

## Monitoring beach changes

as an integral component  
of coastal management



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*Final report of the project on:*

Institutional strengthening of beach management capabilities  
in the Organisation of Eastern Caribbean States  
and the Turks and Caicos Islands

BY GILLIAN CAMBERS

*Cooperation Agreement*

Caribbean Development Bank and UNESCO (GA 82/R)  
(UNESCO project 707RLA40)



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## FOREWORD

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The voice of concern emanating from small islands – limited as they are by size and isolation, and vulnerable to environmental disasters and economic globalization – has a special authenticity, because their agenda will ultimately be the world's agenda. Especially during the last decade of the 20th century, the voice of small islands was increasingly heard, as they focused their efforts on informing the world of their vulnerability to the adverse effects of global climate change.

In 1992, at the United Nations Conference on Environment and Development, the world community adopted Agenda 21. This represents a global consensus and political commitment at the highest level on development and environment cooperation. Following on in 1994, the Global Conference on the Sustainable Development of Small Island Developing States, held in Barbados, attempted to translate Agenda 21 into specific policies, actions and measures to be taken at the national, regional and international level. The resulting Declaration of Barbados and the Programme of Action for the Sustainable Development of Small Island Developing States listed 15 priority areas for specific action. This list was further refined at the Special Session of the United Nations General Assembly in New York in 1999 (Barbados + 5), when six problem areas were identified as being in need of priority attention for the next five years, specifically: climate change; natural and environmental disasters and climate variation; freshwater; coastal and marine resources; energy; tourism.

In 1996, the platform for Environment and Development in Coastal Regions and in Small Islands (CSI) was established by the United Nations Educational, Scientific and Cultural Organization. Through field-based projects, university chairs and an Internet-based discussion forum, CSI seeks to develop an integrated approach to the prevention and resolution of conflicts over resources and values in coastal regions and small islands.

The Caribbean Development Bank was established by an agreement signed in 1969. The Bank's role is to contribute to the harmonious economic growth and development of the member countries of the Caribbean, and promote economic cooperation and integration among them, having special and urgent regard to the needs of the less developed countries.

Capacity building is one of the key activities recommended for the implementation of the Barbados Programme of Action. It is also integral to all CSI activities, particularly its field projects. One such project, executed together with the University of Puerto Rico Sea Grant College Program, focuses on building the capacity within small islands in the Caribbean region to effectively manage their beach resources within a framework of integrated coastal management. In 1996, CSI and the Caribbean Development Bank joined forces to sponsor a regional workshop whereby representatives from the small islands involved in this project met in Puerto Rico to discuss their respective beach-related problems and to devise solutions. One of the recommendations of this workshop was to provide further capacity building and institutional strengthening so that existing beach-monitoring programmes are maintained and expanded and can become fully self-sufficient without requiring outside support.

Following this groundwork, the project described in this report was executed between 1999 and 2001, as a cooperative effort between the Caribbean Development Bank and UNESCO-CSI. The timing proved especially opportune since in 1999 the eastern Caribbean islands were impacted by Hurricane Lenny, one of the most devastating hurricanes of the 20th century.

Through this project, local capacity has been enhanced in four of the problem areas identified in the Programme of Action as being in need of priority attention, namely adapting to

climate change and rising sea levels; improving preparedness for and recovery from natural disasters; protecting coastal ecosystems; and managing tourism growth to protect the environment and cultural integrity.

Spreading the results of this initiative to the wider Caribbean, as well as other small island regions in the world, is a goal yet to be attained. Working together, small islands can achieve sustainable lifestyles, retain their uniqueness and individuality, and effect meaningful change in the world.

Caribbean Development Bank

UNESCO, Environment and Development  
in Coastal Regions and in Small Islands

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## ACRONYMS

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CDB	Caribbean Development Bank
CFD	Conservation and Fisheries Department, British Virgin Islands
COSALC	Coast and Beach Stability in the Caribbean project
CPACC	Caribbean: Planning for Adaptation to Climate Change
CRIS	Coastal Resources Information Systems
CRMP	Coastal Resources Management Project, Turks and Caicos Islands
CSI	Environment and Development in Coastal Regions and in Small Islands, UNESCO
DCA	Development Control Authority, Antigua and Barbuda
DE	Department of the Environment, St Kitts
DECR	Department of Environment and Coastal Resources, Turks and Caicos Islands
DF	Department of Fisheries, St Lucia
DFMR	Department of Fisheries and Marine Resources, Anguilla
DP	Department of Planning, Turks and Caicos Islands
ENCORE	Environment and Coastal Resources Project
FD	Fisheries Division, Antigua and Barbuda, Grenada, Montserrat, St Kitts and Nevis
FWPD	Forestry, Wildlife and Parks Division, Dominica
GBT	Grenada Board of Tourism, Grenada
GDP	Gross domestic product
GEF	Global Environment Facility
GIS	Geographical information systems
GPS	Geographical positioning system
LSD	Lands and Surveys Department, Grenada
LWRU	Land and Water Resource Unit, Grenada
MCW	Ministry of Communication and Works, Antigua and Barbuda
MPRD	Multi-Program and Regional Development
NGO	Non-governmental organization
NHCS	Nevis Historical and Conservation Society
NSTC	National Science and Technology Council, Grenada
OAS	Organization of American States
OECS	Organisation of Eastern Caribbean States
PPD	Physical Planning Division, Dominica, St Kitts
PPU	Physical Planning Unit, Dominica and Montserrat
SIDS	Small Island Developing States
UNCHS	United Nations Centre for Human Settlements
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPR-SGCP	University of Puerto Rico Sea Grant College Program
USAID	United States Agency for International Development
WiCoP	Wise Coastal Practices for Sustainable Human Development forum, UNESCO-CSI



## EXECUTIVE SUMMARY

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Against a background of mounting shoreline erosion, increased hurricane frequency, rising sea levels and economic dependency on coastal tourism, the small islands of the Caribbean face a major dilemma – how to maintain and expand their coastal tourism industries while at the same time conserving their beaches for residents and tourists alike. This report describes a project designed to help the islands belonging to the Organisation of Eastern Caribbean States (Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, St Kitts-Nevis, St Lucia, St Vincent and the Grenadines) and the Turks and Caicos Islands, develop the institutional capability to effectively manage and find solutions to these problems.

The project was funded by the Caribbean Development Bank (CDB) and executed through a cooperation agreement with the United Nations Educational, Scientific and Cultural Organization (UNESCO). The project focused on one specific aspect of beach management, namely the monitoring of physical changes in beaches, and sought to strengthen in-country capability to analyse and interpret beach change data, and apply the knowledge gained to the planning and management of beach resources. Specially designed software (Beach Profile Analysis) was installed in environmental and planning agencies in the countries/territories included in this project, and training was provided in its use and application to beach management. Follow-up visits provided the opportunity to assess the results of the training, and provide additional assistance where necessary. Awareness workshops were held to sensitize islanders about beach changes and to discuss the many issues relating to beach management in small islands.

This CDB-UNESCO project was built on the foundation laid by the 'Coast and Beach Stability in the Caribbean' (COSALC) project. Established in 1985 by UNESCO, and jointly

sponsored by the University of Puerto Rico Sea Grant College Program, this initiative (re-focused in 1996 under the new UNESCO initiative on Coastal Regions and Small Islands) has responded to regional concerns about beach erosion and its effects on tourism (initially voiced in the 1980s) by developing in-country skills to understand and monitor beach changes. The COSALC project resulted in beach monitoring becoming an accepted activity in the islands; however, most of the data analysis was carried out by the COSALC Coordination Centre.

As a result of this CDB-UNESCO project, seven of the eleven countries/territories now have vibrant beach-monitoring programmes with the data analysis and interpretation being conducted in the country/territory. These monitoring programmes can be expected to become self-sufficient in the future and continue without external support. In the other four countries/territories, it is expected that further assistance will be required in the field of beach monitoring.

Many islands now have significant beach change databases covering more than five years and in a few cases more than ten years. This is a critical quantitative record showing the results of natural factors such as hurricanes, and human activities such as sand mining. Such data sets represent a solid foundation on which to base future decisions concerning beach management, such as the planning of new beachfront buildings, the development of tourism activities, and the design of erosion mitigation measures. The temporal scale of the data sets also illustrates the commitment of the islands to beach monitoring.

The monitoring of beach changes provides important information about beach resources; such information is a prerequisite for sound management and informed decision-making. This report discusses monitoring within a framework of integrated coastal management, in particular the tangible and intangible benefits of monitoring; the difficulties of capacity building

in small island states; problems associated with integrated approaches; and the nature of management – whether top-down or bottom-up.

The results of stakeholder workshops on ‘Wise Coastal Practices for Beach Management’ in nine of the countries/territories identified several major conflicts over beach resources between different user groups, e.g. between coastal landowners and the public. Ways to provide for the equitable sharing of beach resources form the basis for the resolution of these conflicts, and several ideas were identified.

Recommendations for future work, arising from the workshops and the consultant’s assessment, include: island-specific initiatives; further technological skills transference, especially in developing an interface between the beach change databases and geographical information systems; enhanced information sharing, such as through face-to-face and electronic means; and the further development of concepts and tools for coastal stewardship and the equitable sharing of beach resources.

# 1. INTRODUCTION

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Shorelines are areas of continuous change where the natural forces of wind and water interact with the land. Here, both natural forces such as storms and hurricanes, and human activities such as sand mining and construction too close to the beach, result in changes, which are often dramatic in nature. Such changes have taken on paramount importance in the Caribbean islands since tourism has become one of the major industries. Statistics show that for the last two decades tourism has been the only steady growth industry in the region (Patullo, 1996). Yet all too often, shorelines, and particularly beaches, one of the main reasons visitors come to the Caribbean, are regarded as permanent features of the landscape requiring little in the way of special management.

Besides tourism, Caribbean beaches are highly valued by island residents for relaxation, sports and simple enjoyment. They represent an important part of islanders' natural heritage and also provide areas for fish landing sites and fulfil the role of flexible barriers protecting valuable land and infrastructure during storms and hurricanes. Furthermore, in many islands, beaches and dunes are used as a source of construction sand.

Against this background, a project, entitled 'Institutional Strengthening of Beach Management Capabilities in the Organisation of Eastern Caribbean States<sup>1</sup> (OECS) and the Turks and Caicos Islands' was executed through a cooperation agreement between the Caribbean Development Bank (CDB) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The project focuses on one specific aspect of management, namely the monitoring of physical changes in beaches, and seeks to strengthen in-country capability to analyse and interpret beach change data, and apply it to the planning and management of beach resources. For this purpose, specially designed software ('Beach Profile Analysis') has been prepared (through a grant from the University of Puerto Rico Sea Grant College Program's (UPR-SGCP) Multi-Program and Regional Development sector). This current CDB-UNESCO project provided for the installation of the software in the environmental and planning agencies in the countries/territories, training in the use of the software, and awareness workshops. The island countries/territories, covered by the project, now have the skills and knowledge to analyse and interpret their beach-



*Photo 1. A Caribbean beach: beauty awaiting development.*

monitoring results, and to apply the information to ensure the effective management of beach erosion phenomena.

This CDB-UNESCO project builds on the foundations laid by another initiative: the 'Coast and Beach Stability in the Caribbean' project (COSALC), established by UNESCO in 1985, and administered by UNESCO's platform for 'Environment and Development in Coastal Regions and in Small Islands' (CSI) since 1996, together with the UPR-SGCP (since 1994). This initiative responded to regional concerns about beach erosion and its effects on tourism, by developing in-country capabilities so that island states could measure and assess their own beach resources within an overall framework of integrated coastal management. The main focus was on monitoring and managing the physical changes in beaches, e.g. erosion and accretion, and establishing and maintaining beach-monitoring programmes using standardized methodology. Besides the OECS and the Turks and Caicos Islands, the COSALC project includes Haiti, the San Andres Archipelago of Colombia and the United States Virgin Islands. However, by the end of the 1990s, while beach monitoring had become an accepted activity in islands covered by the COSALC project, most of the data analysis and interpretation was carried out by the COSALC Coordinating Centre at the UPR-SGCP. In order to make the beach-monitoring activities sustainable, there was a need to provide the islands with further training and skills-transference in data analysis, interpretation and application, hence the need for the CDB-UNESCO project.

Since 2000, the COSALC project has been renamed: 'Managing beach resources and planning for coastline change, Caribbean islands,' and while retaining the focus on physical changes in beaches, the perspective has been broadened to include other aspects, such as coastal planning guidelines (building setback distances), awareness and education components. (Appendix I contains a summary of the COSALC project).

As a result of the COSALC project and this present CDB-UNESCO project, many islands

now have significant beach change databases covering more than five years and in a few cases more than ten years. This is a critical quantitative record showing the results of natural factors such as hurricanes, and human activities such as sand mining. Such data sets represent a solid foundation on which to base future decisions concerning beach conservation, coastal development and tourism activities. The temporal scale of the data sets also illustrates the commitment of the islands to beach change monitoring, which is now an accepted activity, whereas ten to fifteen years ago this was not the case.

The databases are also being incorporated into other ongoing projects. For instance discussions are underway with the Global Environment Facility (GEF) project 'Caribbean Planning for Adaptation to Climate Change' (CPACC) to include the COSALC beach change database in their Coastal Resources Information System (CRIS). Similarly, the Organization of American States and the US Agency for International Development (OAS-USAID), through the Post-Georges Disaster Mitigation project, used the beach change databases in Antigua and Barbuda and St Kitts and Nevis to develop beach erosion hazard maps based on geographical information systems (GIS), (James, 2001a, b; Daniel, 2001a, b). These maps are available on the web.<sup>2</sup>

Experiences gained from this CDB-UNESCO project are also being incorporated into the wider framework of the UNESCO 'Wise Coastal Practices for Sustainable Human Development' (WiCoP) Internet-based discus-

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<sup>1</sup> The nine OECS countries/territories are: Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines. For the purposes of this project, St Kitts and Nevis have been treated as two individual islands, since the constitution of the Federation of St Kitts-Nevis allows for separate government agencies in each island.

<sup>2</sup> The web address is: <http://www.oas.org/pgdm> then follow the Hazard Mapping links.

<sup>3</sup> The forum may be accessed at: <http://www.csiwisepractices.org> (*user name* = csi, *password* = wise)

sion forum.<sup>3</sup> This forum seeks to develop a comprehensive set of wise practices, which together with field-based activities will form the basis for the elaboration of ethical codes of practice tailored for specific domains, which in turn will promote equitable resource sharing in small islands and coastal regions. Several of the forum contributions relate to beach management issues such as those discussed in this report, and one of the recent contributions, which reports on ways to reduce coastal conflicts,<sup>4</sup> is a direct outcome of this CDB-UNESCO project.

The timing of this CDB-UNESCO project was extremely opportune, for shortly after the commencement of project activities, Hurricane Lenny, one of the most destructive hurricanes to affect the eastern Caribbean islands in the 20th century, caused massive coastal erosion along the leeward coasts of the islands from Grenada to Anguilla (November, 1999).

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<sup>4</sup> 'Planning measures need the support of all / Anguilla', by Sharon Roberts-Hodge  
<http://www.csiwisepractices.org/?read=296>  
(*username = csi, password = wise*)

The project was divided into two phases. The first phase covered the period 1 October 1999 to 30 April 2000, and was the subject of an Interim Report (Cambers, 2000a). During this phase, visits were made to all the islands, the software was installed and training activities conducted. During Phase 2, which ran from 1 May 2000 to 2 February 2001, the training activities were evaluated, consolidated and expanded; and, together with island partners, awareness workshops on 'Wise Coastal Practices for Beach Management' were conducted in nine islands.

The following Chapters 2 and 3 of this report describe the project objectives and terms of reference; and the methodology. The results of the beach-monitoring capacity-building activities are then discussed, firstly from an overall perspective, then from an island-by-island viewpoint (Chapter 4). Issues arising from the workshops on 'Wise Coastal Practices for Beach Management' are presented in Chapter 5. This is followed by a discussion chapter (Chapter 6) focusing on beach-monitoring activities within the framework of integrated coastal management. The final Chapter 7 of the report contains conclusions and recommendations.

## 2. OBJECTIVES AND TERMS OF REFERENCE

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The objective of this project was to ensure that existing beach-monitoring programmes are sustainable at the national level by providing capacity building and institutional strengthening through:

- supplying the necessary tools – installation of specially prepared software;
- providing the necessary training to use the software to analyse and interpret the data;
- holding awareness/planning workshops to highlight the information base and discuss beach management issues.

The long-term objective was to ensure that the beach-monitoring activities (data collection, data analysis, data interpretation and data application) become completely self-sufficient (i.e. not requiring support from the COSALC project) in at least half of the countries/territories involved.

The terms of reference for the project were as follows:

- (a) Convert existing beach change databases to the format developed by UPR-SGCP and UNESCO.
- (b) Check for errors and assess the data for quality control.
- (c) Prepare summary data tables.
- (d) Install converted and updated databases along with the new software (Beach Profile Analysis) at the offices of the main environmental counterpart agency.
- (e) Conduct sessions with individual staff on the use of the software to analyse the data and determine beach change trends at particular sites. Ensure competency with retrieving, updating and saving the database.

- (f) Assess training needs and develop and implement a training programme as follows:
  - one day workshop on database utilization for personnel involved in beach management; and
  - half-day session with personnel from physical planning offices.
- (g) Design and develop a manual for utilization of the database.
- (h) Undertake a final visit to assess progress, address problems that may exist and provide any further assistance that may be required.
- (i) Undertake any additional tasks that may be required to complete the assignment.

The project was divided into two phases. The first phase which ran from 1 October 1999 to 30 April 2000 focused on items (a) to (e) and (g), while the remaining items were addressed in the second phase (1 May 2000 to 2 February 2001).

### 3. METHODOLOGY

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The methodology for project implementation is detailed below:

- (a) A customized manual was prepared for each island describing the routines for use of the 'Beach Profile Analysis' programme.
- (b) The existing beach change databases, previously analysed using a customized Lotus 123 spreadsheet programme, were converted to the 'Beach Profile Analysis' programme format.
- (c) Quality control of the beach change databases was undertaken.
- (d) Trend graphs were prepared showing changes in profile area and width over time at all the beach profile sites.
- (e) Beach change databases were compiled for each island, these were computer-based, with paper copies, and consisted of the following:
  - list of contents;
  - map showing the location of the beach profile sites;
  - customized manual describing the routines for use of the 'Beach Profile Analysis' programme;
  - data for each profile site consisting of: table showing values for beach profile area and width, as well as annual means; composite graph showing different beach profiles superimposed on top of each other; trend graph showing the variations in beach profile area and beach profile width over time.
- (f) Two visits were made to each island, for a period of up to five days each, including travel days. After each island visit, a mission report was prepared and sent to UNESCO-CSI, as well as the UNESCO Port of Spain Office. These reports described the background to the monitoring programme, the objectives of the visit, the activities undertaken during the visit, and an assessment of the results. Appendix III contains a schedule for the island visits.
- (g) During the first visit, the 'Beach Profile Analysis' programme and the updated beach change database were installed on computer at the main partner agency. Paper copies and back-up diskettes were provided. Officers of the main partner agency were trained in the use of the programme and the management of the database, specifically in entering, saving and retrieving the data as well as utilizing other routines such as the preparation of composite profile graphs and trend graphs. In some islands further training was also provided in the field techniques for beach monitoring.
- (h) During the second visit, the use of the software and the database was evaluated, and additional training was provided as necessary. Meetings were held with other agencies, e.g. Physical Planning, and where appropriate, the software and database were installed and training provided in its use.
- (i) Together, with partner agencies, one-day workshops on 'Wise Coastal Practices for Beach Management' were held for government and non-governmental organizations and civil society, to highlight the availability of the beach change information base in each island and to discuss issues relating to beach management (see Chapter 5).

(Appendix II shows for a sample site, Morris Bay in Antigua, a data table, composite profile graph and trend graph).

### 3.1 BEACH PROFILE ANALYSIS PROGRAMME

As part of UPR-SGCP support to the COSALC project and to this present CDB-UNESCO project, a fully-compiled software programme was prepared by Dr David F. Gray under the UPR-SGCP contract MPRD-11-75-1-98. This programme, entitled 'Beach Profile Analysis,' was written using the Delphi language, and utilizes the Windows (95 or higher) operating system. It provides for data analysis and the graphical representation of beach change trends and specifically the following:

- entry of beach profile data collected in the field;
  - computation of beach profile area and width;
  - graphical plots of beach profiles;
  - composite plots showing several profiles on the same graph;
- preparation of data tables for individual sites showing values for profile cross sectional area and profile width as well as annual means;
  - preparation of trend graphs showing changes in profile area and width over time.

The programme has four main routines: data entry, graphical plots of the beach profiles, data tables, and trend graphs. The profiles and graphs can be easily transferred to word processing documents.

The programme has fully compiled 'Help' files, and in addition there is a written manual, which describes the routines. The software and indeed all the monitoring protocols used in this project have been designed for use by people with very little computing or surveying skills/experience.



## 4. RESULTS OF THE BEACH-MONITORING CAPACITY-BUILDING ACTIVITIES

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The results of the project have been grouped into two main sections: a synthesis and an island-by-island review. The synthesis contains an overview and evaluation of the results of the training and capacity-building activities in beach monitoring. The island-by-island review describes the same activities in more detail on an individual country/territory basis.

Further detailed information relating to all the activities is contained in Appendix IV. This includes for each country/territory a table summarizing the following:

- Dates of the visits;
- Main partner agency: name, address, contact numbers, e-mail addresses, names of Head/Director and/or persons closely involved in the beach-monitoring programme;
- Other partners: name, address, contact numbers, e-mail addresses, and names of Head/Director and/or persons closely involved in the beach-monitoring programme;
- Version of software installed;
- Agency(ies) where the software and beach change database have been installed;
- Names and affiliations of persons trained in the use of the software;
- Names of persons to whom the software was demonstrated;
- Agencies given the paper copy of the database (as well as the computer version);
- Other activities (field visits and meetings) undertaken during the visits;
- List of beaches currently monitored and the number of sites per beach;
- Length of the database.

### 4.1 SYNTHESIS

Beach-monitoring programmes are in existence in all eleven countries/territories covered by this project. Local agencies are responsible for the

data collection and analysis. However, bearing in mind the individual characteristics of the countries/territories, e.g. the size of the country and the capacity of individual institutions, there are significant differences between the programmes. Four criteria were used to assess the programmes:

- a database covering more than five years of continuous monitoring;
- more than one person actively involved in the monitoring activities;
- data currently being collected and analysed;
- agencies beside the main partner agency, actively involved or interested in the beach monitoring.

Based on these criteria and out of the eleven countries/territories, seven now have a vibrant beach-monitoring programme, which are expected to continue beyond the life of this project. These are: Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, Nevis, St Kitts. Details regarding these countries' monitoring activities and their fulfilment of the criteria are summarized in Table 1.

The programmes in St Vincent and the Grenadines and in the Turks and Caicos Islands have been strengthened as a result of this project; however, they are likely to need further assistance to become fully self-sufficient (see Table 2).

The programmes in the British Virgin Islands and St Lucia are slightly different. In the British Virgin Islands, monitoring with a new methodology is expected to start this year (2001). In St Lucia, the CDB-UNESCO project was executed during a period when the country was reviewing its institutional arrangements for coastal management and the officer who had been in charge of beach monitoring was away on study-leave, thus it was difficult to assess the status of this monitoring programme.

**Table 1. Characteristics of the beach-monitoring programmes in Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, Nevis and St Kitts**

Country/ territory	Length of database	Number of persons involved in the monitoring and main partner agency	Data currently being collected and analysed on island	Other partners involved/interested in the beach-monitoring activities
Anguilla	1992–2001	4, Department of Fisheries and Marine Resources	Yes	Department of Planning
Antigua and Barbuda	1991–2001	6, Fisheries Division	Yes	Development Control Authority
Dominica	1987–1991 1994–2001	3, Forestry, Wildlife and Parks Division	Yes	Physical Planning Division
Grenada	1985–1991 1993–2001	8, National Science and Technology Council	Yes	Fisheries Division; Lands and Surveys Division; Land and Water Resource Unit; Hillsborough Secondary School
Montserrat	1990–1996 1999–2001	4, Fisheries Division	Yes	Physical Planning Unit
Nevis	1988–2001	6, Nevis Historical and Conservation Society	Yes	Department of Planning and Development; Fisheries Division
St Kitts	1991–2001	5, Department of the Environment	Yes	Physical Planning Division; Fisheries Division

**Table 2. Characteristics of the beach-monitoring programmes in St Vincent and the Grenadines, Turks and Caicos Islands, British Virgin Islands and St Lucia**

Country/ territory	Length of database	Number of persons involved in the monitoring and main partner agency	Data currently being collected and analysed on island	Other partners involved/interested in the beach-monitoring activities
St Vincent and the Grenadines	1995–1996 (St Vincent) 2000–2001 (Bequia)	2, Seismic Unit 10 students, Bequia Community High School	Yes (only in Bequia)	Physical Planning Department
Turks and Caicos Islands	1995, 1997; 2000–2001 (Grand Turk only)	3, Department of Environment and Coastal Resources	Yes	Department of Planning; Coastal Resources Management Project
British Virgin Islands	1989–1994 (scheduled to recommence 2001)	4, Conservation and Fisheries Department	No	Town and Country Planning Department
St Lucia	1990–2001 (with some gaps in the database, e.g. 1992–1994, 1999–2000)	2, Fisheries Department	Yes	St Lucia National Trust, Northwest Coastal Conservation Project (Project ended in 2000); Unit for Sustainable Development and the Environment

## 4.2 COUNTRY/TERRITORY ASSESSMENTS

### 4.2.1 ANGUILLA

The Department of Fisheries and Marine Resources (DFMR) is the main partner agency, and is responsible for beach data collection and analysis. Within this CDB-UNESCO project, the updated beach change database and software were installed at the DFMR. Three persons from this agency were trained in the data analysis and are considered competent in the use of the 'Beach Profile Analysis' programme. The software and database have also been installed at the Department of Physical Planning, and three officers were trained in its use.

Anguilla has a substantial database with continuous coverage over the period 1992–2001, which includes the effects of four hurricanes and one tropical storm (H. Luis 1995, T. S. Grace 1997, H. Georges 1998, H. Jose 1999, H. Lenny 1999).

One of the major problems encountered is the loss of profile reference points during hurricanes, even when they are located a considerable distance inland from the vegetation line. When this happens, new reference points have to be located, which obviously interrupts the data trend for that particular site. Another problem encountered is staff mobility, e.g. one per-

son from DFMR, trained in the first visit in January 2000, had been moved to another department by the second visit in September 2000.

The beach change database obviously has the potential for use in the design of sea defence/beach rehabilitation measures. Following Hurricane Lenny in 1999 (and with the permission of the Anguillan authorities), beach profile data for Maunday's Bay and Rendezvous Bay were supplied to Applied Technology and Management Inc. of South Carolina, USA, who were advising individual property owners on beach restoration measures. Data were also provided (again with the permission of the Anguillan authorities) to the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, who had been asked by the insurance company of Cap Juluca to investigate the erosion at Maunday's Bay.

An increase in hard structures (sea walls, rock revetments etc.) on Anguilla's beaches has been noted since Hurricane Luis in 1995. These will inevitably compound the erosion problems already being experienced. The need to implement the coastal development setback guidelines developed in 1996 (Camber, 1996) cannot be over emphasized.

Awareness about beach changes, hurricane impacts and coastal development is an area that needs continual emphasis as beachfront devel-

opment continues in Anguilla. The narrow sandy barriers separating salt ponds from the sea are prime sites for development. During Hurricane Lenny many of these barriers were breached illustrating their fragility, their vulnerability and their unsuitability for permanent buildings.



*Photo 2. Seawall under construction, Maunday's Bay, Anguilla. September 2000.*



*Photo 3. Undermined roadway, Darkwood Beach, Antigua. November 2000.*

#### 4.2.2 ANTIGUA AND BARBUDA

The Fisheries Division (FD) is the main partner agency and is responsible for beach data collection and analysis. (They are also developing the capacity for wetlands, seagrass and coral reef monitoring.) The updated beach change database and software were installed at the FD within this CDB-UNESCO project. Two persons were trained in the data analysis and are considered competent in the use of the 'Beach Profile Analysis' programme. The beach change database was also installed at the Development Control Authority and demonstrated to officers there.

Antigua has a substantial database with continuous coverage over the period 1991–2001, which includes the effects of four hurricanes and one tropical storm (H. Luis 1995, T. S. Grace 1997, H. Georges 1998, H. Jose 1999, H. Lenny 1999). The Barbuda database covers the period 1995–2000.

The beach change database formed the basis for 'Coastal Erosion Hazard Maps' of Antigua and Barbuda, prepared on geographical information systems (GIS) by Mr Philmore James of the FD, as part of an Organization of American States/U.S. Agency for International Development project on Post-Georges Disaster Mitigation. The accompanying technical and

non-technical reports as well as the hazard maps are available on the web.<sup>5</sup>

As in Anguilla, one of the major problems encountered is the loss of profile reference points during hurricanes, even when they are located a considerable distance inland from the vege-

tation line. When this happens, new reference points have to be located, which obviously interrupts the data trend for that particular site. The FD plan to fix the position of their beach profile reference points with a geographic positioning system (GPS) and while this may alleviate this problem, since lost reference points can be located spatially after a hurricane with a fair degree of accuracy, changes in the height of the point will not be reflected.

Fixing of the profile reference points with GPS will, however, allow for linking of the beach-monitoring database directly to the country's geographical information system (GIS). Several agencies in Antigua – the FD, the Development Control Authority and the Environment Division – are interested in this area. The FD, in particular (see above), has the expertise to develop this linkage further.

The beach-monitoring activity used to be a joint activity of the FD and the Development Control Authority (DCA). However, due to staff changes and difficulties with coordination, the involvement of the DCA ceased. Discussions were held on how to re-involve the DCA, since it is recognized that the benefits of monitoring go beyond data collection, and include observa-

<sup>5</sup> <http://www.oas.org/pgdm> then follow the Hazard Mapping link.

*Photo 4. Rock revetment protecting the Government Administration Building, Road Town, Tortola, British Virgin Islands. May 1998.*



tion and assessment of new structural developments, changing beach uses, restriction of beach access, nature of beach dynamics etc. So officers involved in monitoring become knowledgeable about all aspects of their island's beaches and can

thus play an active role in beach management and the enforcement of regulations.

One of the problems present in many countries is the sectoral nature of government and the difficulties this poses for fields such as integrated coastal management. While there has been much talk about the sharing of information (findings, conclusions, applications), the difficulties involved in actually sharing **data** have yet to be fully resolved. For instance, while many agree that the public should have to pay for such information (e.g. information for environmental impact assessments), the question arises whether the information should be freely given to other government agencies. These issues of data ownership and the value of data need further discussion.

The proliferation of hard structures, particularly vertical sea walls, on the beaches in Antigua is another serious problem, and one that needs addressing. However, this will need a concerted effort involving several agencies. Even in Barbuda, which has a low level of beachfront development, serious erosion and loss of buildings took place in August/September 2000. The implementation of the building setback guidelines developed in 1998 (Cambers, 1998a) would be an important first step in reducing the problems caused by developments positioned too close to the active beach zone. Beach sand mining continues to be a problem in Antigua; this activity is controlled by the Ministry of

Communications and Works. However, the existing environmental laws are very ambiguous about the definition of where the beach starts and stops.

#### **4.2.3 BRITISH VIRGIN ISLANDS**

The Conservation and Fisheries Department (CFD) is the main counterpart agency in the British Virgin Islands. Beach-monitoring data were collected between 1989 and 1994; however, then the monitoring ceased. Monitoring in other areas of the environment, e.g. mangroves and coral reefs, also ceased around this time due to staff changes and concentration on other priorities. The 'Beach Profile Analysis' software was provided to the Conservation and Fisheries Department and one officer was trained in its use during this CDB-UNESCO project.

During 2000–2001, the CFD acquired a theodolite and training in its use. During 2001 they plan to re-instate their beach-monitoring programme, concentrating on the north coast beaches of Tortola and Beef Island, specifically: Cane Garden Bay, Brewers Bay, Josiahs Bay, Long Bay Lambert and Long Bay-Beef Island. Permanent markers have been established at these beaches. The objectives of the monitoring are long-term beach change information and an understanding of the sediment budget along this north coast of Tortola and Beef Island.

#### 4.2.4 DOMINICA

The Forestry, Wildlife and Parks Division (FWPD) is the main partner agency and is responsible for beach data collection and analysis. During this CDB-UNESCO project, the updated beach change database and software were installed at the FWPD. One person from this agency was trained in the data analysis and is considered fully competent in the 'Beach Profile Analysis' programme. It is anticipated that the training will be extended to other persons in the Division, who are involved in the monitoring programme. The software and database have also been discussed with the Physical Planning Unit (PPU), although not yet installed there. The PPU is interested in the application of the database to coastal development setback guidelines.

Dominica has a substantial database with coverage over the period 1987–1991 and 1994–2000; this includes the effects of several hurricanes (H. Hugo 1989, H. Luis 1995, H. Georges 1998, H. Jose 1999, H. Lenny 1999).

The FWPD has a history of environmental monitoring (rivers, wildlife) and this may have been an important factor influencing the continuation of the beach monitoring since 1987. In addition, the same officer has been involved in the monitoring programme since 1987 and now has considerable expertise in many aspects of beach management. For

instance, assessment reports were produced after Hurricanes Luis and Marilyn in 1995 and after Hurricane Lenny (Forestry, Wildlife and Parks Division, 1995, 1999). It is anticipated that in the future such reports can be greatly enhanced, e.g. by using profile graphs showing the 'before and after hurricane' situation which can be easily prepared with the 'Beach Profile Analysis' software programme.

As in the other islands, the infrastructure damage, especially to roads and buildings, resulting from recent hurricanes is a major problem. Several beaches, e.g. Toucarie, which in 1987 were wide sandy stretches, are now narrow strips of stones and boulders. Thus Dominicans have lost important recreational resources, and roads have lost natural barriers, which protected them from storm waves.

#### 4.2.5 GRENADA

The National Science and Technology Council (NSTC) is the main partner agency in Grenada. This agency coordinates the beach-monitoring programme with the Fisheries Division, the Lands and Surveys Division, and the Land and Water Resource Unit. The updated beach change database and the software were installed at the NSTC. Within the scope of this CDB-UNESCO project, six persons from the four agencies were trained in the data analysis; four are considered fully competent in the use of the

'Beach Profile Analysis' programme and two will require further training. The software and database were also demonstrated to officers from the Physical Planning Unit, who readily perceived its relevance



*Photo 5. Evidence of the ravages of recent hurricanes, Prince Rupert Bay, Dominica. February 2000.*

to forward planning and development control, and propose to get it installed in their agency in the future.

In addition to these government agencies, the Hillsborough Secondary School in Carriacou is involved in the monitoring programme. Since 1996, students from the third and fourth forms have been collecting data regularly, with the support of the Fisheries Division in Carriacou. The data are then sent to the NSTC for analysis. However, in order for the students to fully benefit from the data collection, training in data analysis needs to be provided in the future.

Grenada has a substantial beach change database covering the period 1985 to 2001 (with one two-year gap, 1991–1993).

Database management was one of the main issues that arose in Grenada. With five agencies involved in data collection, questions regarding location of the database and responsibility for its update, arose. It was decided that the database should be stored at two agencies: the NSTC and the Fisheries Division. Responsibility for collecting and analysing data from the south, west and north coasts should remain with the NSTC, the Lands and Surveys Division and the Land and Water Resource Unit. Responsibility for collecting and analysing the data for the northeast and east coasts would remain with the Fisheries Division. However, logistics for sharing the two databases have not been completely resolved.

The west coast of Grenada experienced serious erosion during Hurricane Lenny in November 1999. In many ways this was a wake-up call for Grenada, since the pre-

vious hurricane to hit Grenada was Hurricane Janet in 1955. Thus, unlike the northern islands, the database in Grenada does not reflect several hurricane events. Furthermore, without recent hurricane experience, there was considerable local concern about the erosion of vital tourism beaches such as Grand Anse.

Responding to this concern, a visit was made to Grenada two weeks after Hurricane Lenny to assess the damage and make recommendations for rehabilitation. (This visit was funded by the CDB-UNESCO project and the Organization of American States.) Following several meetings, a report was produced (Cambers 1999a) advising the Grenadian authorities not to rush to construct remedial structures, but rather to wait for natural beach recovery. After the visit, a committee was organized comprising the Board of Tourism, the Forestry Department, the NSTC, the Organization of American States, several hoteliers and others, to implement the recommendations of the report which included a beach planting programme and the removal of certain damaged structures. As predicted, the beach recovered following the hurricane; this can be seen visually and in the monitoring data, although more time will be required to determine whether the beach fully recovers to its pre-hurricane size.



*Photo 6. Replanting efforts at Grand Anse, Grenada. September 2001.*



#### 4.2.6 MONTSERRAT

The main partner agency in Montserrat was the Agricultural Engineering Unit of the Ministry of Agriculture, Trade and Environment. However, during the volcanic crisis (1995–1998), beach monitoring ceased as many people fled the island. Following a visit in 1998, the monitoring programme was re-established in December 1999 with the Fisheries Division (FD) as the main partner agency. Additional field monitoring equipment (Abney level) was supplied to the FD through the UNESCO-CSI regular programme. During this project, training in field techniques was provided to the FD. The updated beach change database and software were installed there. Two persons from the FD were trained in the 'Beach Profile Analysis' programme, one of whom is considered fully competent in the use of the programme. The 'Beach Profile Analysis' programme and the beach change database were also installed at the Physical Planning Unit and demonstrated to one officer there.

The reduced population of Montserrat (around 5,000 people) is a serious constraint that may influence the long-term continuation of any monitoring programme, especially since there has been recent volcanic activity; in 1999 and 2000 there were reports of a growing dome on the volcano.

Montserrat has a substantial database covering the period 1990–1996; this includes the recovery period after Hurricane Hugo in 1989, as well as the impacts of the 1995 hurricanes. Monitoring has now been re-established since December 1999. Montserrat has also expressed an interest in tying in the beach-monitoring programme with the geographical information system (GIS).

The beach-monitoring database was used by the Physical Planning Unit during the period 1992–1995, when a programme was established to stop the mining of beach sand at all beaches except Farms Bay, and to use quarry sand for all construction purposes except the final plastering/finishing of buildings.<sup>6</sup> However, due to the



*Photo 7. Foxes Bay, Montserrat, one month after Hurricane Lenny, December 1999.*

volcanic crisis, people have had to relocate to the northern third of the island. There is considerable new construction taking place and the supply of sand has become a major issue once again, especially since the quarry is in the 'unsafe' part of the island. The monitoring of beaches again becomes an important tool to effectively manage the sand supply situation.

#### 4.2.7 NEVIS

The Nevis Historical and Conservation Society (NHCS) is the main partner agency in Nevis and is responsible for beach data collection and analysis. Within the CDB-UNESCO project, the updated beach change database and software were installed at the NHCS. Four persons (three of whom were interns) from this agency were trained in the data analysis and are considered competent in the use of the 'Beach Profile Analysis' programme. The software and data-

<sup>6</sup> See article on the 'Wise Coastal Practices for Sustainable Human Development Forum' entitled 'A viable solution to beach sand mining? / Montserrat' by Gillian Cambers  
<http://www.csiwisepractices.org/?read=88>  
(*user name = csi, password = wise*)

*Photo 8. Reclaimed land at Charlestown, Nevis. September 2000.*



base have also been installed at the Department of Planning and Development and two persons there trained in its use.

Nevis has a substantial database with continuous coverage over the period 1988–2001, which includes the effects of five hurricanes (H. Hugo 1989, H. Luis 1995, H. Georges 1998, H. Jose 1999, H. Lenny 1999) as well as several lesser storms. The beach change database has been used to prepare Coastal Erosion Hazard Maps for St Kitts and Nevis (see section 4.2.7).

One of the major problems encountered, as in some of the other northern islands, is the loss of profile reference points during hurricanes, even when they are located a considerable distance inland from the vegetation line. When this happens, new reference points have to be located, which obviously interrupts the data trend for that particular site.

Nevis is one island where a non-governmental organization (NGO) is the main partner agency in the beach-monitoring activity. This illustrates the important role that a dedicated NGO, through its members, can play in environmental management. A series of volunteers from the NHCS have collected beach-monitoring data and, for the past three years, two volunteers have been solely responsible for data collection. The role of the NHCS in continuing and coordinating the monitoring effort is to be commended.

The Department of Physical Planning has been closely involved in the beach-monitoring programme during the early 1990's. As in other islands, there has been a proliferation of hard structures on the beaches which, together with the frequent hurricanes, are compounding the erosion problems and restricting access along

the beaches (Hanley, 1998). Concern about this problem has been voiced for several years, and several management options were discussed in a position paper in 1998 (Cambers, 1998b). New coastal development setback guidelines were also prepared in 1998 (Cambers, 1998c), and while these are being implemented 'informally' the setback distances have not yet been included in planning regulations. However, the problem goes beyond the need for regulations, as illegal unapproved sea defences are being constructed. An assessment of several unapproved coastal defence structures in Nevis was prepared for the Department of Physical Planning early in 1999 (Cambers, 1999b). Thus there is a need for planning, sensitization and awareness, and enforcement.

#### **4.2.8 ST KITTS**

The main partner agency in St Kitts is the Department of the Environment (DE). The updated beach change database and software were installed at the DE during this CDB-UNESCO project. Two persons from the DE were trained in the data analysis and are considered competent in the use of the 'Beach Profile Analysis' programme. One of these persons is from a newly established Parks and Beaches Unit, which has been set up to maintain and enhance the island's parks and beaches. The

software and database have also been installed at the Physical Planning Division and one person there is competent in its use.

St Kitts has a substantial database with continuous coverage over the period 1992–2001; this includes the impacts of four major hurricanes (H. Luis 1995, H. Georges 1998, H. Jose 1999, H. Lenny 1999) as well as several lesser storms.

The beach change database formed the basis for ‘Coastal Erosion Hazard Maps’ of St Kitts and Nevis, prepared on geographical information systems (GIS) by Mr Edsel Daniel of the Physical Planning Division (at present studying at Vanderbilt University), as part of an Organization of American States/US Agency for International Development project on Post-Georges Disaster Mitigation. The accompanying technical and non-technical reports as well as the hazard maps are available on the web.<sup>7</sup>

Like several of their neighbours, St Kitts has also seen a proliferation of hard structures on and adjacent to the beaches over the last few years, especially since the 1995 hurricanes. In particular, the removal of some low sand dunes and the construction of a seawall at North Frigate Bay in the second part of 1999, have caused considerable public concern, as access along the beach was restricted during a seasonal erosion episode (St Christopher Heritage Society Newsletter, October–December 2000).

Coastal development setback guidelines have recently been prepared for St Kitts within the project ‘Planning for coastline change’ (Cammers, 2000b). Implementation of these guidelines will ensure that erosion problems are not compounded as new development takes place, and will reduce the need for further hard coastal defence structures in front of new properties. However, during discussions with the St Christopher Heritage Society (February 2000), concern was expressed about a lack of transparency in the permitting and approval

<sup>7</sup> <http://www.oas.org/pgdm> then follow the Hazard Mapping link.

process, combined with a lack of public involvement in the planning process.

#### 4.2.9 ST LUCIA

The main partner agency in St Lucia is the Department of Fisheries (DF). This agency has been monitoring several beaches in St Lucia since 1990 with the assistance of various NGOs, e.g. the Soufriere Marine Management Area and the St Lucia National Trust. However, it is very difficult to get sustained assistance from other agencies, and the data received is often not continuous and/or unreliable. The officer in charge of the monitoring programme was away on study leave (from the end of 1999 until the end of 2000), so during this period, monitoring ceased. However, the monitoring has since restarted from the beginning of 2001. During this CDB-UNESCO project, the ‘Beach Profile Analysis’ programme was installed on computer at the DF and demonstrated to two other officers from the Department. The beach-monitoring database dates back to 1990. A second beach-monitoring database, focusing only on the northwest coast, was established as one of the activities of the Northwest Coastal Conservation Project (Phase 2). Three years data were collected by this project, which terminated

*Photo 9. Seawall at North Frigate Bay, St Kitts. February 2000.*





*Photo 10. Seawall under construction, Reduit Beach, St Lucia. April 2000.*



*Photo 11. Retaining wall, Port Elizabeth, Bequia, St Vincent and the Grenadines. November 2000.*

Another coastal problem in St Lucia relates to beach sand mining, which again has become a serious issue. Sand mining is under the jurisdiction of the Ministry of Communications and Works. Considerable efforts were made in the early 1990s to ensure that this Ministry was fully aware of the adverse impacts of beach sand mining. However, with a very high staff turnover at this Ministry, such efforts have to be continued, so that the impacts of activities such as sand extraction at river mouths are fully understood and remedied.

#### **4.2.10 ST VINCENT AND THE GRENADINES**

The Seismic Unit of the Ministry of Agriculture and Labour was designated by the government as the main partner agency for the beach-monitoring programme in 1995. However, despite several visits between 1995 and 1999, data were never collected on a regular basis. During the first visit of this CDB-

UNESCO project, in January 2000, the 'Beach Profile Analysis' software was installed at the Seismic Unit and one person was trained in its use. However, further training will be necessary.

Discussions were held with the Ministry of Agriculture and Labour as to the possible nomination of another partner agency, but no decision has been taken to date. The Ministry did, however, express their interest in the monitoring activity especially in view of the damage to the islands' beaches and infrastructure caused by Hurricane Lenny in 1999. The Physical Planning Department also expressed the need for such monitoring information and referred to the erosion at Lower Bay in Bequia, and the destruction of a coastal

in March 2000. Responsibility for coastal management is being transferred to the Department of Fisheries.

St Lucia has seen a proliferation of hard structures on the beaches, particularly along the northwest coast, but also other areas in the south, and concern has been expressed about the effects these were having on beach dynamics. Now that new coastal development setback guidelines have been prepared for St Lucia (Cambers, 1999c), the next stage is to ensure that they are used by the Physical Planning Division of the Ministry of Finance and Planning, so that 'safe' setbacks can be included as conditions for development approval.

road at Hamilton, Bequia, both a result of Hurricane Lenny.

In January 2000, beach monitoring was started in Bequia with the assistance of third form students from the Bequia Community High School and their teacher. Training was provided in field monitoring methods and several sites were established and measured. The 'Beach Profile Analysis' programme was installed on computer at the school and training was provided in its use. It is anticipated that these students will continue the monitoring activity over the next two years and through this activity they will learn about beach dynamics, scientific monitoring and environmental management, and at the same time establish a valuable data base which can be used by the island in the effective management of Bequia's beach resources.

#### 4.2.11 TURKS AND CAICOS ISLANDS

The main partner agency in the Turks and Caicos Islands is the Department of the Environment and Coastal Resources (DECR). The software and updated database were installed at this agency within this CDB-UNESCO project. One person from this Department was trained in the 'Beach Profile Analysis' programme and is considered competent in its use; in addition, the programme was demonstrated to four enforcement officers. The software and database were also installed at the Department of Planning, and one person trained in its use; and at the Coastal Resources Management Project, based in Providenciales, where four persons were trained.

Monitoring was started in the Turks and Caicos Islands in 1995 (in Grand Turk and Providenciales); however, the activity has not been continued and only two data sets exist (one set for 1995 and one set for 1997). As a result of



*Photo 12. Collapsed pool deck, Pelican Beach, Providenciales, Turks and Caicos Islands. July 2001.*

this project monitoring was conducted regularly in Grand Turk in 2000 by the DECR. Discussions are underway to re-start the monitoring in Providenciales, possibly with the assistance of students from the Clement Howell High School. Beach monitoring is very much needed in Providenciales, with its high level of coastal development and vibrant tourism industry which is very much beach-based.

Beach sand mining is a serious problem in the Turks and Caicos Islands, and has reached crisis proportions such that sand importation from the Bahamas is being considered.

The Turks and Caicos Islands, while receiving little damage from Hurricane Lenny in 1999, did receive considerable impact from other hurricanes in the 1999 season, e.g. Hurricane Floyd. Particularly in Providenciales, where coastal development is taking place at a very rapid rate, the need for 'safe' coastal development setback guidelines and control of hard structures on or near the active beach zone is of particular importance. (As a positive sign, it should be noted that in 1998, construction setbacks had been increased from 60 ft from the high water mark to 100 ft from the vegetation line.)

## 5. ISSUES ARISING FROM THE WORKSHOPS ON 'WISE COASTAL PRACTICES FOR BEACH MANAGEMENT'

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The terms of reference for this project (Chapter 2) specified that one-day workshops on the utilization of the beach change databases should be held in each island. Following Phase 1 activities, it was decided to widen the scope of these workshops to include not only beach monitoring and the beach change databases, but also other aspects of beach management. The title selected for these one-day workshops was 'Wise Coastal Practices for Beach Management.' The focus on 'wise' practices ensured a proactive agenda.

Awareness workshops for participants from government and non-governmental agencies, and from civil society, were held in nine of the eleven countries/territories. (Workshops were not held in the British Virgin Islands or St Lucia because the timing was not opportune and/or those countries/territories had other priorities during the project timeframe).

The workshops achieved two goals: firstly they highlighted the existence, nature and results of the beach-monitoring activities in each island, and secondly they initiated a dialogue about beach management practices, ranging from appropriate beach erosion mitigation techniques to the need for public access to the beach, and from water pollution concerns to beach sand mining. In some islands, the workshops have led to specific plans for future action.

The workshops also provided an opportunity for capacity building such that representatives from island agencies compiled and presented the results of their beach change monitoring programmes to a wider audience, and then responded to questions. In some cases (Anguilla, Antigua and Barbuda, Dominica, Nevis, Turks and Caicos Islands), papers and/or handouts on the beach change databases/results were prepared for the workshop participants by the main partner agency. The workshops also provided a forum such that other agencies and individuals became fully aware of the work being done in

beach monitoring and its potential application to sound beach and coastal planning.

This chapter presents a sub-regional overview of the workshop discussions. While this goes beyond the original terms of reference for this CDB-UNESCO project, it is included in this report because it presented a unique, and possibly a first if its kind, opportunity to examine the topic of beach management in nine islands within a five month period. It may also provide a sub-regional framework for future action in beach management.

The workshop programmes, lists of participants and their organizations, as well as the highlights of each workshop, are itemized individually in Appendix V.

### 5.1 NATURE OF THE WORKSHOPS

Standardized outlines for the workshop programme were sent to each island, and the partner agency then modified the programme according to the island's individual needs, and made the necessary arrangements – contacting speakers, inviting participants, arranging a venue, etc.

While the overall goal was to include persons from government and non-governmental organizations, as well as from the private sector and the general public, the actual composition of workshop participants, and total numbers, varied considerably from island to island (see Appendix V). In addition, workshops were held at different times of the day, for instance in Carriacou and Bequia, they were held in the evenings, so that persons working all day could attend. For the purposes of this overview, the participants for each island were grouped into two categories according to whether they represented government agencies or civil society (the latter group including non-governmental organizations, the private sector and the general public), and a criterion of 70% from one group represented a majority, see Table 3.

**Table 3. Categorization of island workshops according to the participants' affiliations**

<b>Government majority</b> (>70% of the participants from government agencies)	<b>Civil society majority</b> (>70% of the participants from civil society: non-governmental organizations/private sector/general public)	<b>Mixture of government representatives and civil society</b>
Antigua and Barbuda, Dominica, Montserrat, St Kitts	Nevis, Bequia (St Vincent and the Grenadines)	Anguilla, Carriacou (Grenada Grenadines), Turks and Caicos Islands

## 5.2 FINDINGS OF THE WORKSHOPS

Beaches in these islands are important resources for islanders and tourists. In regard to tourists, the workshop in the Turks and Caicos Islands highlighted the fact that a recent visitor survey had shown that for 71% of the respondents beaches were their primary reason for visiting the territory. However, the grouping 'islanders' is not homogeneous, representing a wide cross-section of people, all with different interests in the beaches, e.g. hotel owners, beachfront land owners, coastal communities, fishers, boat owners, water sports instructors, sand miners, truckers, persons who visit the beach for recreation, government representatives, business persons, etc. Because of the small size of the eastern Caribbean islands and their growing populations, beach resources are limited, leading to many conflicts, some of which were highlighted in the workshops.

### 5.2.1 NATURE OF THE CONFLICTS

The conflicts highlighted in the workshops were between different user groups:

- developers and beach-user groups (fishers and beach vendors);
- coastal landowners and the public over the right of access to the beach;

- sand-mining operators and beach users;
- coastal property owners protecting their land from the sea and beach users;
- persons dumping solid and other waste at the beach or inland and beach users.

Furthermore, these conflicts between different user groups were compounded by two factors:

- political control of the planning process;
- inadequate and ambiguous environmental legislation.

*Conflicts between developers and beach-user groups* were clearly described in St Kitts where in three cases new developments had forced fishers to abandon beaches they had traditionally used for fishing. While in the Turks and Caicos Islands, an ongoing conflict between beach vendors wishing to sell their goods to the tourists on the beach, and hotel managers who wanted to keep the vendors away from their guests on the beaches, was discussed.

*Conflicts between coastal landowners and the public over the right of access to the beach* were the major concern of workshop participants in the Turks and Caicos Islands. Developments had encroached on public access lanes and in some cases developers/individuals had deliberately blocked the lanes. Thus a privilege that islanders had always taken for granted, the

right to go to the beach, was being eroded. Furthermore they sometimes felt like 'intruders' on beaches adjacent to large hotels. Similar concerns about the loss of public beach access and inadequate parking facilities were voiced in other islands, e.g. Anguilla, Antigua and Barbuda, and Nevis.

*Conflicts between sand mining operators and beach users* were discussed in several islands. In Montserrat, participants noted that sand mining was not compatible with the principle of sustainability, especially given that there were so few beaches remaining accessible to islanders in the 'safe zone' of the island. In Carriacou, participants described how graves were disappearing into the sea as a direct result of sand mining, and they called for a stop to the mining and the use of imported sand. Similarly in the Turks and Caicos Islands, where sand supply has become critical as a result of the rapid development, a call was made to import sand from the Bahamas, which has a number of (biologically) sterile sand banks. While on the other hand, in Barbuda, which does export sand from an inland site, and which tries to follow environmental guidelines in the mining operation, the revenue from sand export provides a third of the Barbuda Council's operating budget. Even though much of Barbuda's sand export goes to the sister island of Antigua, the illegal mining of beaches in Antigua is still a major problem. The inadequacies of beach sand as a building material, especially when not properly washed, were emphasized in the Turks and Caicos Islands.

*Conflicts between coastal property owners protecting their land from the sea and beach users* were also a cause for concern in several islands. It was recognized in Dominica, that the proliferation and expansion of seawalls was resulting in the loss of beaches for recreation, turtle nesting areas, crab habitat, and was disrupting fishers who were used to hauling up their boats on the beaches; the use of alternative erosion mitigation methods was the subject of discussion. While in Nevis, where an alternative measure, namely offshore breakwaters combined with dredging and beach nourishment, was being

implemented at one beach, there was considerable concern about the effects of the dredging on neighbouring beaches. Damage to coral reefs as a result of dredging was discussed in Bequia, and serious doubts were voiced as to the likely success of future beach nourishment projects there.

*Conflicts between persons dumping solid and other waste at the beach or inland and beach users* were major concerns in several islands. In Carriacou, this was the major issue of debate in the workshop, and concerns included the use of beaches as a dumping ground for garbage including dead animals, the use of beaches as bathrooms, and solid and liquid waste being transported via the ghuts to the beaches and the sea. In Dominica it was noted that there was a need to change attitudes to rubbish disposal, since rubbish dumped inland eventually ended up at the beach. As one participant mentioned 'The coastline is an eyesore with ravines of garbage.'

Two factors were accentuating these conflicts in many islands: political control of the planning process and inadequate and ambiguous environmental legislation.

*Political control of the planning process* was a concern voiced in many islands including Anguilla, Montserrat, Nevis, St Kitts and the Turks and Caicos Islands. In Anguilla, for instance, it was pointed out that in the present planning process, appeals relating to decisions made by the Development Control Board are referred to Executive Council, and that 90% of the appeals go against the recommendations of the Department of Physical Planning. In the workshop in the Turks and Caicos Islands, examples were provided where development decisions never went to planning or environmental agencies for technical advice. Similarly it was pointed out in St Kitts that planning decisions are being made by the political directorate with little or no technical input, and as a result the physical planning process is becoming increasingly marginalized. In Montserrat, reference was made to the 'five year syndrome' or the incompatibility between the political time scale (usually four or five years in these islands) and the longer term planning timeframe.



*Inadequate and ambiguous environmental legislation* was cited as reason for much of the conflict over beach resources. For instance in Antigua, the legal definition of a beach causes major problems for the enforcement of sand mining legislation, and the low levels of fines provide little deterrent. Similar problems exist in other islands, e.g. in the Turks and Caicos Islands, where the legislation is unclear over the issue of public access to the beach. In Nevis and Dominica, reference was made to the lack of enforcement of existing laws, e.g. the litter laws.

### 5.2.2 CONFLICT RESOLUTION

While there was insufficient time to examine this subject in detail in workshops of only one day's duration, some interesting insights did emerge that warrant further examination in the future.

During the workshop in the Turks and Caicos Islands, one participant put forward the statement: 'In small islands, where tourism is the main income-earner, inevitably environmental issues take backstage.' While this is undoubtedly true at the present time, the question must be asked 'Must it always be this way?'

#### *Providing for the equitable sharing of beach resources*

Resolving the conflicts discussed in the workshops will, in the long term, require mechanisms to be put in place for the equitable sharing of beach resources. This idea was voiced in different ways in the workshops, such as developing a sense of civic pride, coastal stewardship and ethical considerations.

*Installing a sense of civic pride* was one of the main challenges identified in Antigua, where it was stated that a general sense of apathy and a 'so what' attitude prevails. Similarly in Dominica, the need for individuals to have a personal commitment to the benefit of their country was voiced. It was recognized that in many cases this would involve sacrificing individual gains or benefits for the greater good of the community or island.

*The concept of coastal stewardship* was voiced in different terms in the workshops. In Nevis it was pointed out that the coastal zone is the area of highest risk and the area of highest financial investment. Added to these factors is the issue of public rights to the coast, particularly the beach. Thus the management of the coast should not be solely dictated by financial considerations, rather an approach based on coastal stewardship should be adopted. In a similar vein, the participants in the Dominica workshop recognized that, while beaches should be well managed and promoted as part of the overall ecotourism product, the primary goal of beach management should be for the benefit of islanders, thus reinforcing the idea that financial considerations (tourism) should not be the only ones considered. In Carriacou it was recommended that everyone needs to be a coastal steward in order to get the necessary coastal information across. Thus the ideas being voiced behind stewardship were for islanders to take a collective responsibility, and for every individual to play a role in the implementation of wise coastal practices, which should not necessarily be dominated by financial goals.

*Ethical considerations* were voiced in Montserrat, where it was suggested that since beaches belong to everyone, it was not ethical for the government to take away that right of national ownership by allowing beach sand mining.

However, this concept of the 'equitable sharing of resources' is not going to be easy to convey or accept. In the Turks and Caicos Islands' workshop it was noted that there may sometimes be cases where it is no longer feasible to protect certain areas from coastal erosion, thus the only option is to let them be eroded by the sea. One participant in Bequia stated that 'The hardest thing to come to terms with is that some hotels will end up not having a beach.'

#### *Tools for conflict resolution*

In the St Kitts workshop, one participant, in discussing how to resolve conflicts between fishers and new development, suggested that the use of education, dialogue, co-management and clearly

defined agency responsibilities and guidelines could reduce such conflicts. These suggestions were echoed in several other islands, and are discussed below, under the following headings:

- education and awareness;
- community responsibility for beaches;
- improved coordination between agencies and clear definitions of agency responsibilities;
- proactive approaches to planning, including adequate coastal development setbacks;
- improved beach facilities.

*The need for improved education and awareness* was cited in several islands. As was noted in St Kitts, the only way to reduce the marginalization of the physical planning process was through education and public involvement. In order to achieve this, NGOs would have to adopt a 'watch-dog' role through their members, and a free press is essential in this respect. Several islands, including Anguilla, Bequia and St Kitts suggested the use of videos to demonstrate wise and unwise practices. In Montserrat, the use of the Internet to bring public pressure to bear on a political decision to mine sand from an important turtle-nesting beach, resulted in a reversal of the decision. In fact one of the recommendations from the Montserrat workshop was to undertake a widespread sensitization campaign about the sand mining issues. The need to extend such efforts to tourists was noted in Anguilla and Carriacou, in particular so that they accept a natural-looking beach vista (with seaweed and seagrass), rather than a perfectly manicured beach.

*Community responsibility for beaches* was a topic taken up for discussion in Antigua and Barbuda where it was suggested that this was one way to generate civic pride. It was suggested that there were many staunch environmentalists at the community level, but the problem was how to unite these individuals to make a difference. Suggestions such as community beach clean-ups and 'best kept beach' competitions were ideas discussed in Dominica. The importance of beaches in the family structure was described in Montserrat where beaches are considered a place for family bonding.

*The need for improved coordination among agencies and the clear definition of agency responsibilities* was noted in several islands: Anguilla, Antigua and Barbuda, Dominica, Nevis and St Kitts. The need to share information among agencies, e.g. beach-monitoring data, was emphasized in Antigua and Barbuda, and in Bequia, where one of the workshop recommendations resulted in a presentation about the beach monitoring to a meeting organized by the Tourist Board. Strengthening existing organizations and/or creating new agencies for coastal management was discussed in Dominica, Nevis and St Kitts. In many islands new legislation, regulations and plans have been in the pipeline, awaiting government approval for many years, e.g. a land-use development plan in Anguilla, beach regulations in St Kitts, fisheries regulations in Dominica; these need to be brought to the front of the queue and passed into law.

*Proactive approaches to planning* were thought to be another way to reduce conflicts. This was suggested in relation to sand mining in St Kitts and to beach erosion in Nevis, so that instead of just reacting to crisis situations, agencies had prepared well-designed strategies in advance. In St Kitts and Dominica, zoning plans for beaches were suggested as ways to reduce conflicts, while in Nevis, preparations for a coastal management plan were scheduled to start by the end of 2000. Although perhaps the crux of the issue was identified in Anguilla, where it was stated that more public involvement in the planning process is needed.

*Implementation of adequate coastal development setbacks* was identified as one of the planning mechanisms that would help reduce some of the conflicts. The difficulties of enforcing such measures in the political climate were discussed in Anguilla and in Antigua and Barbuda. The need to increase existing setback distances was noted in the Turks and Caicos Islands and Dominica, and in the latter island one participant noted that 'Hurricane Lenny was a blessing in disguise' since this event clearly showed the public there was a need for such measures.

*Improvement of beach facilities* was recognized in many islands as a way to better utilize the resources. Suggestions included developing beach-rating systems (St Kitts) such as the European Blue Flag system (Antigua and Barbuda). The concept of carrying capacity and limits to numbers of users was discussed in the Turks and Caicos Islands and in Carriacou (in relation to Sandy Island, a vulnerable offshore cay). Water quality was another concern voiced in the Turks and Caicos Islands, and pollution from yachts was identified as an issue in Bequia.

### 5.3 FUTURE DIRECTIONS

Many of the ideas and proposals for conflict resolution that were voiced in the workshops, are preliminary and require further discussion, elaboration and refinement through dialogue, meetings and an Internet-based discussion forum, such as the WiCoP forum described in Chapter 1. As a follow-up activity, UNESCO-CSI held an inter-regional workshop on 'Furthering Coastal Stewardship in Small Islands' in Dominica, 4–6 July 2001, to further advance some of these issues, in particular those relating to the equitable sharing of resources.

Obviously a first step is to share information by ensuring that workshop reports are circulated to the participants and the relevant branches of government. Reports have already been prepared and distributed in some islands, e.g. Anguilla and Dominica. In other islands, e.g. Bequia, beach erosion issues discussed at the workshop, were presented to the Tourism Association at a subsequent meeting. It was particularly interesting to note that the Turks and Caicos Islands planned to publish the workshop papers and discussions and to use them as the basis for a framework beach management plan to be discussed with the political directorate in mid-2001. In all cases, specific outcomes from the workshops have been identified and are being pursued. These are described in the relevant appendices. They range from plans to hold decentralized workshops on 'Wise Coastal Practices for Beach Management' in Dominica, to an education and awareness campaign about beach sand mining in Montserrat.

While each island is unique and has a multitude of different ideas for a way forward, the general framework can perhaps best be summarized in a quotation from the Nevis workshop: 'An educated public can adopt wise beach management practices.'

## 6. DISCUSSION: BEACH-MONITORING ACTIVITIES AND INTEGRATED COASTAL MANAGEMENT

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All the islands involved in this project are small islands – some are Small Island Developing States (SIDS), some are territories. As such, they face similar problems: small size and populations, the importance of their coastal areas environmentally and economically, their dependence on outside influences (e.g. economic factors in North America), and their vulnerability to natural disasters.

Well-designed environmental monitoring programmes provide information needed for management and thus are an integral part of management. While the beach-monitoring activities focus on just one geographical part of the coastal system, their implementation involves all aspects/principles of integrated coastal management. The following discussion focuses on monitoring within the wider context of integrated coastal management.

### 6.1 TANGIBLE AND INTANGIBLE BENEFITS OF ENVIRONMENTAL MONITORING

A monitoring programme may be divided into four components: data collection, data analysis, data interpretation and data application. To simplify the differences, a comparison may be drawn: ‘oceans of data, seas of information, rivers of knowledge and drops of wisdom’. Thus the goal of the monitoring may be seen as deriving a few drops of wisdom, or wise decisions, from the oceans of data, or hundreds of beach profile graphs.

In order for the maximum benefit to be derived from a beach-monitoring programme, all four components (data collection, analysis, interpretation and application) should be in place in the island. However, even if only one component is ongoing, e.g. data collection, an island may derive considerable benefit. For example, regular monitoring visits to the beaches, provides information about seasonal erosion and

accretion cycles, and other simple observations may show the loss of a beach access or excessive garbage on the beach. Armed with such information, persons involved in monitoring become knowledgeable about their island’s beaches and can then play an active role in beach management.

### 6.2 BUILDING INSTITUTIONAL CAPACITY

Through the beach-monitoring activities over the past decade, data collection has become an established activity in most islands. With the help of this CDB-UNESCO project, data analysis and data interpretation are also becoming established activities in most islands. However, the application of scientific data to coastal decision-making, e.g. ways to use the information in the review of coastal planning applications, or in the selection of beaches for mining, is a very difficult skill to transfer. It involves individuals, their perceptions and background-training, as well as institutional procedures for decision-making. Some of the islands have the potential to move forward to the data application stage, particularly those islands where the monitoring is in the hands of persons with tertiary (university) education. For instance, individuals in Antigua and Barbuda, and St Kitts and Nevis have used the beach change database to develop coastal erosion hazard maps (see sections 4.2.2, 4.2.7, 4.2.8).

However, it is one matter to strengthen institutional capacity at the technical and professional levels, and yet another matter to actually use that enhanced institutional capacity. All too often island governments prefer to call in outside experts, rather than to consult and listen to the opinion and advice of their own professionals. This is a significant problem that needs to be addressed. Unless island governments listen to, and heed the advice of their own support

staff and professionals, efforts at training persons at this level will be under-utilized, and valuable staff members will become part of an overseas 'brain-drain.'

The reality, in the smaller islands in particular, shows small environmental agencies with very few persons with tertiary education, and difficulties in keeping good staff. These problems are evident in many different ways in the islands. For example, in many cases environmental agencies are fairly new and environmental monitoring may be a relatively recent activity. Thus while there is often considerable enthusiasm for collecting the data in the field, there is often less interest in the data analysis aspects because of unfamiliarity with the objectives and results of environmental monitoring.

Some islands have found innovative ways to maximize their institutional capacity. For instance, Anguilla has used secretarial staff to enter monitoring data on computer. In addition, by ensuring that these staff members have the opportunity to take part in field data collection on occasion, the data entry becomes more meaningful, interesting and accurate.

Utilizing the assistance of NGOs in the monitoring activities is another way of developing institutional capacity and also a means for involving members of the public in environmental management. This has worked particularly well in Nevis and also in St Lucia. Similarly in Dominica, communities taking part in the Environmental and Coastal Resources project (ENCORE) were involved in beach-monitoring activities for a three-year period (1994–1996). While unfortunately their involvement did not continue once the ENCORE project finished, those persons residing in the communities who were involved in monitoring now have the benefit of increased knowledge about the changes taking place on their community's beaches and how to deal with those problems. In a further effort to build capacity at the community level, Dominica plans to hold decentralized 'Wise Practices for Beach Management' workshops in 2001, as a follow-up activity to the workshops held during this CDB-UNESCO project.

Involving schools in beach monitoring, is another way of imparting information about beach changes and beach management to students, their parents and communities. The students learn about science and its applications to their island environments. This has been illustrated successfully in Carriacou, in Grenada's Grenadine Islands, where students have been monitoring the island's beaches for more than three years. A similar programme started within this CDB-UNESCO project in Bequia, in St Vincent and the Grenadines. Involvement of high school students in the beach monitoring is also being considered in the Turks and Caicos Islands.

These different ways to maximize institutional capacity and to involve other groups require considerable effort and time from the main partner agency. Often, it takes the partner agency more time to coordinate and train another group, as well as to oversee the quality of the data, than for the partner agency to do the actual monitoring. Thus commitment to the overall goals of integrated coastal management are crucial. Furthermore, in order for such efforts to work, the monitoring protocols, particularly for data collection and analysis, must be standardized and simple.

### 6.3 SECTORAL AND INTEGRATED APPROACHES

Proponents of integrated coastal management have long deplored the sectoral nature of government institutions. However, there is a long history of sectoral government in the Caribbean islands, which continues up until today. Hence, perhaps the focus should be on ways to strengthen the sectors whilst at the same time promoting ways to share ideas, exchange information and coordinate actions. While considerable efforts are being made in this direction, especially through projects and committees, true integration is some distance away in most of the islands.

Grenada is one island that has made an effort to integrate its beach-monitoring activities. Four different agencies from two different ministries work together to collect and analyse the data. However, mechanisms still have to be

established in Grenada to share the updated databases.

The difficulties of coordination can be seen in Anguilla, and Antigua and Barbuda, where beach-monitoring programmes were initially established with both planning and environmental agencies playing key roles. However, after two or three years, the planning agency ceased its input to the data collection process as other priorities took precedence, and the environmental agency was left to continue the monitoring activity on its own.

While integrated coastal management calls for the sharing of information, the difficulties involved in actually sharing **data** have yet to be fully resolved. Some islands have put in place a system whereby the public has to pay for such information, e.g. for use in environmental impact assessments, although the payment usually covers only the printing costs not the actual cost of the data collection. The question arises whether such information should be given freely to other government departments and statutory bodies. Issues regarding data ownership and monetary value require further discussion within the region.

As a result of this CDB-UNESCO project, environmental and planning agencies in most islands are now involved in the beach-monitoring activities, if not directly with data collection, at least with data interpretation and application. However, in most islands it is the department with responsibility for public works which is directly concerned with sea defences and the control of beach sand mining. These agencies therefore have an important role to play in beach management, especially in view of the fact that beaches provide natural, flexible barriers, which protect infrastructure such as roads. It is often difficult to involve agencies with responsibility for public works in environmental and planning initiatives; for instance, they were only represented in a few of the island workshops despite being invited to all the workshops. Nevertheless, their involvement in beach management, as partners with planning and environmental agencies, as well as with coastal communities and other groups from civil society, must be an ultimate goal.

#### 6.4 TOP-DOWN AND BOTTOM-UP APPROACHES

Recent trends in integrated coastal management have pointed to the need for a bottom-up approach rather than the traditional top-down approach. But perhaps, a common ground needs to be developed, which brings together the top and the bottom, a difficult task indeed. A recent paper by Courtney and White (2000) points to this very problem '... issues facing Philippine coasts and their human communities are too complex and caused by too many factors to find viable solutions by intervening only at the local level.'

The monitoring activities described in this report fall somewhere in the middle of the spectrum between top and bottom. Aiming as they do to strengthen institutional capacity at the professional and technical level, they have also attempted in some islands to enhance capabilities at the community, NGO and school levels.

The need to continue focusing efforts on the bottom-up approach was clearly illustrated in many of the island workshops. In St Kitts, the construction of a seawall, which restricted access along the beach during a seasonal erosion episode, resulted in considerable concern and debate about a lack of transparency and public involvement in the permitting and approval process. Ways to give islanders a voice and a role in the management of their resources must continue to be sought, as one workshop participant in the Turks and Caicos Islands asked 'Where can the public express their viewpoints on issues such as these (in reference to a dredging permit)?'

Yet efforts directed at the bottom-up approach should not dilute efforts at the top-down approach. In many of the islands, all major, and sometimes too all minor development decisions are made by the political directorate, with or without the advice of their technical support staff. Marginalization of technical agencies, especially planning, was an issue brought out at several of the island workshops. Thus innovative ways must be found to provide essential environmental information to the political and senior administrative level, so as to

assist them in the making of informed decisions. This will not be a simple or clear-cut task, because while it is relatively easy to provide training to technical and professional persons through workshops and other means, time constraints make it impossible to apply similar methods to politicians and senior administrators. This was evidenced by the fact that at nearly all the workshops, senior administrators and ministers were only present for the opening ceremonies. (The one exception was Anguilla, where several senior administrators and government ministers remained for the entire morning session). Thus methods must be found that have continuity and relay the information in a concise, easily understandable and relevant manner, and which recognize that politicians have other agendas to consider besides the environmental one.

#### **6.5 FROM LOCAL TO REGIONAL TO GLOBAL LEVELS**

There does not as yet exist any formal mechanism for reporting environmental monitoring results to a central agency; this is an area that merits further consideration. With many aid agencies basing their monetary assistance solely on economic indicators such as gross domestic product (GDP), incorporating environmental indicators such as the loss/reduction in size of an island's beaches because of a particularly severe hurricane or as a result of inappropriate coastal construction, might go some way

towards providing a more realistic picture of an island's true state of development.

Similarly, there is no mechanism within the sub-region for exchanging information about beach management issues. For example, after Hurricane Lenny, several islands were considering offshore dredging to replace eroded beaches, but did not know where to turn to for advice, apart from coastal engineering firms. Yet there exists a wealth of hands-on experience about such activities in a number of islands, e.g. Anguilla, British Virgin Islands, St Lucia. Establishing a focused, electronic list for sharing such information regionally could provide for information exchange and practical advice. While the region faces many limitations with e-mail and Internet access, these should improve in the future and should not deter the start of such an information exchange network.

Moving beyond the regional level to the global level, small island developing states and island-territories all over the world face similar problems relating to sustainable development and environmental management. Exchanging information globally is yet another way to benefit from the experiences of others in similar situations. However, in order for such exchanges to be maximized and not too time consuming, they have to be focused, for instance the global forum on 'Wise Coastal Practices for Sustainable Human Development' moderated by UNESCO's Coastal Regions and Small Islands platform seeks to define, assess and implement wise coastal management practices.

## 7. CONCLUSIONS AND RECOMMENDATIONS

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This project has resulted in the building of institutional capacity in the field of beach management, such that the beach change monitoring programmes in nine of the eleven countries/territories are now more firmly established, and seven are sustainable in the sense that they are likely to continue beyond the life of this project. In most islands, several persons from environmental and planning agencies are involved in the programmes. Furthermore, islanders now have the skills, training and tools for beach change data collection, analysis, interpretation and application.

However, while environmental and planning agencies, as well as NGOs and schools in some of the islands, have been involved in the activities, little success has been achieved in bringing agencies responsible for public works on board. Thus, this is an area where further efforts are required in the future.

Furthermore, technology is never static, and new skills and tools need to be developed to interface the beach-monitoring databases with geographical information systems. Some islands are already moving ahead in this area and other regional initiatives may be able to provide assistance in this area.

The dialogues and discussions on the wider field of beach management have been especially enlightening on many issues. Ways to follow-up on some of the recommendations made at the workshops need to be pursued. One of the most interesting concepts related to ideas of coastal stewardship and the need to involve all of civil society in looking beyond individual needs to the good of the country.

### 7.1 RECOMMENDATIONS

(a) When considering potential follow-up to a regional project such as this one, it is important to consider every country/territory individually, particularly as regards the stage they are at with their

monitoring programmes and the type of further assistance needed. Based on the issues discussed and the recommendations made at the workshops, several specific follow-up actions are listed below:

- Provision of additional beach-monitoring equipment and training to the Fisheries Division staff in Barbuda, so that beach monitoring in that island can be carried out on a more regular and frequent basis than at present;
- Training of students at the Hillsborough Secondary School in Carriacou in the use of the 'Beach Profile Analysis' software, in order to complement and enhance their data collection activities;
- Decentralized workshops on 'Wise Coastal Practices for Beach Management' in Dominica, so as to determine concerns and plan action at the district level;
- Sensitization campaign on sand mining issues in Montserrat;
- Extending the monitoring to other islands in the St Vincent Grenadines, in particular Mayreau;
- Involving high school students in monitoring activities in the Turks and Caicos Islands;
- Holding a workshop/discussion forum on beach management with senior decision-makers and government ministers in the Turks and Caicos Islands and preparing a framework beach management plan;
- Further training in short environmental video preparation and broadcast (Anguilla, Grenada and St Lucia).

Some of these activities will be carried out by the countries/territories themselves, but some may require additional assistance.

(b) Further development of the skills and technologies used in beach monitoring is required.



For example most of the countries/territories have developed or are developing skills in geographical information systems (GIS), and an interface needs to be developed so that the beach change databases can be easily utilized with GIS.

(c) Enhance the sharing of information relating to beach management within the region. There is a considerable source of practical knowledge and information in the islands about beach changes and the types of erosion mitigation methods that have worked or not worked. New mechanisms and activities need to be developed, and existing mechanisms need to be fully utilized to enhance that knowledge base and to share it within the region and with other small islands. Some suggestions follow:

- Meetings, workshops and conferences (e.g. the Conference on ‘Managing Beaches

in the Caribbean – Investing in our Future,’ 18–21 June 2001, Puerto Rico);

- Electronic (e-mail) networks;
- Internet-based discussion fora, such as the ‘Wise Coastal Practices for Sustainable Human Development’ forum.

(d) One of the many interesting ideas emerging from the workshops related to the need to provide for the equitable sharing of the region’s limited beach resources. Such concepts lie at the heart of integrated coastal management, but are very difficult to implement in practice. The ideas discussed, such as those relating to collective responsibility, coastal stewardship, civic and national pride need to be further developed to see if they can provide a framework and/or be translated into working tools. As a first step towards this goal, an inter-regional workshop sponsored by CSI on ‘Furthering Coastal Stewardship in Small Islands’ was held in Dominica, 4–6 July 2001.

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## SUMMARY OF THE FIELD PROJECT 'MANAGING BEACH RESOURCES AND PLANNING FOR COASTLINE CHANGE: CARIBBEAN ISLANDS'

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<i>Revision date</i>	31 October 2000
<i>Title</i>	Managing beach resources and planning for coastline change: Caribbean islands. (The project was formerly titled 'Coast and beach stability in the Caribbean' and is known locally by an old acronym – COSALC.
<i>Goal</i>	To develop in-country capabilities so that small islands of the Caribbean, often economically dependent on coastal tourism, can effectively manage their changing beach resources and plan for coastline change in a framework of integrated coastal management.
<i>Location</i>	The initial focus was on small islands in the eastern Caribbean: Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Turks and Caicos Islands, United States Virgin Islands; recently the scope has widened to include Haiti and the San Andres Archipelago (Colombia).
<i>Starting date</i>	1985; the project was re-focused in 1996.
<i>Partners</i>	Government agencies responsible for physical planning, fisheries, forestry, natural resources, national parks, and science and technology councils; schools; and environmental non-government agencies in the 13 countries/territories; Caribbean Development Bank, Organization of American States, Organisation of Eastern Caribbean States Natural Resources Management Unit (who have provided support); University of Puerto Rico Sea Grant College Program (who have been joint partners since 1994); UNESCO: Communications Sector (Kingston office), Associated Schools Caribbean Sea Project (Port-of-Spain office), Coastal Marine Programme (1985–1995), and the Coastal Regions and Small Islands platform, 1996 onwards.
<i>Pilot project leader</i>	Dr Gillian Cambers University of Puerto Rico Sea Grant College Program PO Box 9011, Mayaguez, Puerto Rico 00681-9011 tel: +787 832 3585, fax: +787 265 2880 e-mail: g_cambers@hotmail.com
<i>Description</i>	Within COSALC, there are at present four main activity lines:  (1) <i>Understanding beach changes</i> , 1985 – present, 13 countries/territories: this involves providing persons from government agencies and non-governmental organizations with the skills, equipment, training and software to measure, assess and man-

age the various phenomena associated with beach erosion. Beach-monitoring programmes, using standardized methodology, have been established in the islands; these are maintained and managed by the islands themselves; databases cover periods of 1–12 years. The information is being used by the islands in coastal planning and erosion mitigation.

(2) ***Planning for coastline change***, 1996 – present, five countries/territories: this activity seeks to apply the information collected in the activity line ‘Understanding beach changes’ so as to ensure that new coastal development is placed at a safe distance from the active beach zone, thereby providing for the safety of coastal infrastructure and the conservation of beaches. A generic methodology was developed which has been applied to five countries/territories (Anguilla, Antigua and Barbuda, Montserrat, St Kitts and Nevis, St Lucia) so that specific safe setback distances have been determined for individual beaches in these islands.

(3) ***Environmental video production and broadcast***, 1998 – present, three countries/territories, in collaboration with the UNESCO Jamaica Office: this activity seeks to get the message into the living room by providing training and equipment to persons from environmental and broadcast agencies in three countries/territories (Anguilla, Grenada, St Lucia) to design, prepare and broadcast short environmental video clips (30 seconds – 1 minute duration) which carry a specific message and can be broadcast repeatedly.

(4) ***Sandwatch project***, 1999 – present, five COSALC countries, 13 Caribbean countries total, in collaboration with the UNESCO Associated Schools Project Net, Caribbean Sea Project: this three-year project seeks to train schoolchildren in the use of the scientific method through monitoring and observing changes, activities and processes at local beaches; and then, with the assistance of their teachers, parents and communities, to apply that information to design and implement specific projects to solve a particular problem while also improving the environment at their local beaches.

*Achievements & assessment* (1) ***Understanding beach changes***: As a result of training and capacity building over a decade, beach-monitoring programmes have been fully established in 13 countries/territories, and by December 2000 will be self sufficient (running without external assistance) in at least 60% of these countries/territories.

(2) ***Planning for coastline changes***: safe setback distances have been designed for several countries/territories; in three countries/territories (Anguilla, Montserrat, St Kitts-Nevis) they are being implemented informally by planning departments; in one country (Antigua and Barbuda) they are awaiting planning legislation; in one country (St Lucia) they are under review. In none of the islands have the setback distances yet been incorporated into planning legislation.

(3) ***Environmental video production and broadcast***: six short video clips have been produced and aired on local television in the three countries/territories. Further training and editing equipment is needed before this activity becomes an established one in the three pilot project countries/territories, and before the activity can be expanded to other countries.

(4) *Sandwatch project*: this project was launched in 2000 and a first training workshop for teachers is scheduled for the first half of 2000, after which the project will get underway in the various countries.

*Future directions*

Future activities will be focused on beach management in the islands of the Caribbean, but wherever possible, linkages will be established with small islands in other regions of the world in order to share and enhance ideas and activities. Specifically future directions are:

(1) To evaluate the success of the longer-running beach-monitoring programmes by determining if they continue once project support is reduced; to continue to work with the newer monitoring programmes to bring them to a level where they can continue without outside support; to expand the monitoring protocols to other islands in the region and in other regions.

(2) To develop linkages and interfaces between the beach change databases and geographical information systems.

(3) To evaluate the use and the effectiveness of the 'safe' setback concept, and to determine whether it can be applied as a planning concept to other islands in and beyond the region.

(4) To continue to work with the islands of the region to reduce their dependence on beach sand for construction and to develop the use of alternative materials.

(5) To establish an electronic communication network amongst the islands taking part in the project for the purpose of sharing information and solving problems.

(6) To work with other agencies in the region to enhance and improve overall beach management which is so important to the economic and tourism development of the region.

(7) To develop a cadre of persons in the islands trained in environmental video production and broadcast, who will be skilled and equipped in the dissemination of information on environmental and coastal issues to the public.

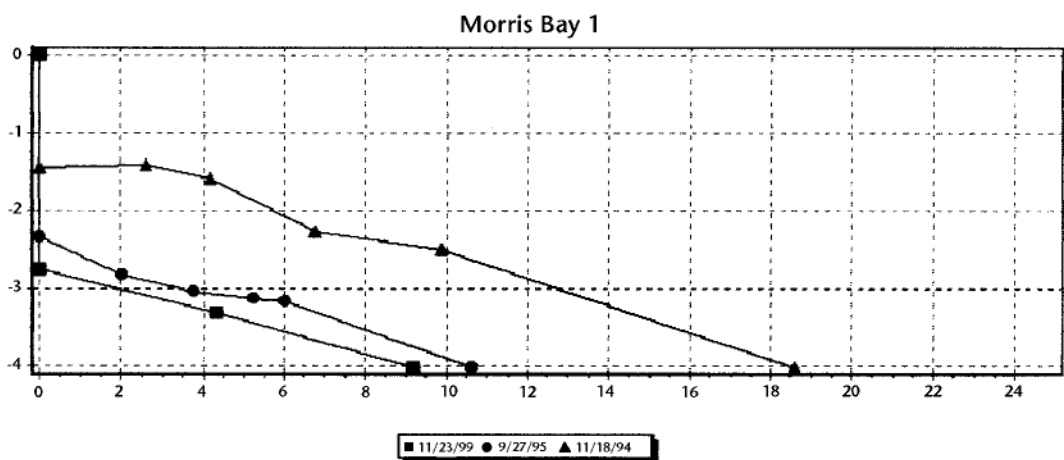
(8) Through the implementation of the Sandwatch Project, to educate schoolchildren, their parents and communities in the scientific monitoring and wise management of their beach resources.

## BEACH-MONITORING DATA FOR A SAMPLE SITE (MORRIS BAY, ANTIGUA)

### 1. Data Table

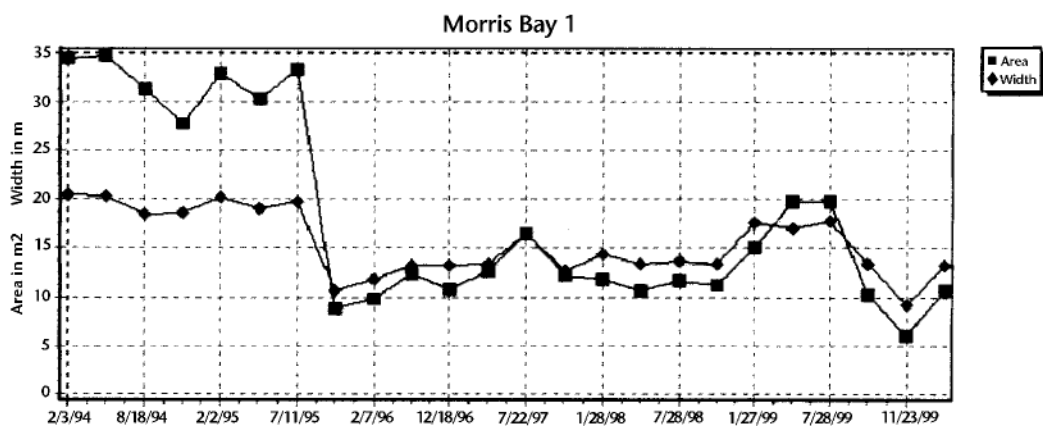
Date	Profile area (m <sup>2</sup> )	Profile width (m)
02.03.94	34.332	20.478
04.27.94	34.683	20.397
08.18.94	31.210	18.538
11.18.94	27.715	18.596
Mean 1994	31.985	19.502
02.02.95	32.778	20.190
05.05.95	30.221	19.060
07.11.95	33.205	19.760
09.27.95	8.862	10.644
Mean 1995	26.266	17.414
02.07.96	9.826	11.825
05.09.96	13.336	13.175
12.18.96	10.815	13.180
Mean 1996	10.992	12.726
02.19.97	12.600	13.389
07.22.97	12.470	16.504
10.28.97	12.292	12.586
Mean 1997	13.787	14.160
01.28.98	11.738	14.291
05.13.98	10.582	13.407
07.25.98	11.612	13.617
09.30.98	11.229	13.391
Mean 1998	11.293	13.676
01.27.99	15.025	17.691
05.04.99	19.803	17.043
07.28.99	19.784	17.716
11.04.99	10.170	13.431
11.23.99	6.043	9.207
Mean 1999	14.165	15.014
02.03.00	10.695	13.202

**2. Composite graph showing beach profiles measured between 1994 and 1999**



The graph shows different beach profiles at Morris Bay measured between 1994 and 1999. In 1994 the beach had a width of 18 m. After Hurricane Luis, in September 1995, the beach was lowered in height by about 1 m and narrowed to 10 m in width. The beach did not recover to pre-hurricane levels.

**3. Line graph showing the trends in profile area and profile width over time**



This graph shows how the beach at Morris Bay has varied over time. The line with square markers represents profile cross-sectional area and the line with diamond markers shows the width of the beach profile. As a result of Hurricane Luis in September 1995, profile area decreased from 33m<sup>2</sup> to 9 m<sup>2</sup>, and profile width decreased from 20 m to 10 m. Again, the graph shows clearly that while there was some recovery in the years following Hurricane Luis, the beach did not return to its pre-hurricane levels.



## SCHEDULE OF ISLAND VISITS

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Country/territory	Date
Anguilla	10–14 January 2000, 10–14 September 2000
Antigua and Barbuda	6–10 March 2000, 18–22 November 2000
Barbados (Caribbean Development Bank) and Trinidad and Tobago (UNESCO Regional Office)	19–23 October 1999
British Virgin Islands	2 February 2000, 26 January 2001
Dominica	3–7 February 2000
Grenada	30 November – 2 December 1999, 20–24 March 2000, 3–9 November 2000
Montserrat	13–17 December 1999, 31 October – 2 November 2000
Nevis	1–5 November 1999, 14–17/20–23 September 2000
St Kitts	21–25 February 2000, 17–20 September 2000
St Lucia	3–7 April 2000
St Vincent and the Grenadines	24–28 January 2000, 22–24 November, 2000
Turks and Caicos Islands	14–19 November 1999, 29 January – 2 February 2001

## ISLAND-SPECIFIC DETAILS REGARDING THE BEACH CHANGE DATABASES

## ◆ Anguilla

<i>Country/territory:</i>	Anguilla
<i>Dates of visits:</i>	10–14 January 2000, 10–14 September 2000
<i>Main partner agency:</i>	Department of Fisheries and Marine Resources (DFMR), Crocus Bay, Anguilla tel: +264 497 2871, fax: +264 497 8567 Mr Roland Hodge, Chief Fisheries Officer e-mail: dfmr@anguillanet.com Mr Othlyn Vanterpool, Fisheries Officer
<i>Other partners:</i>	Department of Physical Planning (DPP), The Valley, Anguilla tel: +264 497 5392, fax: +264 497 5924 Mr Vincent Proctor, Chief Planning Officer e-mail: vincentp@gov.ai Mrs Sharon Roberts-Hodge, Planning Officer  Anguilla National Trust, PO Box 1234, The Valley, Anguilla tel: +264 497 5297, fax: +264 497 5571 Mrs Ijhayna Christian, Executive Director e-mail: axanat@candw.ai
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Department of Fisheries and Marine Resources, Department of Physical Planning
<i>Persons trained in use of software:</i>	Ms Katrina Richardson, Mr Carlos Sasso, Mr Othlyn Vanterpool (DFMR) Mr Julian Hughes, Ms Sharon Roberts-Hodge, Mr Vincent Proctor (DPP)
<i>Manual supplied to:</i>	DFMR and DPP
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"> <li>• South coast beaches particularly severely hit by Hurricane Lenny resurveyed and new reference points established where necessary (01/00)</li> <li>• Sites at Sandy Ground, Rendezvous Bay and Cul de Sac visited with officials from the DPP, DFMR and Public Works to assess post Hurricane Lenny beach restoration and protection measures (01/00)</li> <li>• Sites at Sandy Hill Bay, Maundays Bay, Cove Bay and Blowing Point visited with officials from the DPP and DFMR (09/00)</li> </ul>
<i>Beaches currently monitored and # of sites per beach:</i>	Shoal Bay West (4), Maundays Bay (3), Cove Bay (4), Rendezvous Bay (4), Sandy Hill (2), Sile Bay (2), Savannah Bay (2), Junks Hole (1), Captains Bay (1), Shoal Bay (8), Limestone Bay (1), Meads Bay (3), Barnes Bay (2), Sandy Island (3), Prickly Pear (3)
<i>Length of database:</i>	1992–2001
<i>Follow-up activities:</i>	Written assessment of new seawall at Rendezvous Bay (01/00)

## ◆ Antigua and Barbuda

<i>Country/territory:</i>	Antigua and Barbuda
<i>Dates of visits:</i>	6–10 March 2000, 18–22 November 2000
<i>Main partner agency:</i>	Fisheries Division (FD), Ministry of Agriculture, Perry Bay, St Johns, Antigua tel: +268 462 1372, fax: +268 462 1372 Ms Cheryl Jeffrey, Chief Fisheries Officer e-mail: fisheries@candw.ag Mr Philmore James, Fisheries Officer
<i>Other partners:</i>	Development Control Authority (DCA), Cecil Charles Building, Cross Street, PO Box 895, St Johns, Antigua tel: +268 462 6427, fax: +268 462 6427 Mr Aldin Crump, Chief Planning Officer e-mail: authority@candw.ag  Environment Division, Ministry of Tourism and Environment, Queen Elizabeth Highway, St Johns, Antigua tel: +268 462 6265, fax: +268 462 6298 Ms Diann Black Layne, Chief Environment Officer e-mail: mintourenv@candw.ag  Environmental Awareness Group, PO Box 2103, St Johns, Antigua tel: +268 462 6236, fax: +268 463 7740 Mr Sherrod James, Executive Director e-mail: eag@candw.ag
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Fisheries Division, Development Control Authority
<i>Persons trained in use of software:</i>	Ms Cheryl Jeffrey, Mr Philmore James, Fisheries Division
<i>Demonstration of software to:</i>	<ul style="list-style-type: none"><li>• Mr Aldin Crump, Dr Deborah Thomas, DCA</li><li>• Ms Diann Black Layne, Environment Division</li><li>• Ms Gillian Cooper, Environmental Awareness Group</li><li>• Mr George Brown, Secretary General, Antigua and Barbuda National Commission for UNESCO</li></ul>
<i>Manual supplied to:</i>	Fisheries Division
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"><li>• Field visits to Mosquito Cove, Darkwood and Crab Hill to see damage caused by Hurricane Lenny (03 and 11/00)</li><li>• Meeting with Mr J. Fernandez and Mr Benjamin concerning a Climate Change Assessment project (UNEP) (03/00)</li><li>• Meeting with Mrs Gillian Cooper, Executive Director, Environmental Awareness Group (03/00)</li><li>• Meeting with Mr Aldin Crump, Chief Planning Officer and Dr Deborah Thomas, UNCHS Consultant, Development Control Authority (03/00)</li></ul>

◆ **Antigua and Barbuda** (*continued*)

	<ul style="list-style-type: none"><li>• Meeting with Ms Diann Black Layne, Chief Environment Officer, Environment Division (03/00)</li><li>• Meeting with Mr George Brown, Secretary-General, Antigua and Barbuda National Commission for UNESCO (03/00)</li></ul>
<i>Beaches currently monitored and # of sites per beach:</i>	Antigua: Dickinson Bay (4), Runaway Bay (3), Fort James (2), Deep Bay (2), Yorks Beach (2), Stony Horn Beach (2), Mosquito Cove (1), Lignumvitae Bay (3), Ffryes Bay (3), Darkwood (3), Crab Hill (1), Morris Bay (1), Falmouth (1), Pigeon Point (2), Mamora Bay (1), Halfmoon Bay (3), Long Bay (2), Dutchman Bay (3), Jabberwock (2)
<i>Length of database:</i>	Barbuda: Governors Bay (1), Cocoa Point (3), Dulcina (1), Palmetto Point (1), Low Bay (1), Two Foot Bay (1)
<i>Follow-up activities:</i>	Antigua: 1991–2001, Barbuda: 1995–2001

◆ **British Virgin Islands**

<i>Country/territory:</i>	British Virgin Islands
<i>Dates of visits:</i>	2 February 2000, 26 January 2001
<i>Main partner agency:</i>	Conservation and Fisheries Department, PO Box 3323, Road Town, Tortola, British Virgin Islands tel: +284 494 5681/3429, fax: +284 494 2670 Mr Bertrand Lettsome, Chief Conservation and Fisheries Officer e-mail: cfd@bvigovernment.org Ms Lauralee Mercer, Conservation Officer
<i>Other partners:</i>	Town and Country Planning Department, PO Box 634, Road Town, Tortola, British Virgin Islands tel: +284 494 3701, fax: +284 494 5794 Mr Louis Potter, Chief Physical Planning Officer e-mail: bvitcp@candwbvi.net
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Conservation and Fisheries Department
<i>Persons trained in use of software:</i>	Ms Lynda Varlack, Conservation and Fisheries Department
<i>Manual supplied to:</i>	Conservation and Fisheries Department
<i>Other activities:</i>	Meeting with Ms M.Wheatley, BVI National Commission for UNESCO (01/01)
<i>Beaches currently monitored and # of sites per beach:</i>	Monitoring is about to start (02/01) at Long Bay Beef Island (4), Long Bay Lambert (3), Josiahs Bay (3), Brewers Bay (3), Cane Garden Bay (3) using a different methodology. Between 1989 and 1994 the following beaches were monitored: Tortola: Long Bay (2), Cappaons Bay (2), Little Carrot Bay (1), Great Carrot Bay (1), Cane Garden Bay (1), Brewers Bay (1), Josiahs Bay (1), Long Bay Lambert (1), Lloyds (1), Fat Hogs Bay (1), Brandywine Bay (1), Kingston Bay (1), Fish Bay (1), Nanny Cay (1), Smugglers Cove (1) Virgin Gorda: Devils Bay (1), The Baths (1), Spring Bay (1), St Thomas Bay (2), Little Dix Bay (1), Savannah Bay (1), Mahoe Bay (1), Nail Bay (1), Little Leverick Bay (1), Prickly Pear Island (2), Eustatia (1) Anegada: Loblolly Bay (1), Bones Bight (1), Cow Wreck Bay (1), West End (1), Pomato Point (1), Anegada Reef Hotel (1), Nutmeg Point (1) Peter Island: Sprat Bay (1), Deadmans Bay (2), Big Reef Bay (1) Jost Van Dyke: White Bay (1), Great Harbour (1)
<i>Length of database:</i>	1989–1994, 2001– (planned re-start)

◆ **Dominica**

<i>Country/territory:</i>	Dominica
<i>Dates of visits:</i>	7–11 February 2000, 15–18 November 2000
<i>Main partner agency:</i>	Forestry, Wildlife and Parks Division (FWPD), Ministry of Agriculture and the Environment, Botanical Gardens, Roseau, Dominica tel: +767 448 2401, fax: +767 448 7999 Mr David Williams, Director (Acting) e-mail: forestry@cwdom.dm Mr Arlington James, Forest Officer
<i>Other partners:</i>	Physical Planning Division (PPD), Economic Development Unit, Charles Avenue, Goodwill, Roseau, Dominica tel: +767 448 2401, fax: +767 448 7744 Mr Raphael Francis, Chief Physical Planning Officer
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Forestry, Wildlife and Parks Division
<i>Persons trained in use of software:</i>	Mr Arlington James, Forestry, Wildlife and Parks Division
<i>Manual supplied to:</i>	Forestry, Wildlife and Parks Division
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"><li>• Meeting with Mrs Patsy Alexander, Secretary-General, Dominica National Commission for UNESCO (02/00) and with Dr Alexandra Burton-James, Secretary-General, Dominica National Commission for UNESCO (11/00)</li><li>• Meeting with Mr Raphael Francis, Chief Physical Planning Officer, PPD (02 and 11/00)</li><li>• Field visits to west coast beaches damaged by Hurricane Lenny and to the major landslide site at the Layou River with FWPD (02/00) and to Donkey Beach (11/00)</li></ul>
<i>Beaches currently monitored and # of sites per beach:</i>	Scotts Head (4), Soufriere (2), Rockaway (1), Mero (1), Batalie (1), Coconut Beach (2), Glanvilla (1), Purple Turtle (1), Belle Hall (1), Toucarie (1), Hampstead (1), Pointe Baptiste (1), Woodford Hill (1), Londonderry (1), Pagua (1), Bout Sable (2)
<i>Length of database:</i>	1987–1991, 1994–2001

◆ Grenada

<i>Country/territory:</i>	Grenada
<i>Dates of visits:</i>	30 November – 2 December 1999, 20–24 March 2000, 3–9 November 2000
<i>Main partner agency:</i>	National Science and Technology Council (NSTC), Marine Villa, Tanteen, St Georges, Grenada tel: +473 440 3118, fax: +473 440 9292 Mr Peter Thomas, Assistant Director Mrs Gail Gilchrist, Secretary
<i>Other partners:</i>	Fisheries Division (FD), Church Street, St Georges, Grenada tel: +473 440 3814/3831, fax: +473 440 6613 Mr Crafton Isaac, Mr Paul Phillip, Mr Junior McDonald (Carriacou) e-mail: grenfish@caribsurf.com  Lands and Surveys Division (LSD), Ministry of Agriculture, Mount Wheldale, St Georges, Grenada tel: +473 440 1439, fax: +473 440 6613 Mr Trevor Barclay, Mr Wilbur Thomas  Land and Water Resource Unit (LWRU), Ministry of Agriculture, Mount Wheldale, St Georges, Grenada tel: +473 440 3195 Ms Anne Francis  Hillsborough Secondary School, Carriacou tel: +473 443 7872 Contact person: Mr Junior McDonald, Fisheries Division
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	National Science and Technology Council
<i>Persons trained in use of software:</i>	Mrs Gail Gilchrist (NSTC), Mr Crafton Isaac, Mr Junior McDonald (FD), Mr Trevor Barclay, Mr Wilbur Thomas (LSD), Ms Anne Francis (LWRU)
<i>Demonstration of software to:</i>	Mr Peter Thomas (NSTC); Mr Crafton Hannibal, Mr Fabian Purcell, Physical Planning Unit
<i>Manual supplied to:</i>	NSTC, FD, LSD, LWRU
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"><li>• Assessment visit to Grand Anse after Hurricane Lenny with Mr Ricky Morain, Grenada Board of Tourism (GBT), Mr Gordon Paterson, Forestry Department and Mr Peter Thomas, NSTC (11/99)</li><li>• Grand Anse damage mitigation meeting with Mr William Joseph, Mr Ricky Morain, Ms Anne Isaac (GBT), Dr James Pitt, Mr Peter Thomas (NSTC), Mr Francis McBarnette of the Organization of American States, Mr John Auguste, Energy Division, Ministry of Finance (11/99)</li><li>• Viewing of video footage of damage caused by Hurricane Lenny and slides of beach changes at Levera (03/00)</li><li>• Visit to west and north coast beach sites and re-establishment of profile sites lost during Hurricane Lenny (03/00)</li></ul>

◆ Grenada (*continued*)

	<ul style="list-style-type: none"><li>• Meeting with Mr Francis McBarnette, Director, Organization of American States (03/00)</li><li>• Field visits to beaches in Carriacou and Petite Martinique with NSTC, FD (11/00)</li></ul>
<i>Beaches currently monitored and # of sites per beach:</i>	Grenada: La Source (3), Magazin (2), Grand Anse (6), Grand Mal (1), Palmiste (2), Mount Rodney (1), Sauteurs (2), Levera (3), Bathway (3), River Antoine (2), Lower Telescope (2), Grenville (2) Carriacou: (12)
<i>Length of database:</i>	Grenada: 1985–1991, 1993–2001 Carriacou: 1997–2001
<i>Follow-up activities:</i>	Preparation and circulation of a report entitled ‘Recommendations for the rehabilitation of Grand Anse, Grenada, following the erosion caused by Hurricane Lenny’ (12/99)



## ◆ Montserrat

<i>Country/territory:</i>	Montserrat
<i>Dates of visits:</i>	13–17 December 1999, 31 October – 2 November 2000
<i>Main partner agency:</i>	Fisheries Division (FD), Ministry of Agriculture, Land, Housing and Environment, PO Box 272, Brades, Montserrat tel: +664 491 2546/2075, fax: +664 491 9275 Ms Melissa O'Garro, Chief Fisheries Officer e-mail: mnifish@candw.ag
<i>Other partners:</i>	Physical Planning Unit, Ministry of Agriculture, Land, Housing and Environment, PO Box 272, Brades, Montserrat tel: +664 491 6795, fax: +664 491 5655 Mr Alan Gunne-Jones, Chief Physical Planning Officer e-mail: gunnjonesa@candw.ag
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Fisheries Division, Physical Planning Unit
<i>Persons trained in use of software:</i>	Ms Melissa O'Garro, Mr John Jeffers, Fisheries Division
<i>Demonstration of software to:</i>	Mr Clement Mead, Physical Planning Unit
<i>Manual supplied to:</i>	Fisheries Division, Physical Planning Unit
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"><li>• Mr John Jeffers (FD), Mr Denzil Daley and Mr Adolphus Ryan, Irrigation Technicians from the Ministry of Agriculture, Land, Housing and Environment re/trained in field techniques (11/99 and 11/00)</li><li>• Field measurement programme re-established (11/99)</li><li>• Meeting with Mr Alan Gunne-Jones, Chief Physical Planning Officer, Physical Planning Unit (11/99)</li><li>• Meeting with Ms Anne Marie Dewar, Permanent Secretary, Ministry of Agriculture, Lands, Housing and Environment (11/99)</li></ul>
<i>Beaches currently monitored and # of sites per beach:</i>	Sturge Park (1), Foxes Bay (1), Old Road Bay (2), Lime Kiln Bay (1), Woodlands Beach (1), Bunkum Bay (1), Carrs Bay (1), Little Bay (1)
<i>Length of database:</i>	1990–1996, 1999–2001
<i>Follow-up activities:</i>	<ul style="list-style-type: none"><li>• New beach-monitoring equipment supplied to Fisheries Division through the UNESCO-CSI regular programme (01/00)</li><li>• Manual describing field sites prepared (01/00)</li></ul>

◆ Nevis

<i>Country/territory:</i>	Nevis
<i>Dates of visits:</i>	1–5 November 1999, 14–17/20–23 September 2000
<i>Main partner agency:</i>	Nevis Historical and Conservation Society (NHCS), PO Box 563, Charlestown, Nevis tel: +869 469 0408/5786, fax: +869 469 0274 Mrs Annette Manners, Executive Director e-mail: nhcs@caribsurf.com
<i>Other partners:</i>	Department of Planning and Development (DPD), Cotton House, Market Street, Charlestown, Nevis tel: +869 469 5521, fax: +869 469 5485 Mrs E. Esternella West, Director of Planning e-mail: planevis@caribsurf.com  Fisheries Division (FD), Department of Agriculture, Ministry of Agriculture, Lands and Housing, PO Box 507, Charlestown, Nevis tel: +869 469 5521, fax: +869 469 1806 Mr Audra Barrett, Fisheries Officer
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Nevis Historical and Conservation Society Department of Planning and Development
<i>Persons trained in use of software:</i>	Ms Corrina Mak, Ms Shauna McGarvey, Ms Christina Olsen, Mr David Robinson (NHCS), Ms Lillith Richards, Mr Lewis Newton (DPD)
<i>Demonstration of software to:</i>	Mr Audra Barrett (FD); Mrs Barbara Gosling, Mr Geoffrey Gosling (NHCS volunteers)
<i>Manual supplied to:</i>	Nevis Historical and Conservation Society
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"><li>• Preparation of a report on the impact of Hurricane Jose (11/99) using the beach change database</li><li>• Visit to west and north coast beaches to re-survey the beaches and see the impacts of Hurricanes Jose and Lenny (11/99 and 09/00)</li><li>• Meeting with Mr Audra Barrett, Fisheries Division (11/99)</li><li>• Meeting with Mrs E. Esternella West, Director of Planning and Mr Glasgow, Permanent Secretary, Ministry of Planning and Development (11/99)</li></ul>
<i>Beaches currently monitored and # of sites per beach:</i>	Gallows Bay (2), Pinneys Beach (6), Cades Bay (1), Mosquito Bay (1), Hurricane Hill (2), Newcastle (1), Nisbett (2), Longhaul Bay (1), White Bay (1), Indian Castle (1)
<i>Length of database:</i>	1988–2001

◆ St Kitts

<i>Country/territory:</i>	St Kitts
<i>Dates of visits:</i>	21–25 February 2000, 17–20 September 2000
<i>Main partner agency:</i>	Department of the Environment (DE), PO Box 132, Basseterre, St Kitts tel: +869 465 4040, fax: +869 466 3915 Mr Raymond Solomon, Director e-mail: sknmtcce@caribsurf.com Mr Bryan Farrell
<i>Other partners:</i>	Fisheries Division (FD), Department of Agriculture, PO Box 39, Basseterre, St Kitts tel: +869 465 8045, fax: +869 465 2635 Mr Sam Heyliger, Chief Fisheries Officer e-mail: fmusk@caribsurf.com  Physical Planning Division (PPD), Department of Planning, PO Box 597, Basseterre, St Kitts tel: +869 465 2277, fax: +869 466 7398 Mr Patrick Williams, Chief Physical Planning Officer e-mail: phyplskb@caribsurf.com  St Christopher Heritage Society, West Square Street, Basseterre, St Kitts tel: +869 465 5584, fax: +869 465 5584 Mrs Jacqueline Cramer-Armony, Executive Director e-mail: jalatuka@caribsurf.com
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Department of the Environment (DE) Physical Planning Division (PPD)
<i>Persons trained in use of software:</i>	Mr Brian Farrell (DE); Mr Loftus Bridgewater, Parks and Beaches Unit (DE).
<i>Demonstration of software to:</i>	Mr Bernell Hobson, Parks and Beaches Unit (DE); Mr Patrick Williams (PPD); Ms Dauna Manchester Joseph, Secretary-General, St Kitts and Nevis National Commission for UNESCO.
<i>Manual supplied to:</i>	DE, PPD
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"><li>• Visit to the new seawall at the Royal St Kitts Beach Resort and Casino, North Frigate Bay (02/00)</li><li>• Meeting with Mrs Jacqueline Cramer-Armony, Executive Director, St Christopher Heritage Society (02 and 09/00)</li><li>• Meeting with Mr Patrick Williams, PPD (02/00)</li><li>• Visits to beach sites on the peninsula and the mainland of St Kitts to check on beach profile reference points and the damage caused by Hurricane Lenny (02/00)</li><li>• Meeting with Ms Dauna Manchester Joseph, Secretary-General, St Kitts-Nevis National Commission for UNESCO (02/00)</li></ul>

◆ **St Kitts (continued)**

*Beaches currently monitored  
and # of sites per beach:*

South Frigate Bay (1), Basseterre (2), New Guinea (1), Pump Bay (1), Belle Tete (2), Dieppe Spit (3), Caines Pasture (1), Sandy Bay (1), Connaree (1), North Frigate Bay (1), North Friars Bay (2), Sand Bank Bay (2), Mosquito Bay (2), Cockleshell Bay (3), Banana Bay (2), Majors Bay (2), White House Bay (2), South Friars Bay (3)

*Length of database:*

1992–2001

*Follow-up activities:*

Further advice/correspondence with the St Christopher Heritage Society and the Department of the Environment concerning the North Frigate Bay seawall (after the 02/00 visit)

◆ **St Lucia**

<i>Country/territory:</i>	St Lucia
<i>Dates of visits:</i>	3–7 April 2000
<i>Main partner agency:</i>	Fisheries Department, Sans Souci, Castries, St Lucia tel: +758 452 6172/3987, fax: +758 452 3853 Mr Horace Walters, Chief Fisheries Officer e-mail: deptfish@slumaffe.org Mrs Susanna Scott, Fisheries Officer
<i>Other partners:</i>	Unit for Sustainable Development and Environment, Ministry of Finance and Planning, PO Box 709, Castries, St Lucia tel: +758 451 8746, fax: +758 452 2506 Mr Bishmunarine Tulsie, Mr Christopher Corbin e-mail: est_mpde@candw.lc  Northwest Coastal Conservation Project, Ministry of Agriculture, Forestry and Fisheries, Forestry Headquarters, Union, St Lucia tel: +758 450 2484, fax: +758 451 9029 e-mail: nccp@candw.lc Mrs Anita James, Project Manager
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Fisheries Department
<i>Persons trained in use of software:</i>	Mrs Sarah George, Ms Dawn Nathaniel, Fisheries Department
<i>Manual supplied to:</i>	Fisheries Department
<i>Other activities undertaken during the visits:</i>	<ul style="list-style-type: none"> <li>• Meeting with Mrs Anita James, Mr Sylvester Chastanet, Northwest Coastal Conservation Project</li> <li>• Meeting with Mr Bishmunarine Tulsie, Mr Christopher Corbin and Ms Marian Henry, Unit for Sustainable Development and the Environment</li> <li>• Meeting with Mrs Shery Alexander Heinis, Secretary-General, St Lucia National Commission for UNESCO; Mr Leton Thomas, UNESCO; Mr Giles Romulus, Dr Marie Louis Felix, Dr Stephen King, Science Sub-Commission of the National Commission</li> <li>• Meeting with Dr Vasantha Chase, Organisation of Eastern Caribbean States Natural Resources Management Unit</li> <li>• Field visits to Reduit Beach and Pigeon Island Causeway</li> </ul>
<i>Beaches currently monitored and # of sites per beach:</i>	Causeway (1), Reduit Beach (2), Vigie Beach (2), Anse La Raye (2), Anse Chastanet (1), Soufriere (1), Malgretoute (1), Anse Ger (2), Fond D'Or (3)
<i>Length of database:</i>	1990–1991, 1994–2001

◆ **St Vincent and the Grenadines**

<i>Country/territory:</i>	St Vincent and the Grenadines
<i>Dates of visits:</i>	24–28 January 2000, 22–24 November 2000
<i>Main partner agency:</i>	Bequia Community High School, Port Elizabeth, Bequia, St Vincent and the Grenadines tel: +784 458 3301 Mr Herman Belmar, Industrial Arts Teacher e-mail: humpback_52@yahoo.com
<i>Other partners:</i>	Physical Planning Department, Central Administration Building, Kingstown, St Vincent and the Grenadines tel: +784 457 1746, fax: +784 456 2430 Ms Elizabeth Mwakosya, Chief Physical Planning Officer  Seismic Unit, Ministry of Agriculture and Labour, Kingstown, St Vincent and the Grenadines tel: +784 457 2070, fax: +784 457 1479 Mr Maxwell Porter, Seismic Officer Mr Kemvel Spence, Seismic Technician
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2000
<i>Software and beach change database installed at:</i>	Seismic Unit, Bequia Community High School
<i>Persons trained in use of software:</i>	Mr Kemvel Spence, Seismic Unit Mr Herman Belmar (and students), Bequia Community High School
<i>Manual supplied to:</i>	Seismic Unit, Bequia Community High School
<i>Other activities undertaken during the visits:</i>	<ul style="list-style-type: none"> <li>• Meeting with Mr Simeon Green, Permanent Secretary, Ministry of Agriculture and Labour and Mr Reuben Robinson, Deputy Chief Agricultural Officer (02/00)</li> <li>• Meeting with Ms Elizabeth Mwakosya, Chief Physical Planning Officer (02/00)</li> <li>• Meeting with Ms La Fleur John, Secretary-General, St Vincent and the Grenadines National Commission for UNESCO (02/00)</li> <li>• Field visit to Rose Place with Mr Theodore Trimmingham and 3rd form students, Emanuel High School, Kingstown (02/00)</li> <li>• Field training in beach measurement techniques with Mr Herman Belmar and third form students from Bequia Community High School, beach monitoring sites established and beaches measured in Bequia (02/00)</li> <li>• Visits to beaches damaged by Hurricane Lenny in Bequia (02 and 11/00)</li> </ul>
<i>Beaches currently monitored and # of sites per beach:</i>	The beaches in St Vincent are not currently monitored: St Vincent: Byera Bay (2), Colonarie Bay (1), Shipping Bay (1), Argyle Bay (2), Diamond Bay (2), Calliaqua Bay (3), Villa Beach (1), Indian Bay (3), Questrelles Bay (1), Layou Bay (2), Mount Wynne Bay (2) The beaches in Bequia are monitored: Hamilton Beach (3), Port Elizabeth (2), Springs (3)

◆ **St Vincent and the Grenadines** (*continued*)

*Length of database:*

St Vincent: 1995–1997

Bequia: 2000– (measurement started in 01/00)

*Follow-up activities:*

Beach-monitoring site description folder sent to Bequia Community High School (02/00)

◆ **Turks and Caicos Islands**

<i>Country/territory:</i>	Turks and Caicos Islands
<i>Dates of visits:</i>	14–19 November 1999, 29 January – 2 February 2001
<i>Main partner agency:</i>	Department of Environment and Coastal Resources (DECR), South Base, Grand Turk, Turks and Caicos Islands tel: +649 946 2970, fax: +649 946 1895 Mr Mark Day, Director e-mail: decr@tciway.tc (South Caicos: wesley@tciway.tc) Mrs Michelle Fulford-Gardiner, Chief Scientific Officer Mr Wesley Clerveaux, Scientific Officer
<i>Other partners:</i>	Coastal Resources Management Project (CRMP), National Parks Office, Providenciales, Turks and Caicos Islands tel: +649 941 5122, fax: +649 946 4793 Mrs Judith Campbell, Project Manager e-mail: crmpgarland@tciway.tc  Department of Planning (DP), South Base, Grand Turk, Turks and Caicos Islands tel: +649 946 2220, fax: +649 946 2448 Director of Planning e-mail: planningtcig@tciway.tc
<i>Version of software installed:</i>	Beach Profile Analysis, version 3.2, January 2001
<i>Software and beach change database installed at:</i>	DECR, Grand Turk, CRMP, Providenciales, DP, Grand Turk
<i>Persons trained in use of software:</i>	Mrs Michelle Fulford-Gardiner (DECR), Mrs Judith Campbell, Mr David Shim, Ms Michelle Taylor (CRMP), Mr Danier Lightbourne (DP)
<i>Demonstration of software to:</i>	Ms Melinda Seymour, Mr Eldon Talbot, Mr Valdez Thomas, Mr Ernest Williams, Conservation/Enforcement Officers (DECR) Mr Randolph Boodocem, Mr Carlos Ramez, Planning Officers (DP)
<i>Manual supplied to:</i>	DECR, CRMP, DP
<i>Other activities (field visits, meetings) undertaken during the visits:</i>	<ul style="list-style-type: none"> <li>• Field methods training session in beach monitoring in Providenciales with Mr David Shim, Ms Michelle Taylor, Mr Julian Garland, Mr Galvin Hall, CRMP (11/1999)</li> <li>• Field methods training session in beach monitoring in Grand Turk with Ms Michelle Fulford, Ms Melinda Seymour, Mr Eldon Talbot, Mr Valdez Thomas, Mr Ernest Williams, DECR, and Mr Danier Lightbourne, Mr Randolph Boodocem, Mr Carlos Ramez, DP (11/99)</li> <li>• Meeting and visit to beaches in South Caicos with Mr Wesley Clerveaux, DECR (11/99)</li> <li>• Meeting with Dr Murray Rudd, Director of the School for Field Studies, South Caicos</li> <li>• Meeting with Mr Berkely Malcolm, DP (11/99), Providenciales</li> <li>• Meeting with Ms Grace Les Fouris, DP (11/99)</li> <li>• Meeting with Mr Terry Smith, Permanent Secretary, Ministry of Natural Resources (11/99)</li> <li>• Meeting with Mr Neil McQuity, Public Works Department (01/01)</li> </ul>



◆ **Turks and Caicos Islands** (*continued*)

<i>Beaches currently monitored and # of sites per beach:</i>	Grand Turk: Booby Rock Point (2), Kittina (1), Salt Raker (1), Pillories Beach (1), Coralie Gardens (1) Providenciales: Turtle Cove (2), PDM Park (1), Club Med West (1), Pelican Road (2), Sunnyside (2), Prince of Wales (2)
<i>Length of database:</i>	1995–1997. Monitoring recommenced in 2000 in Grand Turk.
<i>Follow-up activities:</i>	Copies of Beach Field Manual sent to DECR and DP (12/99)

## ISLAND-SPECIFIC DETAILS REGARDING THE WORKSHOPS ON 'WISE COASTAL PRACTICES FOR BEACH MANAGEMENT'

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### ◆ Anguilla

#### *Summary table*

<i>Workshop title, date and venue:</i>	Wise Coastal Practices for Beach Management in Anguilla, 12 September 2000, Anguilla Library/Teachers Resource Centre
<i>Workshop organized by:</i>	Department of Physical Planning (PPD)
<i>Number of participants:</i>	44
<i>Follow-up activities:</i>	Workshop report prepared by DPP and circulated to participants (10/00). There was radio and newspaper coverage of the workshop.

#### *Workshop programme*

*National song of Anguilla* – Miss Anguilla, Hyacinth Snaggs  
*Song:* Cherish the Rock – Mr Bankie Banks  
*Invocation* – Rev. John A. Gumbs  
*Opening remarks* – Mr Orris Proctor, Permanent Secretary, Education, Lands and Planning

*Presentations and discussion* –

1. Department of Physical Planning – Mrs Sharon Roberts Hodge
2. Department of Fisheries and Marine Resources – Mr Othlyn Vanterpool
3. Cuisinart Hotel – Mr Rupert Balgobay
4. Anguilla Tourist Board – Ms Candis Niles
5. Anguilla National Trust – Mr Tom McCarty
6. Dr Gillian Cambers

*Discourse* – 'Planning the way forward'  
*Vote of thanks* – Mr Vincent Proctor, Principal Planning Officer

#### *List of participants*

Sharon Roberts-Hodge	Department of Physical Planning
Daryl V. Stoddard	Department of Physical Planning
Othlyn Vanterpool	Department of Fisheries and Marine Resources
Gillian Cambers	UNESCO/UPR-SGCP
Rupert Balgobay	Cuisinart Resort and Spa
Candis Niles	Anguilla Tourist Board

Rodney M. Rey	Chief Minister's Office
Rhone A. Connor	Blowing Point Community Council
Vincent Proctor	Department of Physical Planning
John A. Gumbs	Methodist Church
Bankie Banks	Dune Preserve
Julian Hughes	Department of Physical Planning
Blondell Rodgier	Soroptimist
Gifford I. Conner	Department of Lands and Surveys
Bancroft Battica	Ministry of Infrastructure, Communications and Utilities
John V. Rogers	Land Development Survey Services Co. Ltd.
Nat Richardson	Palm Grove Bar and Grill
Sam Mason	Allamanda Hotel
Olive Hodge	Land owner
Aileen Smith	Indigo Reef
Priscilla Allen	Anguilla National Trust volunteer
Tom McCarty	Anguilla National Trust
Brenda Carty	Daily Herald
Rebecca Eggleton	Altamer Resort
Kenn Banks	Ministry of Infrastructure Communications and Utilities
Kareen Rogers	The Anguillan
Peter Johnstone	Governor
Samuel Connor	Parliamentary Secretary
Roger Cousins	Deputy Governor
Eric Reid	Minister of Social Services
Kenneth Harrigan	Minister of Infrastructure, Communications and Utilities
May Steel	The Light
Donna A. Banks	Political Advisor, Chief Minister's Office
Sydney Gumbs	Political Advisor, Chief Minister's Office
Troy Bentley	Ministry of Finance
Melma Proctor	Department of Agriculture
Kenswick Richardson	Ministry of Infrastructure Communications and Utilities
Cleveland Richards	Department of Lands and Surveys
L. Smith	Department of Infrastructure
Cerel Niles	Con Engineering
Roland Hodge	Department of Fisheries and Marine Resources
Ernie Hodge	Tourist Board
Students (2)	Environmental Club, Albena Lake Hodge Comprehensive School

### *Highlights of the workshop discussion*

- The present planning process, whereby appeals relating to decisions made by the Development Control Board are referred to Executive Council, and 90% of the appeals go against the recommendations of the DPP, needs revision.
- The draft Land-Use Development Plan, which includes the coastal development setback guidelines, needs to be revised and brought to Executive Council as soon as possible.

- The needs of residents, for beach parking and access in particular, must be considered. (These needs are included in the draft Land-Use Development Plan.)
- The UNESCO-COSALC short videos shown on cable TV in 1999 need to be repeated and new videos produced.
- There should be more public involvement in the planning process.
- Coastal development setbacks need to be enforced.
- The hoteliers present promised to work with government agencies in a constructive manner to remedy mistakes made in the past.
- Education, particularly of tourists, must be continued to ensure visitors accept a 'natural-looking' beach vista (with seaweed and dead seagrass, etc.) rather than a perfectly manicured sand beach.
- Environmental activities must be coordinated among the different agencies involved.

## ◆ Antigua and Barbuda

### *Summary table*

<i>Workshop title, date and venue:</i>	Wise Coastal Practices for Beach Management in Antigua and Barbuda, 21 November 2000, Fisheries Complex, St Johns
<i>Workshop organized by:</i>	Fisheries Division (FD)
<i>Number of participants:</i>	9

### *Workshop programme*

*Opening remarks* – Mr Philmore James, Fisheries Division

- A Caribbean perspective on beach management – Dr Gillian Cambers, UNESCO-COSALC Project
- The tourism perspective on beach management – Mr Carlton Lake, Ministry of Tourism
- Beach management in Barbuda – Mr Arthur Nibbs, Chairman of the Barbuda Council
- Beach management from the community perspective – Mr Sherrod James, Executive Director, Environmental Awareness Group
- Changes in beaches in Antigua and Barbuda – Mr Philmore James, Fisheries Division

*Discussion*

*Closing remarks*

### *List of participants*

Gillian Cambers	UNESCO/UPR-SGCP
Carlton Lake	Ministry of Tourism
Arthur Nibbs	Barbuda Council
Sherrod James	Environmental Awareness Group
Ato Lewis	Environmental Division
Tricia Lovell	Fisheries Division
Ian Horsford	Fisheries Division
Steve Archibald	Fisheries Division
Philmore James	Fisheries Division

### *Highlights of the workshop discussions*

- The issue of beach sand mining figured prominently. Mr Nibbs presented the picture in Barbuda, where sand is an important resource and mining is conducted at a site 1.5 miles from the beach. The mining operation follows guidelines prepared by the COSALC project in 1998. Revenue from the mining provides a third of Barbuda's operating budget. Sand is exported mainly to Antigua.

- Sand mining is also an important issue in Antigua where mining is under the control of the Ministry of Communications and Works (MCW). However, significant mining is carried out legally and illegally from the back section of the beach and the land behind the beach. (A sand management project is at present under way through the Caribbean Planning for Adaptation to Climate Change – CPACC – project.) Sand is not valued as a resource in Antigua, and there are major shortfalls in the legislation and the level of fines, e.g. the beach is defined as the area seaward of the ‘beach crest’, a difficult feature to define on many beaches.
- Building setbacks were another major issue discussed, and it was suggested a study be conducted of the economic impacts of inadequate development setbacks.
- The possible introduction of the European ‘Blue Flag’ classification system for beaches next year in Antigua-Barbuda was discussed. It was felt that this system was being imposed on the country and that conformation to the Blue Flag guidelines would be difficult. However, the long-term advantages of the system, if it works, would be of benefit to the environment.
- Other problems such as a lack of beach access, e.g. at Jolly Harbour and Runaway Beach, lack of garbage removal, beach maintenance and tree planting, and inadequate legislation were discussed.
- Ways to install a sense of civic pride also featured in the discussions. A general sense of apathy and a ‘so what’ attitude exists. The FD, who do a lot of work at the community level, pointed out that while there are a lot of staunch environmentalists at the local level, the problem remains how to unite these individuals to make a difference. Suggestions included community meetings, schools, summer library programmes, churches. However, the need for coordination of the efforts of the various agencies was very evident.
- The need to make beach-monitoring data available to other agencies so that it is fully utilized, was also emphasized. While the FD mentioned that MCW built sea defences on the beaches without consulting them, it was pointed out that it was up to the FD to take a proactive approach to ensure that their database and knowledge was made available to the MCW.

The following recommendations were made by the workshop participants:

- Improve beach monitoring (frequency and the number of beaches monitored) in Barbuda by training FD officers based in Barbuda to do the monitoring themselves. This will require the approval and support of the Barbuda Council, additional equipment and training of the officers involved. (The Environmental Division offered to help with the training through an ongoing educational project in Barbuda – although this may be too soon for the FD.) The COSALC project may be able to help with the equipment. This recommendation is to be implemented by the FD.
- Increase awareness about the beach-monitoring activities, e.g. regular updates in government newspapers, photographic documentation of beach changes (FD).
- FD to prepare a report on beach changes 1995–1999, to follow up on the report prepared by Cambers for the period 1991–1995; also to prepare a summary for Cabinet and a fact sheet (by the end of 2000).
- In relation to the sand mining issues, recommendations were made to investigate the possibility of bagging ‘premix’ (sand and cement in one bag) so that individual users would not need to buy a load or a cubic yard of sand for small jobs; also to investigate new practices for building construction that use less sand.

## ◆ Dominica

### Summary table

<i>Workshop title, date and venue:</i>	Wise Coastal Practices for Beach Management in Dominica, 16 November 2000, Fisheries Complex, Roseau
<i>Workshop organized by:</i>	Forestry, Wildlife and Parks Division (FWPD)
<i>Number of participants:</i>	18
<i>Follow-up activities:</i>	A workshop report was circulated to the participants and the Permanent Secretary of the Ministry of Agriculture and the Environment by the FWPD. There was television, radio and newspaper coverage of the workshop.

### Workshop programme

#### *Opening ceremony:*

*Opening prayer* – Mr Adolphus Christian, Assistant Forestry Officer

*Welcome/introductory remarks* – Mr Arlington James, Acting Director, Forestry, Wildlife and Parks Division

*Remarks* – Mr Felix Gregoire, Permanent Secretary, Ministry of Education, Science and Technology

*Remarks* – Dr Gillian Cambers, University of Puerto Rico Sea Grant College Program

*Vote of thanks*

- Recent beach changes in Dominica, 1987–2000 (Results of the local beach-monitoring programme) – Mr Arlington James, Forestry, Wildlife and Parks Division
- Community and public concerns regarding beach management – Mr John Fontaine, Local Government Department
- Results of local beach clean-up campaigns – Mr Terry Raymond, Dominica Conservation Association
- Tourism's viewpoint on beach management – Mr Bill McLawrence, Tourism Division, National Development Corporation
- Planning's perspective for beach management – Mr Raphael Francis, Physical Planning Division
- Beaches and fisheries – Ms Jiselle Allport, Fisheries Division
- A Caribbean perspective on beach management – Dr Gillian Cambers, UNESCO-COSALC Project

*Discussion session* – 'Where do we go from here'

*Workshop evaluation*

*Closing remarks*

### *List of participants*

Ashton C. Lugay	Forestry, Wildlife and Parks Division
John Fontaine	Local Government and Community Development Department
Charles Gregoire	Dominica Association of Local Authorities
Alexandra Burton-James	Secretary-General, Dominica National Commission for UNESCO
Leonard Letang	Physical Planning Division
Mark John	Environmental Coordinating Unit
Jiselle Allport	Fisheries Division
Shirlyn Samuel	Dominica Conservation Association
Terry Raymond	Dominica Conservation Association/ Dominica Youth Environment Service Corps
Rhona Tyson	Environmental Coordinating Unit
Matthew Maximea	Forestry, Wildlife and Parks Division
Adolphus Christian	Forestry, Wildlife and Parks Division
Amonia Paul	Local Government Department
Priscilla Paul	Purple Turtle Beach Club
Bill McLawrence	Tourism Division/National Development Corporation
Raphael Francis	Physical Planning Division
Gillian Cambers	UNESCO/UPR-SGCP
Arlington James	Forestry, Wildlife and Parks Division

### *Highlights of the workshop discussions*

- The beach change database, which extends back to 1987, clearly shows the changes in Dominica's beaches, some of which have disappeared, while others have changed from sand to rocks/boulders, and a few have grown in size (accreted).
- Many participants emphasized the need for an integrated and coordinated approach to beach management activities, in particular for individuals and agencies to work together. For example, Mr Terry Raymond of the Dominica Conservation Association (DCA) described how the DCA formed a national coordinating committee for the 1999–2000 coastal clean-ups involving Youth Development, Youth Councils, Solid Waste, Environmental Health, Roseau City Council, Fisheries Division, Local Government Department and the media.
- The issue of solid waste disposal was discussed by several participants, including the need to change attitudes to rubbish disposal, since rubbish dumped inland eventually ended up at the beach. As one participant pointed out, 'The coastline is an eyesore with ravines of garbage.'
- The need for communities to take responsibility for cleaning their beaches was emphasized; best-kept beach competitions might provide an incentive here.
- The subject of beach clean-ups was addressed by several participants. There is a need for such activities to be combined with widespread education campaigns and the enforcement of existing litter laws.
- A longer-term approach to beach management should include revegetation.



- Several participants felt that buildings are being constructed too close to rivers and the sea. Mr Raphael Francis, Chief Physical Planning Officer, mentioned that ‘Hurricane Lenny was a blessing in disguise’ since this hurricane clearly showed the public that there was a need for development control especially along the coastlines and rivers.
- Existing coastal development setbacks are 50 ft from the high water mark; however, the Physical Planning Division plan to use the coastal development setback guidelines proposed in the UNESCO-CSI publication<sup>8</sup> in new planning regulations.
- While in many cases relocation of buildings away from the coastline may be the best answer, the costs of land acquisition may be prohibitive.
- The new seawall being constructed at Pottersville, as well as seawalls at Pointe Michel and in the north of the island, were the subject of much debate. Questions were asked as to whether alternative structures, e.g. offshore breakwaters, had been considered. The new seawalls will result in the loss of the beaches and of turtle nesting areas, and will severely disrupt fishers who are used to hauling up their boats on these beaches. Mr Felix Gregoire, Permanent Secretary in the Ministry of Education, mentioned in his opening remarks to the workshop that planning for future relocation of certain roads further inland should be considered.
- While it was recognized that beaches should be well managed and promoted as part of the overall ecotourism product, the primary goal of beach management in Dominica should be for the benefit of Dominicans.
- The likelihood of increased beach erosion during the present ‘active hurricane cycle’, predicted to continue for the next two decades, was discussed.
- Ethical issues were also raised, such as the need for individuals to have a personal commitment to the benefit of the country.

Major recommendations for future action were as follows:

- To get the information out to the public through decentralized workshops such as this present one, but held in the coastal communities;
- To forward the major issues and recommendations from this workshop to the minister;
- To better coordinate the activities of government and non-government agencies in beach management activities;
- To utilize all forms of the media fully in getting the information out to the public;
- To pass the pending fisheries regulations;
- To enforce existing laws, especially the Litter Act;
- To include new coastal development setback guidelines in planning legislation;
- To establish a unit responsible for integrated coastal management;
- To prepare a zoning plan for the use of beachfronts.

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<sup>8</sup> Cambers, G. 1997. Planning for coastline change: Guidelines for construction setbacks in the eastern Caribbean islands. CSI info 4, UNESCO, Paris, 14 pp.

## ◆ Grenada (Carriacou and Petite Martinique)

### Summary table

<i>Workshop title, date and venue:</i>	Wise Coastal Practices for Beach Management in Carriacou and Petite Martinique, 6 November 2000, Carriacou
<i>Workshop organized by:</i>	National Science and Technology Council (NSTC) and the Ministry of Carriacou and Petite Martinique Affairs
<i>Number of participants:</i>	35

### Workshop programme

*Call to order* – Chairperson, Mrs Bernadette Lendore Sylvester, Permanent Secretary, Ministry of Carriacou and Petite Martinique Affairs

*Prayers* – Participant

*Welcome* – Mrs Bernadette Lendore Sylvester

*Beach Management Presentation* – Mr Peter Thomas, Assistant Director, National Science and Technology Council

*Presentation and declaration of the workshop open* – Senator Eleuthan Noel

*Panel presentation* –

Mr Junior McDonald, Fisheries Division

Mr William Guadeloupe, Public Health Department

Mr Brian Whyte, Board of Tourism

Dr Gillian Cambers, UNESCO-COSALC

*Vote of thanks* – Participant

### List of participants

Gertrude Simon	Bishops College
Daniel Gray	Ministry of Carriacou and Petite Martinique Affairs
Hilda Stiehl	Patty's Villa
G. B. Adams	Ministry of Carriacou and Petite Martinique Affairs
Gail Gilchrist	National Science and Technology Council
Maxanna Francis	Community Development, Petite Martinique
Ann de Roche	Petite Martinique New Woman's Organization
Osbert Felix	Labaye Agricultural Cooperative
Mericia Mitchell	Carriacou Tourism Office
Clemencia Alexander	Lesterre Woman's Organization
Kervin Stiehl	Proprietor, Patty's Villa
Tonbred Milton	Paradise Inn
Augustine James	

Cecil Edmond	
Augustine Joseph	
Yenna Lor	Bogles Community Development Group
Florina Charles	Bogles Community Development Group
Michael Frank	Bogles Community Development Group
Hanzel Patrice	Windward Community Group
Ken Stowe	
David Jafferen	
Gladwin Simons	
Roy Delisle	
C. Paul	Police Department
Glean Thomas	Police Department
Elvis Edwards	Police Department
Werner Max Nagel	Carriacou Silver Diving Ltd.
Edward Niles	Integrated Land Use Management Project
William Guadeloupe	Environmental Health Department
Brian Whyte	Grenada Board of Tourism
Bernadette Lyndore- Sylvester	Ministry of Carriacou and Petite Martinique Affairs
Sen. Eleuthan Noel	
Peter Thomas	National Science and Technology Council
Ryan Viechweg	T. A. Marrishaw College
Gillian Cambers	UNESCO/UPR-SGCP

### *Highlights of the workshop discussions*

- The need for beach cleanliness was a major issue for both Carriacou and Petite Martinique. Problems included beaches being used as a dumping ground for garbage including dead animals, people using the beaches as a bathroom, garbage near fishers' sites, solid and liquid wastes being transported via the ghuts to the beach and the sea.
- Discussion also focused on ways to solve these problems, including:
  - government needs to consider a budgetary allocation for beach cleaners;
  - increased awareness and education on a sustained basis, and the need for everyone to be a steward to get the message across;
  - in the short term, private residences need to construct soakaways, while in the long term, the government needs to plan for a municipal sewage system.
- A presentation from the Tourism Board illustrated several initiatives they were planning to undertake together with other agencies/groups, including:
  - shade planting on Sandy Island;
  - beach signs;
  - toilets at Paradise Beach in 2001;
  - beach clean-up programmes with the schools (Esplanade);
  - controlling the number of visitors to Sandy Island by installing a limited number of mooring buoys and prohibiting anchoring.

- The removal of seaweed from beaches used by tourists was another matter for concern, e.g. one cruise ship agent refused to take visitors to Paradise Beach because of seaweed on the beach. While there was much debate on this issue, the fact remains that the removal of seaweed loosens sand and removes nutrients from the system, while on the other hand tourists do not favour swimming and using beaches with a lot of seaweed/seagrass on the beach and in the nearshore area.
- Sand mining, especially at Tibou on the windward (east) coast, was another matter for concern. It was estimated that 7,000 tons of sand a year are removed from the beaches for construction. Already this is resulting in graves from cemeteries, once behind the beach, now being washed into the sea. The recommendation from the meeting was that sand mining be stopped and sand imported.
- In answer to the question ‘What can be done now?’, several items were listed for immediate action by the communities:
  - beach planting;
  - beach clean-ups;
  - awareness and education about the need to clean beaches.

## ◆ Montserrat

### Summary table

<i>Title, date and venue of workshop:</i>	Wise Practices for Beach Management in Montserrat, 1 November 2000, Government Headquarters
<i>Workshop organized by:</i>	Fisheries Division (FD)
<i>Number of participants:</i>	19

### Workshop programme

*Opening remarks* – Mr Gerard Gray, Director of Agriculture

*Remarks* – Dr Gillian Cambers, COSALC Project

Beach monitoring and beach changes in Montserrat: An overview – Ms Melissa O’Garro, Fisheries Division

Community and public concerns regarding beach management – Mr Stephen Macnamara, Montserrat National Trust

The private sector’s view on beach management – Mrs Carol Osborne, Chamber of Commerce

Tourism and beach management – Ms Ernestine Cassell, Montserrat Tourist Board

Beaches and fisheries – Mr John Jeffers, Fisheries Division

A Caribbean perspective on beach management – Dr Gillian Cambers

*General discussion* – A way forward

*Closing*

### List of participants

Gillian Cambers	UNESCO/UPR-SGCP
Anthony Breedy	Ministry of Agriculture, Land, Housing and Environment
Wolf Krebs	Sea Wolf Diving School
Carlton O’Garro	Fisherman
Adolphus Ryan	Ministry of Agriculture, Land, Housing and Environment
Denzil Daley	Ministry of Agriculture, Land, Housing and Environment
St Clair Ryan	Fisheries Division
Tony Hill	Forestry and Natural Resources Advisor
Carol Osborne	Chamber of Commerce/Vue Pointe Hotel
Dion Weekes	Ministry of Communications and Works
Gerard Fergus	Environmental Health Department
Stephen Macnamara	Montserrat National Trust
Gerard Gray	Department of Agriculture
Beverly Anderson Kleeb	Iles Bay

Ernestine Cassell	Montserrat Tourist Board
John Jeffers	Fisheries Division
Ezra Greer	Police Department
Melissa O'Garro	Fisheries Division
Eugene Skerritt	Ministry of Communications and Works

### *Highlights of the workshop discussion*

- Uses of beaches, e.g. recreation, tourism opportunities, source of aggregate, coastal protection, should be viewed as goods and services, and these are dependent upon ecosystem health.
- In discussing the history of sand mining since 1998, when the volcanic crisis abated, it was pointed out that Foxes Bay, an important turtle-nesting beach, was opened to mining despite the protests of local environmentalists. However, with the help of international pressure via the Internet and the threat to bring in Greenpeace, the minister reversed the decision.
- The importance of beaches to provide a social climate for family bonding was stressed.
- Management issues, including access, cleanliness, ownership and the need to teach people (children and their parents) to swim, were discussed.
- The tourism industry, although small in Montserrat, is growing, and beaches are an integral part of the tourism product. (There were 7,000 tourists in 1998 and 8,000 for the first six months of 2000.)
- A private sector representative pointed out that the sand mining issue had ethical considerations, in that beaches belong to everyone – and it is not right for the government to take away that right by allowing sand mining.
- The subject of political interference ('the five year syndrome') was referred to many times, as well as the need to strike a balance and seek compromises.
- Beach sand mining is not compatible with the concept of sustainability, particularly when so few beaches (7) remain accessible to Montserratians in the safe zone.
- Caribbean ports are being instructed to deepen their harbours to accommodate the 'mega cruise-ships' being built. The inability of the Caribbean countries to unite over cruise ship passenger fees was discussed; this has led to the cruise ship companies 'playing off' one country against another.

The following way forward regarding the sand mining issue was proposed:

- The Ministry of Communications and Works are already working on long term plans which will include the establishment of an inland quarry; the mining, sorting and testing of some of the recent deposits from the volcano; importation of sand; and the control of these enterprises by the private sector – not the government. However, these measures will not solve the immediate problem facing the Montserrat building industry.

- The immediate problem, now that the east coast beaches are inaccessible due to the growth of the volcanic dome, is that at present only one beach, Iles Bay, is open for sand mining. The Ministry of Agriculture, Land, Housing and Environment had recently (the last week of October) presented recommendations to the minister on ways to manage the mining at Iles Bay. These recommendations included: the employment of two beach wardens to monitor the mining, the issuing of a directive that no beach sand was to be used in any government building project, the imposition of a tariff of \$ 25/cubic yard on beach sand in order to cover the management costs.
- Besides these long- and short-term initiatives, the workshop participants recommended that key players (Ministry of Agriculture, Land, Housing and Environment, Ministry of Communications and Works, Tourism, National Trust, truckers and the private sector) set up a committee to conduct an education and awareness campaign on the sand mining issues. Such a campaign should be carried out over a period of at least 12 months.

## ◆ Nevis

### *Summary table*

<i>Title, date and venue of workshop:</i>	Wise Coastal Practices for Beach Management in Nevis, 22 September 2000, Credit Union Building
<i>Workshop organized by:</i>	Department of Planning and Development (DPD)
<i>Number of participants:</i>	25
<i>Follow-up activities:</i>	Workshop results to be reported in the NHCS newsletter

### *Workshop programme*

*Workshop moderator* – Ms Cheryl Bartlett

*Opening remarks* – Mrs E. Esternella West, Department of Planning and Development

Recent beach changes in Nevis 1988–2000 – Mr David Robinson and Mr Geoffrey Gosling, Nevis Historical and Conservation Society

The Department of Planning’s perspective on beach management – Ms Lillith Richards, Department of Planning and Development

Tourism’s viewpoint on beach management – Mr Tyrone O’Flaherty, Ministry of Tourism

Community and public concerns regarding beach management – Mr David Robinson, Nevis Historical and Conservation Society

The private sector’s viewpoint on beach management – Ms Jennifer Lowery and Mr John Guilbert

Beaches and fisheries – Mr Audra Barrett, Fisheries Department

A Caribbean perspective on beach management – Dr Gillian Cambers

*Discussion* – ‘Where do we go from here?’

*Workshop evaluation*

*Closing remarks*

### *List of participants*

Lillith Richards	Department of Planning and Development
Gillian Cambers	UNESCO/UPR-SGCP
Joan Robinson	Nevis Historical and Conservation Society
Barbara Gosling	Nevis Historical and Conservation Society volunteer
Spencer W. Hanley	SJCIC
Arthur Anslyn	Department of Fisheries
Ricky Hill	Sandollar Beach Bar and Grill
Michael Slack	Sandollar Beach Bar and Grill
Kenneth Selfridge	Public Works Department
Annette Manners	Nevis Historical and Conservation Society



Joyce Movers	Hickmans Sports Club
John Hanley	Charlestown Secondary School
George Dasent	Self-employed
Esternella West	Department of Planning and Development
David Robinson	Nevis Historical and Conservation Society
Cherril Bartlett	Community Affairs Department
Geoffrey Gosling	Nevis Historical and Conservation Society volunteer
Jennifer Lowery	Coolshade Landscaping
John Yearwood	Oualie Beach Hotel
Andy Brear	Nisbet Plantation
Tyrone O'Flaherty	Ministry of Tourism
Magnus Blanchette	Blanchette Development Group Ltd.
Simeon Hill	National Housing and Land Development Corporation
Franchette Manners	
Denzil Stanley	Public Works Department

### *Highlights of the workshop discussion*

- There was some discussion relating to the Four Seasons beach restoration methods (offshore breakwaters and dredging/beach nourishment). The need for continual on-the-site monitoring of the dredging operation by an outside party was recommended. Despite a considerable number of public consultations about the beach work, there was still a lack of understanding of the issues. Overall it had been a learning experience.
- Partly as a result of the situation at the Four Seasons, during which the DPD had taken a reactive approach, efforts were now being made to ensure that future approaches would be proactive.
- To achieve this, the DPD would be preparing a Coastal Zone Management Plan between 2000 and 2003. Phase 1 would be undertaken in 2001 and would cover Charlestown to the Airport. A second phase would cover the rest of the island. A coastal zone survey would commence in October–November 2000, based on door-to-door inquiries and questionnaires, to catalogue the land-based activities behind the beach. Public involvement would be a key component of the Coastal Zone Management Plan.
- Major problems facing the DPD relate to the increased level of development as well as increased sedimentation from land clearing inland.
- Issues relating to coastal setbacks, maintaining a clear view to the sea, and the responsibility for the removal of eroded buildings were also discussed.
- There is a need to clearly establish and mark public accesses to the beach, as a matter of priority.
- Several management issues, such as the lack of enforcement of existing littering laws and technical decisions being over-ridden by politicians, brought out the need for continued and enhanced public education – ‘An educated public can adopt wise beach management practices.’
- While the coastal zone is the area of highest risk, it is also the area where there is the highest level of financial investment, and added to these factors, there is the issue of public rights to the coastal

zone and particularly the beach. It was recommended that management of the coast should not be solely dictated by financial considerations, but that an approach based on coastal stewardship be adopted.

- Agency responsibilities need to be clearly defined.
- A request was made for the public to inform the DPD about illegal development. The NHCS also plays an important role in this 'watchdog' process.

Recommendations from the workshop include:

- The NHCS propose to make this workshop the focus of their November newsletter.
- A core group from this workshop consisting of persons from the public and private sectors, should meet to develop the recommendations further. Such a group might form the foundation of a Coastal Zone Management Committee.

## ◆ St Kitts

### *Summary table*

<i>Workshop title, date and venue:</i>	Wise Coastal Practices for Beach Management in St Kitts, 20 September 2000, Bird Rock Hotel
<i>Workshop organized by:</i>	Department of the Environment (DE)
<i>Number of participants:</i>	25
<i>Follow-up activities:</i>	Workshop recommendations to be forwarded to the Ministry of Health and Environment. Radio coverage of the workshop.

### *Workshop programme*

#### *Opening ceremony*

Recent beach changes in St Kitts 1992–2000 – Mr Linday Archibald and Mr Bryan Farrell, Department of the Environment

Community and public concerns regarding beach management – Mrs Jacqueline Armony, St Christopher Heritage Society

Tourism viewpoint on beach management – Ms Aurelie Lam, St Kitts Department of Tourism

Planning's perspective for beach management – Mr Patrick Williams, Physical Planning Division

Beaches and fisheries – Mr Sam Heyliger, Fisheries Division

A Caribbean perspective on beach management – Dr Gillian Cambers

*Discussion session* – ‘Where do we go from here?’

*Workshop evaluation*

*Closing remarks*

### *List of participants*

Gillian Cambers	UNESCO/UPR-SGCP
Aurelie Lam	St Kitts Department of Tourism
Loftus Bridgewater	Department of the Environment
Rhonda Nisbett Browne	Hotel and Tourism Association
Randolph A. Edmead	Clarence Fitzroy Brydant College
Conroy Ottley	Bird Rock Beach Hotel
Jacqueline Armony	St Christopher Heritage Society
Shauna Huggins	St Christopher Heritage Society
Raymond Solomon	Department of the Environment
Theresa Henry	Department of the Environment
Nital	Department of the Environment
Rudolph	Department of the Environment

Tishant	Department of the Environment
Patrick Williams	Physical Planning Division
Shervene Gardiner	Clarence Fitzroy Brydant College
Deon Armory	Clarence Fitzroy Brydant College
Shamoya McCoy	Clarence Fitzroy Brydant College
Naria Williams	Clarence Fitzroy Brydant College
Nefon Pringle	Department of the Environment
Franklyn Jeffers	Department of the Environment
Sam Heyliger	Fisheries Division
Rasan Eddy	Department of the Environment
Linday Archibald	Department of the Environment
Ras Benjie	Department of the Environment
Bryan Farrell	Department of the Environment.

### *Highlights of the workshop discussion*

- Many of the problems discussed relate to a lack of public input into government and development decisions.
- While new development will always cause conflicts, as was clearly described in three cases dealing with fishers, the use of education, dialogue and co-management, together with clearly defined responsibilities and guidelines, can reduce such conflicts.
- A lack of enforcement of existing laws is a major problem, and is compounded by the fact that the level of fines imposed is no deterrent.
- A lack of political will is resulting in agencies such as Physical Planning being marginalized, so that planning decisions are being made by the political directorate with little or no technical input. The only way around this problem appears to be through more education and public involvement.
- There is a need to put in place proper management systems to control activities like sand mining and littering. It is significant that other islands, e.g. Nevis, no longer mine sand, but import sand instead.
- Draft beach regulations, sent to the Legal Department two years ago, need to be passed and enforced.
- The Physical Planning Division is trying to develop a policy to link development planning with hazard mitigation.
- The St Christopher Heritage Society is developing a role as a ‘watchdog’ agency such that their member’s, as well as the public, report infringements of the law and environmental problems to them. They then take these matters up with the relevant government organizations. The existence of a free press helps this process.
- There is a need for government agencies to work together on beach management and for clearly defined guidelines and responsibilities, so that everyone knows who is responsible for enforcing laws relating to littering, sand mining, etc.

Following group discussions, some ideas were formulated for immediate action. These will be forwarded to the ministry.

- Increasing education and public awareness activities directed towards residents and visitors using print and TV media, and the preparation of videos showing wise and unwise beach management practices.
- Developing standards to categorize beaches and rating them with the ultimate goal to bring all beaches to a high standard.
- Zoning beach activities so as to reduce conflicts.
- (DE) adopting a more proactive approach to sand mining which will involve greater public and private sector involvement.
- Developing a specific unit within the DE, perhaps within the Parks and Beaches Unit for beach management.
- Commencing a coral reef monitoring programme.

## ◆ St Vincent and the Grenadines (Bequia)

### Summary table

<i>Workshop title, date and venue:</i>	Wise Coastal Practices for Beach Management in Bequia, 22 November 2000, Rotary Club Building, Low Bay, Bequia
<i>Workshop organized by:</i>	Mr Herman Belmar, Bequia Community High School
<i>Number of participants:</i>	15
<i>Follow-up activities:</i>	Presentation on the beach monitoring and results of the workshop to be made to the Bequia Tourism Association (12/00)

### Workshop programme

*Opening and welcome remarks* – Mr Herman Belmar, Bequia Community High School, Bequia

Beach-monitoring activities in Bequia – Mr H. Belmar

Beach management from a Caribbean perspective – Dr Gillian Cambers,  
UNESCO-COSALC project

*Open discussion*

*Closing remarks* – Mr H. Belmar

### List of participants

Latoya John	Bequia Community High School
Dacia Marius	Bequia Community High School
Nicholas Rose	Bequia Community High School
Zillah Stowe	Paget Farm
Simone Cordice	Mount Pleasant
Kurt Cordice	Tobago Cays National Park
William Lewis	Port Elizabeth
Sylvester Simon	Lower Bay
Grace John	Lower Bay
Chester Peters	Bequia Beach Club, Friendship
John McVile	Lower Bay
Sylvannus Peters	Hamilton
Franklyn Bowater	
Herman Belmar	Bequia Community High School
Gillian Cambers	UNESCO/UPR-SGCP

### *Highlights of the workshop discussion*

- Offshore dredging which comes under the control of the Ministry of Communication and Works had been undertaken at Hamilton Beach in 1998. This had resulted in the death of the coral reef and discussion centred around future dredging and sand replenishment at that beach as well as at other beaches.
- Other dredging projects in the Grenadines, e.g. at Canouan, and their often disastrous consequences were discussed.
- The merits and impacts of other sea defence measures such as seawalls and offshore breakwaters were debated. As one participant put it, 'The hardest thing to come to terms with is that some hotels will end up not having a beach.'
- Problems relating to pollution were also discussed, especially land-based liquid pollution, and in particular discharges from coastal hotels. Pollution resulting from yachts in Admiralty Bay was another issue for concern.
- Ways to control the proliferation of coastal structures with everyone 'just doing their own thing', as with a small groyne in front of Frangipani Hotel, were discussed. Interestingly enough, the head of the Rotary Club, Mr Chester Peters, advocated the top-down approach and the need for more control and better laws, because in a small island such as Bequia it was very difficult to enforce things at the community level when everyone was related or friendly with each other. Other participants, though, advocated a more one-on-one/community approach to these issues.

Recommendations for action resulting from the workshop were:

- The Rotary Club offered to assist with transport to some of the beaches such as Princess Margaret Beach, Friendship Bay and Lower Bay, so that the high school students can monitor these beaches.
- The high school students, with the help of Mr Belmar and Mr Cordice, will prepare a presentation on the monitoring for the annual general meeting of the Bequia Tourism Association on 4 December 2000.
- The students will prepare a training video on beach monitoring which could be used to help other schools and groups around the Caribbean/world start their own beach-monitoring activities.

## ◆ Turks and Caicos Islands

### Summary table

<i>Workshop title, date and venue:</i>	Wise Coastal Practices for Beach Management in the Turks and Caicos Islands, 1 February 2001, Allegro Beach Resort
<i>Workshop organized by:</i>	Department of Environment and Coastal Resources (DECR)
<i>Number of participants:</i>	31
<i>Follow-up activities:</i>	Workshop proceedings to be published, circulated and used to develop an agenda for a beach management plan seminar with politicians (DECR, mid 2001)

### Workshop programme

*Opening prayer* – Mr William Clare, Protocol Officer, Ministry of Provo Affairs

*Welcome* – Mrs Michelle Fulford-Gardiner, Chief Scientific Officer, DECR

*Opening remarks* – Mrs Susan Malcom, Under Secretary, Ministry of Natural Resources

*Remarks* – Mr Mark Day, Director, DECR

*Scene setting* – Mrs Michelle Fulford-Gardiner, DECR

Caribbean perspective on beach management – Dr Gillian Cambers, University of Puerto Rico  
Sea Grant College Program

Positive aspects of beach pollution - message in a bottle – Mr Nigel Sadler, TCI Museum

Planning for beach management - a tourism perspective – Mr Lindsay Musgrove,  
TCI Tourism Board

Baseline study of East Bay, South Caicos – Mr Wesley Clerveaux, Scientific Officer, DECR

Sand mining activities in the Turks and Caicos Islands – Mrs Michelle Fulford-Gardiner, DECR

Hurricanes and tropical storms and their negative impacts on the coastal environment –

Mr Franklyn Michaels, Office of Disaster Preparedness, British Virgin Islands

Video presentation of Hurricane Hugo – Mr Kingsley Been, Permanent Secretary, Provo Affairs

Health implications of coastal water quality – Mr Lorne Robinson, Environmental Health Officer,  
Department of Health

Water quality survey in Providenciales – Ms Michelle Taylor, Coastal Resources  
Management Project

Beach access concerns as it affects Provo residents – Mr William Clare, Protocol Officer,  
Provo Affairs

Beach access lanes and management issues – Mrs Ethlyn Gibbs-Williams,  
Turks and Caicos National Trust

Salt Cay beach management – Ms Lydia Ewing, District Commissioner's Office, Salt Cay

*Closing remarks*



### *List of participants*

Ethlyn Gibbs-Williams	TCI National Trust
Michelle Taylor	Coastal Resources Management Project
Sheron Forde	Turks and Caicos News
Bradley Handfield	Clement Howell High School
Kingsley R. Been	Ministry of Provo Affairs
Susan Malcolm	Ministry of Natural Resources
Royal Robinson	National Parks Environmental Advisory Committee
William Clare	Chief Secretary's Office, Provo
Mark Parrish	Big Blue Unlimited
Franklyn Michael	Office of Disaster Preparedness, British Virgin Islands
Lorne A. Robinson	Environmental Health, Department of Health
Dottis Arthur	District Commissioner, Middle Caicos
Mahala Wynns	Disaster Management and Emergencies
Lindsey Musgrove	TCI Tourist Board
Gillian Cambers	UNESCO/UPR-SGCP
Dautine Cox	DECR
Wesley Clerveaux	DECR, South Caicos
Carlos Tamayo	Planning Department
Ogail Aurad	Planning Department
Don Vogt	Beaches Resort and Spa
David Vickers	Governor's Office
Nigel Sadler	Turks and Caicos National Museum
Lydia Ewing	District Commissioner's Office, Salt Cay
Ezekeil E. Hall	Hall Tech.
Michelle Fulford-Gardiner	DECR
Mark Day	DECR
Judith Campbell	Coastal Resources Management Project
4 students	Clement Howell High School

### *Highlights of the workshop discussion*

- Beach access, especially in Providenciales, was one of the major issues discussed. When the development of Providenciales started in the 1970/1980's, the development plan included designated access lanes to be kept open for free public access to the beach. However, over the years, these access lanes acquired parcel numbers, and were sometimes sold, and certain hotel owners and private property owners have restricted access by incorporating these access lanes into their private property.
- There have been cases where access lanes have been chained off, or developments have encroached into the lanes thereby blocking public access.
- Except in the case of the National Parks, the laws are very unclear about many issues relating to access.
- It was recommended that the government use the Compulsory Land Acquisition Act to acquire access for public use and then to deed them to the National Trust as inalienable land (to be held in

perpetuity for the people of the TCI). However, it was noted that there seems to be some reluctance on the part of the politicians to move into this arena.

- It was also suggested that dedicated beach access lanes should also be designated in the Caicos Islands *now*, before development really gets under way there.
- There is a need to extend the coastal development setbacks in the TCI, at present 100 ft from the vegetation line, but this would need to be combined with an extensive public awareness effort.
- It was noted that there are sometimes instances when it is necessary to take difficult decisions regarding beach erosion, which may include deciding that it is no longer feasible to protect certain areas.
- Sand supply has reached crisis conditions in Grand Turk, and the possibility of importing from the Bahamas was discussed.
- Problems also exist in TCI, relating to incidents where technical advice is over-ruled by the political directorate. Examples were given where permits had been issued by Executive Council without even consulting the relevant technical departments or obtaining Environmental Impact Assessments (EIA's). For instance, an offshore dredging permit had been granted for West Sandspit, a pristine diving site, with no input from the DECR or any EIA. As one private ecotourism entrepreneur asked, 'Where can the public express their viewpoint on issues such as these?'
- A visitor survey had shown that 71% of the respondents said that beaches were their primary reason for coming to TCI.
- The need for beach carrying capacity was stressed.
- In relation to a proposed development at East Bay, South Caicos, many environment and development issues were raised, such as the developer presenting an ecotourism concept to DECR while actually envisioning a very different proposal involving cutting through a barrier reef and major dredging of seagrass beds; the question as to whether this site was even suitable for a hotel; the political versus the technical viewpoints on development at this site. As one participant said, 'In small islands, where tourism is the main income-earner, inevitably environmental issues take backstage.'
- A water quality survey, undertaken in 2000, had shown that while coliform bacteria in bathing waters were not yet a problem, increased nutrient levels were a problem and had caused large blooms of sea-thimble jellyfish in 2000.
- Another major issue being faced by TCI is the social conflict generated by vendors selling directly to the tourists on the beach (and sometimes, but not always, harassing them) and the hotel owners, who want the vendors away from the beaches. Solutions being considered include licenses and establishing a permanent selling market for vendors.

While some participants were in favour of preparing a workshop resolution on beach access, the consensus was that since this was such a complex and major issue, there was insufficient time to decide on such a resolution today, but that it would become a major focus for the follow-up meeting/seminar with politicians tentatively scheduled for mid-2001.

**Previous titles in the CSI info series:**

- 1 *Integrated framework for the management of beach resources within the smaller caribbean islands*. Workshop results. 1997. 31 pp. (English only). [www.unesco.org/csi/pub/info/pub2.htm](http://www.unesco.org/csi/pub/info/pub2.htm)
- 2 *UNESCO on coastal regions and small islands*. Titles for management, research and capacity-building (1980–1995). 1997. 21 pp. (English only). [www.unesco.org/csi/pub/info/pub1.htm](http://www.unesco.org/csi/pub/info/pub1.htm)
- 3 *Qualité de l'eau de la nappe phréatique à Yeumbeul, Sénégal*. Étude sur le terrain. 1997. 27 pp. (French only). [www.unesco.org/csi/pub/info/info3.htm](http://www.unesco.org/csi/pub/info/info3.htm)
- 4 *Planning for coastline change. Guidelines for construction setbacks in the Eastern Caribbean Islands*. 1997. 14 pp. (English only). [www.unesco.org/csi/pub/info/info4.htm](http://www.unesco.org/csi/pub/info/info4.htm)
- 5 *Urban development and freshwater resources: small coastal cities*. Proceedings and recommendations. International Seminar, Essaouira, Morocco, 24–26 November 1997. 1998. 109 pp. (English and French). [www.unesco.org/csi/pub/info/info5.htm](http://www.unesco.org/csi/pub/info/info5.htm)  
[www.unesco.org/csi/pub/info/info5f.htm](http://www.unesco.org/csi/pub/info/info5f.htm)
- 6 *Coast and beach stability in the Caribbean Islands*. COSALC Project Activities 1996–97. 1998. 57 pp. (English only). [www.unesco.org/csi/pub/info/info6.htm](http://www.unesco.org/csi/pub/info/info6.htm)
- 7 *Role of communication and education*. Workshop Proceedings (PACSICOM). 1999. 88 pp. (English and French). [www.unesco.org/csi/pub/info/info7e.htm](http://www.unesco.org/csi/pub/info/info7e.htm)  
[www.unesco.org/csi/pub/info/info7f.htm](http://www.unesco.org/csi/pub/info/info7f.htm)
- 8 *Développement urbain durable en zone côtière*. Actes du Séminaire international, Mahdia, Tunisie, 21–24 juin 1999. 2000. 225 pp. (French only). [www.unesco.org/most/dpmahdia1.pdf](http://www.unesco.org/most/dpmahdia1.pdf)
- 9 *D'une bonne idée à un projet réussi*. Manuel pour le développement et la gestion de projets à l'échelle locale. 2000. 158 pp. (French) (Original English version published by SEACAM). [www.unesco.org/csi/pub/info/seacam.htm](http://www.unesco.org/csi/pub/info/seacam.htm)
- 10 *Wise coastal practices for sustainable human development*. Results of an intersectoral workshop and preliminary findings of a follow-up virtual forum. 2000. 126 pp. (English and French). [www.unesco.org/csi/pub/info/wise.htm](http://www.unesco.org/csi/pub/info/wise.htm)  
[www.unesco.org/csi/pub/info/sage.htm](http://www.unesco.org/csi/pub/info/sage.htm)
- 11 *Petites villes côtières historiques : Développement urbain équilibré entre terre, mer et société*. Actes du Séminaire international, Saida, Liban, 28–31 mai 2001. 2002. xvi + 373 pp. (French with partial English translation). A synthesis report of the seminar (in English) is given at: [www.unesco.org/most/csisaidaeng.htm](http://www.unesco.org/most/csisaidaeng.htm)
- 12 *An ecological assessment of Ulugan Bay, Palawan, Philippines*. 2002. 46 pp. (English). [www.unesco.org/csi/pub/info/ulu.htm](http://www.unesco.org/csi/pub/info/ulu.htm)
- 13 *Lwa ki gen pou wè ak Anviwònman Kotye ak Lapèch nan Peyi d Ayiti. Lois relatives à l'environnement côtier et à la pêche en Haïti*. 2002. 45 pp. (Bilingual French/Creole). [www.unesco.org/csi/pub/info/haiti.htm](http://www.unesco.org/csi/pub/info/haiti.htm)
- 14 *Remote Sensing Applications for Fisheries Sciences - From Science to Operation*. 2002. 213 pp. + App. + CD-ROM. ITC Publication no. 83. (English only). Available from: [admin@unesco.bilko.org](mailto:admin@unesco.bilko.org)

**Titles in the CSI series Coastal region and small island papers:**

- 1 *Managing beach resources in the smaller Caribbean islands*. Workshop Papers. Edited by Gillian Cambers. 1997. 269 pp. (English only). [www.unesco.org/csi/pub/papers/papers1.htm](http://www.unesco.org/csi/pub/papers/papers1.htm)
- 2 *Coasts of Haiti. Resource assessment and management needs*. 1998. 39 pp. (English and French). [www.unesco.org/csi/pub/papers/papers2.htm](http://www.unesco.org/csi/pub/papers/papers2.htm)  
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