,
- Frigate Bay Salt Pond,
- Friar's Bay Salt Pond,
- Great Salt Pond,
- Little Salt Pond
- Mosquito Bay Salt Pond,
- Cockleshell Bay Salt Pond, and
- Major's Bay Salt Pond.

In considering ponds for protection, cognisance was taken of planning permission that has already been granted for development on the South East Peninsula. Specifically, information has been received about permission or permission in principle for the following developments of salt ponds on the peninsula:

- A marina at Little Salt Pond dredged and opened to the sea.
- A residential development on Great Salt Pond which is connected to Little Salt Pond.
- A high-end waterfront hotel, restaurant, villas, etc at Majors Pond.
- A marina and high-end villa development at Cockleshell Bay which impacts both Cockleshell Bay and Mosquito Bay Salt Ponds.

Based on the grant of permission for these developments, Ecoengineering considered it impractical to recommend these particular ponds for protection. Simply put, the revoking of planning permission could make the Government of St. Kitts and Nevis liable to pay compensation for loss of anticipated earnings, which in these cases would involve very large sums of money. The discussion in the remainder of this section therefore excludes these ponds.

The following sections provide some additional information on these ponds (where available).

6.4.1 Resources and Assets

Figure 6-19 shows the resources and assets associated with the salt ponds.

6.4.1.1 Greatheeds Pond

Greatheeds pond was originally a fresh water pond which is now brackish due to extensive disturbance in the past. The pond and surrounding area supports the following resources / assets:

- Remnant coastal scrubland including species such as Acacia (*Acacia sp.*), Loblolly (*Pisconia fragrans*), Torchwood (*Amyris balsamifera*) and Wild Tamarind (*Leucaena leucocephala*);
- Coastal species such as Sea Grape (*Coccoloba uvifera*) and Manchineel (*Hippomane mancinella*);

- Habitat for avian species such as Common Stilt (*Himantopus mexicanus*), Lesser Yellow Legs (*T. flavipes*) and West Indian Tree Duck (*Dendrocygna arborea*);
- Habitat for terrestrial avian species such as Turtle Dove and Cattle Egret (*Bubulcus ibis*);
- Habitat for other fauna such as Fiddler crabs (*Uca sp.*), Mongoose (*Herpestes auropunctatus*) and Tree Lizards.

6.4.1.2 Muddy Point Salt Pond

Muddy Point Salt Pond and surrounding area supports the following resources / assets:

- Habitat for avian species such as Great Blue Heron (*Ardea herodias*), Grey Heron (*A. cinerea*), Belted Kingfisher (*Ceryle alcyon*), Yellow Billed Cuckoo (*Coccyzus americanus*), Mangrove Cuckoo (*Coccyzus minor*), Killdeer (*Charadrius vociferus*), American Golden Plover (*Pluvialis dominica*), Pacific Golden Plover (*Pluvialis fulva*);
- Small stand of mangrove trees.

6.4.1.3 Half Moon Bay Salt Pond

Half Moon Bay Salt Pond and surrounding area supports the following resources / assets:

- Fringing mangrove habitat,
- Associated avifauna species such as Baird's Sandpiper (*Calidris bairdii*), Willet (*Catoptrophorus semipalmatus*), Northern Waterthrush (*Seiurus noveboracensis*), Louisiana Water Thrush (*Seiurus motacilla*), Black-bellied Plover (*Pluvialis squatarola*), Veery Semi-Palmated Plover (*Charadrius semipalmatus*), Wilson's Plover (*Charadrius wilsonia*), and
- Unique fauna such as brine shrimp.

The mangrove at Half Moon Pond is dominated by black mangrove trees. During the site reconnaissance conducted in June, this vegetation was fairly dense and healthy. This mangrove system supports a healthy diversity of bird species and this pond is also listed as an important bird area.

During the site visit this pond was physically divided into discrete coves and we were told that there was once cultivation of brine shrimp practiced. Our understanding is that this is no longer practised although the team did see brine shrimp in a number of the coves.

6.4.1.4 Frigate Bay Salt Pond

The important environmental assets associated with this salt pond are:

- Fringing mangrove habitat,
- Associated avifauna species, and
- Unique fauna such as brine shrimp.

Fringing mangroves can be found at almost all the salt ponds including the Frigate Bay Salt Pond. However, the mangrove at this pond is not extensive and there is evidence of pruning. The pond does support a number of bird species and it is listed as an Important Bird Area due to the breeding of three species:

- Least Tern (*Sterna antillarum*),
- Brown Pelican (*Pelecanus occidentalis*), and
- Roseate Tern (*S. dougallii*).

Other avian species seen at this salt pond are:

- Eight species of Herons and Egrets;
- Common Moorhens (*Gallinula chloropus*);
- Blue-winged Teal (*Anas discors*);
- Black-necked stilt (*Himantopus mexicanus*);
- Stilt Sandpipers (*Calidris himantopus*);
- Soras (*Porzana Carolina*);
- Clapper Rail (*Rallus longirostris*); and
- Tricoloured Heron (*Egretta tricolor*).

Apart from the birds, salt ponds, due to the level of salinity (especially in the dry season) also support a specialized fauna and microfauna.

6.4.1.5 Friar's Bay Salt Pond

Friar's Bay Salt Pond and associated vegetation support the following resources / assets:

- Dense mangrove habitat (black, red and white) supporting terrestrial avian species such as Yellow Warblers (*Dendroica petechia*), Northern Water Thrush (*Seiurus noveboracensis*) and Mangrove Cuckoo (*Coccyzus minor*);
- Associated avifauna species such as Common Moorhens (*Gallinula chloropus*), Blue-winged Teal (*Anas discors*), Clapper Rails (*Rallus longirostris*), White-cheeked Pintail (*A. bahamensis*), and
- Unique fauna.

6.4.2 Pressures and Threats

Figure 6-20 shows some of the pressures and threats associated with the salt ponds.

6.4.2.1 Greatheeds Pond

This pond is arguably the most disturbed of all the ponds under discussion. To the west of the pond is a quarry with an associated block factory. There is also encroachment of the pond margins by low and medium density housing. To the south of the pond is the existing landfill that has also started to encroach upon the pond margins. Other developments that have been established close to the pond include garages and a car wash. There is also some small scale agriculture and (in the past) the area has been used as a firing range. Finally, the Agriculture Department used oil on the margins of the pond for mosquito control.

6.4.2.2 Muddy Point Salt Pond

This pond is under threat from one main source: an existing golf course. The site visit conducted in June 2009 showed that the pond is under stress from run-off from the golf course.

6.4.2.3 Half Moon Bay Salt Pond

This salt pond is under threat through two activities:

- Past use of the pond for cultivation of brine shrimp; and
- Sand mining

During the site visit in June 2009, the pond was divided into discrete coves and shrimp was still observed in the pond. The extent to which the natural hydrology of the pond has been affected by this activity is unknown but it is certainly disturbed. Sand mining was also observed during this site visit. The mining of sand off the dunes between the pond and the sea could result in the opening up of the pond to salt water intrusion thus again altering the natural hydrological cycle of the pond.

6.4.2.4 Frigate Bay Salt Pond

The Frigate Bay Salt Pond is located in the middle of the tourism area of the island. It is therefore under threat from increased construction / establishment of hotels, golf courses and restaurants.

6.4.2.5 Friar's Bay Salt Pond

Friar's Bay is also an area earmarked for increased tourism development. It is therefore under threat from increased construction / establishment of hotels etc. The area has also been used in the past for military manoeuvres.

6.4.3 Suitability

The suitability of the salt ponds for inclusion into the System of Protected areas will be discussed under the following headings:

- Status / Representiveness;
- Ecological Gap Analysis,
- Boundaries and Extent,
- Levels of Protection,
- Challenges to Protection.

6.4.3.1 Greatheeds Pond

6.4.3.1.1 Status and Representativeness

The Greatheeds pond is a highly disturbed system which has deteriorated to the extent that its main characteristics have changed. However, as noted in Section 6.4.1.1 the following assets are recommended for protection:

- It is surrounded by the remnants of coastal scrub vegetation which supports some terrestrial avifaunal species;
- The pond which is now brackish supports a low diversity and abundance of shorebirds;

6.4.3.1.2 Ecological Gap Analysis

Neither of the best model runs recommended the protection of the Greatheeds Pond within the System of Protected Areas (see Figures 6-21 and 6-22). The percentage target for salt ponds was only 50% which was met by including other systems.

6.4.3.1.3 Boundaries and Extent

The pond and associated habitat is approximately 320 acres in extent. Figure 6-23 shows the proposed boundaries of the Greatheeds Pond Protected Area. This was determined based on the results of the EGA as well as past biodiversity and ecology studies on the pond and environs.

6.4.3.1.4 Challenges to Protection

The main challenge to protection of this system is the fact that the pond is almost entirely surrounded by developments that are having a negative impact on it. The fact that these developments have been allowed to continue to discharge directly into the pond greatly affects the level of protection that can be provided for this system.

However, as discussed above in Section 6.4.1.1, there is still some value to protection of this system.

6.4.3.2 Muddy Point Salt Pond

6.4.3.2.1 *Status and Representiveness*

The Muddy Point Salt Pond is a highly disturbed system which has deteriorated to the extent that its main characteristics have changed. However, as noted in Section 6.4.1.2 the following assets are recommended for protection:

- The salt pond supports a fair diversity of shorebird and wetland species;
- There is a small stand of mangrove.

6.4.3.2.2 *Ecological Gap Analysis*

Neither of the best model runs recommended the protection of Muddy Pond within the System of Protected Areas (see Figures 5-21 and 5-22). The percentage target for salt ponds was only 50% which was met by including other systems.

6.4.3.2.3 *Boundaries and Extent*

The pond and associated habitat is approximately 2 acres in extent. Figure 6-24 shows the proposed boundaries of the Muddy Point Salt Pond Protected Area. This was determined based on the results of the EGA as well as past biodiversity and ecology studies on the pond and environs.

6.4.3.2.4 *Challenges to Protection*

The main challenge to protection of this system is the fact that the pond is almost entirely surrounded by a golf course which is having a negative impact on it. The fact that this development has been allowed to continue to discharge directly into the pond greatly affects the level of protection that can be provided for this system.

However, as discussed above in Sections 6.4.1.2 and 6.4.3.2.1, there is still some value to protection of this system.

6.4.3.3 Half Moon Pond

6.4.3.3.1 Status / Representiveness

It is recommended that the Half Moon Bay Salt Pond be established as a protected area and included in the National System of Protected Areas since it contains the following:

- A healthy Mangrove System which is a depleted resource on the island;
- Abundant birdlife (Important Bird Area);

This pond is also one of the few remaining ponds that has not been irreparably damaged by existing development.

6.4.3.3.2 Ecological Gap Analysis

Both of the two model runs which provided the best outputs of the Marxan model included parts of Half Moon Salt Pond as recommended protected areas. Although the salt ponds were listed as a target for the model, the required goal was only 50% and this goal was met by other ponds on the island.

6.4.3.3.3 Boundaries and Extent

Figure 6-25 shows the proposed boundaries of the Half Moon Salt Pond Protected Area. A buffer of 30 m is recommended for this system. This buffer is constrained by the existing roads and the golf course.

6.4.3.3.4 Challenges to Protection

One of the main challenges to including the Half Moon Bay Salt Pond into the System of Protected Areas is the uncertainty of land tenure associated with salt ponds in St. Kitts. This is a concern since the majority of land in the area is private.

6.4.3.4 Salt Ponds of the S. E. Peninsula

The remaining salt ponds are located within the S.E. Peninsula and are therefore included in the SEPNMMA (see Section 6.2.1.1). These are:

- Frigate Bay Salt Pond;
- Friar's Bay Salt Pond;
- Great Salt Pond;
- Little Salt Pond;
- Mosquito Bay Salt Pond;
- Cockleshell Bay Salt Pond; and
- Major's Bay Salt Pond.

6.4.4 Level of Protection

Apart from the salt ponds which have been excluded from this discussion (Little Salt Pond, Great Salt Pond, Major's Bay Salt Pond, Mosquito Bay Salt Pond and Cockleshell Bay Salt Pond), two separate levels of protection are recommended for the Salt Ponds on St. Kitts. For those ponds which are still in relatively good condition and can be maintained as salt ponds, we recommend that they be classified as IV under the ICUN system. That is, areas of land and or/sea which is subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. The objective here would be to preserve these ponds as salt ponds, with the attendant contribution to biodiversity due to the visiting bird life and the seasonal hypersaline conditions. Three of these ponds have been selected for rehabilitation for ecotourism and educational purposes (Frigate Bay Salt Pond, Friar's Bay Salt Pond and Half Moon Pond).

The second level of protection would apply to those ponds which have been altered significantly to the extent that it would be impractical to return them to nearly their original condition as salt ponds. Specifically, these would be Greatheeds Pond and Muddy Salt Pond. In these cases, it is recommended that the ponds should be preserved mainly as sediment sinks and bird roosting areas. Planning permission should not be given to fill in these ponds or to open them out to the sea, but beyond this there would be no additional conservation activity.

6.4.5 Proposal

In summary, three salt ponds are proposed for enhancement and rehabilitation for ecotourism and educational purposes under the Protected Areas System:

- Frigate Bay Salt Pond;
- Friar's Bay Salt Pond; and
- Half Moon Bay Salt Pond.

Of these three systems, Frigate Bay Salt Pond and Friar's Bay Salt Pond have been included in the S. E. Peninsula and the Narrows Marine Management Area (SEPNMMA).

Finally, it is considered to be impractical to return two ponds to nearly their original condition as salt ponds:

- Greatheeds Pond, and
- Muddy Point Salt Pond.

It is therefore recommended that these ponds should be preserved mainly as sediment sinks and bird roosting areas. Planning permission should not be given to fill in these ponds or to open them out to the sea and this should be strictly enforced, but beyond this there would be no additional conservation activity.

6.5 Freshwater Lagoons

There are a number of freshwater lagoons on Nevis. Of these only the following are being recommended for inclusion into the National System of Protected Areas:

- Bath Bogs;
- Nelson Springs;
- Jessup's Pond,
- New River Spring;
- Pinney's Pond; and
- Parris Pond.

6.5.1 Resources / Assets

6.5.1.1 Bath Bogs Protected Area

The Bath Bogs is part of a larger area being considered for protection which includes the Bath Hotel and the Bath Stream. The Bath Bogs contains the following environmental assets (see Figure 6-26):

- Wetland habitat at the mouth of the Bath Stream;
- Small White Mangrove Belt;
- Habitat for a number of avian species.

The area is known as the largest wetland area on the island of Nevis. Bath Bog itself is separated from the sea by Gallows Bay Beach. There are various vegetation zones described in the area. At the centre of the area, there is a wet, boggy zone which has very poor drainage and fluctuating water levels. The dominant vegetation is Sourgrass (*Paspalum conjugatum*) with the occasional White Mangrove (*Laguncularia racemosa*). This zone is an important feeding spot for marsh birds such as herons and egrets.

West of the boggy zone, parallel to the coastline is the dune area. Dune vegetation helps to hold the sand and soil in place against erosion by rain and waves, therefore protecting the bog from heavy surf and sea blast. The dominant vegetation are Coconut (*Cocos nucifera*), Manchineel (*Hippomane mancinella*) and Acacia (*Acacia spp.*) in the overstory and Sourgrass (*Paspalum conjugatum*) and Beach Morning Glory (*Ipomoea pes-caprae*) in the understory.

Further east and south of the boggy zone are the drier zones. In these zones, the soil is a dry, hard-packed, light-coloured clay. These zones are dominated by Coconut (*Cocos nucifera*), Manchineel (*Hippomane mancinella*), Acacia (*Acacia spp.*), Wild Tamarind (*Leucaena leucocephala*) and Clammy Cherry (*Cordia collococca*) (Rodrigues, 1990).

The Bath Stream runs along the southern segment of the area. On either sides of this stream, there exists a small White Mangrove Belt. This mangrove system provides a good cover for wildlife and protects the stream from erosion. Cattle egrets (*Bubulcus ibis*) are known to roost and nest in the mangroves at the mouth of the stream.

Finally, south of the Bath Bog area, there is a dry zone flora which is dominated by Mexican Creeper (*Antigonon leptopus*), Acacia (*Acacia sp.*), Wild Physic nut (*Jatropha curcas*) and grasses such as Sourgrass, Purpletop (*Chloris inflata*) and Running Grass (*Digitaria sanguinalis*). This area is used as pasture land for goats and sheep.

6.5.1.2 Nelson Springs

Nelson spring is part of a larger area being considered for protection which includes, Parris Pond, Pinney's Pond and Jessup's Pond. Nelson Spring contains the following environmental assets:

- Marshland habitat;
- Habitat for a number of avian species;
- Adequate fresh water resources for supply to nearby communities.

During the site visit conducted in June, the marshland habitat showed no signs of degradation. As noted in Section 5.8.3, the spring is also used to provide water to the nearby parish of St. Thomas Lowland.

6.5.1.3 Jessup's Pond

Jessup's Pond is also part of a larger area being considered for protection which includes, Parris Pond, Pinney's Pond and Nelson Spring. Jessup's Pond contains the following environmental assets:

- Marshland habitat;
- Habitat for a number of avian species.

As noted in Section G.8.3, the spring is also used to provide water to the nearby parish of St. Thomas Lowland.

6.5.1.4 New River Estate and Springs

These springs are part of an estate that contained a number of key assets to be preserved including:

- Amerindian Artefacts;
- Spring;

- Frenchman's Cave;
- Devil's Copper.

During the site visit in June, the project team were able to visit a part of the site that included the hiking trail which was apparently frequently used by hikers. The trail was not well maintained and showed signs of frequent use. At the sides of the trail, railing had been constructed to assist hikers along steep stretches of the trail. These railings were in poor condition and in some instances posed a hazard since where it existed, the weakness of the structure could give-way and result in injury to hikers.

The spring was also found to be stagnant in some areas, although this seemed to be as a result of debris in the water. There were no signs of eutrophication to suggest that the spring was receiving excessive effluent.

6.5.1.5 Pinney's and Parris Ponds

Pinney's and Parris Ponds are located within the larger Pinney's Estate which is being proposed as a protected area. The estate contains the following resources / assets:

- Lagoons / wetlands including Pinney's Pond, Parris Pond, Cades Pond and Nelson Spring;
- Sandy Beach;
- Historical Sites including Fort Ashby, James Town and Golden Rock Pavilion;
- Opportunities for recreational fishermen; and
- Nesting of sea turtles.

Pinney's Pond, Parris Pond, Nelson Spring, Fort Ashby and the Sandy Beach area were all visited as part of the site reconnaissance in June. Nelson Spring was discussed in Section 6.5.1.2 above while Fort Ashby will be discussed in Section 6.9 under historic sites.

Parris Pond is a small wetland area located close to the southern end of the Pinney's Beach. The pond is surrounded by a small mangrove system dominated by white mangroves which provides habitat for a number of avifaunal species. There is a bridge across the pond which connects the land on which the Pinney's Beach Hotel is located with Pinney's Beach. At the time of the field visit, the pond water was stagnant since there was no connection to the sea.

Pinney's Beach is a 2.6 mile stretch of beach which is very popular with tourists. It is also a popular bathing area for locals. Artisanal fishing is also practised from this beach.

6.5.2 Pressures / Threats

6.5.2.1 Bath Bogs Protected Area

The location of the Bath Bogs adjacent to the town of Charlestown has resulted in a number of adverse impacts on the resources / assets of the area. The Bogs receive discharge from a number of businesses in the Charlestown area including untreated effluent from grease traps from nearby restaurants as well as untreated sewage from residences (see Figure 6-27). This has resulted in the die-off of the mangrove system as well as severe deterioration of the water quality of the stream and the wetland area. The area has also been used as an illegal dump site which contributes to the unsightly image and odour.

6.5.2.2 Nelson Springs

The main threat to Nelson Springs is the proposed development of villas and other residential developments. It is also our understanding that there has been clearing of trees around the springs. Any construction activities close to the springs may result in a deterioration of the water quality which could reduce its ability to support the resident wildlife. Deterioration in the water quality could also impair the quality of water available for distribution to the nearby communities.

6.5.2.3 Jessup's Pond

No information on any development proposed for the Jessup's area was available. However, the location of the pond is within an area that is already highly developed and therefore it is expected that additional development may be proposed. Any construction activities close to the pond may result in a deterioration of the water quality which could reduce its ability to support the resident wildlife. Deterioration in the water quality could also impair the quality of water available for distribution to the nearby communities.

6.5.2.4 New River Estate and Springs

One of the main threats to the site is overuse by tourists who hike up the trail to visit the springs, the Amerindian artefacts and the cave. This has resulted in the erosion of the trail and the deterioration of trail structures such as the railing and the benches.

6.5.2.5 Pinney's and Parris Ponds

Pinney's Pond and Parris Pond receive discharge from the nearby restaurant and hotel. This has resulted in the deterioration of the water quality of both systems. Recent construction works in the area has also resulted in increased sedimentation of the ponds.

6.5.3 Suitability of Units

6.5.3.1 Bath Bogs Protected Area

6.5.3.1.1 Status / Representiveness

Bath Bogs is recommended for inclusion in the National System of Protected Areas for the following reasons:

- It is a habitat for both resident and migratory species;
- It is also a habitat for both resident and migrant shore birds;
- The wetland provides a habitat for crustaceans, adult and juvenile fish; and
- It also functions as a nursery for juvenile fish.

6.5.3.1.2 Ecological Gap Analysis

Both runs of the Ecological Gap Analysis recommended the Bath Bogs for inclusion in the System of Protected Areas. The target being considered in this case was freshwater ponds of which 100% were recommended for conservation (see Figures 6-28 and 6-29).

6.5.3.1.3 *Boundaries and Extent*

Figure 6-30 shows the boundaries of the Bath Bogs Protected Area which includes the Bath Hotel and Bath Stream. This site is 57 acres in extent. Although the EGA recommended only the Bogs for inclusion, this is expected since the targets were based on the conservation of biodiversity. However, the area that will be protected will be a wider area including the historic Bath Hotel and the scenic Bath Stream. Within this larger area to be protected there has been provision for a buffer.

6.5.3.1.4 *Challenges to Protection*

The main challenge to inclusion of the Bogs area is the advanced state of deterioration of this resource. As noted in Section 6.5.2.1, the Bogs have received the effluent from residents, businesses and the old Power Station for a number of years. This has resulted in the deterioration of the water quality and the die-off of some of the mangrove vegetation.

There is also little room for the creation of a buffer around this bog area since there is development to the east and north with the coastline to the west. To the south is the Bath Hotel and stream.

6.5.3.2 *Nelson Spring*

6.5.3.2.1 *Status / Representiveness*

Nelson Spring is recommended for inclusion in the National System of Protected Areas for the following reasons:

- It is a habitat for both resident and migratory species;
- It is also a habitat for both resident and migrant shore birds; and
- The springs are also tapped for use as bottled water.

As noted above in Section 6.5.1.2, the springs are included as part of a larger protected area called Pinney's Beach Conservation Area.

6.5.3.2.2 *Ecological Gap Analysis*

Both runs of the Ecological Gap Analysis recommended the Nelson Spring for inclusion in the System of Protected Areas. The target being considered in this case was freshwater ponds of which 100% were recommended for conservation (see Figures 6-31 and 6-32).

6.5.3.2.3 *Boundaries and Extent*

As noted in Section 6.5.1.2, the Nelson Spring is part of a larger area being considered for protection. This larger area, the Pinney's Beach Conservation Area is 472 acres in extent. This area is shown in Figure 6-33. Again, due to the fact that the spring is located within a larger area for protection, there is provision for a buffer within its boundaries.

6.5.3.2.4 *Challenges to Protection*

As with the Bath Bogs, the main challenge to inclusion of the Pinney's Beach Conservation Area which includes Nelson Spring is the potential for additional development. The fact that some of the land is private makes this a very real threat and a challenge since the experience has been for private developers to resist the attempt by Government to control development on their land.

6.5.3.3 *Jessup's Pond*

6.5.3.3.1 *Status / Representiveness*

As noted above in Section 6.5.1.3, the springs are included as part of a larger protected area called Pinney's Beach Conservation Area. This pond area is relatively small and very little information was available on the nature and status of the resources. However, the reasons stated for the inclusion of the other ponds are also applicable here.

6.5.3.3.2 Ecological Gap Analysis

Both runs of the Ecological Gap Analysis recommended Jessup's Pond for inclusion in the System of Protected Areas. The target being considered in this case was freshwater ponds of which 100% were recommended for conservation.

6.5.3.3.3 Boundaries and Extent

As noted in Section 6.5.1.3, Jessup's Pond is part of a larger area being considered for protection. This larger area, the Pinney's Beach Conservation Area is approximately 472 acres in extent. This area is shown in Figure 6-33. Again, the provision of a buffer was taken into consideration when identifying the larger Pinney's Beach area for protection.

6.5.3.3.4 Challenges to Protection

As noted above in Section 6.5.2.3, the main challenge to inclusion of the Pinney's Beach Conservation Area which includes Jessup's Pond is the potential for additional development. The fact that some of the land is private makes this a very real threat and a challenge since the experience has been for private developers to resist the attempt by Government to control development on their land.

6.5.3.4 New River Estate and Springs

6.5.3.4.1 Status / Representiveness

It is recommended that the new river springs are suitable for inclusion into the system of protected areas for the following reasons:

- It is contained within a larger area proposed for protection;
- The springs provide an important drainage function;
- The springs are used as a source of potable water by nearby communities;
- The springs seem to be in fairly good condition and there were no obvious signs of pollution; and
- There is the potential for the creation of a buffer.

6.5.3.4.2 *Ecological Gap Analysis*

Both runs of the Ecological Gap Analysis recommended the spring associated with the New River Stream for inclusion in the System of Protected Areas. The target being considered in this case was freshwater ponds of which 100% were recommended for conservation. However, as noted above in Section 6.5.1.4, the New River Spring is part of a larger area being considered for protection which includes historic / cultural sites that were not considered in the EGA.

6.5.3.4.3 *Boundaries and Extent*

The proposed boundaries of the New River Protected area are unclear. More information on the location of the springs, the artefacts and the caves is needed before boundaries can be proposed.

6.5.3.4.4 *Challenges to Protection*

The main challenge for protection is the level of uncertainty associated with the resources at this site. Additional information is needed before the site can be properly assessed for inclusion into the System of Protected Areas.

6.5.3.5 *Pinney's and Parris Ponds*

6.5.3.5.1 *Status / Representiveness*

Pinney's Pond and Parris Pond are recommended for inclusion into the system of protected areas for the following reasons:

- They are contained within a larger area proposed for protection;
- The ponds provide an important drainage function; and
- The associated vegetation provide habitat for a number of avian species.

6.5.3.5.2 *Ecological Gap Analysis*

Both runs of the Ecological Gap Analysis recommended Pinney's and Parris Ponds for inclusion in the System of Protected Areas. The target being considered in this case was freshwater ponds of which 100% were recommended for conservation. However, as noted above in Section 6.5.1.5, both ponds are part of a larger area being considered for protection which includes historic / cultural sites that were not considered in the EGA.

6.5.3.5.3 *Boundaries and Extent*

The proposed boundaries of the Pinney's Beach Conservation Area are shown in Figure 6-33. The fact that these ponds are located within a larger area being considered for conservation provides some buffer for the ponds.

6.5.3.5.4 *Challenges to Protection*

As noted above in Section 6.5.2.5, the main challenge to inclusion of the Pinney's Beach Conservation Area which includes Pinney's and Parris Ponds is the potential for additional development. The fact that some of the land is private makes this a very real threat and a challenge since the experience has been for private developers to resist the attempt by Government to control development on their land.

6.5.4 *Level of Protection*

We recommend that freshwater lagoons be classified as VI under the ICUN system. That is, an area which contains predominantly unmodified natural systems which would be managed to ensure long term protection and maintenance of biodiversity while providing a sustainable flow of natural products and services to meet community needs. The objective here would be to preserve these lagoons as fresh water systems, with the attendant contribution to biodiversity due to the bird life.

6.5.5 Proposal

Based on the discussions in the previous sections, the following freshwater lagoons are recommended for inclusion into the System of Protected Areas:

- Bath Bogs,
- Nelson Spring,
- Jessup's Pond,
- New River Springs,
- Parris Pond, and
- Pinney's Pond.

6.6 The Ghauts

There are approximately 81 Ghauts on St. Kitts and 33 Ghauts on Nevis. These drainage channels, locally called "ghauts" are very important in the islands' overall drainage systems (see Section G.9.3).

6.6.1 Resources / Assets

The Ghauts are physical channels that flow from the mountains at the centre of both islands and transport water from these heights to the sea. These ghauts contain or maintain the following resources / assets (see Figures 6-34 and 6-35):

- Sand / Aggregate (in St. Kitts),
- Habitat for Faunal Species.

The Ghauts provide ideal habitat for numerous mountain bird species such as Brown Tremblers, Pearly-eyed Thrashers, Rainforest Pigeons, and Bridled-quail Doves.

6.6.2 Pressures / Threats

There are a number of pressures on the Ghauts (see Figures 6-36 and 6-37):

- Erosion – In the past, severe erosion at College Ghaut has threatened villages such as Lower Monkey Hill and Wades Garden. Many other ghauts on the island have severe erosion problems almost with similar intensity to that of College Ghaut with the exception, however, that they may not be passing through highly populated areas.
- Illegal sand mining.
- Squatting on the banks of ghauts predisposes the land to erosion and degradation.
- Illegal and unauthorized development.
- Illegal farming and grazing of animals.
- Illegal dumping.

The illegal sand mining has led to severe erosion resulting in the loss of arable farmland. In addition, excessive silt from erosion is deposited into the sea, contributing to negative effects on the sea grass beds, coral reefs and other spawning grounds in the marine environment.

On Nevis, although there is no illegal sand mining within ghauts, quarrying occurs in close proximity to several ghauts such as at Hick's, New River, Indian Castle and Dogwood Estate. This quarrying has resulted in sediments being transported down adjacent ghauts into the nearshore environment and led to a subsequent deterioration of the nearshore ecosystems.

6.6.3 Suitability of Units

6.6.3.1 Status / Representiveness

As noted in Section G.9.3, the Ghauts play an important role in the drainage of the both islands. While the majority of Ghauts on St. Kitts are in good condition, there are some that have been degraded by the activities listed above. For example Wash Ghaut (which was visited during the June site visits) was being mined and information from the

Department of Physical Planning was that this mining was significant. Apart from Wash Ghaut, other sites known to be mined include College Ghaut, Tabernacle Ghaut and Holland Ghaut. Additionally, at Bridge Ghaut which was also visited there was evidence of illegal dumping. The Ghauts on Nevis are considered to be in better condition since they are not mined.

6.6.3.2 Ecological Gap Analysis

Ghauts were not considered as a target in the EGA.

6.6.3.3 Boundaries and Extent

The boundaries of individual Ghauts are clearly defined. Although the exact acreage covered by all the Ghauts of St. Kitts and Nevis is not clear, it is expected to be a significant proportion of land. One of the ways in which a buffer can be provided for protection of the ghauts is by the designation of a setback for development from the edge of the ghauts. The St. Christopher Physical Development Plan recommends a minimum of 20 m buffer from the edge of Ghauts. A similar distance is recommended for Nevis Ghauts. This would fall under the purview of the Development Control Board under the Development Control Act.

6.6.3.4 Level of Protection

6.6.3.4.1 St. Kitts

Two separate levels of protection are recommended for the Ghauts of St. Kitts. For those ghauts which are still in a relatively good condition and have not been designated as legal sand mining sites, we recommend that they be classified as Category II under the IUCN system. That is a natural area of land, designated to:

- Protect the ecological integrity of one or more ecosystems for present and future generations,
- Exclude exploitation or occupation inimical to the purposes of designation of the area, and
- Provide a foundation for spiritual, scientific, educational, and recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

The objective here would be to preserve these ghauts as ghauts, with the attendant contribution to biodiversity.

The second level of protection would apply to those ghauts which have been altered significantly to the extent that it would be impractical to return them to nearly their original condition as ghauts. Specifically, these would be College Ghaut, Tabernacle Ghaut, Wash Ghaut and Holland Ghaut. Planning permission should not be given to development within the proposed 20 m setback distance from the edge of the ghauts, but beyond this there would be no additional conservation activity. Additionally, there would be management of these ghauts to ensure that the sand / aggregate resource is not unsustainably used resulting in adverse downstream effects.

6.6.3.4.2 Nevis

Given the fact that the ghauts in Nevis are not mined for sand / aggregate, we recommend that they be classified as Category II under the IUCN system. That is a natural area of land, designated to:

- Protect the ecological integrity of one or more ecosystems for present and future generations,
- Exclude exploitation or occupation inimical to the purposes of designation of the area, and
- Provide a foundation for spiritual, scientific, educational, and recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

The objective here would be to preserve these ghauts as ghauts, with the attendant contribution to biodiversity.

6.6.3.5 Challenges to Protection

The main challenge to be faced in considering Ghauts as protected areas is the use of Ghauts for illegal mining in St. Kitts. This mining has led to downstream impacts that can continue to harm the marine environment and the fragile ecosystems that exist there. In Nevis, quarrying adjacent to ghauts has led to sedimentation of the nearshore environment. The challenge is the fact that the majority of these quarries are privately owned and operate with little or no legal or regulatory guidelines (JECO Caribbean Inc. 2007).

The other challenge to inclusion of the Ghauts is the enforcement of regulations regarding unauthorized development and setbacks from the edge of the ghauts on both islands.

6.6.4 Proposal

It is recommended that the Ghauts of both St. Kitts and Nevis be included in the System of Protected Areas since they provide a unique function in the drainage system of the islands and also function as vegetated corridors.

6.7 Dry Forest

As noted in Section G.10.3 of Appendix G, the vegetation type classified as “dry forest” is really made up of four deciduous vegetation types (see Figure 6-38). Vegetation classified as “dry forest” can be found in the following three main areas:

- Brimstone Hill;
- Hilltops of the S. E. Peninsula; and
- Northernmost, Southeast and Southwest slopes of Nevis Peak.

6.7.1 Resources / Assets

“Dry Forests” contain the following resources:

- 21 species unique to dry evergreen forests in St. Kitts;
- 39 species of scrub unique to dry scrub woodland in St. Kitts;
- Supports a small population of white tailed deer on St. Kitts.

Common species that characterize these forests types include:

- *Acacia farnesiana*
- *Bursera simaruba*
- *Croton flavens*
- *Calotropis procera*

- *Plumeria alba*
- *Cephalocereus royenii*
- *Erithalis fruticosa*
- *Cordia obliqua*
- *Conocarpus erectus*
- *Ardisia obovata*
- *Randia aculeata*
- *Coccoloba uvifera*

6.7.2 Pressures / Threats

There are a number of pressures / threats associated with dry forests in St. Kitts and Nevis:

- Conversion to other uses;
- Clearing for built development;
- Extraction of Ornamental and Medicinal Plants;
- Illegal Farming;
- Invasive Species;
- Charcoal Production;
- Livestock Grazing; and
- Illegal dumping of waste.

6.7.3 Suitability of Units

This type of forest is being cleared at alarming rates for built development, and the need to protect this forest type has been discussed in Section 6.7.1. There has been some protection of dry forests within the boundaries of the Brimstone Hill Fortress National Park as well as within the Nevis Peak National Park in Nevis. Outside these areas, the majority of dry forests occur on the S. E. Peninsula, where they grow on private land. Even though it is recognized that the establishment of any protected area will be difficult due to private ownership, Ecoengineering considers it useful to include some area of dry forest on the Southeast Peninsula in the Systems Plan, as will be discussed in Section 7.11.2. The vegetation types that are classified as “dry forests” were included as targets in the Ecological Gap Assessment and the targets for conservation were met by the best model runs from the modelling exercise. It is therefore recommended that a suitable area of dry forest on the S. E. Peninsula be identified for protection (see Section 7.11.2).

6.8 Historic Charlestown

6.8.1 Resources / Assets

Historic Charlestown as a historic site contains the following assets (see Figure 6-39):

- Buildings of unique architectural value;
- Diversity of structures;
- Unique character and charm; and
- Tourism potential.

6.8.2 Pressures and Threats

As noted in Section G.11.4, some of the pressures / threats associated with Historic Charlestown include:

- Neglect of sites and buildings,
- Poor repairs and restoration,
- Ill-considered redevelopment;
- Exceeding carrying capacity;
- Property Theft and Destruction;
- Littering; and
- Graffiti.

It is also our understanding that the Government has recently leased some land in Charlestown for private development that may potentially impact one of the buildings recommended for protection as part of Historic Charlestown.

6.8.3 Suitability of Units

6.8.3.1 Status / Representiveness

Table 6-1 below highlights the individual buildings being proposed for initial inclusion into the historic site that is Historic Charlestown:

TABLE 6-1: STATUS OF HISTORIC BUILDINGS

BUILDING	STATUS / REPRESENTIVENESS
Austin Hotel,	Built in the English Architectural Style known as “Georgian”.
Library Building	Built in the English Architectural Style known as “Georgian”.
Alexander Hamilton Museum	Excellent Condition. Presently part of walking tour by Department of Tourism.
St., Theresa’s Catholic Church	Good condition. Presently part of walking tour by Department of Tourism.
Slave Market	The wall representing the location of the slave market is the only evidence. There is a sign providing information on the location of the slave market and its significance. This site is also part of a walking tour by the Department of Tourism.
Wesleyan Holiness Church and Manse	Excellent Condition. Presently part of walking tour by Department of Tourism.
Treasury Building	Well maintained. Present use as offices of Department of Tourism.
Customs House	The Customs building holds a sports store, Department of Culture and a gift shop.
Old Great House	Built in the English Architectural Style known as “Georgian”.

6.8.3.2 Boundaries and Extent

The exact boundaries of Historic Charlestown are limited to the boundaries of the town of Charlestown. It is important to note that the individual buildings being considered are just the first ones being offered. There is therefore the intension of adding other buildings. However, these will all be limited to the present extent of the town. This also means that there is little potential for a buffer.

6.8.3.3 Level of Protection

The level of protection appropriate for Historic Charlestown is effected by Category II Historic Site for the following reasons:

- Historic Buildings associated with the past;
- Part of historical and cultural heritage;
- Includes historic landmarks.

6.8.3.4 Challenges to Protection

The main challenge to inclusion of the buildings for Historic Charlestown is the present tenure of the individual buildings. While a number of the buildings are provided for Government use and have been used for this purpose in the past, there are a number that are privately owned. It is unclear whether these property owners would be willing to cede these buildings to the state for including in the System of Protected Areas.

6.8.3.5 Proposal

It is therefore recommended that the buildings listed in Table 6-1 be included within the System of Protected Areas as Historic Charlestown for the reasons listed in Section G.11.6.

6.9 Historic / Cultural Sites

As noted in Section 5.12, a number of sites have been offered for consideration into the System of Protected Areas either as individual sites or as parts of larger sites with multiple assets. These include (see Figure 6-40):

- ▶ Old Road Town Petroglyphs, St. Kitts;
- ▶ Petroglyphs at Stonefort, St. Kitts;
- ▶ Belmont Estate, St. Kitts;
- ▶ Mansions Estate, St. Kitts;
- ▶ Spooner's Ginnery, St. Kitts;
- ▶ Black Rocks, St. Kitts;
- ▶ Charles Fort, St. Kitts;
- ▶ Indian Castle Protected Area, Nevis;
- ▶ Fort Ashby, Nevis;
- ▶ Bath Hotel, Nevis;
- ▶ New River Estate, Nevis; and
- ▶ Fort Charles, Nevis.

6.9.1 Resources / Assets

Table 6-2 provides information on the resources and assets at these historic sites:

TABLE 6-2: RESOURCES OF HISTORIC SITES

SITE	RESOURCE / ASSET
Old Road Town Petroglyphs, St. Kitts	Amerindian rock carvings. Already part of tourism tour.
Petroglyphs at Stonefort, St. Kitts	Amerindian rock carvings.
Belmont Estate, St. Kitts	Remnants of sugar plantation, with chimneys and old plantation buildings.
Mansions Estate, St. Kitts	Remnants of sugar plantation, with chimneys and old plantation buildings.
Spooner's Ginnery, St. Kitts	Remnants of cotton ginnery, with original equipment.
Black Rocks, St. Kitts	Coastal geologic feature, with existing local involvement. Already part of tourism tour.
Charles Fort, St. Kitts	Remnants of old fort including cistern, guard room, prison, magazine and cannons.
Indian Castle Protected Area, Nevis	Remnants of Fort George. Amerindian artefacts.
Fort Ashby, Nevis	Remnants of fort, including fort building and cannon. Part of a larger site including several freshwater lagoons.
Bath Hotel, Nevis	Restored historic hotel, including Bath stream and original bath house and newly constructed bath house. Part of a larger site including Bath Bogs.
New River Estate, Nevis	Amerindian artefacts, water wheel. Part of a larger site containing and important water source and hiking trails.
Fort Charles, Nevis	Certain local stone walls remain and a dug stone-lined cistern, as do a number of cannons.

6.9.2 Pressures / Threats

Pressures and threats associated with each site are highlighted in Table 6-3 below:

TABLE 6-3: PRESSURES AND THREATS ASSOCIATED WITH HISTORIC SITES

SITE	PRESSURES / THREATS
Old Road Town Petroglyphs, St. Kitts	Over use of site. Development. Climatic conditions leading to deterioration of carvings.
Petroglyphs at Stonefort, St. Kitts	Over use of site. Development. Climatic conditions leading to deterioration of carvings.
Belmont Estate, St. Kitts	Unauthorized development Neglect of buildings and other structures such as the chimney and mill.
Mansions Estate, St. Kitts	Unauthorized development Neglect of buildings and other structures such as the chimney.
Spooner's Ginnery, St. Kitts	Unauthorized development. Illegal livestock grazing. Neglect of buildings and other structures.
Black Rocks, St. Kitts	Over use. "Acts of God" such as earthquake, landslide.
Charles Fort, St. Kitts	Neglect of buildings and other structures.
Indian Castle Protected Area, Nevis	Unauthorized development. Livestock grazing. Neglect of buildings and other structures.
Fort Ashby, Nevis	Unauthorized development. Neglect of buildings and other structures.
Bath Hotel, Nevis	Inappropriate use. Neglect of buildings and other structure. Inappropriate renovations / additions.
New River Estate, Nevis	Over use of site. Development.
Fort Charles, Nevis	Neglect of buildings and other structure. Inappropriate development.

6.9.3 Suitability of Units

6.9.3.1 Status / Representiveness

Table 6-4 highlights the status / representiveness of the sites being considered:

TABLE 6-4: STATUS OF HISTORIC SITES

SITE	STATUS / REPRESENTIVENESS
Old Road Town Petroglyphs, St. Kitts	Well maintained. Good representation of Amerindian carvings.
Petroglyphs at Stonefort, St. Kitts	Good representation of Amerindian carvings. Not very well maintained.
Belmont Estate, St. Kitts	Good representation of sugar estate industry by layout and structures. Not very well maintained.
Mansions Estate, St. Kitts	Good representation of sugar estate industry by layout and structures. Not very well maintained.
Spooner's Ginnery, St. Kitts	Good representation of cotton ginnery with original equipment. However, the building is in extremely poor condition and the surrounding environment is littered with solid waste and other types of waste.
Black Rocks, St. Kitts	Rocks an interesting geologic feature. Its position makes it difficult to be disturbed by man but (as noted above in Section 6.9.2) "Acts of God" can create extensive damage. The nearby strip of coastal land is used by locals during tourist visits. Existing huts are in good condition.
Charles Fort, St. Kitts	Fort building in a state of disrepair. Surroundings overgrown and not maintained.
Indian Castle Protected Area, Nevis	Fort building in a state of disrepair. Amerindian artefacts need to be classified to determine their worth.
Fort Ashby, Nevis	Fort building in a state of disrepair. Amerindian artefacts need to be classified to determine their worth. Cannon in fairly good condition. Surrounding environment is littered with solid waste.
Bath Hotel, Nevis	Bath Hotel in excellent condition.
New River Estate, Nevis	Amerindian artefacts need to be classified to determine their worth. The trail to the sites is not very well maintained.
Fort Charles, Nevis	The site has lost a significant amount of ambience due to an inappropriate development immediately adjacent to it, which suffered hurricane damage and has never been completed. It is now a site of a number of partly completed dilapidated buildings which ideally should be demolished (Hyder, 2008).

6.9.3.2 Boundaries and Extent

Information on the boundaries and extent of the sites is listed in Table 6-5 below:

TABLE 6-5: BOUNDARIES OF HISTORIC SITES

SITE	BOUNDARIES / EXTENT
Old Road Town Petroglyphs, St. Kitts	The boundaries are well defined. The area is fenced and the approximate size of a household lot. No potential for buffer around fenced area but there is an approximate 3 m buffer around carving.
Petroglyphs at Stonefort, St. Kitts	The boundaries and extent are not well defined but the site has been described as extending 200 m on both sides of the ravine about 500 m from the Island Main Road. There is some potential for the creation of a buffer.
Belmont Estate, St. Kitts	The estate yard is approximately 3 acres in extent. There is some potential for the creation of a buffer.
Mansions Estate, St. Kitts	The estate yard is approximately 3 acres in extent. There is some potential for the creation of a buffer.
Spooner's Ginney, St. Kitts	This site is estimated to be 1.8 acres. There is limited potential for the creation of a buffer.
Black Rocks, St. Kitts	The boundaries of the formation are well defined. The boundaries of the associated coastal strip used by local not so well defined though it is approximately 30 m. There is limited potential for the creation of a buffer.
Charles Fort, St. Kitts	This site is approximately 7 acres (28,200m ²) in size.
Indian Castle Protected Area, Nevis	15 acres. Area fenced. There is the potential for a buffer.
Fort Ashby, Nevis	Boundaries well defined. Area is fenced. The site is approximately the size of a household lot. The fort is part of a larger area being considered for protection which has an extent of 472 acres.
Bath Hotel, Nevis	Boundaries well defined. Area is fenced. The site is approximately the size of 2-3 houselots. The fort is part of a larger area being considered for protection which has an extent of 57 acres.
New River Estate, Nevis	Potential for a buffer. No clear indication of the boundaries of the site and therefore the extent is not known.
Fort Charles, Nevis	This site is approximately 3 acres (11,706 m ²) in size.

6.9.3.3 Level of Protection

Table 6-6 below provides suggestions for the level of protection recommended for each historic site:

TABLE 6-6: LEVEL OF PROTECTION PROPOSED FOR HISTORIC SITES

SITE	TOURISM MASTER PLAN/ IUCN CATEGORY
Old Road Town Petroglyphs, St. Kitts	Category 1
Petroglyphs at Stonefort, St. Kitts	Category 1
Belmont Estate, St. Kitts	Category 2
Mansions Estate, St. Kitts	Category 3
Spooner's Ginnery, St. Kitts	Category 4
Black Rocks, St. Kitts	Category VI (IUCN)
Charles Fort, St. Kitts	Category 2
Indian Castle Protected Area, Nevis	Category 1
Fort Ashby, Nevis	Category 2
Bath Hotel, Nevis	Category 1
New River Estate, Nevis	Category 2
Fort Charles, Nevis	Category 2

6.9.3.4 Challenges to Protection

Table 6-7 provides information on the challenges to inclusion of individual historic sites to the System of Protected Areas:

TABLE 6-7: CHALLENGES TO PROTECTION OF HISTORIC SITES

SITE	CHALLENGES TO PROTECTION
Old Road Town Petroglyphs, St. Kitts	None identified
Petroglyphs at Stonefort, St. Kitts	Inaccessibility of the site.
Belmont Estate, St. Kitts	Advanced state of disrepair of structures. Uncertainty of tenure.
Mansions Estate, St. Kitts	Advanced state of disrepair of structures. Uncertainty of tenure.

SITE	CHALLENGES TO PROTECTION
Spooner's Ginnery, St. Kitts	Advanced state of disrepair of structures. Uncertainty of tenure.
Black Rocks, St. Kitts	Inappropriate development. Unauthorized development.
Charles Fort, St. Kitts	Stigma attached to past use as a Leprosarium. Close proximity of residential neighbours. Advanced state of disrepair of structures.
Indian Castle Protected Area, Nevis	Incompatible use of the site for agriculture. Advanced state of disrepair of structures.
Fort Ashby, Nevis	Advanced state of disrepair of structures.
Bath Hotel, Nevis	Maintenance of historic nature of building and compatibility of use for office space.
New River Estate, Nevis	Little knowledge of artefacts. Deterioration of the structures on the sites.
Fort Charles, Nevis	Inappropriate development and the resultant loss of ambience. Private tenure of property. Advanced state of disrepair of structures.

6.9.4 Proposal

Based on the discussions in the sections above, it is recommended that the following historic sites be included in the System of Protected Areas:

- ▶ Old Road Town Petroglyphs, St. Kitts;
- ▶ Petroglyphs at Stonefort, St. Kitts;
- ▶ Belmont Estate, St. Kitts;
- ▶ Mansions Estate, St. Kitts;
- ▶ Spooner's Ginnery, St. Kitts;
- ▶ Black Rocks, St. Kitts;
- ▶ Charles Fort, St. Kitts;
- ▶ Indian Castle Protected Area, Nevis;
- ▶ Fort Ashby, Nevis;
- ▶ Bath Hotel, Nevis;
- ▶ New River Estate, Nevis; and
- ▶ Fort Charles, Nevis.

THIS PAGE LEFT INTENTIONALLY BLANK

7 DEVELOPMENT STRATEGY FOR PROTECTED AREAS SYSTEM

This chapter contains our recommendations regarding the elements of the proposed protected area system. As in Chapters 5 and 6, specific sites and groups of sites are discussed separately. In each section, information is presented and recommendations made concerning:

- NCEMA Categories;
- Management Strategies (Management Structure, Management Plan and Staffing); and
- Financing Strategies.

With regard to financing strategies, our recommendations rely heavily on the report entitled “Sustainable Financing of Protected Areas in the OECS” prepared by The Environment and Development Group (2009). Information for this section was also obtained during consultation meetings on the draft report during the period March 01 to 04, 2010.

7.1 Overall Structure

7.1.1 NCEMA Categories

The existing NCEPA Act, 1987 addresses the establishment and operation of protected areas. A new draft NCEMA (last revision in 2009) is expected to supersede the NCEPA and also addresses the establishment and operation of Protected areas (see Section 3.1.2). In anticipation of the passing of this Act the categories of protected areas in this chapter are those listed in that law. This is in contrast to earlier chapters which described Protected Areas in the context of categories established by the IUCN and the Tourism Masterplan.

7.1.2 Management

7.1.2.1 Overall Management Structure

Given the diversity of the Protected Areas that will be described in this chapter, as well as the differing Management Objectives at different Protected Areas, it is inevitable that a range of organizations and agencies will have responsibility for their management. In

this situation, we recommend that an “umbrella” body be established to co-ordinate the efforts of the various management agencies. This “National Conservation Commission” (see Section 3.1.2) will have oversight responsibility for the entire system of protected areas, and would have the following functions or roles:

- Policy decision making;
- Selection of protected areas;
- Coordinating of individual Site Management Bodies;
- Harmonization of activities;
- Recommendations for disbursements under the Environmental Trust Fund; and
- Ensuring accountability by Individual Site Management Bodies.

The suggested composition of the National Conservation Commission would be made up of fifteen members appointed by the Minister:

Chairman
Vice Chairman
Secretary
Coordinator (Ex Officio)

Members

Department of Physical Planning and Environment (St. Kitts)
Physical Planning Department (Nevis)
Water Department (St. Kitts)
Water Department (Nevis)
Department of Tourism (St. Kitts)
Nevis Tourism Authority (Nevis)
Nevis Historical and Conservation Society
St. Christopher National Trust

It is further suggested that the Body be supported by a full-time secretariat consisting of a Co-ordinator and two administrative staff members. The co-ordinator would be an ex-officio member of the Body. The secretariat would be established under the Ministry of Physical Planning and Environment. The level of training required for the Co-ordinator would be a University Degree in Environmental Science or History / Archaeology, with specialized training in Management. The training for the administrative staff would be secretarial / administration.

7.1.2.2 Site Specific Management Structure

Day-to-day responsibility for the management of individual sites would, however, be the responsibility of individual agencies. Their role or function would be as follows:

- Formulation and implementation of Management Plans;
- Day-to-Day Management;
- Hiring of staff;
- Setting and collection of fees (if applicable); and
- Formulation of projects.

It is important to note that the composition of each board or management agency must reflect the diversity of stakeholders of a particular site. It is not the recommendation of this consultancy that a management agency be created for each individual site; instead it may be prudent to group certain sites together because of commonality of features or proximity. This refers, for example to such sites as the marine management areas and some of the historic sites.

Where protected areas have already been suggested by other existing planning documents such as the respective physical development plans, it is our recommendation that these boundaries be kept. For example, there are several protected areas in Nevis (recommended by the Nevis Physical Development Plan) that include both historic and biodiversity elements. It is our recommendation that this arrangement be maintained and therefore that the management agency in charge of those particular sites manage all aspects of the sites. However, it is expected that the composition of the board of such a management agency reflect the skills needed to manage the diversity of elements within the site.

7.1.3 Financing Strategies

Funding for the various elements in the Protected Areas Systems Plan is also discussed in this section. The strategies to be discussed are mainly those listed in the Sustainable Financing Study Report:

- ▶ Government Subventions,
- ▶ Funding from International Donor Groups,

- ▶ User Fees, and
- ▶ Environmental Levies.

The Environmental Trust Fund described under the NCEMA is also referenced.

The discussion of funding in this chapter is presented in broad concepts, focussing on what is presently done and what may be required in the future. However, it must be emphasized that a detailed discussion of funding at any individual site (such as an estimate of capital and operational cost and cash flow) is outside the scope of this study.

With particular reference to the secretariat for the National Conservation Commission (see Section 7.1.2, above), typical levels of salary in St. Kitts for the Co-ordinator and the administrative staff were kindly provided by the NICE. Using these salary levels, and applying the “rule-of-thumb” that non-salary costs (office accommodation, office equipment, electricity, telephones, stationery, etc) are about 125% of salaries, it is estimated that the cost of the secretariat would be of the order of \$US 8,500.00 per month.

7.2 Brimstone Hill Fortress National Park

Brimstone Hill Fortress is internationally the best-known heritage site in St. Kitts and Nevis, with a 40-year history of successful management by the Brimstone Hill Fortress National Park Society.

7.2.1 NCEMA Categories

BHFNP is already a National Park (Category I) as defined in the draft NCEMA 2009. This includes the 400 m buffer on all sides. There is no need to change this designation. This area is also a World Heritage Site.

7.2.2 Management Strategies

7.2.2.1 Management Structure

As noted above, there is a long history of successful management of this site by the Brimstone Hill Fortress National Park Society (and its predecessor The Society for the Restoration of Brimstone Hill), and this arrangement should be maintained. In summary, the Board of the Society consists of:

- President,
- Vice President,
- Treasurer,
- Members
- Corporate Member Representative,
- Student Member,
- Government Members,
- Honorary Secretary, and
- General Manager.

7.2.2.2 Management Plan

BHFNP presently operates under a Management Plan. One challenge which was highlighted during the RAPPAM workshop is maintaining the visitorship of the Park within the carrying capacity of the site. One approach to this could be adjusting the admission fees (see Section 7.2.3 below).

7.2.2.3 Staffing

BHFNP is currently staffed by a combination of employees and volunteers.

7.2.3 Financing Strategies

Historically, the BHFNP has been financed by three mechanisms:

- User Fees,
- Government Subvention, and
- Grants from International Agencies.

Under the NCEPA 1987, the Society is empowered to collect admission fees from visitors to the park, and this appears to be the primary source of funding at present. At the RAPPAM workshop there was consensus that funding has been adequate over the past five years, but there are doubts that this situation will continue. Notwithstanding this, there was a moderate level of confidence that the long-term financial outlook for this site is stable.

Based on the information at hand, it appears that this Park can continue to rely on user fees for its day-to-day operation (recurrent expenditure). The Sustainable Financing Study (The Environment and Development Group, 2009) noted that user fees at this site and other sites in the region are somewhat lower than comparable international fees. As noted above therefore, the Society may consider an upward adjustment of the admission fees to control the level of visitorship so as not to exceed the carrying capacity of the site. In contrast, funding for capital expenditure such as restoration of buildings may have to rely on solicitation of grants from International Donor Agencies or grants from the proposed Environmental Trust Fund (see Section 3.6.1).

7.3 Central Forest Reserve National Park

7.3.1 NCEMA Categories

This unit has been established as a National Park, and satisfies the criteria for Category I in the NCEMA:

- It is relatively large land area;
- It contains important natural features of national significance (biodiversity of the forests, tourism attractions by way of the system of trails, and its importance as water supply recharge to springs and the aquifer); and
- It must be managed in a manner to protect these resources.

It is also noted that specific areas within this National Park may have to be protected as a Category III - Nature Reserve; that is:

“An area containing outstanding or fragile natural features or life forms of national importance that need protection in an undisturbed state where the only permitted activities are management measures, controlled scientific research and educational study”.

The definition of such areas requires detailed ecology surveys of the National Park, which are outside the scope of this study. Relevant information for such decision-making is expected to come from the Environmental and Socio-Economic Studies for the Central Forest Reserve which has been commissioned under the OPAAL Project.

7.3.2 Management Strategies

7.3.2.1 Management Structure

Management of this unit is primarily entrusted to the Department of Physical Planning and Environment (DPPE), but this jurisdiction must be shared with both the Water Department and the Department of Tourism. It is therefore envisaged that a joint management structure would be established between these three agencies. Should a dispute arise on a specific management issue (for example, if the Department of Tourism wishes to expand a trail into an area which the DPPE considers to be environmentally sensitive), the first effort would be to resolve it directly between the three agencies. If that fails, it would then be referred to the National Conservation Commission (see Section 7.1.2).

7.3.2.2 Management Plan

As noted in Section G.2.5, a Management Plan has been prepared for this Protected Area. Ecoengineering recommends that the principle of joint management under the three agencies listed above be included in that Management Plan. The relationship of the three agencies to the National Conservation Committee vis-à-vis the management of this Protected Area would be included in a revision to the Management Plan once that Committee has been established.

7.3.2.3 Staffing

The Management Plan for CFRNP envisages 6 full-time staff members during the first year of this project:

- ▶ a Protected Area Manager,
- ▶ a Community Co-ordinator / Assistant Manager,
- ▶ a Public Outreach Specialist,
- ▶ a Natural Resources Specialist, and
- ▶ 2 Visitor Services Rangers.

The plan appears to envisage that these will all be employees of the St. Kitts Department of Physical Planning and the Environment. The plan also makes provision for necessary equipment and some capital expenditure on facilities.

In addition to the full-time staffing listed above, the Management Plan acknowledges that the Defence Force has assisted in emergency response within the CFRNP, and that both the Defence Force and the police have been involved in the eradication of illegal crops (marijuana). It is expected that these two organizations will continue to play these roles on an as-needed basis.

7.3.3 Financing Strategies

The Management Plan for CFRNP does not provide global cost projections for the operation of the park, but it does project a funding gap of \$US 130,000.00 in the first year rising to \$US 350,000.00 in the third year. Ecoengineering envisages that the management and operation of this National Park would be funded by a combination of five mechanisms:

- Public Service Salaries,
- User Fees,
- Government Subvention,
- Grants from International Agencies, and
- Grants from the proposed Environmental/Conservation Trust Fund.

Because the management of this National Park would be entrusted to three Government Agencies, it is envisaged that the basic salaries of the officers who would undertake this task will continue to be paid by those agencies. In several West Indian countries, a small stipend would be paid to those officers over and above their normal salaries, to acknowledge the higher level of responsibility they will assume and also the fact that meetings may be held outside of normal working hours. This stipend, too, would be paid by their agencies, but it is important to harmonize the quantum of the stipend.

Maintenance and upkeep of the National Park would be paid for by a combination of Public Service Salaries, User Fees and Government Subvention. It is considered likely that maintenance functions would be undertaken by the staff of the three Government Agencies, and that these staff costs would be covered by their normal salaries. The

possible exception may be the DPPE who may be required to hire dedicated staff to upkeep the trails, etc. In that case, the recurrent expenditure for day-to-day operations (salary costs of the dedicated staff as well as equipment and materials for maintenance) would require a government subvention during the early years of operation.

Given the size and likely user attractiveness of this National Park, it is considered likely that a system of user fees can be developed similar to what applies at Brimstone Hill Fortress National Park. Such fees would replace part of the government subvention to cover recurrent expenditure over time, but it is not clear that it would entirely replace the subvention in the short term (next 5 years).

Again as at Brimstone Hill Fortress National Park, funding for capital expenditure is likely to rely on solicitation of grants from International Donor Agencies or grants from the proposed Environmental Trust Fund (see Section 7.1.3). Such capital expenditure could include the establishment of an Interpretation Centre, significant expansion of trails, purchase of emergency response equipment and material, etc.

7.4 Nevis Peak and Camps River National Park

7.4.1 NCEMA Categories

This unit is also being established as a National Park, and satisfies the criteria for Category I in the NCEMA:

- It is relatively large land area;
- It contains important natural features of national significance (biodiversity of the forests, tourism attractions by way of the system of trails, and its importance as water supply recharge to springs and the aquifer); and
- It must be managed in a manner to protect these resources.

It is also noted that specific areas within this National Park may have to be protected as a Category III - Nature Reserve; that is:

“An area containing outstanding or fragile natural features or life forms of national importance that need protection in an undisturbed state where the only permitted activities are management measures, controlled scientific research and educational study”.

As with CFRNP (see Section 7.3, above) the definition of such areas requires detailed ecology surveys of the National Park, which are outside the scope of this study.

7.4.2 Management Strategies

7.4.2.1 Management Structure

Management of this unit is primarily entrusted to the Physical Planning Department in Nevis, but this jurisdiction must be shared with the Nevis Water Department, the Department of Tourism and the Department of Agriculture. In the Management Plan for this National Park (see Section 7.4.2.2, below), it is envisaged that a National Park Advisory Committee would be established with a wide membership including Government Agencies, business interests, conservationists and local stakeholders (including area residents).

7.4.2.2 Management Plan

As noted in Section G.3.5, a Management Plan has been prepared for this Protected Area. Ecoengineering recommends that the principle of joint management under the three agencies listed above be included in that Management Plan. The relationship of the four agencies to the National Conservation Committee vis-à-vis the management of this Protected Area would be included in a revision to the Management Plan once that Committee has been established.

7.4.2.3 Staffing

The Management Plan for NPNP is silent on the levels of staffing that would be required; noting that it is premature in the process of creating the Park to provide meaningful recommendations about how to administer it. Notwithstanding this, Ecoengineering envisages that (as for CFRNP – see Section 7.3.2.3, above) there would be full-time staff members for this Park, and that they will be employees of the Nevis Physical Planning Department.

7.4.3 Financing Strategies

The Management Plan is silent on the question of an operating budget for this Park. Notwithstanding this, Ecoengineering envisages that (as for CFRNP - see Section 7.3.3, above) the management and operation of this National Park would be funded by a combination of five mechanisms:

- Public Service Salaries for the management activity.
- Public Service Salaries, User Fees, and Government Subvention for recurrent expenditure (day-to-day operations and maintenance); with User Fees reducing (but not necessarily replacing) the Government Subvention over time.
- Grants from International Agencies and Grants from the proposed Environmental Trust Fund for capital expenditure.

7.5 Basseterre Valley Aquifer National Park

As noted in Section G.4.5, the BVANP is geared to the use of the area for conservation as part of the resource endowment to the country's tourism industry and also to preserve the Basseterre Aquifer (an important source of public water supply for the island of St. Christopher).

7.5.1 NCEMA Categories

This unit is described as a National Park, and appears to satisfy the criteria for Category I in the NCEMA:

- It is relatively large land area;
- It contains an important natural feature of national significance (the aquifer as water supply); and
- It must be managed in a manner to protect this resource.

In addition, the proposed development will also satisfy Category VII, Botanic Garden; described as a garden established for the preservation, display and propagation of the national botanical resources.

7.5.2 Management Strategies

7.5.2.1 Management Structure

Management of this unit must include representatives of the Water Department and the Department of Tourism, the two important stakeholders of this resource. Given the high cost of developing other water sources for the public supply, maintenance and protection of the aquifer should be a cornerstone of the management of BVANP. This objective is included in the Management Plan which has been prepared for this protected area.

Given the concept of this National Park, it would appear that a separate management structure (akin to BHFNP) would be appropriate. Ecoengineering therefore supports the proposed Basseterre Valley Project Steering Committee arising out of the Advisory Committee described in the Paper IWCAM GEF Project Priority Demonstration.

According to this paper, A Project Management Unit (PMU) will be set up under the St. Kitts and Nevis Development Control and Planning Board. The PMU will consist of a Project Manager and Administrative Assistant. The PMU will be guided and instructed by a Steering Committee. This Committee will include representatives from the relevant government departments. It will also include representation from the community, from at least one relevant NGO, and from the private sector. Other members may be co-opted at the discretion of the permanent membership. The Steering Committee will be chaired by a member of the Development Control and Planning Board. The Steering Committee will report to the Cabinet of Ministers through its chair in the DCPB. The Steering Committee will evolve out of the existing Basseterre Valley Advisory Committee, ensuring that there is appropriate facility for non-government stakeholder participation.

7.5.2.2 Management Plan

A Management Plan has been prepared for this Protected Area. While the Plan is silent on specific management arrangements for the Basseterre Valley Aquifer National Park, Ecoengineering recommends that the principle of joint management under the Steering Committee described above be considered.

7.5.2.3 Staffing

Ecoengineering envisages that (as for CFRNP – see Section 7.3.2.3, above) there would be full-time staff members for this Park, and that they will be employees of the appropriate Government Department.

7.5.3 Financing Strategies

The Management Plan for the Basseterre Valley Aquifer National Park envisages a number of different revenue streams including:

- Entrance fees,
- Performance, Program and Special Events Fees,
- Concession Fees,
- Rental Fees for Private / Special Events,
- Individual and Corporate donations of cash,
- Concession Fees,
- Grants, and Government in-kind contributions such as technical support, monitoring, etc.

The capital expenditure for establishing the facility would be sourced from grants and Government subventions. Recurrent expenditure will have to be sourced from Government subventions for the first several years after the facility is established. However, the objective would be to fund such expenditure from the other charges listed above as the facility becomes more established.

7.6 Marine Management Areas

As noted in Section 6.2.4 marine management areas must form an integral role and important part of the System of Protected Areas. The two marine areas proposed are the SEPMMMA and the SPMMA.

7.6.1 NCEMA Categories

Under the NCEMA, Marine Management Areas would be classified as “Marine Reserves” (Category IV); that is, an area as provided in Section 23 of the Fisheries Act, 1984. The Act describes Marine Reserves as areas where special measures are necessary:

- To afford special protection to the flora and fauna of such areas and to protect and preserve natural breeding grounds and habitats of aquatic life, with particular regard to flora and fauna in danger of extinction;
- To allow for the natural regeneration of aquatic life in areas where such life has been depleted;
- To promote scientific study and research in respect of such areas; or
- To preserve and enhance the natural beauty of such areas.

Some areas within these Reserves will also be classified as Category III Nature Reserve; that is, an area containing outstanding or fragile natural features or life forms of national importance that need protection in an undisturbed state where the only permitted activities are management measures, controlled scientific research and educational study. Those would be the Nags Head and Booby Island. Booby Island is expected to be preserved in its entirety but while the general area of Nag’s Head is well-established, additional ecological studies will be required to define the exact boundaries for special protection. Such ecological studies would cost an estimated \$US 12,500.00, but they are outside the scope of this assignment.

Finally, there will be some areas classified as Category V Area of Special Concern; that is, a place or site needing special protection and controlled use in order to stabilize or restore important ecological features or functions. Such areas would be the turtle nesting beaches and any area defined for fish and shellfish propagation. The limits of the turtle nesting beaches are reasonably well-established, but additional ecological / fisheries studies would be required to establish the boundaries of the reserves for fish and shellfish propagation. Such ecological / fisheries studies may be undertaken by the Fisheries Departments in St. Kitts and Nevis, but they are outside the scope of this assignment.

7.6.2 Management Strategies

7.6.2.1 Management Structure

The most important management functions with regard to marine management areas are:

- Strict protection of nesting sites for internationally important bird species;
- Strict protection of spawning grounds for commercial species;
- Managed use of commercial fishing and diving areas;
- Prevention of interference with nesting turtles; and
- Enforcement of Planning Regulations to prevent development which would result in excessive noise or artificial lighting of the beaches during the nesting season.

At present, there is no agency responsible for the monitoring of avifauna. Instead, *ad hoc* inventories have been associated with short term projects. The St. Christopher National Trust on St. Kitts and the Nevis Historical and Conservation Society on Nevis do play a role in capturing some data on birds but this role is unclear at this time. It is proposed that the St. Christopher National Trust and the Nevis Historical and Conservation Society take charge of the monitoring of birds on the Peninsula particularly at the ponds, Nag's Head and Booby Island.

The marine environment is under the jurisdiction of the Fisheries Department of both islands. Under the Fisheries Act, this Department is responsible for the development of a Fisheries Management and Development Plan to sustainably manage the Federations' fisheries resources. Also as noted above, this Department can also declare Fishing Priority Areas and Marine Reserves. Notwithstanding this, there is some merit to considering the creation of a Management Committee for identified marine areas to assume the role of management of these areas. This Committee would be co-chaired by the Fisheries Departments in St. Kitts and Nevis, and would include representatives from other government departments, conservationists, water sports operators, and representation from the nearest communities.

Planning approvals and enforcement of planning regulations is the responsibility of the Physical Planning Departments in both St. Kitts and Nevis. It is envisaged that these departments will continue to be responsible for preventing inappropriate development adjacent to turtle nesting beaches, since (as before) there is no need (nor any logic) to transfer these responsibilities to a new agency or to another existing agency.

7.6.2.2 Management Plan

The development of a Management Plan for these Marine Management Areas will be an early requirement for their successful implementation.

7.6.2.3 Staffing

Ecoengineering envisages that (as for CFRNP – see Section 7.3.2.3, above) there would be full-time staff members for the operation and maintenance of these MMAs, and that they will either be employees of the appropriate Fisheries Departments in St. Kitts and in Nevis, or they will work directly for the Management Committee of the MMAs. However, the planners will continue to work for the respective Physical Planning Departments in St. Kitts and in Nevis.

7.6.3 Financing Strategies

Based on recent costs for preparing Management Plans for Protected Areas in the West Indies, we estimate that the preparation of a Management Plan for these proposed marine management areas will be of the order of \$US 35,000.00.

No estimates were available to Ecoengineering on the budget requirements for these proposed Marine Protected Areas. However, an appreciation can be gained by what is being spent at other sites in the West Indies. According to the Sustainable Financing Study, annual expenditure at Tobago Keys Marine Park in St. Vincent and the Grenadines is of the order of \$US 750,000.00. Similarly, at North East Marine Management Area in Antigua and Barbuda, the annual expenditure is \$US 320,000.00. Given the respective sizes of those two marine protected areas, a “ballpark” estimate for the two proposed marine protected areas in St. Kitts and Nevis is likely to be of the order of \$US 500,000.00.

Funding for Marine Areas will be from two sources:

- User Fees associated with use of the resources within the marine area such as for diving, snorkelling, mooring etc; and
- Public Service Salaries (for members of the Fisheries Department) for the day-to-day management activity such as enforcement of management zones etc.

According to the Sustainable Financing Study, Marine Protected Areas in the West Indies have a successful track record of generating user fees which approach the level of their expenditure (in contrast to the land-based protected areas, which generally appear to require significant subventions and grants.

Responsibility for granting (or denying) planning permission in and around turtle nesting beaches, and for taking enforcement action against offenders, lies with the Physical Planning Departments. Funding for those activities will therefore come from the normal budget of those departments.

7.7 Turtle Nesting Beaches

Turtle nesting beaches are of critical importance to biodiversity, and they play a key role in the life cycle of endangered marine turtles. Some of these beaches fall within other units of the proposed Protected Areas System, such as the marine management area along the Southeast Peninsula of St. Kitts and across The Narrows to Nevis.

7.7.1 NCEMA Categories

As noted in Section 7.6.1, Turtle Nesting Beaches would be classified under NCEMA as Category V Area of Special Concern; that is, a place or site needing special protection and controlled use in order to stabilize or restore important ecological features or functions. This classification would prevent killing or injury to the turtles themselves as well as avoiding factors which would discourage laying of eggs (light, noise, etc). However, it would allow other uses on the beach, especially during turtle nesting season.

7.7.2 Management Strategies

The most important management functions with regard to turtle nesting beaches are:

- Prevention of interference with nesting turtles; and
- Enforcement of Planning Regulations to prevent development which would result in excessive noise or artificial lighting of the beaches during the nesting season.

At present, patrolling of turtle nesting beaches and recording the numbers of nests are undertaken by the St. Kitts Sea Turtle Monitoring Network and the Nevis Turtle Group in conjunction with the respective Fisheries Departments. Ecoengineering envisages that these same groups will continue to undertake these tasks. A draft Management Plan for turtles has been prepared, and this includes specific recommendations for protecting these species.

Planning approvals and enforcement of planning regulations is the responsibility of the Physical Planning Departments in both St. Kitts and Nevis. It is envisaged that these departments will continue to be responsible for preventing inappropriate development adjacent to turtle nesting beaches, since (as before) there is no need (nor any logic) to transfer these responsibilities to a new agency or to another existing agency.

7.7.3 Financing Strategies

Based on discussions with Government Agencies, the primary need for funding on Turtle Nesting Beaches relates to transport of persons to and from the beaches during the turtle nesting season. There appears to be no regular source of funding to support this activity, and that in turn has hindered its effectiveness. Such funding may be sourced from a user fee or from a government subvention or grant from a funding agency. Within the Caricom Region where several of the most important turtle nesting beaches in Trinidad have been declared prohibited areas, the authorities have levied a small “entrance fee” for turtle watching during the nesting season. This fee is used to support the building of facilities at these beaches and to support monitoring and tagging of turtles. That model may be applied in St. Kitts and Nevis.

Responsibility for granting (or denying) planning permission in and around turtle nesting beaches, and for taking enforcement action against offenders, lies with the Physical Planning Departments. Funding for those activities will therefore come from the normal budget of those departments.

7.8 Salt Ponds

Salt Ponds in St. Kitts are special systems which sustain salt resistant species during the dry season. They also attract both local and migratory bird species. As such, the salt ponds play a key role in preserving biodiversity. Unfortunately, salt ponds have been adversely affected by the effects of adjacent development, modification of their flow regimes and contaminated discharges and runoff. Five of the ponds on the Southeast Peninsula have been earmarked for development and will cease to function as salt ponds.

7.8.1 NCEMA Categories

Under the NCEMA, Salt Ponds would be classified as “Areas of Special Concern” (Category V); that is, sites needing special protection and controlled use in order to stabilize or restore important ecological features or functions. This classification would not accommodate further alterations which would affect the basic hydraulics of the ponds (approval of ponds for development as marinas, or opening up the ponds to the sea, for example).

7.8.2 Management Strategies

The most important management functions with regard to salt ponds are:

- Enforcement of Planning Regulations to prevent development which would alter the basic hydraulics of the ponds;
- Enhancement and Rehabilitation of selected ponds for eco-tourism and education; and
- Monitoring and policing to detect and prevent illegal alterations of the ponds.

Planning approvals and enforcement of planning regulations is the responsibility of the Department of Physical Planning in St. Kitts, and enhancement of selected ponds would be the responsibility of the Environment Department in St. Kitts. There is no need (nor any logic) to transfer these responsibilities to a new agency or to another existing agency. However, it is important that the objectives of preserving the remaining ponds (and enhancing selected ponds) be accepted at the highest decision-making level of the Government of St. Kitts and Nevis. In the absence of such acceptance of these objectives, it will not be possible for the Physical Planning Department to refuse planning applications on this basis, nor will it be possible for either the Planning Department or the Environment Department to take action against offenders.

7.8.3 Financing Strategies

Responsibility for granting (or denying) planning permission in and around the salt ponds, and for taking enforcement action against offenders, lies with the Physical Planning Department. Funding for those activities will therefore come from the normal budget of that department. In contrast, funding for the enhancement and rehabilitation of selected ponds will require a special Government subvention, a grant from an International Donor Agency, or a grant from the proposed Environmental Trust Fund. The cost of such enhancement and rehabilitation work would be site specific and cannot be estimated until the nature of each restoration has been determined. The specialized, detailed studies needed to determine the nature of those restoration projects are outside the scope of this study.

7.9 Freshwater Lagoons

Freshwater Lagoons in Nevis also have a special function as part of the drainage system and attract both local and migratory bird species. As such, they play a key role in preserving biodiversity. Freshwater Lagoons have been under threat due to adjacent development, modification of their flow regimes and (to a lesser extent) contaminated discharges and runoff.

7.9.1 NCEMA Categories

Under the NCEMA, Freshwater Lagoons would also be classified as “Areas of Special Concern” (Category V); that is, sites needing special protection and controlled use in order to stabilize or restore important ecological features or functions. Again, this classification would not accommodate alterations which would affect the basic hydraulics of the lagoons.

7.9.2 Management Strategies

As with Salt Ponds, the most important management functions with regard to freshwater lagoons are:

- Enforcement of Planning Regulations to prevent development which would alter the basic hydraulics of the ponds;
- Enhancement and rehabilitation of selected ponds for eco-tourism and education; and
- Monitoring and policing to detect and prevent illegal alterations of the ponds.

Planning approvals and enforcement of planning regulations is the responsibility of the Department of Physical Planning in Nevis. As before, there is no need (nor any logic) to transfer this responsibility to a new agency or to another existing agency. However, it is important that the objectives of preserving them be accepted at the highest decision-making level of the Nevis Island Administration. In the absence of such acceptance of these objectives, it will not be possible for the Nevis Physical Planning Department to refuse planning applications on this basis, nor will it be possible for them to take action against offenders.

7.9.3 Financing Strategies

Responsibility for granting (or denying) planning permission in and around the freshwater lagoons, and for taking enforcement action against offenders, lies with the Physical Planning Department. Funding for those activities will therefore come from the normal budget of that department. In contrast, funding for the enhancement and rehabilitation of selected lagoons will require a special Government subvention, a grant from an International Donor Agency, or a grant from the proposed Environmental Trust Fund. As noted before, the cost of such enhancement and rehabilitation work would be site specific and cannot be estimated until the nature of each restoration has been determined. The specialized, detailed studies needed to determine the nature of those restoration projects are outside the scope of this study.

7.10 The Ghauts

Ghauts form an integral part of the island-wide surface drainage system, conveying rainfall runoff from the heights of the mountains to the sea. In St. Kitts they are under threat from illegal sand mining and unauthorized built development, and in Nevis from unauthorized built development.

7.10.1 NCEMA Categories

Under the NCEPA and NCEMA, Ghauts are classified as “Areas of Special Concern” (Category V). This category is further explained as sites needing special protection and controlled use in order to stabilize or restore important ecological features or functions. This classification would accommodate legal sand mining in St. Kitts as “controlled use”.

7.10.2 Management Strategies

The most important management functions with regard to Ghauts are:

- Enforcement of Planning Regulations to prevent unauthorized development in the Ghauts;
- Monitoring and policing to detect and prevent illegal sand mining;
- Regulation of legal sand mining to ensure sustainability; and
- Regulation of quarrying in the vicinity of ghauts to prevent sedimentation.

Enforcement of planning regulations is the responsibility of the Department of Physical Planning and the Environment in St. Kitts and the Department of Physical Planning in Nevis. Enforcement of planning regulations should remain the responsibility of the two Physical Planning Departments. There is no need (nor any logic) to transfer this responsibility to a new agency or to another existing agency.

During meetings with Government Agencies in St. Kitts, some uncertainty was expressed as to the responsibility for policing illegal sand mining. The Department of the Environment held the view that such policing was the responsibility of the Ministry of

Public Works since they regulate legal sand mining. In contrast, the Ministry of Works indicated that their responsibility was only for legal sand mining whereas illegal sand mining is an environmental issue. It is strongly recommended that this question be resolved to ensure that illegal sand mining is effectively and aggressively policed. Once this issue has been resolved, responsibility for policing illegal sand mining will remain with the respective agency. As before, there is no need (nor any logic) to transfer this responsibility to a new agency or to another existing agency.

Regulation of legal sand mining in St. Kitts is clearly the responsibility of the Ministry of Works. It does not appear that the Department of the Environment is formally consulted when decisions are made to establish legal sand mines in Ghauts. It is recommended that such consultation be established to ensure that environmental issues are fully integrated into the site selection process for legal sand mines. In parallel with this, the Government of St. Kitts and Nevis may consider undertaking a Strategic Impact Assessment to identify specific locations which may be suitable for legal sand mining in the future. It is expected that regulation of legal sand mining will remain the responsibility of the Works Department with advice from the Department of the Environment. As before, there is no need (nor any logic) to transfer this responsibility to a new agency or to another existing agency.

The regulation of quarrying in the vicinity of ghauts in Nevis is the responsibility of the Nevis Housing and Land Development Co-operation and the Physical Planning Unit. The Nevis Housing and Land Development Co-operation provide the lease terms and conditions for the land if it is owned by the Nevis Island Administration while the Physical Planning Unit will address the issues of zoning and operations (JECO Caribbean Inc. 2007).

7.10.3 Financing Strategies

As stated above, responsibility for managing the Ghauts lies with existing Government agencies, and is funded out of their normal budgets. It is expected that this arrangement will continue. However, funding for a Strategic Impact Assessment (estimated to cost \$US 50,000.00 to \$US 60,000.00) will require a special Government subvention or may be funded by an International Donor Agency. If specific restoration work is deemed necessary in any of the Ghauts (to repair the effects of illegal sand mining or unauthorized development) this will also require a special government subvention. The cost of such restoration work would be site specific and cannot be estimated until the nature of each restoration has been determined.

7.11 Dry Forests

As noted in Section G.10.6, dry forests are a distinct forest type from rainforest and the conservation of this type of forest makes a different contribution to the overall biodiversity of the Federation. In Section G.10.1 it is recommended that examples of this type of forest should be protected under the Systems Plan at the following locations:

- Slope of Brimstone Hill (St. Kitts);
- Selected Peak(s) of the Southeast Peninsula (St. Kitts); and
- Northernmost, Southeast and Southwest slopes of Nevis Peak.

7.11.1 NCEMA Categories

Under the NCEMA, the selected areas of dry forest would be classified as “Areas of Special Concern” (Category V). This category is further explained as sites needing special protection and controlled use in order to stabilize or restore important ecological features or functions. This classification would accommodate a limited amount of hiking trails, birdwatching, etc.

7.11.2 Management Strategies

The first management action required for this type of forest is to identify a suitable area of dry forest on the Southeast Peninsula for inclusion in the Protected Area Systems Plan. This would require consultation between the Environment Department, the Department of Physical Planning and the South-East Peninsula Land Development and Conservation Board to select potential candidate site(s). This would be followed by detailed ecological / forestry studies to recommend the specific site(s) to be protected under the Systems Plan. Such consultation and ecology / forestry studies are outside the scope of this assignment.

Once the site(s) on the Southeast Peninsula have been identified, Ecoengineering recommends that, for management and financing purposes, it / they should be amalgamated into the Central Forest Reserve National Park, and the Management Plan for the CFRNP should be modified to reflect this. As such:

- ▶ the dry forest at Brimstone Hill will be managed as part of the Brimstone Hill Fortress National Park (see Section 7.2.2);
- ▶ the dry forest on the Southeast Peninsula will be managed as part of the Central Forest Reserve National Park, (see Section 7.3.2); and
- ▶ the dry forest on Nevis will be managed as part of the Nevis Peak National Park, (see Section 7.4.2).

7.11.3 Financing Strategies

It is expected that the studies to identify suitable areas on the Southeast Peninsula (estimated to cost \$US 10,000.00) would be financed by a subvention from the Government, or a grant from an international donor agency. Financing for recurrent and capital expenditure will be:

- ▶ as part of the Brimstone Hill Fortress National Park (see Section 7.2.3);
- ▶ as part of the Central Forest Reserve National Park, (see Section 7.3.3); and
- ▶ as part of the Nevis Peak National Park, (see Section 7.4.3).

7.12 Historic Charlestown

The largest historic site in the Federation after Brimstone Hill Fortress is Historic Charlestown, Nevis. The concept being pursued is to preserve the historical ambience of the area by maintaining the characteristic architecture and managing the physical planning process. Significant buildings which contribute to the concept of Historic Charlestown are Austin Hotel, Library Building, The Alexander Hamilton Museum, St. Theresa's Catholic Church, Slave Market, Wesleyan Holiness Church and Manse, Treasury Building and Customs House and Old Great House.

7.12.1 NCEMA Categories

Historic Charlestown is clearly a historic site (Category II) as defined in NCEMA. This is a place or site which is historic by reason of an association with the past and its part in the cultural or historical heritage of St. Kitts and Nevis. At the present time there exists a Physical Action Plan for Historic Charlestown, issued under the draft Nevis Physical Development Plan. It is recommended that designation of Charlestown as a “Priority Area” in the Physical Development Plan be formalized as soon as NCEMA becomes law.

7.12.2 Management Strategies

The most intensive management of Historic Charlestown at present is effected through the system of planning approvals administered by the Physical Planning Department. The effectiveness of this approach has been proved on one site close to the waterfront where developmental works were stopped when historical artefacts were discovered on the site. The Department has also been successful in encouraging the preservation of the typical Nevis architecture on a number of buildings which have recently been upgraded or rebuilt. There is also a role for the Nevis Department of Tourism since this Department currently manages a walking tour through Charlestown which includes stops at some of the buildings recommended for initial inclusion in the Protected Areas System.

On a wider scale, the organization in Nevis which presently spearheads the thrust to preserve heritage sites is the Nevis Historical and Conservation Society. The Executive Board of the society is composed of a minimum of eleven persons, including its President, Vice-president, Secretary, and Treasurer, and an ex officio member appointed by the Nevis Island Administration. The current membership of fifteen also includes an appointed 'Youth' representative.

Despite financial limitations, the Nevis Historical and Conservation Society appears to be doing a creditable job. Specifically, their efforts appear to be effective at the limited number of sites which they now manage. It is therefore recommended that, in the short term, management of Historic Charlestown be assigned to the Nevis Historical and Conservation Society actively supported by the Physical Planning Department and the Nevis Department of Tourism. This should not be an ad hoc arrangement. Instead, a formal Memorandum of Understanding should be executed between the three agencies. This MOU should address issues such as:

- Specific responsibilities,
- Policy-making,
- Policy Implementation,
- Staffing and Funding,
- Accounting and accountability, and
- Public Involvement.

7.12.3 Financing Strategies

At the present time, the Physical Planning Department and the Nevis Department of Tourism are funded through the normal Public Service budget, and the Nevis Historical and Conservation Society is funded through grants and membership fees. This situation is expected to continue into the future. The levying of an entrance fee is not practical since this is the working capital city of Nevis. However, there are guided walking tours in Historic Charlestown, and this offers an opportunity for part of the tour guides fee to be paid to the Nevis Historical and Conservation Society. This may be difficult to implement since the tour guides will resist the “sharing” of their income.

7.13 Other Historic Sites

In addition to Brimstone Hill Fortress and Historic Charlestown, there are a number of individual sites which have been identified as worthy of consideration for protection and rehabilitation under the Systems Plan:

- ▶ Old Road Town Petroglyphs, St. Kitts;
- ▶ Petroglyphs at Stonefort, St. Kitts;
- ▶ Belmont Estate, St. Kitts;
- ▶ Mansions Estate, St. Kitts;
- ▶ Spooner’s Ginnery, St. Kitts;
- ▶ Black Rocks, St. Kitts;
- ▶ Charles Fort, St. Kitts;
- ▶ Indian Castle Protected Area, Nevis;
- ▶ Fort Ashby, Nevis;
- ▶ Bath Hotel, Nevis;
- ▶ New River Estate, Nevis; and
- ▶ Fort Charles, Nevis.

7.13.1 NCEMA Categories

The sites listed above would fall under several categories as follows:

CATEGORY			SITE
Category II	–		<ul style="list-style-type: none"> ▶ Old Road Town Petroglyphs, St. Kitts; ▶ Petroglyphs at Stonefort, St. Kitts; ▶ Belmont Estate, St. Kitts; ▶ Mansions Estate, St. Kitts; ▶ Spooner’s Ginnery, St. Kitts; ▶ Charles Fort, St. Kitts ▶ Indian Castle Protected Area, Nevis; ▶ Fort Ashby, Nevis; ▶ Bath Hotel, Nevis; ▶ New River Estate, Nevis; ▶ Fort Charles, Nevis.
Category VI	–		<ul style="list-style-type: none"> ▶ Black Rocks, St. Kitts; ▶ Indian Castle Protected Area, Nevis; ▶ New River Estate, Nevis.

7.13.2 Management Strategies

Different management strategies will apply in St. Kitts and Nevis.

7.13.2.1 St. Kitts

The Tourism Department is presently involved in maintaining the Petroglyphs at Old Road Town and also in developing the site at Black Rocks. The other sites with the exception of Charles Fort have been or are in the process of being vested in the St. Christopher National Trust. The membership of the Council of the St. Christopher National Trust is as follows:

- one President (elected from among the members for a period of 3 years)
- the Immediate Past President
- one Vice President (elected from among the members)
- one Honorary Treasurer
- two individual members representatives
- two corporate members representative

- one student members representative
- one life members representative
- one representative appointed by the Ministry of Culture
- one representative appointed by the Ministry of Environment
- one representative appointed by the Ministry of Tourism
- one nominee of the Brimstone Hill Fortress National Park Society
- one nominee of the Chamber of Industry and Commerce
- the Hon. Secretary and Executive Director who both shall be non-voting members

Information received during the consultation meetings on the draft Systems Plan Report is that Charles Fort will best be managed as part of Brimstone Hill Fortress National Park. This approach is endorsed in the St. Christopher National Physical Development Plan.

Ecoengineering supports the designation of the St. Christopher National Trust to have overarching responsibility for heritage sites in St. Kitts.

7.13.2.2 Nevis

In Nevis, heritage sites (except Historic Charlestown) are managed by the Nevis Historical and Conservation Society. Our comments on their work are contained in Section 7.12.2, and it is envisaged that they will be given responsibility for additional heritage sites in Nevis. The Executive Board of the Nevis Historical and Conservation is composed of a minimum of 11 persons including its president, vice-president, Secretary, Treasurer and an *ex officio* member appointed by the Nevis Island Administration. There is also a 'youth' representative.

7.13.3 Financing Strategies

Unlike larger heritage sites like Brimstone Hill and Historic Charlestown, these smaller sites attract lower numbers of visitors. In fact, their present attraction appears to be as part of a wider tour (such as a number of sites included in the St. Kitts Island Railway Tour). This affects the financing options which are realistically available for sites of this kind.

7.13.3.1 St. Kitts

At the present time, the Tourism Department is funded through the normal Public Service budget and the St. Christopher National Trust is funded through grants. This situation is expected to continue into the future. The levying of an entrance fee at these locations is likely to be problematic. The cost of a “fee collector” at each site is likely to approach or even exceed the value of the fees to be collected. An alternative would be to have the tour operator collect a global fee and pass this along to the St. Christopher National Trust. However, as was noted in Section 7.12.3, there may be resistance on the part of tour operators to “sharing” their fees; and this may result in under reporting of visitor numbers where there is no on-site representative of the St. Christopher National Trust.

7.13.3.2 Nevis

Of the sites in Nevis, Bath Hotel (as opposed to The Baths) clearly operates under a different financing arrangement than the other small heritage sites. Specifically, Bath Hotel is the office building for a Government agency and is therefore operated and maintained under the normal Public Service budget. It is not anticipated that Bath Hotel would be opened to visitors, since this would raise significant security concerns. However, it is expected that the exterior of the hotel would be maintained in its historic character to maintain the ambience of The Baths. Under this arrangement, funding for Bath Hotel is expected to continue as at present.

The levying of an entrance fee at the other locations is also likely to be problematic for the reasons given in Section 7.13.2.3.1.above.

8 THE WAY FORWARD

Table 8–1 summarizes the proposals for the Protected Areas Systems Plan as described in Chapters 5, 6 and 7. This chapter summarizes the actions which are required to implement the proposed Protected Areas Systems Plan for St. Kitts and Nevis, under the following headings:

- ▶ Approval of the Plan,
- ▶ Prioritizing Actions,
- ▶ Organizational Arrangements,
- ▶ Further Studies,
- ▶ Training, and
- ▶ Updating the Systems Plan.

8.1 Approval of the Plan

This Protected Areas Systems Plan has important implications for environmental policy, land use policy, tourism policy, fishing policy and educational policy in the Federation of St. Kitts and Nevis. As such, it requires approval at the highest level of decision-making: the Government of St. Kitts and Nevis as well as the Nevis Island Administration. To ensure buy-in to the concepts reflected in this plan, such approval should be preceded by consultation on the draft Plan in the form of focus group meetings with key stakeholders as well as presentation to and discussion with the public. This is recognized in the scope of services for this assignment, as two of the outputs are:

Task 5 – Finalization and Endorsement of Systems Plan: The consultant will undertake a consultative process for securing finalization of the plan based on the draft and its endorsement by national stakeholders and present the draft plan to the NICE, Steering Committee and National Technical Advisory Committee for OPAAL for feedback and recommendations prior to its finalization.

Task 6 – Submission of Finalised Systems Plan: The consultant will submit a finalised Systems Plan and draft Cabinet memo to ESDU, through the NICE, having incorporated feedback from the NTAC and other key national agencies.

TABLE 8-1: SUMMARY OF SYSTEMS PLAN PROPOSALS

ITEM	ACTUAL OR SUGGESTED
Brimstone Hill Fortress National Park	
Area / Layout	<ul style="list-style-type: none"> • As presently defined, the hill and a quarter-mile buffer zone around it.
NCEMA Categories	<ul style="list-style-type: none"> • National Park (Category I). • Also listed as a World Heritage Site.
Management Agency	Existing: <ul style="list-style-type: none"> • Brimstone Hill Fortress National Park Society
Financing Strategies	<ul style="list-style-type: none"> • User Fees and Government Subvention for recurrent expenses. • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Includes areas of Dry Forest.
Central Forest Reserve National Park	
Area / Layout	Areas in excess of 1,000 feet above mean sea level (needs to be marked in the field).
NCEMA Categories	National Park (Category I).
Management Agency	Proposed: <ul style="list-style-type: none"> • Department of Physical Planning and Environment, with inputs from Water Department, Department of Tourism and Department of Agriculture.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for management expenses. • Public Service Salaries, User Fees and Government Subventions for recurrent expenses. • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Very important to the public water supply.
Nevis Peak and Camps River National Park	
Area / Layout	Areas in excess of 1,000 feet above mean sea level, and extending down the Camps River Valley to the coast (needs to be marked in the field).
NCEMA Categories	National Park (Category I).
Management Agency	Proposed: <ul style="list-style-type: none"> • Nevis Physical Planning Department with inputs from Nevis Water Department, Nevis Tourism Authority and the Nevis Department of Agriculture.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for management expenses. • Public Service Salaries, User Fees and Government Subventions for recurrent expenses. • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.

ITEM	ACTUAL OR SUGGESTED
Other Comments	<ul style="list-style-type: none"> • Very important to the public water supply. • Includes an area of Dry Forest.
Basseterre Valley Aquifer National Park	
Area / Layout	197 ha east of the town of Basseterre and west of the Conaree Hills
NCEMA Categories	<ul style="list-style-type: none"> • National Park (Category I). • Botanic Gardens (Category VII).
Management Agency	Proposed: <ul style="list-style-type: none"> • Basseterre Project Steering Committee.
Financing Strategies	<ul style="list-style-type: none"> • User Fees and Government Subventions for recurrent expenses. • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Very important to the public water supply.
Marine Management Areas	
Area / Layout	<ul style="list-style-type: none"> • Southeast Peninsula and The Narrows. • Sandy Point Marine Management Area.
NCEMA Categories	<ul style="list-style-type: none"> • Marine Reserves (Category IV). • Nature Reserves (Category III). • Areas of Special Concern (Category V).
Management Agency	Proposed: <ul style="list-style-type: none"> • Fisheries Departments of both islands with inputs from other Government Departments, conservationists, water sports operators and representatives from nearby communities.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for Planning Controls. • User Fees and Public Service Salaries for recurrent expenses. • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	These areas include salt ponds and turtle nesting beaches.
Turtle Nesting Beaches	
Area / Layout	<ul style="list-style-type: none"> • Within the proposed Marine Protected Areas at Southeast Peninsula and the Narrows and at Sandy Point. • Other locations around St. Kitts and Nevis.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Existing: <ul style="list-style-type: none"> • Fisheries Departments in St. Kitts and Nevis with inputs from the St. Kitts Sea Turtle Monitoring Network and the Nevis Turtle Group.
Financing Strategies	<ul style="list-style-type: none"> • User Fees and Public Service Salaries for recurrent expenses.

ITEM	ACTUAL OR SUGGESTED
Other Comments	Keys Turtle Nesting Beach is part of a proposal for the St. Mary's Biosphere Reserve under the UNESCO Man and the Biosphere Reserve Program.
Salt Ponds	
Area / Layout	<ul style="list-style-type: none"> • Within the proposed Southeast Peninsula and the Narrows Marine Management Area. • Other locations around St. Kitts.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Existing: <ul style="list-style-type: none"> • Department of Physical Planning and the Environment in St. Kitts.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for planning controls. • Grants from International Donor Agencies and proposed Environmental Trust Fund for enhancement and rehabilitation of two Ponds (in the first instance) for ecotourism and educational purposes.
Other Comments	Ponds with existing planning permission to be radically modified were not included in this analysis.
Freshwater Lagoons	
Area / Layout	<ul style="list-style-type: none"> • Within the proposed Nevis Peak and Camps River National Park. • Other locations around Nevis.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Existing: <ul style="list-style-type: none"> • Nevis Department of Physical Planning, Nevis Tourism Department and Nevis Water Department.
Financing Strategies	Public Service Salaries for planning controls.
Other Comments	Some of these lagoons provide potable water to nearby parishes. These lagoons are part of larger protected areas as recommended in the Nevis Physical Development Plan.
The Ghauts	
Area / Layout	<ul style="list-style-type: none"> • Throughout both islands. • 81 in St. Kitts and 33 Ghauts in Nevis.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Existing: <ul style="list-style-type: none"> • Department of Physical Planning on both islands. • Ministry of Works for legal sand mining in Ghauts.
Financing Strategies	Public Service Salaries for planning controls. Government subvention or Grants from International Donor Agencies for conduct of a Strategic Impact Assessment. Government subvention for restoration works deemed necessary.
Other Comments	There is some question as to the agency responsible for policing illegal sand mining.

ITEM	ACTUAL OR SUGGESTED
Dry Forests	
Area / Layout	<ul style="list-style-type: none"> • Within Brimstone Hill Fortress National Park, • A new area on the Southeast Peninsula of St. Kitts to be included in the CFRNP. • Within Nevis Peak and Camps River National Park.
NCEMA Categories	Areas of Special Concern (Category V).
Management Agency	Proposed: <ul style="list-style-type: none"> • Brimstone Hill Fortress National Park Society. • Nevis Physical Planning Department.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for management expenses. • Public Service Salaries, User Fees and Government Subventions for recurrent expenses. • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	--
Historic Charlestown	
Area / Layout	Within the town of Charlestown.
NCEMA Categories	Historic Site (Category II).
Management Agency	Existing: <ul style="list-style-type: none"> • Nevis Physical Planning Department. • Nevis Historical and Conservation Society. • Nevis Tourism Authority.
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for planning controls. • Government Subventions for recurrent expenses (User Fees may also be considered). • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Other sites / buildings may be added after the designation of the initial listing of sites / buildings.
Other Historic Sites	
Area / Layout	Throughout St. Kitts and Nevis.
NCEMA Categories	Historic Sites (Category II). Scenic Sites (Category VI)
Management Agency	Existing: <ul style="list-style-type: none"> • St. Kitts Tourism Department. • Nevis Tourism Authority. • St. Christopher National Trust. • Nevis Historical and Conservation Society.

ITEM	ACTUAL OR SUGGESTED
Financing Strategies	<ul style="list-style-type: none"> • Public Service Salaries for planning controls. • Government Subventions for recurrent expenses (User Fees may also be considered). • Grants from International Donor Agencies and proposed Environmental Trust Fund for capital expenditure.
Other Comments	Some of these historic sites are part of larger protected areas as recommended in the Nevis Physical Development Plan.

8.2 Prioritizing Individual Units

This Section summarizes the information documented in Chapters 6 and 7 by providing a priority listing of actions to be taken in implementation of this Systems Plan. Action items have been prioritized into the following categories:

- Highest - Those actions which should be taken as early as practical.
- High - Those actions that should be taken within the next 3 years; and
- Medium - Those actions which should be taken within the next 5 years.

While there are no actions that will be described as having low priority, there are some that will take a longer period of time to implement either due to restrictions in time, money or other resources.

8.2.1 Highest Priority

The following actions are to be given the highest priority:

- Acceptance of this National Protected Areas Systems Plan.
- Enact and Assent to the National Conservation and Environmental Management Act (NCEMA).
- Operationalize the Environmental Trust Fund as envisaged under the NCEMA.
- Establish the National Conservation Commission as envisaged under the NCEMA.

- Declaration of Nevis Peak and Basseterre Aquifer as National Parks under the NCEMA Act, 2009.
- Revision of the Management Plan for the Central Forest Reserve to include joint management of the four key agencies (Physical Planning and Environment, Water Department, Tourism Department and Agriculture Department).
- Revision of the Management Plan for the Nevis Peak and Camps River Watershed to include joint management of the four key agencies (Physical Planning, Water Department, Nevis Tourism Authority and Nevis Department of Agriculture).
- Declaration of Booby Island as a Nature Reserve in accordance with the NCEMA Act.
- Conduct of ecological studies to determine the extent of Nag's Head Nesting Site.
- Conduct of fisheries studies to determine the boundaries of fish and shellfish propagation areas to be included in the SEPNMMA.
- Declare Keys Turtle Nesting Beach (St. Kitts) as a beach of "Special Concern" under the NCEPA Act.
- Declare Sea Haven Turtle Nesting Beach (Nevis) as a beach of "Special Concern" under the NCEPA Act.
- Completion of an assessment of the structures and a determination of the boundaries at Spooner's Ginnery, Mansions Estate, Belmont Estate, Charles Fort, Indian Castle, Fort Charles and Fort Ashby to determine any restoration works that will be needed.

8.2.2 High Priority

The following actions are to be given high priority:

- Adjustment of the Admission Fees for the BHFNP.

- Declaration of Nag's Head as a Nature Reserve in accordance with the NCEMA Act.
- Enhancement and Rehabilitation of Frigate Bay and Half Moon Bay Salt Ponds.
- Conduct ecological studies to determine the extent of dry forest on the S. E. Peninsula that is considered suitable for protection.
- Conduct fisheries studies to determine the boundaries of fish and shellfish propagation areas to be included in the SPMMA.
- Declaration of Marine Reserves within the SEPNMMA and SPMMA under the Fisheries Act, 1984.
- Review regulations on closed season for turtle harvesting with a view to recommending a moratorium on all harvesting of turtles and eggs both onshore and in the marine environment.
- Declaration of Muddy Point Salt Pond and Greatheeds Pond as protected areas where no additional development will be permitted.

8.2.3 Medium Priority

The following actions are to be given medium priority:

- Conduct a Strategic Environmental Impact Assessment to identify specific locations for legal sand mining.
- Amalgamation of identified areas of dry forest on the S. E. Peninsula into the CFRNP.
- Conduct restoration works at New River Estate to bring the trails and associated infrastructure up to a level suitable for use by tourists.

8.3 Organizational Arrangements

A number of institutional arrangements need to be put in place as part of the implementation of the Protected Areas Systems Plan for St. Kitts and Nevis:

- Establishment of the proposed National Conservation Commission (see Section 7.1.2);
- Establishment of a working relationship between the St. Kitts Department of Physical Planning and the Environment, Water Department, Department of Tourism and the Department of Agriculture relative to the management of the Central Forest Reserve National Park (see Section 7.3.2).
- Establishment of the proposed Basseterre Valley Project Steering Committee (see Section 7.5.2).
- Establishment of the proposed Nevis Peak National Park Advisory Committee to manage the Nevis Peak and Camps Valley National Park (see Section 7.4.2).

8.4 Further Studies

This section addressed two levels of further studies that will be required:

- Further studies for the implementation of this Systems Plan; and
- Site Specific Plans for Individual Units.

8.4.1 Implementation of Systems Plan

A number of further studies will also be required to fill data limitations described in Section 1.5.1:

- The Environmental and Socio-Economic Studies of the Central Forest Reserve National Park (see Section 7.3.1).
- Detailed ecology survey of Nevis Peak and Camps Valley National Park, to identify areas of ecological significance which require a higher level of protection (see Section 7.4.1).

- Ecological Studies to establish the area to be reserved for the protection of the bird nesting sites at Nags Head (see Section 7.6.1).
- Ecology / Fisheries Study by the Fisheries Departments in St. Kitts and Nevis to establish the area to be reserved for the protection of fish and shellfish propagation areas in the proposed Southeast Peninsula and The Narrows Marine Management Area and the Sandy Point Marine Management Area (see Section 7.6.1).
- Strategic Impact Assessment on the winning of sand from the Ghauts in St. Kitts (see Section 7.10.2).
- Ecology / Forestry Study to identify a suitable area of Dry Forest in the Southeast Peninsula for inclusion in the Protected Areas System Plan (see Section 7.11.2).

8.4.2 Site Specific Plans

Once Individual units have been declared to be included as part of the National System of Protected Areas, Site Specific Plans must be prepared to guide the implementation of these units. In many instances, these plans will be in the form of a Management Plan, however, some sites may require more specialised plans such as Operational Plans. The NCEMA Act 2009 (Draft) identifies a number of components that should be included in Management Plans for individual sites:

- a) the long term goals of the protected area and the associated conservation, restoration, research, educational and recreational objectives of the area to meet these goals;
- b) a description of the manner and time frame within which various management measures will be undertaken, including the kinds of activities that will be regulated or prohibited;
- c) a statement of the projected capital and recurrent costs of implementing the management plan and an analysis of funding strategies for defraying these expenses; and
- d) a monitoring plan, including objective verifiable indicators for the determination of the effectiveness of management strategies.

- e) compliance requirements, commitments, or expected responsibilities under multilateral international and regional conventions, agreements, or programmes, including those related to designation of specially protected areas, wildlife on land or in the sea, conservation or migratory species, protection of wetlands for endangered waterfowl, conservation of biological diversity, protection of wildlife controlled in international trade and preservation of world heritage sites.

8.5 Training

This section discusses training at two levels:

- ▶ A Workshop on the Protected Areas Systems Plan, and
- ▶ More in-depth Training.

8.5.1 Workshop

Once this Systems Plan has been approved, it will be very useful to sensitize stakeholders to its contents. Ecoengineering therefore recommends that a 2- or 3- day workshop be held in St. Kitts and Nevis to discuss the approved Systems Plan. At this workshop, key stakeholders including Government Agencies and others will be familiarized with the plan and their expected roles under the plan.

8.5.2 In-depth Training

Training will play a critical role in the implementation of this National Protected Areas System Plan as well as in the establishment of individual System Units and the Management Plans for these units. Under the OPAAL project, a Protected Areas Training Needs Assessment was conducted to determine *site specific and national training needs to inform the design and implementation of training program(s) for building the capacity of stakeholders in protected area planning and management; and sustainable livelihoods* (Parsram, 2007). This report identified training needs at the national level, the site level and training for associated livelihood stakeholders. A summary of training needs identified in this report for the national and site level is as follows:

National Level

- Organizational Management and Leadership;
- Communications;
- Project Management;
- Protected areas financing;
- Fundraising and resource mobilization;
- Partnerships and Networking;
- Project Monitoring and Evaluation;
- Natural resources monitoring and assessments;
- Co-management;
- Ecosystems/conservation management;
- Site operations and Management;
- Community Outreach and management;
- Protected area planning methods and management plan development;
- Protected areas policy analysis, development and implementation;
- Enforcement;
- Tourism and sustainable livelihoods management; and
- Education awareness and outreach.

Site Level

- Organizational Management and Leadership;
- Communications;
- Project Management;
- Protected areas financing;
- Fundraising and resource mobilization;
- Partnerships and Networking;
- Project Monitoring and Evaluation;
- Natural resources monitoring and assessments;
- Co-management;
- Ecosystems/conservation management;
- Site operations and Management;
- Community Outreach and management;
- Protected area planning methods and management plan development;
- Protected areas policy analysis, development and implementation;
- Enforcement;
- Tourism and sustainable livelihoods management;
- Education awareness and outreach; and
- Socioeconomic and cultural resources.

8.6 Updating the Systems Plan

This systems plan is intended to be a “living document” which is updated on a regular basis as new information comes to hand. Specifically, it is envisaged that the following updates would be undertaken:

- ▶ A Major Update after about 36 months, when the results of Further Studies (see Section 8.3, above) have been completed.
- ▶ Routine updates every 5 years thereafter, based on experience with the Protected Area Systems Plan and additional information that would have come to hand.

THIS PAGE LEFT INTENTIONALLY BLANK

BIBLIOGRAPHY

- Anderson, L. et al. (2000): Ecotourism and the Development of the Old Military Road Trail, St. Kitts.
- Beard, JS. (1949): The Natural Vegetation of the Windward and Leeward Islands. Oxford For. Mem. 21. Oxford, UK: Oxford University. 192 pp.
- Birdlife International (2009): Important Birding Area Factsheets.
- Caribbean Conservation Association (1991): St. Kitts and Nevis Country Environmental Profile.
- Caribbean Waterways – Newsletter of GEF IWCAM Project (2008): Protecting the Basseterre Valley Aquifer: An IWCAM Approach for St. Kitts and Nevis.
- Chapman, Fedigan & Fedigan (1988): Ecological and Demographic Influences on the Pattern of Association in St. Kitts Vervets.
- Coral Reef Alliance (2006): St. Kitts & Nevis and the Coral Reef Sustainable Destination Model.
- Department of Physical Planning (2008): Nevis Physical Development Plan.
- Department of Physical Planning and Development (2007): National Action Programme for combating desertification (2007).
- Environmental Support Services, LLC, 2006: Review of the Policy, Legal And Institutional Frameworks for Protected Areas Management in St. Kitts and Nevis.
- Fisheries Management Unit (1998): Proposal for a Management Plan For The Development Of Marine Protected Areas In St. Kitts.
- Government of St. Kitts and Nevis (2004): National Biodiversity Strategy and Action Plan for St. Kitts and Nevis.
- Government of St. Kitts and Nevis (2004): Proposal for the Creation of a National Park at The Basseterre Valley Aquifer. St. Kitts.
- Government of St. Kitts and Nevis (1993): St. Kitts and Nevis Tourism Master Plan.
- Hanley, J. W., (1998): Beaches and Mangrove Systems of Nevis.

- Homer, F. (2004): National Environmental Management Strategy and Action Plan (2005-2009).
- Honebrink, T. (1993): Friars Bay Salt Pond Site Report.
- Hyder Consulting Limited (2008): Charlestown Physical Action Plan.
- Hyder Consulting Limited (2003): Draft integrated Coastal Zone Management Report
- Horwith, B. & Lindsay, K. (1999): A Biodiversity Profile of St. Kitts and Nevis.
- Horwith, B. et al. (2009): Protected Area Management Plan For The Proposed Nevis Peak National Park And Camps River Watershed Area.
- Island Resources Foundation (2009): Protected Area Management Plan for the Proposed Nevis Peak National Park and Camps River Watershed Area.
- Island Resources Foundation (1989): Eastern Caribbean Parks and Protected Areas Bibliography.
- JECO Caribbean Inc. (2007). Environmental Impact Assessment. Nevis Quarry Impact & Soil Conservation Study.
- Knechtle, J. and Nichols, S. (2008): "The OECS Policy on Protected Area Systems" and "Model Protected Areas Systems Act" Institutional Arrangements for Protected Areas Management
- Lindsay, K. & Horwith, B. (1999): A Vegetation Classification of St. Kitts And Nevis.
- Ministry of Finance, Development and Planning (2004): National Assessment of the BPOA+10 (1994-2003).
- Ministry of Health and Environment (2001): National Report on Integrating The Management Of Watersheds And Coastal Areas In St. Kitts And Nevis.
- National Conservation and Environmental Protection Act (1987 Amended 2001).
- NHCS, (1999): Preserving Charlestown's Heritage: The Economic and Social Benefits of Preservation with Guidelines On How To Maintain The Town's Unique Character
- Oatham, M. and Boodram, N. (2006): Gap Analysis of Neotropical Dry Forests. Tropical Ecology 47 (2): 271-278.

- OECS (2008): Management Plan for the Central Forest Reserve National Park.
- Olson et al (2001): Terrestrial Ecoregions of the World: A New Map of Life on Earth. Bioscience 51: 933-938.
- OPAAL, (2007): Environmental Awareness in the OECS.
- Parsram K. (2007): Protected Areas Training Needs Assessment. St. Kitts and Nevis Country Report
- Pemberton, E (Undated): Proposed Marine Management Areas in St. Kitts and Nevis.
- Planning Unit (2004): National Assessment of the BPOA+10 1994-2003.
- Raffaele, R. (1977): Comments on the Extinction of *Loxigilla portoricensis grandis* in St. Kitts, Lesser Antilles.
- Rodrigues, D. (1990): A survey of the dominant flora in three wetlands habitats on Nevis, West Indies.
- Sahely, H. (2008): Rehabilitation and Management of the Basseterre Valley as a Protection Measure for the Underlying Aquifer in St Kitts-Nevis.
- St. Christopher Heritage Society et. al. (1992): Friar's Bay Biodiversity Site.
- St. Christopher Heritage Society et. al. (1992): Mosquito Bay.
- St. Christopher Heritage Society et. al. (1992): Mosquito Bay Biodiversity Data Collection.
- St. Christopher National Trust (2006): St. Christopher National Trust Strategic Plan 2006-2010.
- Steadman, D. et. al (1997): The Birds of St. Kitts, Lesser Antilles.
- Sun St. Kitts Nevis (2007): The Central Forest Reserve – A Protected Area of SKN.
- The Federation of St. Kitts and Nevis (2007): Management Plan for the Central Forest Reserve National Park (2007 – 2011)
- UNESCO (2003): Monitoring Beach Change: Nevis.
- US Army Corps of Engineers (2004): Water Resources Assessment of Dominica, Antigua, Barbados, St. Kitts and Nevis.

Vittery, A. (2006): The Ornithological and Ecological Importance Of Wetland Sites And The Eco-Tourism Potential Of Birds In St. Kitts.

Walters, R. (1995): Establishing the Sandy Point Marine Protected Area to Maintain Biological Diversity and Sustainable Use.

Walters, R. (1995): Greatheeds Pond: An Environmental Impact Assessment To Evaluate Its Potential Future As A Bird Sanctuary.

Widecast (1992): Sea Turtle Recovery Action Plan for SKN.

Wilson. J. (1999): Birdlife of the Coastal Zone of St. Kitts: Preliminary Summary of Field Research with Conservation Recommendations.

World Heritage Committee, (1999): Nomination of Brimstone Hill Fortress National Park as World Heritage Site.