AN INTEGRATED COASTAL ZONE MANAGEMENT PROCESS FOR A SMALL ISLAND: A CASE STUDY OF NEVIS

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A practicum
Submitted in partial fulfillment of the
Requirements for the Degree,
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BY

KARLENE DEBANCE MAHARAJ

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirement of the degree

of

MASTER OF NATURAL RESOURCES MANAGEMENT

ABSTRACT

The small island of Nevis is located in the Eastern Caribbean Archipelago. It is a small round island of volcanic origin and is dominated by the Nevis Peak. As tourism and its related activities become increasingly important to the local economy, environmental issues such as waste and sewage disposal, beach mining, ecological and coastal degradation and species depletion have emerged as growing concerns.

The purpose of my research was to develop an Integrated Coastal Zone Management (ICZM) process for small islands using Nevis as the case study. The first objective described the geographic sub-zones that constitute a small island environment. These sub-zones include coastal offshore sub-zone, beach sub-zone, coastal lowland sub-zone, and the inland sub-zone. As a basis for ICZM planning on small islands, it is critical that the processes and activities within these sub-zones are well understood in the context of how they interact and impact each other.

The second objective entailed identifying an ICZM plan in the Caribbean and using it as an example for developing an ICZM process for Nevis. The Barbados Coastal Zone Management plan was selected and its best management components were assessed and, where relevant, applied to Nevis. The Barbados example illustrated that the ICZM process can be developed in a staged approach over the course of a few years. The third objective analyzed the existing environmental legislation in Nevis, the roles of the Non Governmental Organizations, public and government within Nevis. It was concluded that Nevis should develop an ICZM process that would reduce further environmental and coastal degradation.

In drafting the ICZM process for Nevis it was noted that, like Barbados, there would be several challenges that would be encountered along the way, such as, weak institutional capacity, need for funding, data collection and analysis, access to training, lack of enforcement and lack of co-operation from the various stakeholders and participants. This research recognized that each small island in the Caribbean is different from others and has its own unique characteristics. The process that is being drafted for Nevis is intended to serve as a guide for other small Caribbean islands that have expressed an interest in engaging in ICZM planning. This guide can be modified to cater to the small island's own needs and requirements.

The ICZM process presents a window of opportunity for collaboration, building of diverse partnerships, developing community involvement and effective decision making at an integrated level. It is a concept that should be explored and developed further by Nevis and other Eastern Caribbean Islands to ensure that future sustainability of its coastal environment is achieved.

ACKNOWLEDGEMENTS

When I was selecting a topic for my research, I immediately thought of the Caribbean region because of my familiarity and knowledge of the islands, culture, bureaucracy and environment. Little did I know that the task in front of me was not an easy one. However, overcoming these challenges proved to be an enlightening and enriching experience and best of all enabled me to work in the Caribbean thus fulfilling a personal goal of mine.

Over the course of my studies at the Natural Resources Institute (NRI), my project changed many times. The end result today would not have been possible without the continued support, guidance, advice and patience from my supervisor, Dr. Helen Fast and committee members, Dr. Fikret Berkes, Mr. Ashmede Asgarali and Professor Thomas Henley. To them, I am indebted for their encouragement and for having faith in me throughout the process. I would like to acknowledge and thank Professor Lino Briguglio, Director, Institute for Islands and Small States, University of Malta for his invaluable contribution and input during the earlier stages of my research.

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On a personal note I would like to thank my husband and my family for their unconditional love and understanding. My parents have instilled in me a strong sense of pride, family values and morals. They have sacrificed tremendously to give me nothing but the best in life and have been my teachers in life. To them, I am eternally grateful.

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BCZMP - Barbados Coastal Zone Management Plan
CCA - Coastal Conservation Association
CCP - Coastal Conservation Programme
CDB - Caribbean Development Bank
COSALC - Coast and Beach Stability in the Lesser Antilles
ECNAMP - Eastern Caribbean Natural Area Management Program
GDP - Gross Domestic Product
GIS - Geographic Information Systems
ICZM - Integrated Coastal Zone Management
IDB - Inter-American Development Bank
IISD - International Institute for Sustainable Development
NCEPA - National Conservation and Environment Protection Act
NHCS - Nevis Historic and Conservation Society
NGO - Non Governmental Organization
NRI - Natural Resources Institute
OCOD - Organization for Cooperation in Overseas Development
SIDS - Small Island Developing States
UNCCD - United Nations Convention to Combat Desertification
UNCSD - United Nations Commission on Sustainable Development
UNEP - United Nations Environment Programme
UNESCO - United Nations Educational, Social and Cultural Organization
USAID - United States Agency for International Development

INTRODUCTION

CHAPTER ONE: INTRODUCTION AND OVERVIEW

1.1 BACKGROUND

Small islands constitute nearly seven percent of the earth's land area[1]. Each small island is unique in terms of its physical and geographic features, its people, cultural and social customs, natural resources and size. Small islands are often characterized as being "fragile" due to their more vulnerable ecosystems and economies, and limited natural and human resources (Beller, 1986). At the same time, they are adjacent to some of the world's few remaining reserves of fish stocks, a high proportion of endemic plant and animal species, unique ecosystems and a large variety of cultures (United Nations, 1994). The United Nations in 1994 recognized the importance of islands and especially of Small Island Developing States (SIDS), and called for international action for their protection and future management.

Some of the world's smallest island states are found in the Caribbean Basin (Figure 1), which covers approximately 2.4 million square kilometres and is home to 31 political entities. The small islands of the Eastern Caribbean or Lesser Antilles exhibit great disparity in their political, economic, natural and physical amenities. For example, Anguilla and Antigua are dry and flat with little rainfall, while other islands like Dominica and St. Lucia are mountainous and experience very high rates of rainfall. Some islands, like Monsterrat and St. Vincent, are susceptible to frequent volcanic eruptions. In 1998, Monsterrat was decimated by volcanic activity with the island's population reduced to a few families. St. Lucia and Grenada enjoy protection from

[1] For the purposes of this study, small islands will be defined according to the Commonwealth Secretariat definition as "those islands with a population of 500,000 or less and a land area of approximately 10,000 square kilometers" (Towle, 1979).

hurricanes, thanks to their naturally protected harbours (Towle et al., 1991). Generally speaking, small island economies can be characterized as follows:

1. Most people on small islands depend on earnings from the sale of local raw materials and merchandise for their livelihood. These resources can include mineral or arable land, fishery resources and tourism—all of which are dependent on the natural environment (climate, soil, seas, sun and sand).
2. Limited natural resources encourage a reliance on imported goods and encourage small islands to carry trade deficits. The proportion of goods exported is often less than the goods imported in both production for small domestic markets, and in the provision of social and physical infrastructures, and public administration (Beller, 1986; Gomes, 1993).
3. Because small islands are highly dependent on imports, their economies rely on foreign assistance (Pantin, 1995). Foreign assistance provides additional financial resources for the small islands.
4. Economic policies such as diversification of the economy, increased imports of products and foods, investment in expanded and new infrastructure such as airports, roads etc. often have negative impacts on the environment (Thomas, 1990). Products such as aluminium cans and plastics (disposable diapers, bottles and bags), often cannot be recycled on many of the small islands because of a lack of economic incentives, high capital cost and low return on investment. Instead of being recycled, these products are usually burned on the island resulting in airborne pollution.

5. The small land area and heavy dependence on natural resources, which is typical of small islands, have serious implications for the natural environment (Demas, 1967; Farrel, 1979).
6. Many forms of developmental activity result in unacceptable levels of environmental degradation on the small island environment. For example, hotels located along the coastline increase the number of tourist-related activities on the beach area. The consequences include increased beach erosion, disturbance of habitats and destruction of vegetation that protects the beach from erosion. Other factors that lead to environmental degradation on small islands are: airport expansion resulting in more visitors, noise pollution and air pollution; increased tourism that leads to an increased demand for goods and services and a lack of resource management skills needed to interpret economic trends and their impacts on the small island economies (McElroy; Albequerque, 1990).

In 1996, the United Nations Commission on Sustainable Development at its fourth session addressed the issues of traditional neglect of environmental protection in the small Caribbean Islands in the context of their high degree of environmental sensitivity, vulnerabilities and limitations for growth of their economies (Pantin, 1995). The Commission also acknowledged the important contribution of tourism to the development of many small islands but at the same time noted that "if not properly planned and managed, tourism could significantly degrade the environment on which it is so dependent" (United Nations, 1994).

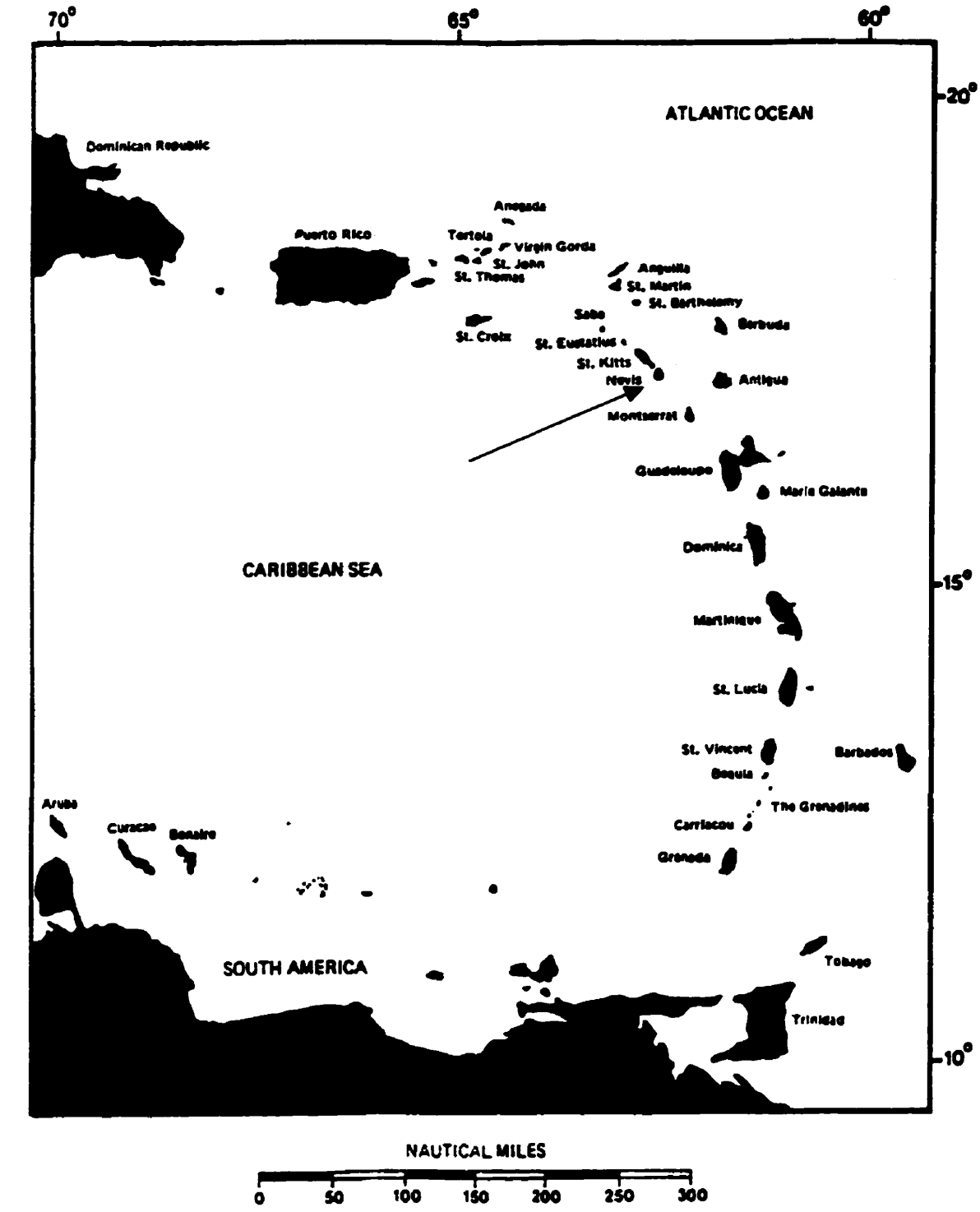

Figure 1: Map of the Caribbean Basin (Source: ECNAMP, 1998)

In May 1998, the United Nations Commission on Sustainable Development at its sixth session reaffirmed that small islands are "ecologically fragile and vulnerable and because they face particular constraints in their efforts to achieve sustainable development" (United Nations, 1999). According to Singh (1992), these ecosystems have "little margin for error". That is, because of the limitations inherent to small islands (limited resources, land and fragility of their ecosystems), further developmental activity can compromise the integrity of their environment and the well-being of their people (United Nations, 1994).

1.2 RESEARCH PROBLEM, PURPOSE AND OBJECTIVES

Nevis (Figure 2) is the smallest island state in the Eastern Caribbean archipelago. It has been selected for study because of its emerging tourism industry, and its relatively pristine environment. Tourism in Nevis has deep roots in its historical past. Many of the hotels and tourist sites on Nevis were built on past colonial landmarks and estates. Since 1991, tourism activities on Nevis have focused on small-scale, cottage-type hotels (Towle, 1991). Larger North American owned resorts such as the Four Seasons hotel is slowly replacing the small locally owned hotels.

Tourism activities have been heavily encouraged by the island's government through commitments to increase the following: foreign exchange earnings; hotel construction; job creation; and imports of goods and services that support the agriculture and food industries. The development activities that impact small islands and lead to irreversible environmental degradation can be minimized through an ICZM process.

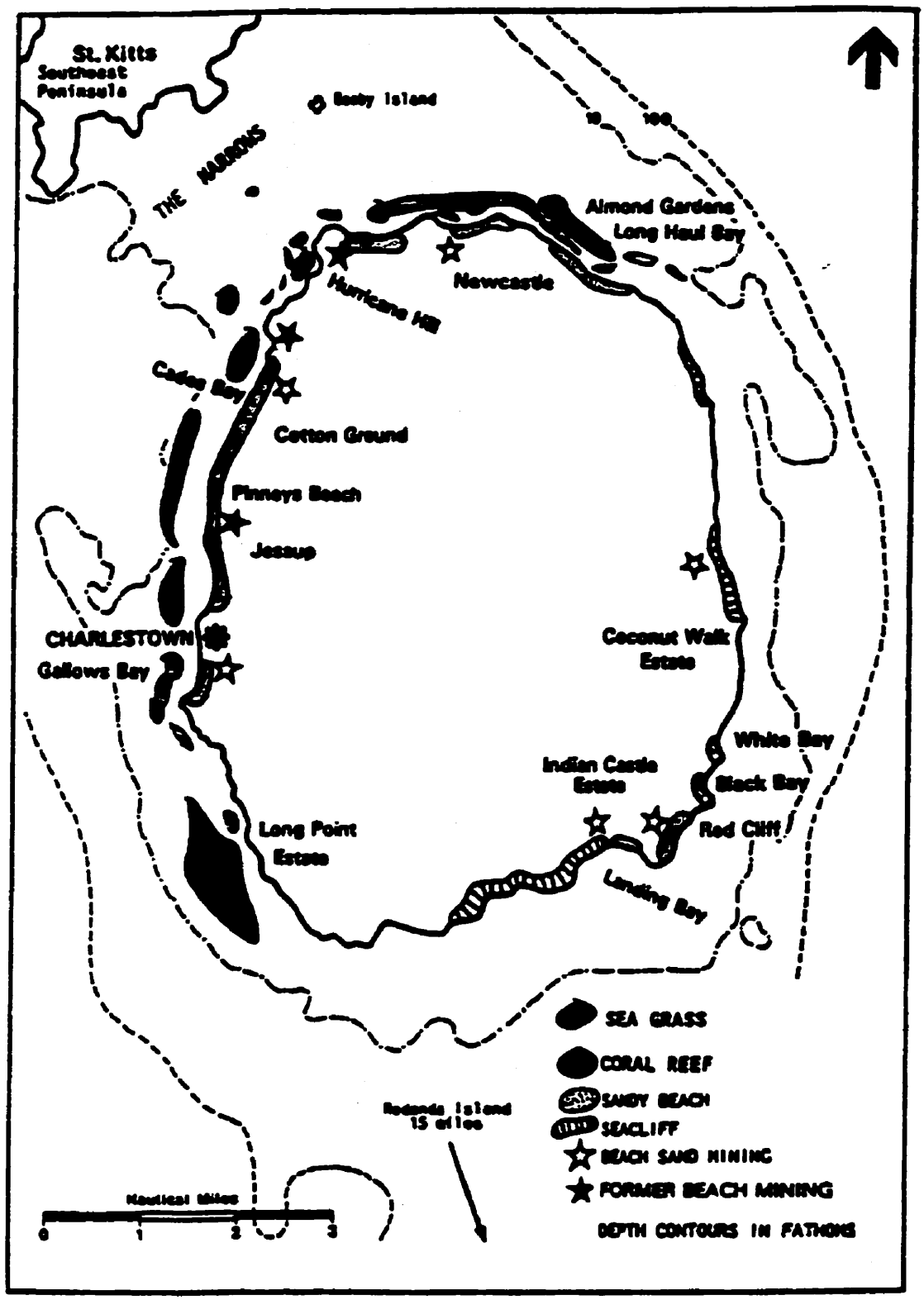

Figure 2: Map of Nevis Showing its Sandy Beaches, Sand Mining Sites, Shoreline Marine Features including Coral Reefs and Seagrass Communities. (Source: Eckert and Thomas, 1992))

The purpose of this research is to develop an integrated coastal zone management process for small islands using Nevis as a case study.

The objectives of this research are:

1. To describe the geographic sub-zones of small islands in order to provide a basis for coastal zone management planning in these regions and Nevis. These sub-zones include the coastal offshore zone; the beach zone; the coastal lowland zone and the inland zone;
2. To analyze the Barbados coastal zone management plan in order to identify best management components and assess their relevance for Nevis;
3. To draft a coastal zone management process for Nevis coastal offshore zone; the beach zone; the coastal lowland zone; and the inland zone using the best management components identified; and
4. To develop recommendations for coastal zone management processes for other small islands using the coastal zone management process proposed for Nevis.

1.3 METHODOLOGY

The methodology used in this study included a literature review, fieldwork and an analysis of findings. The literature review provided contextual support for drafting a coastal zone management process that would enable small Caribbean islands to move towards long term sustainability. By using Nevis as a case study, the management process and recommendations proposed can be generalized and applied to other small islands.

Materials used for the literature review included United Nations Meeting session reports and recommendations; proceedings from Small Island workshop conference papers; research papers from Caribbean researchers and environmentalists; documentation, official government documents of St. Kitts and Nevis; and published articles on integrated coastal zone management of small Caribbean Islands. Fieldwork consisted of a visit to Nevis in October 1997, which provided the visual and contextual framework on which this research was based. Analysis of both the literature and fieldwork findings provided the basis for the development of the ICZM process applicable to small islands.

1.4 THE STUDY AREA: NEVIS

Nevis is located one mile from the Southeast Peninsula of St. Kitts. Its land area is 93 sq. km (36 sq. miles), with a population of approximately 9,600. The island is primarily volcanic, and is dominated by "Nevis Peak", its highest point at 985 m (Photograph 1). Its tropical sea temperatures average about 81 degrees, or 27 degrees Celsius. Nevis Peak is marked by deep ghauts (pronounced "guts") that divide the slopes from below the peak to the sea. Vegetation cover is extensive but not dense, and much of the island's leeward coastland is marked by wetlands (Towle, 1991).

There are no bays, inlets or cays along Nevis' coast. The island is outlined by long stretches of sandy beaches, with the main sand beaches located on the West and North coast (Cambers, 1997). It is here that many hotels have been constructed, including the largest hotel complex in Nevis; the Four Seasons Resort. Other hotels are reconstructed plantation houses located inland rather than on the beach zone of Nevis

(Cambers, 1997). The sand beaches however, are relatively undeveloped and are backed with palm trees and wetlands (Photograph 2).

Beaches are important to Nevis since they constitute a major component of the recreational pleasure for the local population and the tourism industry. Nevis' beaches protect the coastal land from wave action, provide habitats for animal species, and are the most aesthetically pleasing part of the environment (Cambers, 1997). There is much concern among locals, environmentalists and the government about Nevis' beach and coastal area due to threats of pollution, hurricanes, wave swells, sand mining, increased hotel and infrastructure construction, increased tourism pressures, habitat destruction and sand erosion in the beach zone (Ackland, Pers. Comm., 1997).

The Newcastle Airport for example, is located on the coast of Nevis and is being expanded directly on the coastline of Nevis. Erosion (See Photographs 3 and 4) is already occurring along the coastline approximately two miles from the present airport (Ackland, Pers. Comm. 1997). The development of Nevis commenced in the early 1800s (Watts, 1973). Sugar cane cultivation and the cotton industry dominated the island's economic activities and employment opportunities until the 1880s (Towle, 1991). During this time, the Nevisian population was expanding, and education and literacy were becoming more important than working in the fields, since the wages from the sugar and cotton industry were not sufficient for a Nevisian family to meet its basic needs.

In addition, a marginal and small resource base, weak sugar crop earnings, and an underdeveloped infrastructure resulted in the government's need to capitalize on other forms of intervention and growth.

Photograph 1: The Western Profile Of Nevis, The Nevis Peak In Background (source: Karlene Debance, 1997)

Photograph 2: Close up View Of The Western Coastline Of Nevis: Pinney's Beach (Source: Karlene Debance, 1997)

Photograph 3: Coastal Erosion Along Nevis' Coastline (Source: Karlene Debance, 1997)

Photograph 4: Airport Construction On Coastline A Few miles Ahead Of Photograph 3

(Source: Karlene Debance, 1997)

The 1880s onwards saw a decline in the sugar industry as workers emigrated to other islands, the United States and Great Britain to seek other employment and educational opportunities. Rapid expansion was recorded in the 1970s in the construction of new and larger hotels and infrastructure development of services such as: banking, transport, telecommunications, realty, and restaurant businesses. These were directly related to the tourism industry (St.Kitts-Nevis Government, 1981). "It was a decade of major change as the number of visitors, the number of hotel rooms and the level of per capita GDP all more than doubled" (Towle, 1991).

Other jobs were created indirectly through the tourism sector and the manufacturing industry. The tourism industry was very inviting to new employees, since the average weekly earning was two or three times that in the agriculture or fishing industry (Towle, 1991). Standards of living were also adjusted to embrace development and change within Nevis. During the same period, the number of telephones per household increased, bank deposits doubled, and 50% of the houses being built used concrete instead of wood (Rojas and Meganack, 1987).

During the 1980s, the agriculture industry suffered from improper management to protect their farms from foraging animals, lack of storage facilities, small local markets, and inadequate farm size allocated to the farmers. There were some attempts by the government to address these issues in terms of providing government land to farmers on a longer term, constructing new feeder roads, providing occasional loans, and providing surveillance service for crops on a regular basis (Towle, 1991). As tourism intensified in this period (1980's), government policies targeted the agriculture and fishing industries for diversification in order to enhance their survival. Although the

growth in the tourism industry was a main factor in the cause of the decline of the agriculture and fishing industries, there were many other incremental, wage-related, physical and seasonal details that played an important role in its depreciating value. In the fishing industry for instance, the fishermen were not paid routinely for their fishing effort and time—especially during the migratory fishing period. Many would travel great distances for extended periods of time, and the expenses incurred would not match the retail value of their catch.

Nevis operates a form of local government through its Island Assembly, which allows a certain amount of autonomy from the Federal Parliament of St. Kitts and Nevis. The economy of Nevis has only achieved moderate levels of growth in recent years (by its own standards). The rate of growth has not exceeded 5% in any year since 1990 (UNEP, 1996). Tourism has emerged as one of the most important economic activities impacting directly on a number of sectors including hotels and restaurants, transportation, and retail trade. The population trend of Nevis experienced a negative growth from 1980-1991. This decline has been attributed largely to the effects of emigration.

POPULATION TRENDS IN NEVIS 1844-1997

Year	Population
1844	9,571
1871	11,703
1901	12,774
1921	11,569
1960	12,770
1970	11,250
1980	9,428
1997	9,600

Table 1: Table Showing Population Trends in Nevis 1844-1997

(Source: Towle, 1991 and UN, 2000)

Nevis imports most of its food for consumption. This situation is the function of two major factors – the low level of crop and livestock production locally and the booming tourism industry which must be sustained (Towle, 1991). A significant development since the 1980s has been the increase in the number of households with water piped into their dwellings from 28% to 50% (Towle, 1991) as opposed to those using public standpipes. This is yet another clear indication of improving economic circumstances impacting positively on living standards in Nevis.

At the end of the 20th Century, the structure of the Nevisian economy is marked by three distinct factors:

- Dependence on foreign exchange through: export sales, foreign investments (services, hotel construction and other manufacturing companies) and tourist spending.
- The nearby island of St. Kitts has a deep-water harbour, location of the seat of government for both islands, shared legislation and management. St. Kitts dominates the Nevisian economy since its centre serves as a tourist attraction.
- Economic diversification from traditional sugar and cotton exports, small-scale agriculture, livestock grazing, fishing and light manufacturing to arts and crafts, construction, furniture building and the service sector etc. (Towle, 1991).

1.5 DEFINITIONS OF KEY CONCEPTS USED IN THIS RESEARCH

SMALL ISLANDS: Small islands are defined as those land masses with approximately 10,000 square kilometers or less and approximately 500,000 or fewer residents (Hess in Beller et al., 1990).

COASTAL ZONE: The Coastal Zone is the transitional area between land and sea. It is a band whose width is determined by the level of interaction of marine and terrestrial coastal processes (the worldwide average is approximately 60 km wide). Coastal Zones accommodate more than 60% of the world's population and are marked by high levels of economic activity (NetCoast, 1997).

INTEGRATED COASTAL ZONE MANAGEMENT STRATEGY (ICZM): ICZM implies a special focus on the interactions between the various activities and resource demands that occur within the coastal zone (Cicin-Sain, 1993). Integrated management strategies require an ecosystem approach so that the coastal zone is examined as an "environment within a system" (Cicin-Sain, 1993). Intrinsic to ICZM are the long-term management goals; **integration** and **co-ordination** of actions, resource use, policy and economic growth; and **monitoring** of processes, outcomes and actions (Thia-Eng, 1993).

ECOSYSTEM: An ecosystem is comprised of various interactive groups of species, genera, families and communities of organisms; such as, a coral reef, mangrove swamp or a small island (McEachern & Towle, 1974). An ecosystem model assumes a closely coupled matrix of linked subsystems and key controlling processes – economic, demographic, socio-political and environmental – which interact to condition the behaviour and define the stability of the overall system (McElroy & Albuquerque, 1990).

SUSTAINABILITY: Sustainability is a process of protecting and maintaining ecosystem integrity. Sustainability, according to the United Nations, 1994, can be achieved by meeting the needs of the population without compromising the ability of future generations to meet their own needs. Sustainability also means having management options in place that dictate the use of resource, economic policies, technological development, population growth and institutional structures while enhancing the current and future potential for human progress.

1.6 APPLICATION OF ICZM TO A COASTAL ZONE MANAGEMENT PROCESS

ICZM is by definition, a dynamic process, in which a coordinated program is developed and implemented by balancing human use of natural resources to achieve the conservation and sustainable multiple use of the coastal environment (Cambers, 1992). ICZM is said to constitute a process, which comprises the following attributes:

1. It is initiated by a response to evident signs of coastal resource degradation or destruction from coastal hazards;
2. It is a continuous program usually initiated by legislation or executive mandate;
3. It clearly defines the geographic scope of its jurisdiction;
4. It establishes a clear and specific set of objectives or issues to be addressed;
5. It possesses an institutional identity;
6. It is characterized by the integration of two or more sectors e.g. waste pollution and marine protection (Sorenson, 1993).

Traditional small island management strategies have tended to be sectoral and fragmented in character, for example, waste management, tourism, disaster management (UNESCO, 2000). Sectoral management strategies do not address all indirect issues but attempts to manage the particular industry or single problem under one management plan. ICZM strategies employ three essential components: planning, implementation, and monitoring processes (Thia-Eng, 1993). The issues of ICZM are usually categorized into resource use, environmental quality and institutional concerns.

Its purposes are aimed at including institutional organization and arrangements, incentives, regulations to change behavior and actions, and can include public involvement and participation (Coughanowr; Kullenberg, 1993). Some ICZM issues are very obvious and can be easily identified by site inspection while others may require appropriate survey instruments or field research (Thia-Eng, 1993).

ICZM attempts to improve and maintain the quality of coastal regions in order to ensure a sustained flow of benefits to human societies, and to improve the governance of coastal environments (Crawford, Cobb; Friedman, 1993). It follows that ICZM is built on the essential elements of integration (system, policy and functional) and coordination. The operational component of ICZM consists of a series of specific policies and management actions that emphasize the implications on the livelihoods, and economic activities of the stakeholders (Thia-Eng, 1993). ICZM processes have been successfully applied to coastal zones and the larger and more economically developed islands and coastal communities. ICZM processes are developed to reduce environmental degradation to coastal and island environments, and they serve as the blueprint for sustainable development. ICZM aims to promote environmental quality, reduce resource-use conflicts, destabilize social unrest, and regulate economic growth (Hein, 1990).

- Integration ensures internal consistency between policies, actions, projects and programs, and maintains the linkages between the process of planning and implementation (Thia-Eng, 1993).
- Systems integration considers the spatial and temporal dimensions of the coastal resources in terms of physical and seasonal changes of the

environment, resource use patterns, and as well, the social and economic setting that determines the course of action over time within a given coastal environment. Thia-Eng (1993) comments that ICZM systems address and link all relevant management issues that arise from the physical, social and economic sectors.

- Functional integration focuses on the management actions of programs and projects, and how consistent they are with the goals and objectives of ICZM.
- Policy integration relates to the national and local policies that complement link programs and projects (Olsen, 1993).
- Co-ordination is essential to the process, because of the complexity of the issues involved in ICZM. Co-ordination brings together the understanding among the various stakeholders, in addressing a wide range of coastal development and management issues (Thia-Eng, 1993). It is central to the local and national levels in the planning and implementation stages of ICZM. Effective co-ordination consists of the following fundamental steps: research and analysis; program formulation; execution of projects and programs; implementation; monitoring; and, evaluation. Co-ordination would involve a multidisciplinary team whose expertise promotes and strengthens the process of change within the coastal environment (Olsen, 1993).

ICZM planning thus provides conditions that are likely to facilitate development and encourage progress. In general, the goals are specified targets related to the desired

mix of goods, services and values to be produced, consumed or conserved (Net Coast, 1997). Griffith (1993) argues that, ICZM, as a concept and a tool, provides an adequate framework for the sustainable use and development of coastal environments. Hein (1990) and Ashe (1993), assert that ICZM provides the framework for the consideration of many diverse, but sometimes conflicting uses of resources, as well as of the anthropogenic impacts on these resources and the environment within.

The issues of sustainability and island sustainability will be discussed in more detail in the literature review presented below.

1.7 THE CONCEPT OF SUSTAINABILITY: ITS RELATION TO ICZM

The concept of sustainability implies enhancing ecosystem quality and health while not foreclosing future options (Charles, 1989). The new notion of sustainability include those paradigms of international development where " people are consulted, [and] where they participate freely...then economic and social performance are better and development is more sustainable (Chambers, 1991). Sustainability, according to the International Institute for Sustainable Development (IISD), at the operational level, means ensuring self-sustaining improvements in productivity and quality of life of communities and societies (access to basic health, education, nutrition, shelter and sanitation, and employment); ensuring that environmental integrity is maintained and overexploitation of resources are at a minimum or activity that causes the least negative impact on the environment; and, ensuring that all forms of development-- economic, political and social issues --are addressed equally and integratively (IISD, 1996; Ham, 1995; Titi and Singh, 1993).

Achieving sustainability on Nevis is not the ultimate goal of this study. Rather, it is the intention of this study to propose a process for an ICZM process that can be implemented in Nevis and which will lead to island sustainability (sustainable island management) in the long term. The intent behind identifying and drafting an ICZM process for Nevis is to ensure that when implemented, the island of Nevis will have viable options for ecosystem recovery, preservation of the natural resources and the services they provide and the maintenance of environmental integrity for future generations.

1.8 PLAN OF RESEARCH

Chapter 1 provides an introduction to the study and defines the principles and theories that will be used in developing the coastal management process for Nevis. The components of Integrated Coastal Zone Management (ICZM) processes and its application to small islands, particularly Nevis, are reviewed. The concept of sustainability as a long-term goal that small islands can develop over time is briefly introduced as it applies to environmental and coastal zone management. The intent of this study is to propose a coastal zone management process that integrates the overall concept of sustainability and the components of integrated coastal zone management.

Chapter 2 defines a small island environment in terms of the sub-zones that exist within it and documents natural processes and activities and their impact on the sub-zones within small Caribbean islands and Nevis specifically. This chapter also discusses the importance of environmental management and the urgency for Nevis to develop an effective management system to manage its coastal zone.

Chapter 3 summarizes and analyzes the Barbados ICZM plan. Chapter 3 identifies the components of the Barbados ICZM process that can be used to develop the coastal zone management plan for Nevis. The existing environmental legislation and current environmental programs in Nevis are examined to determine what has already been done and hence serves as a starting point from where the coastal zone management process can be developed.

Chapter 4 outlines the steps of a draft coastal zone management process that integrates the concepts of ICZM and applies it to Nevis. Chapter 5 concludes with recommendations that can facilitate the development of an Integrated Coastal Zone Management Process for Nevis.

CHAPTER TWO: THE NEED FOR SMALL ISLAND MANAGEMENT

As already noted in the introductory chapter, small islands are defined as those "geographically isolated entities that are less that 10,000 square kilometers with a resident population of approximately 500,000 people or less" (Hein, 1990). This chapter begins by reviewing existing literature on small-island environments and defines the sub-zones that make up the coastal zone or small island. This is followed by a review of the activities that occur within the sub-zones of Nevis and their impacts on the small island environment. Lastly, the present status of Nevis' environment and resource base will be examined.

2.1 SMALL ISLAND ENVIRONMENTS

A small island can be viewed as an ecosystem in which the natural boundaries of one feature are inextricably linked with another (Griffith; Ashe, 1993). For the purposes of this research, a small island environment is summarized as an ecosystem that has the properties of a coastal zone and whose environment is:

- relatively isolated,
- limited in geographical size and resources (human and natural),
- limited in diversity,
- vulnerable economically and ecologically, and,
- fragile (Singh, 1992).

Many small islands have coastal features that serve as natural buffer zones against sea level rise, wave activity, hurricane impact damage and also provide opportunities for recreational activities, harbors and land for settlement (Thia-Eng,

1993). The land and sea interface on small islands is also typically the most densely populated area. Figure 3 illustrates the interface between the marine, land and human components that make up an island system. Understanding these interfaces is fundamental to managing the environment of the small island in the long term.

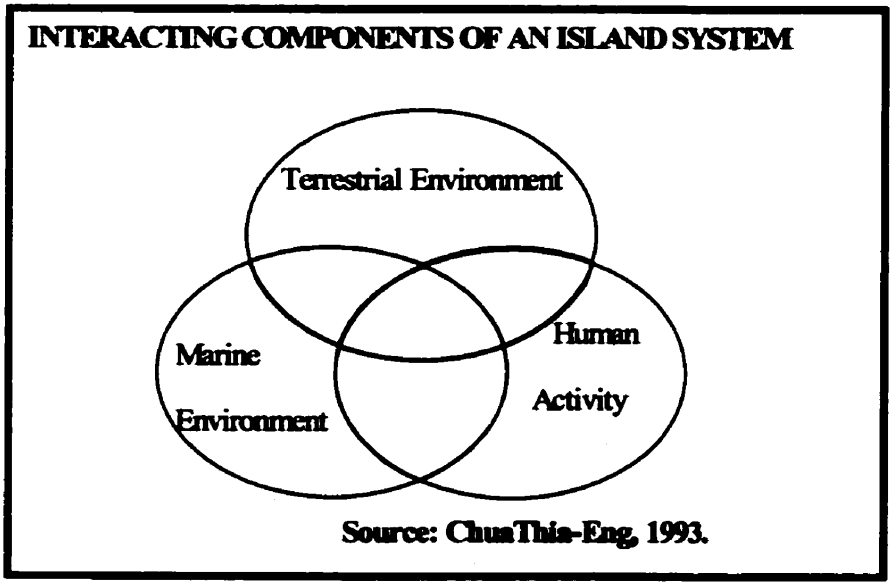

Figure 3: The Activities Of The Island Ecosystem Inextricably Linked.

The literature suggests that small island processes can be defined as natural, social or economic as described below.

- **Natural processes**: These processes may be physical, chemical or biological in nature. They can be gradual or seasonal and can have a variety of impacts on the appearance, functions and potential uses of the island ecosystem (Net Coast, 1997). Examples of such processes and resulting impacts are: wave activity leading to beach erosion or accretion; ecological succession leading to habitat change and biodiversity loss; energy and material cycles affecting biological productivity; natural disasters such as hurricanes and volcanic eruptions (Beller et al., 1990).

- **Social Processes**: Social processes are those that are mainly due to human activities and interactions with the natural environment. Such activities usually include development activities, economic generating industrial activities (tourism, fishing and agricultural industry), construction of other facilities (housing, airport, hotels and businesses), resource and recreational use of resources (Beller et al., 1990).
- **Economic Processes**: In order for populations to survive and grow, populations are continuously interacting and transforming the resources into viable and useable goods and services for their benefit. Economic activities, as well as human settlements, have been concentrated on the land and sea interface. They are increasingly consuming these resources as development increases. Consequently, in many small island systems, the problem of land requirements for development exceeds that presently available for human use. Increased competition for land resources often results in severe island destruction as development most often occurs on land that is ecologically sensitive (Briguglio, 1993).

2.2 THE SUB-ZONES OF A SMALL ISLAND ENVIRONMENT

A coastal zone comprises a narrow strip of coastal lowlands and a vast area of coastal waters (Thia-Eng., 1993). This can be further divided into sub-zones: the offshore zone, the beach zone, the coastal lowland zone, and the inland zone (see Figure 4). The coastal zone is also the land and sea interface where extensive livelihood (work) activities, tourism, housing and intense economic activity all take place. Small islands such as Nevis can also be referred to as coastal zones in that "all activities on the

mainland (of the island) impact directly and indirectly on the coastal area" (Pantin, 1995).

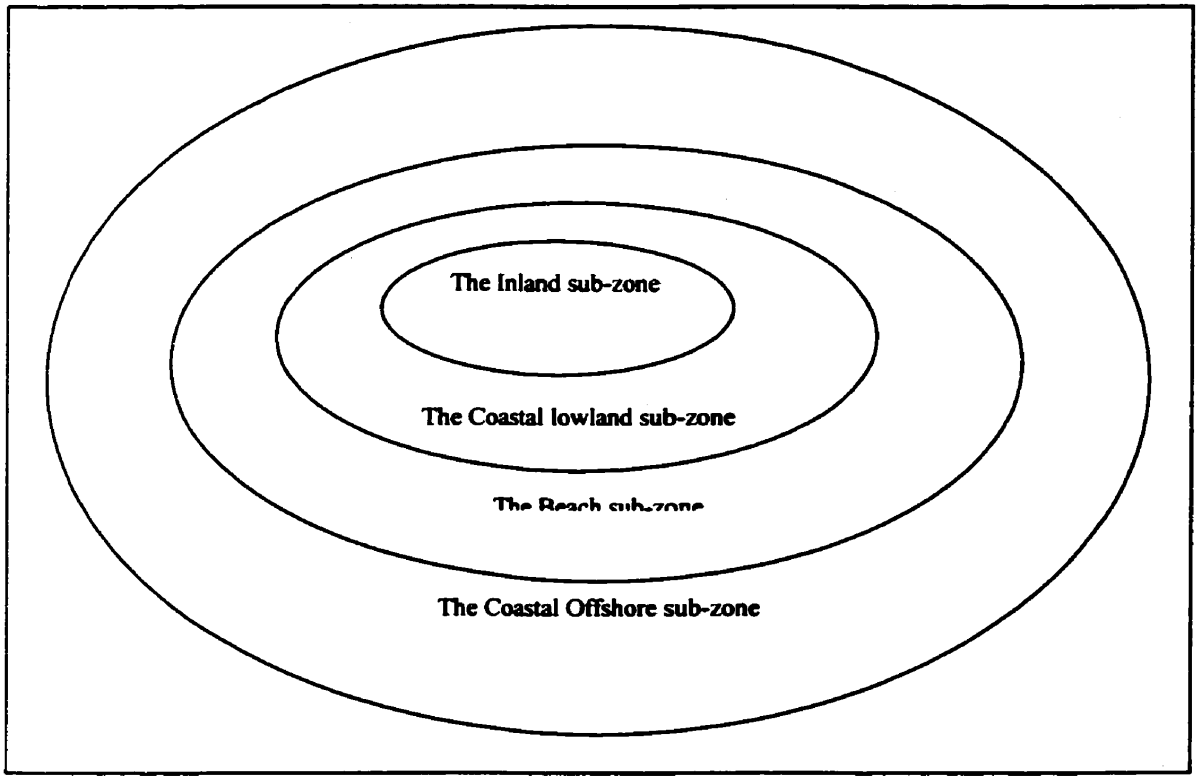

Figure 4: Relationship of A Small Island Or Coastal Area Sub-Zones (Source: Karlene Debance, 2001)

Table 1 below summarizes the four sub-zones of a small island or coastal zone and provides some insight into the complexity that exists within small islands. Table 1 divides the small island environment into four geographic 'sub-zones'. Each sub-zone consists of specific geo-physical characteristics and resources that contribute to the small island environment as a whole functional ecosystem. Understanding how the four sub-zones depend on and interact with each other is important to developing an effective management system for a small island. Table 1 further shows that the uses being made of the resources illustrate that small islands are experiencing strong development thrusts. For example tourism, human settlement, recreation and

infrastructure development leads to pollution of the coastal offshore sub-zone and deterioration of coastal quality. The environmental quality of the natural resources is negatively affected by these activities since they are subjected to disturbance and exploitation.

The coastal offshore sub-zone consists mainly of the marine and submerged lands around the small island. Its resources serve as habitats to many species and are also valuable to the fishing and tourism industry (commercial and recreational). This sub-zone's natural processes are responsible for wave and tide activity and temperature control of the small island. The coastal offshore contains coral reefs, marine species and organisms and sea grass habitats. The coral reefs and sea grass beds provide habitat for the commercially important fish species e.g. spiny lobster and the queen conch. These species in particular rely on these habitats for certain periods of their life cycles. Coral reefs produce nutrients that are important in sustaining marine quality and serve as barriers during periods of heavy storm surge and wave activity. They are also the major contributors to white sands (combination of coral breakdown and nutrients) (Thia-Eng., 1993).

The quality of the coastal offshore sub-zone in Nevis is being degraded as increasing levels of human activities on the beach and inland sub-zones compromise its quality. For example, sewage runs off into the coastal offshore and increases algal bloom that smothers the coral reefs and promotes health risks and odour problems. Activities within the coastal sub-zone itself such as over-fishing, sand mining, coral harvesting, snorkelling and water sports also contribute to further degradation the coastal offshore sub-zone.

THE SUB-ZONES OF THE SMALL ISLAND ENVIRONMENT

Sub-Zone 1: The Coastal Offshore Zone

The Coastal Offshore Zone is the band of ocean (water and submerged land) adjacent to the coastal land. It constitutes the marine processes that controls water depth, waves, tides, seabed composition, and marine habitats.	
Resources and Uses:	**Problems:**
1. Fishery Resources 2. Tourism and Recreation 3. Navigation 4. Waste Discharge	1. Exploitation and depletion of Fishery Resources 2. Disturbance and destruction of marine habitats by fishing activities and technology, mining, diving, anchoring, dredging, dumping and land reclamation. 3. Pollution 4. Deterioration of coastal water quality.

Sub-Zone 2: The Beach Zone

The Beach Zone is the narrow and dynamic area of the island ecosystem. It represents the zone of transition between the marine land and the ocean. It includes the foreshore to the island with its sandy area serving as protection for systems such as the mangroves, swamps and dunes. Also, the beach regulates the hydraulic regime (storm surges and water levels); regulates wind and wave climate, and provides habitat.	
Resources and Uses:	**Problems:**
1. Sand extraction 2. Recreation 3. Human settlement 4. Land reclamation 5. Port development and related industrial activity	1. Disturbance and destruction of coastal habitats by mining, dredging, settlement, and infrastructure development. 2. Loss of beaches by accelerated coastal erosion. 3. Degradation of natural flood protection 4. Spatial conflicts 5. Deterioration of coastal quality.

Sub-Zone 3: The Coastal Lowland Zone

The Coastal Lowland Zone is the immediate land-water structure that usually serves as a buffer for the terrestrial area. These zones are usually in the form of dunes, bays, mangroves, lagoons and wetlands. These systems function as filters and purifiers. They absorb much toxic materials and convert them into reusable nutrients for the ecosystem.	
Resources and Uses:	**Problems:**
1. Habitats for many species 2. Dumping of wastes and collectors of wastes from industrial and agricultural run-off 3. Land reclamation	1. Disturbance and destruction of species and habitats 2. Destruction of important buffer zones for the island 3. Pollution

Sub-Zone 4: The Inland Zone

The Inland Zone is the land or terrestrial area of the island that is adjacent to the coastal lowland zone. Its physical characteristics are those of topography, soil types, ground water resource structures, surface water resources, land - related habitats, vegetation and larger terrestrial organisms.	
Resources and Uses:	**Problems:**
1. Land resources for industry, housing, agriculture, livelihoods and recreation. 2. Human settlement 3. Infrastructure and developmental activities	1. Habitat and overall land destruction 2. Spatial conflict 3. Degradation of quality of land 4. Ecosystem deterioration.

Table 2: Summary of Sub-Zones In A Small Island Environment (Adapted from NetCoast, 1997)

The beach sub-zone is representative of the transition from the coastal offshore sub-zone to the coastal lowlands sub-zone. It is comprised of both marine and land-geo-physical features (combination of water, sand and vegetation). This zone is highly dynamic and protects the coastal lowlands from damage as a result of intensified natural processes such as wave surges, hurricane winds and high tides. The flat sandy areas break the incoming tides allowing the water to roll onto the sandy areas and back into the coastal offshore. This serves a two-fold purpose. It regulates and controls the amount of water that enters from the coastal offshore sub-zone and it protects the coastal lowlands from flooding with the salted water (Thomas, 1990).

The beach sub-zone is habitat to marine/ land species. For example, sea turtles (the endangered leatherback turtles) various species of crabs and molluses. The beach sub-zone provides various forms of recreational activities for the public and is the most important of the four sub-zones in the tourism industry for many small Caribbean islands (Thomas, 1990). Increasingly, the beach sub-zone is treated as prime developmental land for hotels, harbors and increased human use. The leatherback sea turtle is one example of a beach species that is increasingly affected by this type of beach sub-zone development in the Caribbean. With the construction of infrastructure (airports, roads and large hotel facilities), increased illumination, noise and movement on the beaches during the night that are affecting the reproduction and survival of the species. As well, Eckect and Thomas (1992) have documented that these turtles are subject to persistent over-exploitation by the local population as an exotic food item, especially the adult females nesting on the beach.

In addition, coral reef and sea grass degradation, oil spills, chemical waste, plastic and other marine debris, high density coastal development, and an increase in ocean-based tourism have damaged or eliminated nesting beaches and feeding grounds. Population declines are complicated by the fact that causal factors are not always entirely indigenous. Because sea turtles are among the most migratory of all Caribbean fauna, what appears as a decline in a local population may be a direct consequence of the activities of peoples many hundreds of kilometers distant (Eckect and Thomas, 1992).

The third sub-zone is the coastal lowland sub-zone, which is immediately adjacent to the beach zone (see Figure 4). This sub-zone acts as a buffer for the terrestrial inland sub-zone. This zone usually consists of sand dunes, mangroves, swamps, lagoons, wetlands and estuaries. The coastal lowlands absorb excess water from the beach sub-zone and its plant and animal species serve as filters and purifiers of toxins and nutrients that are released into the coastal offshore sub-zone via the beach zone. This zone however is used as a dumping ground for solid waste, garbage and sewage. It collects chemical runoff from the inland sub-zone. Destruction and degradation of the sub-zone leads to increased flooding of the coastal areas through the loss of mangroves, swamps and wetlands. Erosion and runoff from the inland sub-zone increases the sediment load in the coastal lowlands which in turn interrupts the natural movements of water currents and thereby nutrients in the bays, mangroves and wetlands.

The last sub-zone of the small island is the inland sub-zone. This zone is the land or terrestrial area of the small island or coastal zone. Its physical characteristics are those of soil types, ground water resources, forestry, terrestrial species and various organisms. Activities in the inland sub-zone include those relating to agriculture, infrastructure

development, deforestation, housing settlements and forestry. Alteration of the topographic features of a coastal zone or small island leads to land degradation, erosion and eventually desertification, soil nutrient loss, loss of habitat for various species and organisms that live in its bio-diversity. As discussed earlier, erosion from the inland sub-zone increases sedimentation in the coastal lowlands and alters the natural processes of filtering, purifying the flow of water into the beach and coastal offshore sub-zones (Thia-Eng, 1993).

Understanding the sub-zones of a coastal zone or small island is an important step in the planning process for effective management of a small island or coastal zone. The sub-zones represent important biographic features – uniqueness and specific geological features. The zones together are ecologically important for maintaining ecosystem integrity and ecological processes that are essential for species diversity and survival. At the same time the sub-zones provide economic and social value –historical, cultural, aesthetic, recreational qualities and resource use for commercial purposes.

The next section explores the activities that occur within the sub-zones of the small island of Nevis.

2.3 ACTIVITIES AND PROCESSES WITHIN NEVIS

The activities and processes described below provide some indication of the extent to which small islands may be under threat from the reduction of the quality and quantity of their natural resource bases.

1. **Hurricanes**: Hurricanes have played a significant and detrimental role in the process of coastal erosion in many small islands and especially in the tropics. Hurricanes carry with them high levels of energy, which modify the

beaches and nearshore reefs. Hurricane damage results from the high winds, high waves, storm surges, and heavy rainfall (Cambers, 1996). Many beaches and coastal areas can recover naturally over time. In extreme cases such as with Hurricane Gilbert in 1998 and Hurricane Hugo in 1989, some beach sediment and coastal land can be permanently lost. See photographs 5 and 6.

2. **Sea level Rise**: The effects of sea level rise on small island decreases the size of the land area available on the small island. That is, shorelines move landward in response to this natural activity. The immediate coastal areas of small islands are the most heavily populated areas, the primary focus of tourism activities, and home to many urban centers. It is estimated that in the Eastern Caribbean small islands, at least 45 per cent of the population live within three kilometers of the coast (Nurse, 1993).
3. **Deforestation**: Many small islands have suffered from deforestation—removal of much of their coastal flora; clearing of coastal trees and vegetation for housing, infrastructures (roads, airports, harbors); and agriculture. The unique combination of vegetation is critical in stabilizing the soils on the sand terrace of the beach zone. Deforestation makes beaches more susceptible to coastal recession and scouring (swift erosion) (Nurse, 1993 and Cambers, 1997). Coastal dunes are also protected by vegetation. Dunes are important for beach sedimentation for reducing the amount of wave energy that reaches the sand terrace. Another vital feature that promotes shoreline stability is the mangrove. Mangroves trap sediments and

serve as filter and reservoirs for landward run-off. When the mangroves are removed, high concentrations of nutrients are released into the immediate shorelines and coral reefs. This release of nutrients cause increased growth of algae and decreases the oxygen levels in the run-off waters and coastal streams. This in turn disrupts the filtering of toxins and allows them to be released into the oceans. Corral reefs also play a vital role in beach and coastal stability (Towle, 1991).

4. **Water Quality Deterioration**: Water quality deteriorates due to the discharge of untreated domestic and industrial effluent, run-off containing agricultural chemicals, pesticides and eroded soils (Nurse, 1993). This problem results in not only degradation of the natural environment of the small island but also poses a health problem for the people.
5. **Beach Sand Mining**: Beach mining is commonly practiced for the purposes of tourism and construction in many small islands. The effects of beach mining leads to significant changes in beach morphology and slope and the capacity of the small island system to adjust to seasonal wave climate (Nurse, 1990 and NHCS, 2000). Continued sand deficiency diminishes the role of the beach as an effective buffer to wave energy and increases susceptibility to the impacts of hurricanes and sea-level rise.
6. **Construction on Sensitive Beach Areas**: Construction within the active beach zone increases the incidence of localized land erosion of the small island. Construction of facilities such as airports, hotels, roads, and harbors

reduces the surface area for wave energy absorption and increases the intensity of wave scouring and property damage (Cambers, 1997).

7. **Tourism:** Tourism is often identified as a promising growth sector in small Caribbean islands as it offers one of the few opportunities for economic diversification in the smaller islands and has many links – directly and indirectly to other economic sectors – such as agriculture, fishing, industry and services and transportation (Cambers, 1997). The objectives of the promotion of tourism in small Caribbean islands are to accelerate growth of national incomes; to create gainful employment; to extract foreign exchange earnings; and to increase government tax revenues. Predominant tourist attractions in small Caribbean islands are climate and beaches. As a prerequisite for developing tourism as a major industry, a substantial amount of investment is needed in infrastructure, particularly in airport facilities, roads, sewage, waste management, water supplies, other utilities, and telecommunications (Towle, 1991).

If tourism and other human induced activities are left unmanaged, it can cause extensive deterioration of the small island environment. The next section discusses Nevis' tourism industry and the impact it has on the small island environment.

Photograph 5: Four Season's Hotel At Pinney's Beach, August 1995 (Cambers, 1996)

Photograph 6: Changes at Pinney's Beach, Four Season's Resort (same view) One Month After Hurricane Luis In October 1995 (Cambers, 1996)

2.4 NEVIS AND ITS TOURISM INDUSTRY

The natural conditions of scarcity that exist within small islands make these environments liable to overexploitation, leading to degradation or complete destruction of the resource (McEachern and Towle, 1974). At the same time, policy makers tend to seek to facilitate economic development by maximizing the benefits to be gained from a small island's natural resources. A good example of such an initiative is the growth and development of the tourism industry in many small Caribbean islands (Ballantyne, 1995). The United Nations Environment Programme (1996) identifies tourism as "...a promising growth sector in small island developing states. It offers one of the few opportunities for economic diversification in very small islands". Tourism is linked with many economic sectors- agriculture, fishing and services. Tourism is an important element of socio-economic and political development in many countries.

Tourism can have an important role in the development process of a small island's domestic economies in the areas of local foods and materials, crafts and culture, music and way of life. If the development process is planned carefully, including hotel construction, importation of goods and foods, preservation of culture and heritage protection of the island's environment, the tourism industry can be very positive for a small island (Hirvonen and Cote, 1986). However, the corporate hotel interests (such as the Four Seasons Resort, Sandals and Club Med, that are found on many small islands), international airlines, cruise ship lines, travel agents, and banks, all use their economic opportunities in such environments as opportunities for their own growth (Strauss, 1989). Tourism growth at an uncontrolled rate and capacity also brings with it new pressures of

the more developed countries—machinery, mass transport and communications (McEachern, 1974).

Management strategies in the small Caribbean islands are partly attributable to the following factors (United Nations, 2000):

1. The tourism industry in Nevis has replaced its agricultural and fishing industries (agricultural and fishing activities are now practised for local consumption or pleasure).
2. The beach and coastal sub-zones are major attractions for visitors and locals. Visible destruction, pollution and deterioration of these areas are the result.
3. Hotel construction and associated recreational facilities are large-scale and, not only occupy larger landmasses but they place increasing demands on the quantity of resources used.
4. Increased recreational activity on the beach, coastal and lowlands sub-zones lead to disturbance of habitat, interference of species life cycles and destruction of their habitat.

As early as 1992, environmental planners such as Towle and Cambers (1992) identified the tourism industry in Nevis, as capable of having the largest impact on the natural environment of Nevis. This has been confirmed by both personal observation and the United Nations which found in 2000 that, large areas of coastal land (that includes beach zones and coastal lowlands) are used for hotel construction, golf courses, tennis courts, spas etc. The natural vegetation and physical landscape is altered to create a more appealing and sophisticated site; infrastructure expansion and development

along the coastline is also altering the natural beach zone that protects the coastal lowlands (United Nations, 2000).

The expertise to manage and monitor developmental problems, human activity, and infrastructure does not exist in any operational or authoritative body on the island (Ackland, 1997). For example, Nevis relies on ground water for its source of portable water. There is a need for Nevis to develop an integrated coastal zone management plan to manage its coastal resources and to prevent further degradation to its environment.

2.5 MANAGING SMALL ISLAND ENVIRONMENTS

Environmental management according to Ballantyne (1995) involves the exploration of cross-sectoral and multi-disciplinary linkages, adoption of a long-term strategic perspective, participation in decision-making that includes various organizations, communities and institutions and the need for full co-operation and support on all environmental issues. Ballantyne (1995) uses the Caribbean island of Trinidad and Tobago as an example to illustrate how the responsibility for the environment in Trinidad and Tobago has been shuttled between several ministries over the years. This led to a situation where the environment was not managed in a coherent and co-ordinated manner. In response to some of these problems, the government established an Environmental Management Authority (EMA) to be responsible for the overall environmental co-ordination. One of the priorities for the new agency was to develop a national information system to link and integrate the many national institutions that have demonstrated environmental interests.

Leonard Nurse, Coastal Geomorphologist and Director of the Barbados Coastal Zone Management Unit (1993) identifies coastal problems in small islands as "those

problems always rooted in resource use conflicts". Nevis for example, is experiencing growth in its tourism industry – which is highly dependent on its natural resources. As a result, processes of erosion and accretion are occurring at different points of the coast (Cambers, 1996). Like all other small Caribbean islands, Nevis faces substantial environmental challenges with limited managerial and technical resources to meet them. Hence, the national environmental priorities need to be carefully determined and maximized, including those that can be obtained through foreign aid.

The National Environmental Action Plan (NEAP, 1987) of St, Kitts and Nevis analyzed the environmental issues affecting Nevis and set forth a long-term strategy for maintaining Nevis's natural environment, the health and safety of its population, and its cultural heritage as economic development occurs. In proposing practical measures to remedy Nevis' environmental problems the objective of NEAP (1987) was to develop "a long term national environmental policy and investment strategy based on comprehensive environmental analysis". At the United Nations Convention to Combat Desertification, (2000), St. Kitts/Nevis Government indicated that its government is planning to prepare a management plan that will incorporate appropriate economic policies, incentives and controls providing for resource-based services such as: water supply, waste disposal, sand mining violations, effluent discharge and deforestation.

To date, an ICZM process for Nevis has not been developed. In looking for a useful ICZM example applicable to Nevis, it was essential to find an island with an ICZM plan; that shared similar environmental problems, geophysical (topographic) features, economic development trends and coastal zone problems. Some Caribbean islands have developed coastal zone management plans that address the issues of

tourism and resource management on the islands - such as education, conservation, hotel construction and beach protection The Caribbean island of Barbados was selected as a comparative island for this research. The activities involved in developing the Barbados Coastal Zone Management Plan and its components will be examined in the following chapter.

CHAPTER THREE: BARBADOS COASTAL MANAGEMENT PLAN: ITS RELEVANCE TO NEVIS

Coastal Zone Management Planning is largely synonymous with resource planning and management (Cambers, 1992). The four coastal sub-zones –the offshore, lowlands, beach and coastal offshore are ecologically connected because of the interaction with each other and the functions that take place within these boundaries. Thus when man-made activity is added to the ecological complexity of these four sub-zones, the need for an effective coastal zone management plan becomes increasingly apparent.

This chapter outlines the integrated coastal zone management components that were used by Barbados in developing its Coastal Zone Management Plan. The intention of this chapter is to extract the best management components of the Barbados Coastal Zone Management Plan as they apply to Nevis. The reason for selecting Barbados as an example for integrated coastal zone management is discussed in the next section.

3.1 USING BARBADOS ICZM AS AN EXAMPLE FOR THIS RESEARCH

Barbados is the most easterly of the islands located in the Caribbean Basin. Like Nevis, Barbados is generally flat along the coast and hilly in the interior. Barbados has no natural deep-water harbour and is largely surrounded by coral reefs. Since the late 1960's, the government has shifted its efforts from sugar production to tourism. An environmental synopsis of Barbados in the early 1980's indicated that soil erosion was one of the major environmental problems confronting Barbados, followed by coastal erosion, solid waste disposal, inadequate management and marine pollution. Domestic

pollution from septic tanks and pits was also reaching the coastal zone via leaching and direct discharge.

Coral reefs on the West Coast of Barbados deteriorated as a direct consequence of pollution from intense hotel and residential development (UNCED, 2000). For example, seagrass beds are located in patches up to about 50 M offshore in very shallow water; however, because of pollution, the seagrass beds were not healthy and consequently were unable to trap sediments. Barbados was also once abundant with mangrove swamps. These swamps have now disappeared and given way to coastal development – hotels, roads, and infrastructure (UNESCO, 2000). There are two reef systems that surround the island: the inner reefs (near the shoreline) and barrier reefs (in deeper waters) (UNCED, 2000).

Barbados has been using an ICZM approach since 1983 and this has facilitated the choice of using Barbados as an example for this research. The sections that follow elaborate on the process and components of the Barbados Coastal Zone Management Plan and the institutional frameworks that underlie and influence the environmental decisions. Barbados was the first Caribbean island to develop an ICZM plan. In 1983 a Coastal Zone Management Unit, (CZMU) was established as a specialized governmental unit that was specifically concerned with issues relating to coastal erosion and the application of management strategies for dealing with this threat.

The major functions of the unit at that time were coastal monitoring (beaches, coral reefs, waves, water quality, tides); coastal development control (together with town planning); design, construction and evaluation of sea defense works; environmental education and awareness and surveillance (Atherly, Smith, and Nurse, 1993).

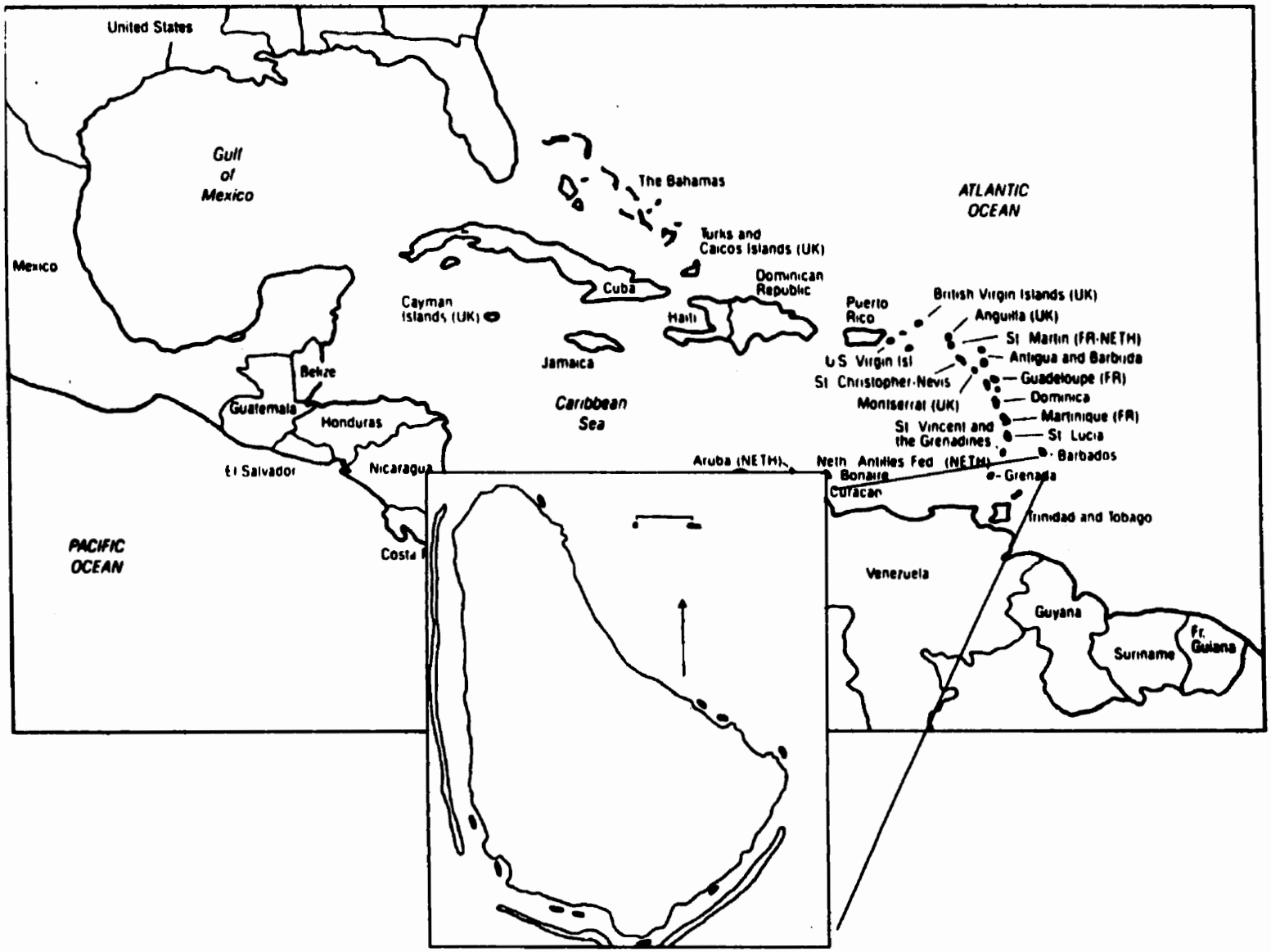

Figure 5: Map Showing Location Of Barbados In The Caribbean. (Source: CEP, 1997)

The long term objective of the Unit was to design and implement an effective, comprehensive coastal zone management plan for the island and to ensure that the coast retained its vital role in economic, social and physical development of Barbados (Cambers, 1992). In 1984, the Government of Barbados completed a pre-feasibility study. This study, funded by the Inter-American Development Bank was the first major project work executed by the Unit and was designed to determine and assess the causes of coastal erosion in Barbados and to make recommendations on remedial strategies. The overall objective of the study was also to provide a clearer understanding of the forces that governed beach and coastline erosion. Specific study objectives of Phase I included:

- Surveying the nature and possible causes of the problems of erosion/accretion along the Barbados coastline.
- Examining the alternatives for protecting the south and western coastline from technical and economic viewpoints.
- Identifying costs/benefits of alternative solutions.
- Developing terms of reference for a feasibility study regarding institutional changes.
- Strengthening the roles and institutional capabilities of the Ministries of housing and lands to manage the coastline and beaches more efficiently.

In 1991-1995, the Unit launched another feasibility and pre-investment Coastal Conservation Study as part of its ICZM plan. The major components of the project were to research and define strategies for the preparation of an integrated coastal management plan for the Atlantic coast of Barbados and design a pre-feasibility assessment of an investment program for Phase II. This pre-feasibility project consisted

of several pilot projects – oceanographic, biological and coastal land use studies for establishing long term coastal management programs; water quality pilot projects, beach enhancement and monitoring programs. At the end of Phase II it was concluded that the south and western coastline of Barbados had been steadily deteriorating. This deterioration had serious implications for the fisheries industry, the marine ecosystem health, and coral reefs and seagrass beds. Based on the results of the study, the Coastal Zone Management Unit introduced a Marine Pollution Bill that provided for the prevention, reduction and control of pollution of the Marine Environment (UNCSD, 1999). While the focus is on the coastal and marine zone, the Bill recognizes that significant amounts of marine pollution originate from land based resources.

Following the Marine Pollution Bill, a Coastal Zone Management Bill (Bill) was introduced. This Bill provided a comprehensive statutory basis for Coastal Zone management and planning in Barbados. It sought to co-ordinate and update the existing, fragmented statutes relevant to coastal management and made provisions for critical areas of concern not covered by current legislation (UNCSD, 1999). The Bill serves as the foundation for the preparation of an integrated coastal zone management plan that sets out the Government of Barbados' coastal management policy and technical guidelines for the use and allocation of coastal resources. As a result of the studies, pilot projects and bills introduced, two areas in Barbados have been designated as marine protected areas (Carlisle Bay and Rockley Breakwater).

Today the Unit is responsible for: advising the Barbados government on environmental and energy policy; developing programs to implement policy; and developing and delivering public environmental education. The unit also acts as a focal

point for regional and international agencies and is responsible for facilitating partnerships with the various sectors and co-ordinating coastal management activities with the public (Atherly, 1993). The Unit is presently involved in a project aimed at developing a Coastal Zone Management Plan for the East Coast of the island – following that developed for the West and Southern coast between 1991-1995 (IDB America, 1999). The next section examines the components of the Barbados Coastal Zone Management Plan.

3.2 THE COMPONENTS OF THE BARBADOS COASTAL ZONE MANAGEMENT PLAN

In order to encourage integrated coastal zone management in Barbados, the Unit has implemented a series of projects, studies and programs particularly around the west and south coast of the island. The Unit has completed extensive research and monitoring programs designed at ensuring integrated coastal zone management. Some examples of Barbados ICZM activities are:

- Beach profiling for over 100 sites
- Wave climate analysis
- Tide level monitoring
- Water quality assessments
- Fringing and bank reef surveys
- Longshore sediment movement
- Geographic Information Unit (GIS) data collection

Using the information from the studies above, the staff at the Unit applied the research towards developing and implementing coastal zone projects. Some examples are:

- Developing coastal legislation
- Lagoon monitoring and improvement
- Beach access
- Ocean data management
- Revegetation and dune management
- Artificial seaweed as means of erosion control

The Unit works in consultation with several agencies and government departments to make decisions with respect to integrated coastal zone management. Table 2 below categorizes and lists the Government agencies and departments involved in the decision-making process for coastal zone management issues.

(1) Sustainable Development Issues and Coastal Zone Management	(2) Marine Environmental Protection	(3) Conservation of Marine Resources
• Coastal Zone Management Unit • Town and Country Planning Department • Ministry of Finance and Economic Affairs • Fisheries Department • Coast Guard • Environmental Division • Environmental Engineering Division • Government Laboratory • National Conservation Commission • Community Representatives	• Coastal Zone management Unit • Coast Guard • Environmental Engineering Division • Chief Parliament Counsel • National Conservation Commission • Ministry of Transport – Harbour • Port Authority • Community Representatives	• Coastal Zone Management Unit • Ministry of Foreign Affairs • Fisheries Division • National Conservation Commission • Marine Division • Environmental Division • Community Representatives

Table 3: Parties Responsible For Integrated Decision-Making On Coastal Zone Management Issues (Source: UNEP, 1996)

There are 9 organizations that are involved in the review and decision-making process for sustainable development issues and coastal zone management. These parties also interact and receive input from the 7 parties responsible for providing input into the Marine Environment Protection issues and the 6 parties that participate in the committee responsible for the Conservation of Marine Resources. It should be noted that each sub-committee or category has representation from the community. The participating members of these three groups bring to the table their own experiences, skills and expertise from their respective disciplines and professions. The input from the review and decision making process are derived through presentations of different perspectives and discussions of the issues as they affect various users and regulatory bodies. For each category, the Unit serves as the Chair of the sessions.

This is another important aspect of the integrated approach used by Barbados. This ensures that there is consistency in the process, greater transparency of sharing, and co-operation in working towards a common goal. The Unit uses its role to facilitate the development of solutions in the form of studies, pilot projects, research and methodology; avoid duplication of such activities by other agencies thereby increasing the opportunities for program delivery and efficiency. Several other local groups are involved in delivering education and programs. They include:

- The "adopt-your-beach" organization (non-profit) utilizes various companies and groups (Junior Chamber of Commerce, Church groups etc.) to aid in beach clean-ups and awareness campaigns.
- An International Year of the Ocean committee has been established to implement various activities to highlight the Ocean.

- Public meetings with community groups and citizens are held regularly.
- Fishermen's groups, seagrass farmers and harvesters etc. are consulted for their traditional knowledge of the marine environment etc.
- Non Governmental Organizations (NGO's)
- The Press/Media
- Youth and Student groups (from churches and schools)
- Divers' Association - PADI (Professional Association of Drivers Incorporated)

Table 3 summarizes the action taken by the Unit via its Coastal Conservation Programme (CCP) to address the issues affecting the sub-zones of the Barbados coastal zone. The action taken was in the form of studies, surveys, data acquisition and assessments. The activities employed by the CCP demonstrated that issues arising from public use access required monitoring and control, enforcement, penalties and change of legislation. Pilot projects were also designed around eco-tourism and beach zoning.

The Barbados Coastal Zone Management Plan is now in its 17th year (1984 – present). During this period there was a movement from the feasibility studies and data collection toward the consolidation and establishment of a routine work program via the technical agency known as the Coastal Conservation Project Unit of Barbados. The Barbados's ICZM approach involved a combination of trained and experienced coastal engineers, technical managers and planners, biologists, fisheries experts, land use planning managers, tourism experts, environmental impact assessment officers and GIS analysts in the development of the guidelines, impact assessments, pilot programs and analysis of the information collected.

THE BARBADOS COASTAL ZONE ISSUES ADDRESSED BY ITS ICZMP

THE SUB-ZONES: ISSUES/IMPACTS	ACTION TAKEN	MAIN TASKS FOR PILOT PROJECTS
THE COASTAL OFFSHORE SUB-ZONE: • Wind, wave, current, tide, sediment impacts • Shoreline impact • Wave climate and processes • Coastal water circulation • Cost-recovery analysis	• Data acquisition and analysis • Feasibility studies • Land use studies • Shore-zone mapping in collaboration with land use activities. • EIA	1. Public rights and access to coastal offshore use (regulations, seasonal use, penalties, surveying) 2. Marine management projects. 3. Coastal engineering projects 4. GIS feasibility
THE BEACH SUB-ZONE: • Wave activity on beach zone • Beach/Coast processes • Beach development • Beach rock/sand removal • Breakwaters • Beach nourishment • Beach habitats • Beach uses • Beach pollution	• Beach –zone mapping and surveying • Education • Analysis and modelling • Control options for storm water, pesticides, sewage and waste run-off. • Habitat and nesting monitoring • Vegetation and organism identification	1. Tourism and recreation impact study 2. Beach use issues – zoning, open access, public participation programmes, beach nourishment programmes and monitoring 3. Data acquisition – mapping
THE COASTAL LOWLANDS SUB-ZONE: • Infrastructure • Agriculture management • Sewage collection • Land degradation • Soil erosion • Tourism and recreation • Land use issues: zoning, boundaries • Population growth and housing • Land resources services	• Surveying and assessing damage to resource base • Education awareness • Monitoring • Measuring depletion, degradation, and pollution • Revamping management practices and actions • Vegetation identification • Monitoring and regulation • Training	1. Identify & design eco-tourism products and projects. 2. Consult with other islands 3. Modify existing development plans 4. Public information dissemination and participation 5. Environmental Impact Assessment.
THE INLAND SUB-ZONE: • Infrastructure • Agriculture • Population growth and housing • Tourism • Recreational activities • Forest – use and degradation • Resource – use and depletion • Wells and ground water • Habitat management	• Spatial assessment and analysis • Habitat monitoring and surveying • Species data collection and monitoring (behavioural, diet and habitat changes) • Human activities impact studies • Public information and education	1. Ecosystem data analysis and mapping 2. Institutional mechanisms 3. Water quality monitoring 4. Development legislation 5. Penalties 6. Tourism control initiatives 7. Inter-institutional co-operation and co-ordination 8. Pollution control

Table 4: Summary Of The Barbados Coastal Conservation Programme Pilot Projects Addressing The Issues Affecting The Barbados Coastal Zone (Adapted from: Atherly, Smith and Nurse, 1993)

Table 3 separates the issues into the sub-zones, which facilitates the comparison to Nevis and provide some ideas of potential coastal zone management projects and action that can be applied to Nevis. One objective of this research, is to determine the best management components of the Barbados Integrated Coastal Zone Management Plan that can be applied to Nevis. This chapter suggests that Nevis can adapt the successful components of the Barbados Integrated Coastal Zone Management Plan to its own needs for developing an ICZM process.

These two islands display similar coastal zone degradation and deterioration issues and it is anticipated that some of the pilot projects and programs from Barbados can be applied to Nevis. However, in order to determine the applicability of the successes and best components of the Barbados ICZM Plan, the current programs and existing legislation within Nevis need to be examined. The next section summarizes the programs, activities and mechanisms that are currently in place to manage Nevis' environment and coastal zone.

3.3 ANALYZING EXISTING LEGISLATION AND CURRENT PROGRAMS IN NEVIS

Although environmental action and awareness began in Nevis in the 1940's with legislation that was regulatory in nature, true development only began emerging in the late 1980's. As a result, much development has taken place without environmental standards or mandatory rules in place. Environmental legislation in Nevis was enacted in the 1940s but was regulatory in nature. Table 5 below provides some examples of the types of legislation passed in the 1900s for specific resources and planning and development in Nevis. For example, the Beach Control Ordinance (1961) provides

authority to control sand mining and construction on the foreshore (beach zone). Use or encroachment of the beach zone or floor of the sea is prohibited, except with the permission of the Minister of Agriculture, Lands, Housing and Development (Towle, 1991).

TABLE 4: PRIMARY RESOURCE MANAGEMENT LEGISLATION IN NEVIS

RESOURCE	LEGISLATION
1. Planning and development	Town and Country Ordinance, 1949 Land Development Ordinance, 1966
2. Agriculture	National Agricultural Corporation Act, 1975
3. Forestry	Forestry (Nevis) Regulations, 1940
4. Water	Watercourses and Waterworks Act, 1956 Watercourse and Waterworks Regulation, 1973
5. Tourism	-
6. Beaches	Beach Control Ordinance, 1961
7. Protected Areas	Public Parks Regulation Ordinance, 1945 Fisheries Act 1984 National Conservation and Environment Protection Act, 1987
8. Wildlife	Wild Birds Protection Ordinance, 1913 Fisheries Regulation, 1986
9. Waste Management	Public Health Act, 1969 Public Health and Disposal of Refuse, 1978 Litter (abatement) Act, 1989

Table 5: Primary Resource Management Legislation In Nevis (Towle, 1991)

Today, the legal basis for resource management in Nevis is provided for by the National Conservation and Environment Protection Act (NCEPA), 1987. It is the only

existing legislation that calls for conservation and protection of the environment. This document provides for:

- The establishment of protected areas and parks;
- The preparation and implementation of a coastal zone management plan to regulate development activities in the coastal area;
- The prohibition of unauthorized sand mining and removal of beach vegetation;
- The prohibition of waste disposal within the coastal zone;
- The protection of forest resources and wild animals and birds including flora and fauna;
- The promotion of conservation in the federation as part of a long-term development plan (Towle, 1991);
- The establishment of an Advisory Conservation Commission;
- The public right to access and recreational use of all beaches;
- The prohibition of waste disposal within the coastal zone;
- The establishment of soil conservation regulations;
- The protection of forests;
- The protection of wild animals and birds; and
- The unauthorized search and recovery of antiquities (Towle, 1991).

Under the provisions of the NCEPA Act, the Advisory Conservation Commission is mandated to carry out the Ministry's functions of selection, management including the preparation of management plans and administration of protected areas. The commission currently consist of eight members: the Chairman, Deputy Chairman, three other representatives appointed by the Minister, and the six remaining members

are drawn from the Nevis Island Administration, Brimstone Hill Fortress National Park Society, and the Nevis Historical Conservation Society.

In addition to the Advisory Conservation Commission, NCEPA also states that the Minister of Agriculture, Lands, Housing and Development, through consultation with the Advisory Conservation Commission, is responsible for the preparation and implementation of a coastal zone management plan to regulate development. The Minister may also declare certain areas to be protected beaches, where activities such as fishing, the use of boats, certain sports, mining or removing of treasures or artifacts from the seabed are prohibited (NCEPA, 1987). Also the function of the Advisory Conservation Commission has not been strengthened or established as a lead agency for environmental and integrated coastal zone management.

NCEPA (1987) created an awareness of the vulnerability and value of the nation's cultural and natural amenities and initiated some changes in Nevis. This resulted in three positive developments that called for protection and management of cultural resources, local support of the coastal management and cultural preservation goals and local initiatives that can make a difference. Some activities included:

1. Enactment of legislation providing a rational framework for protecting and managing cultural resources.
2. The formation of private sector organizations with broad preservation goals: The Nevis Historical and Conservation Society established in 1980.
3. Preservation and Conservation initiatives for Nevis's resources undertaken by the Government.

The Nevis Historical Conservation Society (NHCS) is the principal Non Governmental Organization (NGO) in Nevis that is concerned with the environmental issues The NHCS aims at promoting the protection and preservation of the ecology and natural life forms on the island. Over the years, the NHCS externally funded studies and reports that focused specifically on environmental issues in Nevis. Some examples include coastal erosion, fisheries management, land development and zoning, and agricultural diversification. The NHCS is an example of an organization that already works with and delivers environmental programs with many Nevisian businesses, members of society, high school students, hotels, government officials and international experts.

The NHCS is involved in many environmental education programs and projects that encourage awareness and positive change on the island. Some examples of on-going projects are:

- Monthly ECO Newsletters: Aimed at children in grades 4-6. This newsletter explores environmental issues and includes activities and environmental tips to encourage children to work on solutions to the environmental problems.
- Teachers Kits: Kits that focused on one theme and contain background information for the educator and all supplementary materials to enable teachers to conduct interesting and participatory lessons.
- Environment Week: The Event is held annually and includes displays, environmental contests, and other activities whereby the public can become involved.

- Coastal Clean up: An annual event held in participation with the Centre for Marine Conservation. In 1999, 216 people were involved in the event. It was estimated that 8.2 miles of Nevis coastline was covered and a total of 3, 328 pounds of garbage was removed.
- An active environmental committee that meets regularly to publish articles, and produce radio segments on environmental issues.
- Environmental Hall of Fame Awards event: Various members of society that initiate clean-up and environmentally related activities are awarded for their efforts. For example, teachers leading a workshop on recycling to address the solid waste problem in Nevis; volunteers who actively patrol the beaches for poachers and garbage patrol; and tourism and heritage protection participation etc.
- Biodiversity and Field Studies workshops and projects that focus on improving the understanding of island species, conservation of resources, developmental impacts on natural resources and marine and coastal zone management.

The above examples (NHCS, 2000), illustrate that the NHCS is striving towards providing public education and involving the coastal communities in its environmental projects and programs. Its education programs are being used as important tools to communicate resource and environmental management on many levels, from children to local communities, fishermen, government officials, and visitors alike. The enforcement of legislation and regulatory mechanisms will be easier with the support of the local communities and resource users.

While the NHCS has encouraged environmental awareness and has involved various members of the community in its activities, there is other government initiatives that are currently in the planning stages that relate specifically to the use, protection and conservation of Nevis' resources. These include:

1. **Coastal Marine Resources:**
    - Development of legislation in Nevis is currently being reviewed in context of integrated coastal zone management.
    - Introduction of Environmental Impact Assessments as a decision making tool.
    - Development of educational awareness programs promoting the sustainable use of coastal resources.
2. **Land Resources:**
    - Implementation of policies to encourage the use of soil conservation methods and to regulate the cutting of trees.
    - Review of national physical planning legislation that includes increased awareness and strengthening of the planning offices through training.
3. **Biodiversity:**
    - Development of legislation to conserve biodiversity in terrestrial and marine areas.
    - Development of strategies for conservation and sustainable use of these resources (UNESCO, 2000).

The existing environmental legislation in Nevis, NCEPA (1987) does not sufficiently address the issues of coastal zone management in Nevis. It also does not

offer adequate monitoring and enforcement measures from which conservation and protection results can be achieved. Because there is no integrated management approach for Nevis, the government has been unable to demonstrate more than a sectoral based management approach whereby specific programs and activities are developed to address one resource area. For example, there are no programs implemented in Nevis that link and monitor land use resources and water quality or waste management (sewage, pollution and run-off), coral reef ecosystem health and development along the coastline of Nevis. This type of integrated management approach is lacking in Nevis. There is the need to revamp the NCEPA (1987) Act and to develop an Integrated Coastal Zone Management Plan for Nevis.

The key to developing an ICZM plan for Nevis will be to use what already exists and build upon such initiatives. For example, the Advisory Conservation Commission has already been established under NCEPA (1987). Its function can be strengthened and the Commission can take on a more proactive role in the ICZM process. The NHCS can continue to provide environmental awareness and increase public and community support for such initiatives. In addition, the information collected and conclusions of the programs and projects already implemented by Cambers (1992), Caribbean Environment Program (1997), Inter-American Development Bank (1999) and the Island Resource Foundation (1991) can be developed into a second and third phases.

Nevis can learn from the Barbados ICZM Plan example and can also incorporate some of its management components where applicable. The Barbados example includes the activities that were implemented and used to develop an integrated coastal zone

management plan. It identified issues, established committees, developed and implemented pilot projects (with all members of society and government participating in the process) and built the ICZM framework on what had already been done in Barbados. The next section examines the best management components of the Barbados Integrated Coastal Zone Management Plan that can be applied to Nevis.

3.4 APPLYING BEST COMPONENTS FROM THE BARBADOS ICZM PLAN TO NEVIS

The goal of ICZM is to manage the coastal zone effectively to ensure that environmental, economic and developmental concerns are balanced (Thia -Eng., 1993). The Barbados Coastal Zone Management Plan (BCZMP) developed a large number of projects and activities that can be adapted for a variety of smaller Caribbean Islands such as Nevis. The BCZMP has four main functions:

1. Environmental planning and permit regulation;
2. Monitoring of coastal systems;
3. Environmental awareness and education programs; and,
4. Legislation and enforcement (control and regulatory purposes).

It is important to recognize that not all the components of the plan are applicable to small islands since every island differs in size, culture, history, economy, population size and land use practices etc. However, small islands like Nevis can draw from the experiences and successes of the BCZMP.

Best components and successes that can be applied to Nevis are:

1. **Environmental Awareness:**

- Management strategies that involve public participation in the decision-making process of development and management initiatives e.g. community beach clean ups.
- Newsletters distributed to various NGO's throughout the Caribbean.
- Involvement of youth in projects and community groups - volunteers

2. **Initiating pre-feasibility studies, pilot projects:**
   - Data collection and analysis.
   - Research conducted along the coastlines, beaches and coral reefs particularly on the more densely populated areas.
3. **Monitoring programs for coastal and marine resources:**
   - Sand dune re-vegetation and monitoring.
   - In-land re-vegetation and regeneration
   - Sea grass bed (offshore zone) revegetation.
4. **Strengthening institutional arrangements and administrative capacity:**
   - Employee training and introducing the use of decision-making tools (EIA) to minimize coastal development.
   - National policy planning that includes environment and economic policy.
   - Establishment of an Environmental Unit or body that consists of representatives from the government, NGO community, public communities and various technical and engineering members. Investing in human resource development ideas by infusing education curricula at secondary and tertiary levels of education but not only at the primary level.

- The Coastal Zone Management Unit was the lead co-ordinating body in the ICZM process. In Barbados the Unit was given legal authority to make planning and development decisions regarding the coastal zone as should be the case with Nevis.
- The Unit was also the facilitator for the process of developing various bodies of coastal zone legislation and Bills including the Integrated Coastal Zone Management Act.

5. **Community participation and inclusion in the decision making process:**
   - The ICZM plan process included all groups, organizations, and agencies that represented various groups and stakeholders.
   - Community participation ensured support for programs when designed and implemented and also resulted in a more environmentally educated population.
   - Local resource users were also included in the decision-making process and development of pilot projects such as the sea grass growers and farmers, the fishing industry, sea moss cultivators and sea urchin gathers. This created a forum for exchange of ideas, open discussions and redraft solutions in accepting a solution for livelihoods versus resource conservation. These groups were also very instrumental in providing traditional knowledge on the importance and use of the resources, harvesting methods employed and recent observations of the status and health of the resources.
6. **Encouraging Government Departments to work co-operatively:**

- The collaborative efforts of the various government departments discouraged sectoral management within their specific jurisdiction. This enabled government officials to think, plan and make decisions in a more integrated manner ("thinking outside the box").
- Co-operation amongst the government departments led to a more effective and efficient means of utilizing financial resources and delivering programs and projects in a more efficient manner (sharing of responsibilities and resources leading to economies of scale).
- Government participation in the local meetings and sub-committees provided opportunities for the local community members to discuss their concerns with the "politicians" and created a more transparent process. This interaction also developed a relationship of trust between the government and the local population.

The underlying elements of the management process for Nevis can be summarized as follows:

1. Improving the understanding of the Coastal Zone of Nevis – understanding how the natural environment and human activities are interconnected to form a system.
2. Determining the tools, techniques and mechanisms that will be used to practice coastal zone management and how these goals will be achieved in both the short term and long term.
3. Determining the role of the civilian society and the society's contribution, role and responsibility in the ICZM process.

4. Prioritizing and analyzing the best approach, options and alternatives that can be used for achieving Integrated Coastal Zone Management in Nevis.
5. Empowerment of the stakeholders involved in the process so that the group is a legally binding decision-making body.
6. Overcoming challenges and constraints of the Integrated Coastal Zone Management Plan.

Implementing the activities of an integrated coastal zone management plan requires many years of data collection, ongoing monitoring, alteration of activities and methods to meet changing conditions and needs, co-operation among many stakeholders, flexibility to adapt, public participation, and financial stability. Chapter 4 will develop and will discuss activities that can be initiated by the Government of Nevis towards the development of an integrated coastal zone management plan.

CHAPTER FOUR: AN INTEGRATED COASTAL ZONE MANAGEMENT PROCESS FOR NEVIS

Integrated Coastal Zone Management encompasses the concepts of integrated coastal zone management (ICZM) and sustainable development (Cicin-Sain, 1993). It requires balancing a wide range of ecological, cultural, governance and economic considerations. For example, successful tourism development in Nevis will require a mix of hotels and shops, suitable infrastructures, an accessible and relatively unspoiled natural environment, water sanitation, waste disposal, ports, and roads all inextricably linked and managed under one plan of action. The purpose of this section is to examine the elements involved in the development of an ICZM process for Nevis including challenges and constraints.

ICZM is seen as a process required only for technical experts and professionals, however the successful development of an ICZM process is dependent on strong leadership, good management and co-ordination of stakeholders, participants and activities and community involvement throughout the entire process (Cicin-Sain, 1993). The overall ICZM process is continuous and can be very comprehensive; financially consuming and may cumulatively take many years to be fully implemented. Nevis will need to consider the level of planning and detail that is required and components, issues and activities that need to be addressed in the first few years of the development of the ICZM process.

4.1 DEVELOPING AN INTEGRATED COASTAL ZONE MANAGEMENT PROCESS FOR NEVIS

The process of ICZM involves restructuring present organizations and the way they work with each other, develop programs and share information. As well, it

recognizes the challenges and constraints faced in the development process. An ICZM process is designed for use by the general public, local governments, schools, consultants, international and regional planners and managers, academics and community groups. It is therefore essential that these members be included at the very early stages of the process to ensure successful development of the long-term ICZM plan itself and its associated programs (Cambers, 1991). The process is presented as a sequence of consecutive steps or in some instances, steps that are to occur concurrently to each other. Each step is important in itself, but of more significance, the information, ideas and discussions derived at each stage need to be documented.

Nevis' ICZM process requires the following:

1. A series of public hearings, workshops and meetings to determine and publicize the need for ICZM on the island, clarification of the issues that surround the ICZM process –what it is whom it involves and why it is needed. This includes a process of determining the stakeholders, their role and the level of participation required from each.
    - ICZM links the responsibilities of local government, general public and groups with the communities (women's groups, church groups, youth groups, school clubs, the Leo and Lions club, the Junior Chamber of Commerce etc.), local industries (fishing, agriculture, businesses and tourism etc.).
    - Each member of society within Nevis, regardless of status in the community, profession or age, is responsible for weighing their interests in the environment and the costs and benefits derived from it. Public meetings and participatory processes enable these members of society to harmonize their

interests and be included in the decisions that affect the environment in which they live.

- Information and input from members can be obtained in a variety of ways including surveys, discussions, suggestion boxes, questionnaires, one-on-one interviews, written submissions.
- Public participation is also required during the development of legislation, national policies, projects, plans, and research undertakings.
- Depending on the roles and responsibilities required of some members (based on whether they are members of a specific committee etc.), certain elements of training and guidelines must be provided in terms of interpreting technical data, policy preparation, preparing proposals, evaluation and monitoring processes etc. If members are willing to commit time towards the ICZM process, investment in training and resources should be considered so that these participants are effective and proactive during the process (Nurse, 1993).

2. Selection of a lead agency with legal authority to make decisions to champion the ICZM process.

    - Through consultative meetings the issue of selecting a lead agency to move the ICZM process and co-ordinate the activities should be identified and determined by all members present. This is critical at the early stages because it ensures that the process is integrative and well managed. One agency that comes to mind is the Advisory Conservation Commission (Commission) that has been established under the NCEPA Act (1987). This Commission has the existing mandate to function as an advisory body to the Government of Nevis

and serve as a facilitator in environmental management issues. The Commission's role can be expanded to undertake leading the ICZM process development. The Barbados Coastal Zone Management Unit is an example demonstrating the effectiveness of having such a lead agency specifically for ICZM planning.

- Strong management is required for ICZM planning and the Advisory Conservation Commission can provide the integrative approach that is needed throughout the lifetime of the ICZM process. The Commission can also represent a permanent mechanism to retain the values of a multi-disciplinary, interagency, public and private approach to ICZM.

3. A method of developing, describing and discussing in detail the problems and issues facing Nevis based on information already known.
    - The ICZM process requires that the issues and objectives of the plan are fully understood by all stakeholders (UNEP, 1996). Public meetings, workshops and hearings can provide the forum for interested stakeholders to attend, present their ideas, listen to the different perspectives and generally, obtain clarification on some of the issues behind ICZM. These stakeholders include: business sector, tourism, planning, students and youth, members of the general public, local community groups, fishermen, government officials, NGO's, etc.
4. Analysis of any existing information and what is required based on priorities for management (filling the gaps).
    - ICZM requires extensive data collection, data analysis, project development and multi-stakeholder participation; all of which can be difficult to co-ordinate

and integrate with limited resources. Unlike sectoral based management, where individual departments and organizations collect data that apply to their specific mandate, ICZM requires that data and information be collected on all relevant areas of the environment.

5. Determination of the key priorities and objectives of the ICZM process and what information is required
    - Prioritizing issues include discussing and clarifying issues that are identified.
    - Once issues are prioritized, next step involves determining short term projects and activities can be implemented based on current information, resources (human and financial) and legislation.
6. The establishment of sub-committees from the larger group to serve as focus groups. For example a research and technical group, a marine management group, land based resources management group etc.
    - An executive committee should also be established. This committee will represent a range of interests as well as appropriate local and national organizations to review plans, policy decisions, legislation etc. General sub-committees, Task Force Committees, Planning Teams, Community Development Teams, Educational Awareness Teams, and National Development Councils etc can be formed to deal with specific projects and plans being developed for ICZM in Nevis.

The problems and issues facing Nevis have been discussed and analysed in Chapters 2 and 3 of this document. These issues and problems can be tabled at public meetings and items can be added or deleted based on the general consensus of the

participants. It is important to present what is already known and what has been done to address these issues. This provides the participants with a clear idea of what needs to be done in terms of research, projects or whether another group has already collected the information. This step is a prerequisite to prioritizing the issues and needs for management within Nevis. At this step, clarification and understanding of what is actually involved in management of the particular issue is essential.

Some priority areas for Nevis may include; rate of tourism development, coastal resource management, beach erosion, hurricane preparedness, waste management, National and Administrative Capacity, Marine Protection, Science and Technology and Human Resource Development (Ackland, 1997). Issues can be ranked in order of local priority whereby at this level, the communities and members of local groups and businesses provide the most input. The issues can then be ranked in order of national, regional and international priority and finally all levels cross-referenced. Once the list is agreed to and supported by the public and all stakeholders, the actual goals and components of an ICZM process can be initialized. This stage of the process can be ruled by conflicts and subject to gridlock in terms of decision as to the best approach. However, through a series of consultations, expert advice/clarification of issues and negotiations amongst the stakeholders involved, the opportunities for an impasse are minimized and it ensures that the levels of co-operation and agreement are maintained.

Once issues are prioritized by the participants, pilot projects and feasibility studies can be drafted and developed with specific goals, objectives, management strategies, evaluation and monitoring techniques built in and the benchmarks that can serve as a measuring tool for the overall ICZM process. Pilot projects and pre-feasibility studies in

the Barbados example, played an important role in developing the island's ICZM process. Pilot projects enables the lead agency and its sub-committees to evaluate the feasibility of an ICZM process into the daily functions within the operation of the local government, lead agency and its participants. It provides a limited but useful insight into what resources and effort will be required to implement programs under an ICZM process. Pilot projects not only test the concept but also measure the overall performance of the agency and uncover problems and constraints.

Pilot projects can be developed and run concurrently to the overall planning and design of an ICZM process. Participants in a pilot project should include a team representing a cross section of managers, industry representatives, members of the general public, government etc. These persons would have been actively involved in the needs assessment and issue prioritizing stage. The pilot projects and pre-feasibility studies can provide the following opportunities:

- Integrated and co-ordinated research;
- In-depth analysis that involves all impacts and components within the coastal zone;
- Areas where existing legislation and regulations are weak and potential for amending and developing new and improved legislation for more effective management;
- Areas for training , recruiting experts and consultants etc.;
- Testing of management strategies and future plans; and,
- Estimating costs associated with such undertakings.

The information needed to determine the feasibility and desirability of an ICZM process is usually not available until several public meetings and planning steps have been completed. A successful ICZM process as demonstrated by Barbados includes conducting feasibility studies based on the likelihood that an ICZM process will be beneficial and effective in the long term.

Often small islands like Nevis may encounter several problems in initiating such a large undertaking such as an ICZM process. Some issues for concern are lack of expertise and experts in technical areas, financial resources, easy access to training resources and opportunities, amending legislation and lack of realistic opportunities to participate in fora at the international level (Mohammed, 2001). The next section explores some of these constraints and challenges that can be encountered by Nevis.

4.2 CHALLENGES IN DEVELOPING AN INTEGRATED COASTAL ZONE MANAGEMENT PROCESS FOR NEVIS

A successful ICZM Process and Plan is one that has identified the constraints and challenges to its development, design and implementation (Thia-Eng, 1993). Because coastal and environmental management is a complex process and involves multiple stakeholders and factors, there are several constraints and challenges that require attention.

- Lack of technical and knowledgeable staff to provide information and reports on the issues being raised for discussion.
- Lack of financial resources to conduct studies, and disseminate the basic information to the public and stakeholders involved in the process,.
- Weak institutional capacity to provide leadership and guidance in the development of an integrated plan of action.

- Lack of co-operation and support from existing groups and organizations in Nevis.
- Unequal decision-making authorities amongst the resource users and conservationists.
- Lack of the appropriate technology to acquire information and communicate on an international level.
- Lack of training programs that are targeted to environmental and coastal zone management.
- Lack of policies to encourage new legislation.
- Lack of enforcement mechanisms.

An ICZM process requires financial support for operations and administration if it is to be successful. An operating budget is critical for conducting research, analyzing data, printing and publishing information for public distribution and training staff. ICZM process management committees can secure funds by researching international programs that provide funding for Coastal Management programs, submitting proposals for specific coastal zone management programs, soliciting donations, fund raising etc.

Building institutional capacity to deliver programs are required elements involved in developing an ICZM process. A strong management institution will facilitate co-operation and consensus amongst the resource users such as the fishermen, agricultural users, beach resource users, business, tourists etc. Building on institutional capacity will also attract environmental and coastal managers of the international community to participate in meetings, presentations, and management strategies.

Overcoming constraints and challenges within Nevis requires commitment and time from all stakeholders and parties interested in developing the ICZM process (United Nations, 2000). Public meetings and educational sessions should be held on a regular basis to identify and disseminate information on the issues that are affecting Nevis. Chapter 3 of this document discussed the shortcomings of the NCEPA Act (1987). NCEPA (1987) does not contain an integrated environmental management approach and lacks enforcement mechanisms. However, the NGO community led by the NHCS has combined the efforts of the general public and has initiated several monitoring and clean-up efforts such as beach patrol, beach clean-up, garbage dump site monitoring etc. These initiatives prove that the will to support management initiatives in Nevis exists and that community members are willing to participate and become involved in protecting and managing their environment (Mohammed, 2001).

An effective ICZM process will incorporate both long-term and short-term strategies thereby rendering it flexible enough to respond to changing circumstances. This includes incorporating creative and innovative ways of planning. For example, seeking out internships and international summer programs for training opportunities and using volunteers to staff committees. ICZM processes vary according to the environment, coastal zone and its interaction with other elements within its environment (population growth, resource use, tourism, housing developments, fishing, sand mining, etc.). Overcoming the challenges and constraints of developing an ICZM process in Nevis would involve dealing with the issues that are of national significance, protecting the national interest and sharing the responsibilities amongst the entire nation/population of Nevis.

4.3 USING THE INTEGRATED COASTAL ZONE MANAGEMENT PROCESS TO MOVE TOWARDS SUSTAINABILITY

A successful ICZM process is one premised on sustainability (social well-being, economic efficiency and environmental integrity) with the processes, activities, interactions and stresses that impact on the four sub-zones of the Island Environment (the offshore zone, the beach zone, the coastal lowland zone and the inland zone) (IISD, 1996). A co-ordinated approach will provide balance, conservation and sustainable multiple use of the resources of the small island given that the small island is considered as a coastal zone (Cambers, 1992: ii).

Underlying elements of sustainability that will serve as the foundation in the implementation of the ICZM process:

- Identification of the economic, environmental, social and cultural values of resources and the effects of uses on those values being determined as practicable prior to allowing use of those resources.
- Assessment of the impacts of resource use at local, regional, national and global scales prior to making decisions on resource use. Such assessments should take into consideration long-term impacts on the resources and other users. As far as possible, negative impacts should be minimized.
- Monitoring resource users to ensure that impact assessments are correct. If impacts differ significantly from those predicted, then remedial actions are required including reviewing the resource allocation.
- Considerations of cumulative impacts before decisions are made about the resource use. This can be used to safeguard against unintended negative impacts.

- Determination of the risk and irreversible impact of resource use.
- Allocation of resources to the use that generates the greatest long-term community benefit, where benefit is determined by taking economic, environmental, social and cultural considerations into account.
- Promotion of effective and high quality public participation at all levels of the decision making process.
- Maintenance of habitats and sites of ecological, cultural, archaeological, historic and scientific significance should be taken into account.

Figure 5 illustrates the process that is required for assessing impact levels on the small island environment and the use of this information in designing a management strategy for small islands. In so doing, the processes combined with a successful coastal zone management strategy provide the infrastructure and support for maintaining the sustainability or decreasing the negative impacts on the four sub-zones that constitute an island ecosystem.

Sustainability can only be achieved by having strengthened institutional arrangements with the stakeholder group and the administrative capacity to integrate environmental and economic policy into national planning. For example, access to coastal zone resources for development purposes should be facilitated when the development is consistent with agreed principles for coastal zone resource use. The degree to which an activity is dependent on being located in the coastal zone should be taken into account when resources are being allocated. Priority should be given to uses that are particularly dependent on coastal locations or coastal resources (Cicin-Sain, 1993).

While the coastline of Nevis is public, the extent, location and type of access into the coastal and marine areas of Nevis can be controlled to mitigate adverse effects when there is an incompatible use of the resource or the use relates to a public safety issue. In terms of development and disposal of waste, particularly into rivers, estuaries and the ocean, this can also be controlled, monitored and regulated. Waste disposal can be limited to the quantity and quality that the receiving environment can assimilate without suffering long-term degradation. If the assimilative capacity is unknown, pollution discharges should be progressively reduced to levels at which there is a low probability of adverse impacts on the receiving environment.

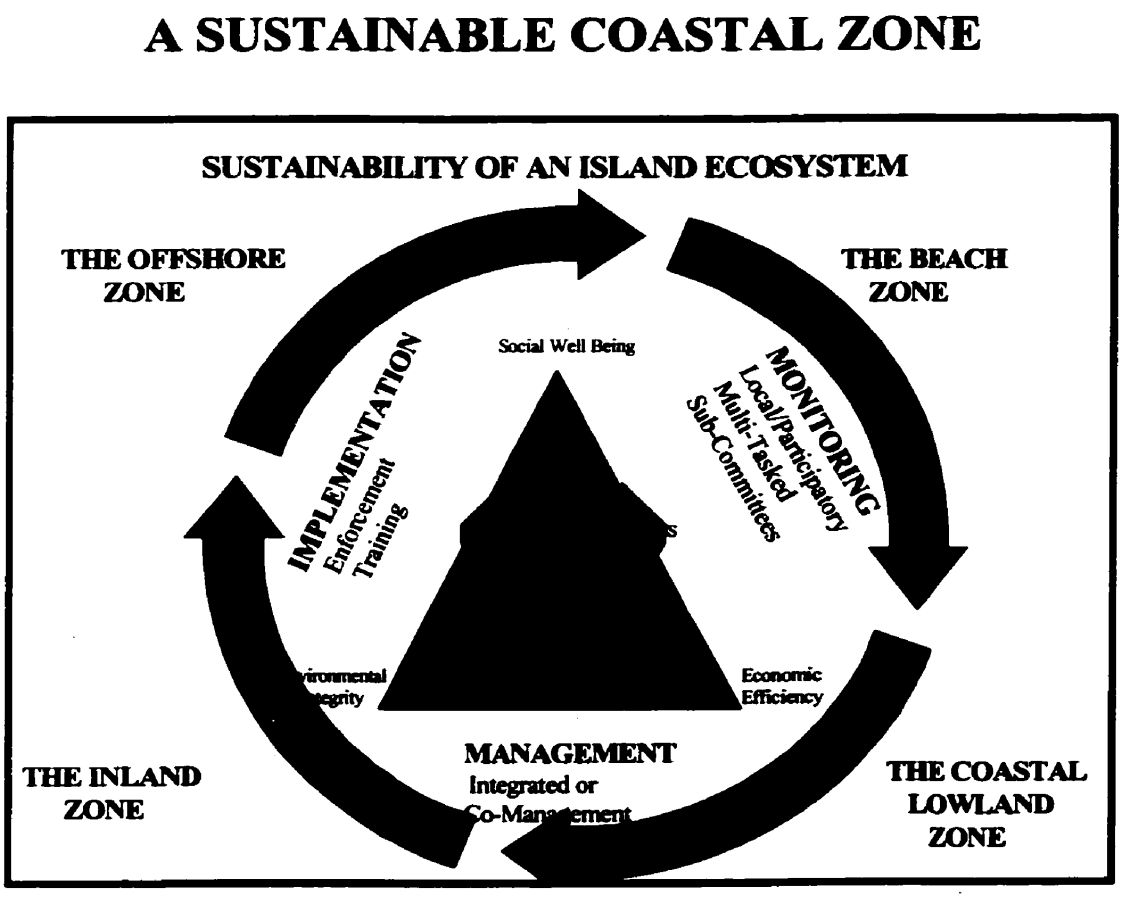

Figure 6: A Sustainable Coastal Zone (Adapted from IISD, 1997 and NetCoast, 1997)

Nevis can also begin to implement the "cost of development" into coastal areas – including infrastructure costs, the costs of environmental management and monitoring and the costs of managing natural hazards that affect the particular infrastructure. These costs should also be borne by the development proponents and ultimately by the users. For example, hotel developers should bear the costs of environmental impact assessments, emergency preparedness and natural hazard mitigation plans prior to their approval. Once approved for construction, hotels should also demonstrate and have on premises trained and experienced environmental planners and managers to file regular reports on arising issues and monitoring of environmental issues that the particular hotel directly or indirectly affects in both the short and long term. Tourists must also incur some costs in their hotel bills for the services of staying in a hotel that is environmentally conscious (Ackland, 1997).

This discussion follows that it should not be the burden of future generations to bear the costs of environmental. Rather the present users – guests and owners of the facility should bear the costs of protecting, conserving and monitoring the resources and environment from which they receive economic benefit, use and enjoyment. When development in the coastal zone results in increased recreation use, additional maintenance, monitoring, and enforcement measures are also associated with the increased use of resources and its protection (United Nations, 1999).

- Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends involves enhancing the individual and community well being by following a path of economic development that safeguards the welfare of future generations. It also provides for

equity within and between generations and it protects biological diversity and maintains essential ecological processes and life-support systems such as the coastal zone. Sustainability in Nevis can be achieved through a successful ICZM process and by ensuring that the decision-making processes effectively integrate long-term and short-term economic, environmental social and equitable consideration.

4.4 SUMMARY OF AN INTEGRATED COASTAL ZONE MANAGEMENT PROCESS FOR NEVIS

Tourism in Nevis is the most striking and outstanding developmental activity requiring immediate attention at all levels including the monitoring of its future development and growth (United Nations, 2001). The impact of tourism on the coastal zone is significant and the existing environmental legislation does not address the coastal zone issues in an integrated way. Instead it focuses on environmental management of the broader sectors of resource management and conservation. Such a system cannot sustainably accommodate all the environmental concerns and human needs. The present NCEPA (1987) environmental legislation in Nevis further illustrates that it was developed mainly for regulatory purposes rather than for ensuring that human actions are monitored or the tourism industry development is regulated within the principles of sustainability.

Developing an ICZM Process for Nevis involves not only managing the issues but also determining who participates in the process and what is required for developing such a management plan. First, the information on the issues that are important to the Nevisian society and decision-makers must be made public information so that it may be discussed and understood at a public level. Secondly, every management plan has its limitations especially when the issues relate to coastal resources, fish population and beach

resources. These resources are not well documented and researched and studies on these resources have to be completed in order for a management plan to be effective in controlling the direct problems. Financial resources, monitoring and enforcement measures, expertise in the areas of coastal management on the island to assist and facilitate resource management are a requirement of ICZM.

A successful ICZM process would also need to include the use of a multi-stakeholder approach whereby every participant has an equal voice and contribution towards the decision-making process (Dubois, 1995). Only then, would there be full co-operation of all members of the society and institutions. In addition, there is the need to identify a strong lead agency that can facilitate the ICZM process and serve as a catalyst for change and resource management for the island of Nevis. This lead agency would ideally have the expertise in some of the issues that require immediate attention and would have already established working relationships with experts and government officials at the local, regional and international level.

Finally, the components of an ICZM process for Nevis would enter its preliminary discussions and development. In so doing, the challenges and constraints at each stage will be identified and possible solutions developed to overcome them. Developing an ICZM process requires time and a commitment to finding creative ways of managing Nevis' coastal resources. It is also important to ensure that each step and plan is well documented so that the successors and interested members and parties can participate while keeping the momentum of the plan. Well-documented files will avoid duplication of past management strategies that failed or will build upon successful strategies implemented in the past.

ICZM have been successfully applied to Barbados. The principles and operational components of ICZM can be effectively applied to Nevis. While sustainability is not the focus of this study, it is understood that the underlying concept of ICZM is premised on the concept of sustainability. That is, finding a common understanding and solution for development versus conservation; human needs versus growth and resource use versus preservation (Griffith and Ashe, 1993).

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The first objective of this research was to describe the sub-zones that constitute a small island and to use this as a basis for coastal zone management planning. An integrated management approach such as ICZM recognizes how the marine and land resources function as a whole ecosystem. ICZM can address the issues and problems that are being faced by the four interactive sub-zones of a small island as described in the literature review. The most threatened sub-zones appear to be the coastal lowland zone and beach zone. The tourism industry directly relies heavily on these two sub-zones and indirectly, these sub-zones are impacted the most by waste and sewer disposal, agricultural run off, erosion, pollution and contamination of resources.

Nevis was selected as the case study for this research because of its fast growing tourism industry and the lack of an effective management process to monitor and control its development. Existing literature and field work highlighted that there was growing concern about the overuse of the coastal zone and natural resources in Nevis. These findings initiated the need to develop an ICZM process for Nevis. After reviewing the study area and the environmental legislation that exists to deal with environmental protection and degradation, it was found that Nevis has not developed its national capacities (including legislation) to effectively manage development on the island. Nevis has one legal environmental management document that–NCEPA (1987) that has not been enforced or supported by environmental programs. When NCEPA (1987) was examined it was found that there were some key elements of the document that could be used as a foundation for developing an ICZM process for Nevis such as the Advisory

Conservation Commission, long-term coastal zone planning, waste disposal management, beach sand mining etc. In order to develop an ICZM process for Nevis, it was practical to examine a working model.

In order to draft an ICZM process for Nevis the natural processes and human activities that impact the sub-zones of Nevis were also examined in this chapter. The growing tourism industry was found to have the greatest impact (both directly and indirectly) on Nevis. Using an ICZM approach will ensure that all components of the tourism industry and its future development are consistent with integrated planning policies, revised environmental legislation and preserve the natural environment of Nevis. While the concept of ICZM in the Caribbean is fairly new, some of the Caribbean islands, notably Trinidad, Jamaica, and Barbados have developed ICZM processes and plans based on the islands' environment, needs and resources. These three islands however are not only larger in size but rely on other industries such as sugar, rum manufacturing, petrochemical and oil to develop their island economies.

The Barbados ICZM process was selected as an example because of its similarities to Nevis in topography (both islands are relatively flat); soil types (unlike St. Lucia and Dominica which are volcanic in nature); coastlines (coasts are gently sloping); and more importantly, similar environmental and coastal zone problems such as coral reef degradation, coastal and marine pollution, waste disposal and legal and institutional development. The island of Barbados has been using ICZM planning for over 17 years and there are many lessons to be learned from the island's successes and failures. One of the first tasks that can be undertaken by the Nevis' ICZM planning committee can be to organize a consultative session or public meeting with the Barbados Coastal Zone

Management Unit. Such a meeting can serve twofold. It will encourage discussion among the various groups and can also lead to the development of partnerships with the Barbados Coastal Zone Management Unit so as to lever human resources and skills into the ICZM planning process of Nevis.

The second objective analyzed the Barbados Coastal Zone Management plan so as to determine its best management components as they apply to Nevis. Many of the smaller islands in the Caribbean region are struggling financially to hire and train environmental managers, planners and technicians to develop an effective ICZM process or plan. These islands also struggle with lack of political will, co-operation amongst the various government departments responsible for the environments and enforcement measures. The Barbados ICZM process has been on going for the last seventeen years. The plan was implemented in phases and stages and this staged process can be useful to Nevis in developing its own ICZM process. It is anticipated that Nevis' ICZM process will evolve over several years and will be modified to cater to new issues and information, level of public participation in the planning process and the degree of government support.

The development of the ICZM process is also dependent on how the public participates in the process. That is, if the public is allowed to provide input at the decision making level through committees, external review groups and direct feedback to the government, then perhaps the ICZM process can gain momentum. In order for the ICZM process to be successful the ICZM policies, programmes and plans to be developed, must be transparent to the public. This approach is necessary because support may involve formal endorsement and approval by responsible institutions at different levels (i.e. the

national level, concerned communities, local stakeholders, fishermen and other affected organizations).

The third objective of this research was to draft a coastal zone management process for Nevis's sub-zones using the best management components identified in the Barbados coastal zone management plan. This study supported the development of an ICZM process for Nevis. Such a process can redress current problems in the coastal zone and can obviate future problems (CDB, 1997). The process if implemented can achieve the following:

- Reduced degradation caused by urban development and activities associated with population growth and development.
- Better facilities for recreation in the coastal zone
- Better management and preservation of natural resources in the coastal areas.
- Improved recognition by the community of the value of the resources of the coastal zone.
- Improved understanding of the effects of human activities on the coastal ecosystems and social systems
- And enhanced community appreciation of the natural processes that operate in the coastal zone.

It follows that the development and implementation of an ICZM process in Nevis may have to be carried out at incremental levels and must be aware of the issues and linkages that are at stake in the four sub-zones. It is important that the ICZM process provides for continuous monitoring and evaluation of the successes and failures of the policies and activities, which have been adopted. These results should be fed back into

the earlier steps of the process so as to allow for adjustments to compensate for failures in foresight or for changing conditions. The feedback process is important and necessary because new policies and programmes may not be exactly what was anticipated or appropriate. It is somewhat impossible to plan for all contingencies that will be encountered during the implementation phase of an ICZM process (Sorensen, 1993).

Chapter 3 described the Barbados Coastal Zone Unit and the role in championing the ICZM process for Barbados. The Barbados ICZM process consisted of feasibility studies, development of new legislation, delivering public programs and engaging in monitoring programs for long-term management purposes (Nurse, 1993). Although Nevis and Barbados were observed to be similar in some respects, there are also notable differences that were advantageous to Barbados. When Barbados started to develop the ICZM process, the feasibility studies and planning was funded by the IDB (IDB, 1999). This funding enabled Barbados to engage in the services of several highly trained coastal engineers, environmental planners and managers and the technical staff required to carry out the feasibility studies and projects. Barbados also had the support and co-operation of the Barbados government and various stakeholders involved. This cohesion and political will is important to the success of an ICZM process.

It was found that the components of the Barbados ICZM Plan provided examples of ICZM activities that may be applicable to Nevis. Chapter 4 used these best components and described the steps involved in an ICZM process such as public meetings, selecting a lead agency, determining the stakeholders, identifying and prioritizing the issues, establishing goals and objectives and developing pilot projects. Chapter 4 also briefly discussed some of the challenges and constraints that are

encountered in developing the ICZM process and how these may be overcome through creative and innovative means. The Nevis government has already acknowledged the need for an ICZM process should include the general public from the very beginning to ensure that the issues are public concerns and that there will be active citizen participation throughout the entire process. Finally, by initiating a variety of activities at the local level such as local beach clean up and monitoring, fundraising, public awareness and preservation of its island's cultural heritage all contribute towards a common goal of future sustainability.

The fourth objective was to develop recommendations for the coastal zone management process selected for Nevis. The ICZM process developed for Nevis can be applied to other islands in the Caribbean. It should be noted that some of the Caribbean islands have indicated an interest in ICZM planning but are at the same stage as Nevis. An ICZM process can redress current problems in the coastal zone and can obviate future problems. A successful ICZM process for Nevis and other small islands can include the following elements:

- Statement of the overall environmental policies and goals;
- Detailed plans, activities, and programmes to address issues and conflicts;
- Institutional arrangements including identification of collaborating agencies and a definition of their responsibilities and mode of collaboration;
- Necessary new laws or amendments to existing legislation;
- Requirements for training and capacity building;
- A phased implementation plan including a realistic timetable;
- A future awareness and participation component; and

- Monitoring, evaluation and enforcement procedures.

A national approach to managing Nevis' coastal zone resources is based on the need to deal with issues of national significance, protect the national interest, reflect the responsibilities of all spheres of government, and local communities, and meet international obligations. Coastal Zone Management plans must be integrated so that the efforts of all parties involved is harnessed effectively. Management should also take a long-term perspective and at the same time be flexible enough to respond to changing circumstances.

Sustainability, when done correctly, can offer government officials and planners with a practical and feasible way to mitigate the destructive effects of hurricane and severe natural disasters. Where coastal planning and the developmental control process are well informed and effective, developing coastal areas and small islands can be orderly and highly productive. Conversely, where there is no such vision and no mitigation planning and the coastal zone remains unmanaged, public sector revenues diminish and the full potential of this otherwise valuable resources of the small island and coastal area will remain unrealized and destroyed.

The success of the ICZM process for Nevis depends on the political will and support of the government, the local population and the hotel owners. These stakeholders have valuable input and can drive the development of an ICZM process (CDB, 1997). Political will does exist on the island but it is not consistent with an integrated management approach. The government of Nevis needs to consider more appropriate methods of tourism planning and management especially with regards to conflicts between tourism and other branches of the economy and the negative impacts of the

tourism industry. A coastal tourism carrying capacity is a function of a broad range of environmental, cultural and economic factors. As these change over time, so does the carrying capacity. Rather than an 'optimum' level of tourism where net tourism benefits are maximized, carrying capacity is a (dynamic) threshold level beyond which additional tourism bring more costs than benefits.

It is not easy to establish carrying capacity levels with scientific accuracy. The best way to address carrying capacity issues, might be through discussions in tourism boards with representation of different interest groups, including the public at large, as well as natural- and social scientists. In the case of a small island coastal tourism destination where savings typically are low due to leakage of revenues and since natural, not man-made, capital might be the most important capital, a more cautious, or so called 'strong sustainability' approach might be called for. Strong sustainability would require that there be no net damage to the natural capital (net damage implies that damage in one area, say a mangrove forest, can be offset by restoration of another already degraded area into its natural state).

From the information presented, Nevis' tourism industry cannot continue to grow at such an environmentally uncontrolled rate. The reality is that development in any form (tourism, road and hotel construction) does compromise the environmental quality of the small island environment. Development initiatives undertaken by Nevis can be viewed as both positive and negative based on the approach and planning process used. That is, the small island of Nevis can develop its infrastructure using a holistic approach – one that considers all factors and aspects of the ecosystem, social and cultural impacts and economic impacts. Positive progress in Nevis can include enforcing infrastructure

development restrictions along the coastline, incorporating emergency preparedness into land and planning issues; maintaining original coastline features and vegetation so as to protect the coastline from further degradation. Tourism development can also be positive in Nevis if existing structures such as old sugar plantation farms and buildings are utilized as opposed to being abandoned. Such an initiative can preserve historical and cultural aspects of Nevis and can make use of existing trails and roads. Furthermore, positive tourism development can encourage small scale fishing and agricultural groups to produce local products and foods so as to promote a "Nevisian experience" within its tourism industry.

5.2 RECOMMENDATIONS

Any framework to promote ICZM in Nevis should be able to address the systematic problems such as integrated public sector planning, environmental awareness, training, governance, management issues, monitoring and effective and continuous programming for integrated coastal zone management. In this context of ICZM, several issues have been identified that require urgent attention of policy makers and also consultation and co-ordination of various departments, stakeholders and community members (Thomas, 1990). Some issues identified may also require the introduction of new legislation, amendment of existing ones and integration of policy and action. The pre-requisites for developing an ICZM process are critical. It is recommended that Nevis engage in the ICZM planning phase by:

- Establishing the government's formal support and approval for the ICZM process. This can be in form of having the government sign the legal plan of action developed by the stakeholders. The level of active participation by the

government in developing an ICZM process depends largely on the extent to which the government has taken an active role in promoting and supporting marine and coastal research and institutions and the approach towards how programmes are initiated. In Barbados for example, the local ICZM initiative was inspired by concerns about the linkage between pollution, beach erosion and coastal coral reef degradation. However, the program was initiated and taken up by the central government, which borrowed money from the International Development Bank to finance the development of the implementation of the first phase of its ICZM process. Presently in Nevis, the Natural Resource Management Unit has done a lot of work in providing awareness and research in the area of Coastal Zone Management. The concept if ICZM is one that is becoming more prevalent and people are also becoming more aware of its benefits (Mohammed, 2001).

- Selecting and legitimizing the leadership team or group of people to lead the ICZM process. This in itself is a complex task as it includes rethinking of ideas, reforming approaches for management and justifying to the national government the need for change. The legitimized group or committee can spearhead the development of the ICZM process.
- Obtaining institutional support. These arrangements are critical for issue identification, technical input and for enhancing public perception about the integrity and legitimacy of the endeavour (Thomas, 1990).
- Developing a strategy for stakeholders participation by bringing coastal area land and facility owners, resource users and coastal interests groups, including

local authorities into the dialogue concerning programme design and development. Coastal area stakeholders have a strong interest in the viability of the coastal zone – their livelihood or other kinds of economic stake depends on it (Sorensen, 1993). This group includes the landowners, resort hotel owners, fishermen, commercial landowners etc. Their interest in the coastal zone depends on the significance of their economic dependency and investment in its resources. The involvement of stakeholders will help government to formulate their policies and programs and ensure that the planning process makes full use of existing expertise and knowledge, particularly at the local level (NHCS, 2000). The involvement of non-stakeholder community members creates a sense of responsibility among these groups resulting a successful outcome of the planning initiative.

- Developing a public awareness strategy to both publicize and upgrade the agenda for relevant coastal zone and management issues, and to build constituency among non-stakeholder communities by facilitating their direct involvement in both the planning process and subsequent implementation and monitoring. Arranging public surveys that focus on coastal zone management, resource depletion and degradation can provide a vehicle for bringing the need for ICZM to the attention of the media and the public (Cicin-Sain, 1993). The initial activities of an ICZM process involve a variety of inventory tasks. The enlistment of help from the public should be encouraged – for example a national wetlands resource survey can interest the hunters and farmers in

Nevis. Likewise, a survey of the coastal or marine areas may interest the private boat owners, yachtsmen, fishermen, scuba diving establishments etc.

It is critical that once an ICZM process is developed that it continues to be operational and on going so that it does not loose momentum. A key programme instrument includes a strategic operational plan (CDB, 1997). This plan addresses the issues of co-operating institutional arrangements; public awareness plans, media plan, information management, funding proposals, logistic support plan, evaluation and monitoring plans. Based on the findings of this research, it is further recommended that Nevis develop a national ICZM process that contains the following:

- A national vision for ICZM
- National ICZM objectives
- Arrangements for implementing and managing the ICZM process
- Mechanisms for community and industry involvement
- Innovative management mechanisms

The concept that is central to the formation of an ICZM process is integration. This involves reconciling issues of conflicting interests and determining and adopting the optimal mix of alternative approaches for Nevis. This involves a continuous process of information dissemination, consultation and consensus building amongst all parties with a stake in the coastal zone. Effective ICZM process requires that all significant governmental and privates sector actions affecting the coastal zone, its resources and environmental conditions be consistent with the coastal policies that the nation adopts as part of the ICZM process.

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PERSONAL COMMUNICATION:

Interviews were conducted with the following individuals:

Ackland Tess, 1997. *Environmental Researcher and Ecotourism Trail Developer*, Nevis Historical Conservation Society, Resident of St. Kitts Nevis. Ms. Ackland provided information on resource management issues, ecotourism issues, and served as a liaison between government officials and the communities.

Mohammed Fazal, 2001. *Ecologist*, Ecoengineering Consultants Limited, Trinidad. Mr. Mohammed works extensively in the area of coastal zone management in the Caribbean. He has recently completed projects, studies and assignments on Nevis and St. Lucia.

Theobald, Tobias, 1998. *Computer Consultant, Ministry of Education*, Resident of St. Kitts/ Nevis. Mr. Theobald provided a social and cultural context of the Island of Nevis and was also relied upon as a tour guide.