



# INTRODUCTION

This draft document is offered to members of the Management and Technical Committees of the UCB/GOB/CCC Marine Research Centre as a strategic framework for developing a Master Plan for the sustainable development of the Turneffe Islands. These general recommendations are the interim results of a collaborative research proposal between the University College of Belize (UCB) and the University of Montana (UM). The development of detailed resource assessments and specific planning recommendations will be carried out in the context of a proposed M.Sc. thesis research project scheduled for January to June 1996 by the author. After the review and revision of this document by relevant persons and agencies, it is suggested that further refinement of the draft Turneffe Islands Master Plan (TIMP) be guided by a process of consultation and participation involving the parties proposed for inclusion in the planning process. The annex at the end of this document outlines the suggested format for the final TIMP document. Based loosely on the recently proposed "**STRATEGY FOR STEWARDSHIP**" developed for the Florida Keys National Marine Sanctuary (1995) and the Belize Draft Cayes Development Policy (1995), it also outlines the required information needed to apply for World Heritage Site Status; this is likely to one of the management strategies pursued.

## 1. TURNEFFE ISLANDS MASTER PLAN HISTORY

### 1.1 Site Background

The Turneffe Islands atoll, the largest in the Caribbean (approximately 400 km<sup>2</sup>; UNEP/IUCN, 1988), is a discrete group of cayes completely surrounded by an extensive reef system which encompasses its complex central lagoon and far-reaching mangrove forested cayes. The atoll has been formally proposed as an area in need of, and suitable for, designation as a planning area through the Government of Belize (GOB) / UNDP-WORLD BANK Global Environmental Facility (GEF) Coastal Zone Management Project (CZMP) in co-ordination with the Coastal Zone Management Unit (CZMU) of the Fisheries Department (Ministry of Agriculture & Fisheries). The atoll is made up of a mix of high and low lands which essentially fringe the expansive lagoon system which reaches an east/west width of 5 miles and a north/south length of 10 miles in some places. The individual cayes, some larger than 5000 acres, are characterised by a variety of mainly wetland vegetation types which reflect the topography of the land. The high lands are generally covered by littoral forest, palmetto, broken palmetto thicket and coconut; the low lands are covered with high, medium and low mangrove, much of which is permanently inundated (Raines, P. & A. Gill, 1994; McGill, 1995).

Turneffe represents a complex pattern of cayes, spits, channels, lagoons and reefs that are excellent breeding grounds for a number of commercially important and ecologically rare terrestrial and marine species (especially vertebrates). Traditionally, the atoll has been used by fishermen from the Maya era up to modern times making it a major base for commercial and sport fishing as well as an increasingly popular tourist destination. Until the advent of severe hurricanes in this century, most of the high coastal ridges were planted with coconuts. Recent tourism developments include three resorts (Blackbird Caye Resort, Turneffe Island Lodge & Turneffe Flats Resort) which cater mostly to sport fishing and diving clientele. Most

of the land on the atoll is owned by the GOB but increasing development pressure has led to some parcels on the east coast being surveyed of late (Raines, P. & A. Gill, 1994; McGill, 1995).

## **1.2 Development Pressures and User Conflicts**

It has been recognised by the GOB, national and international Non-Governmental Organisations (NGO's) and the University College of Belize (UCB) that increasing development pressures on the atoll will lead to conflicts between user occupation rights and the fragile coastal environment. Some years ago a Turneffe Islands Committee (TIC) was established to adjudicate between various conflicting claims which began to arise; one result of this was the informal allotment of different uses to various stakeholder's: Fishermen's Camps (typically 2 to 5 acres); Tourism Areas; Conservation Areas; A Proposed Airstrip; and General Occupation Parcels. Although a management plan was recommended, this process was never formally started, much less completed and the TIC has not formally met since 1991; see Table 1 below (McGill, 1995).

## **1.3 Turneffe Islands Master Plan Rationale**

The need for effective management and protection of Turneffe Islands' resources has been emphasised since 1991 by the three GOB ministries which have primary responsibility for Belize's coastal zone (Agriculture & fisheries Natural Resources, and Tourism & the Environment). UCB and Coral Cay Conservation Ltd. (CCC) agreed to collaborate in early 1993 towards the establishment of a facility for marine research and education on one of Turneffe's east coast cayes, Calabash Caye. CCC was subsequently able to secure a grant from the United Kingdom government's Darwin Initiative for the Survival of the Species to assist in surveying the resources of Calabash Caye and Turneffe Atoll. From over 60 survey transects, mainly on the east side of Calabash Caye, CCC has identified over 400 marine species, some of which represent previously unrecorded and rarely encountered species; see Table 2 below (Raines, P. & A. Gill, 1994).

## Table 1. TURNEFFE ISLANDS COMMITTEE : 1990-1991

### **MEMBERSHIP (APPOINTED BY THE MINISTER OF NATURAL RESOURCES):**

George Myvett, Fisheries Department; Ray Lightburn, Blackbird Caye Resort Operator; Victor Gonzalez, Ministry of Tourism & the Environment; Evadne Garcia, Petroleum and Geology Department; Earl Green, Forestry Department; Allan Bevans, Fishermen's Cooperative; Clinton Gardiner, Lands and Survey Department; Sharon Matola, Belize Zoo; David Aguilar, Ministry of Natural Resources, L. Alamina, Fishermen's Cooperative (?)

### **ASSISTANCE AND INVITEES:**

Janet Gibson, Belize Audubon Society(?), Severo Pinto (?)

### **1. RESOLUTIONS TO BE PRESENTED TO MINISTER OF NATURAL RESOURCES(23 JULY 1990):**

- a) EIA for any leaseholder required prior to implementation of project;
- b) Mangrove legislation to be strictly adhered to;
- c) 66 foot reserve to be respected and landowners to respect fishermen's use of traditional areas;
- d) Dredging only to be allowed under license;
- e) The area around any docks/piers should be retained as national land with access for the public;
- f) Fishermen traditionally using Turneffe should be entitled to lease;
- g) All resorts should purchase seafood from the Co-operative;
- h) Resort divers should not tamper with marine life flora or fauna;
- i) Pelican (off Blackbird Caye) and Soldier Cayes to be declared as Bird sanctuaries with interim management by Belize Audubon Society until Conservation Department is ready for management.

### **2. STATEMENTS AND COMMENTS (16 AUGUST 1990):**

- a) Blackbird Caye (Al Dugan, owner of Blackbird Caye Resort, has 1000 acres); only 100 acres slated for development, the remaining to be kept in its natural state; proposal to restock turtles and conch;
- b) Fishermen to be encouraged to diversify into tourism;
- c) Blackbird Caye to return "some" acreage to Government for a reserve;
- d) Pena development budget is/was \$3,000,000; a plan was to be prepared by a US company to include 50 cabanas; a development concession was applied for;
- e) Calabash Caye; one Kent Crane had owned and then sold to a Mr. Stern for \$3,000,000;
- f) Blackbird Caye: original UCB site? EIA by a Canadian group?

### **3. STATEMENTS AND COMMENTS (7 NOVEMBER 1990):**

- a) Soldier and Pelican Cayes recommended by J. Gibson for protected status;
- b) Northern Lagoon identified by J. Gibson as important salt water crocodile habitat;
- c) Need for Management Plan identified;
- d) Re-location of fishermen suggested; Bevans emphasised need for fishermen to have some permanence on eastern coast for fishing and camping;
- e) Lightburn recommended 3 acre lease for fishermen that wanted to diversify into tourism and 0.50 to 1.0 acres for those not wanting to; Bevans recommended 2 to 3 acres throughout.

### **4. STATEMENTS AND COMMENTS (10 MAY 1991):**

- a) Bevans: 77 fishermen applicants for leases, first 48 to be given priority;
- b) Grassy Caye Range (except the 5 southernmost cayes), Freshwater Creek Lagoon and majority of mangrove cayes to be kept for conservation;
- c) Permanent committee, consisting of fishermen and resort owners, proposed to oversee conservation;
- d) Blackbird Caye: 5 acres to be reserved for GOB (Forest Dept.) Use;
- e) Recommendation that all new fishermen leases can not be canceled for five years;
- f) Recommendation that fishermen could transfer leases among themselves;
- g) Recommendation that fishermen get a minimum of 1.0 acre each;
- h) Concern over resorts interfering with fishermen.

### **5. STATEMENTS AND COMMENTS (23 MAY 1991):**

- a) Recommendation that this process could be used for other areas.

**Table 2. TURNEFFE ISLANDS MARINE SPECIES BY PHYLUM  
Identified from CCC Surveys; January to September, 1994.**

<b>PHYLUM (English Equivalent)</b>	<b>SPECIES</b>	<b>PERCENT</b>
CHORDATA (Bony Fish, Reptiles, Mammals, etc.)	210	46.77%
CNIDARIA (Hydras, Jellyfish and Corals)	84	18.71%
ANGIOSPERMAE/PHAEOPHYTA/CHLOROPHYTA/RHODOPHYTA/CYANOPHYTA (Algae)	51	11.36%
PORIFERA (Sponges); PREVIOUSLY IDENTIFIED TO LIFEFORM LEVEL ONLY	44	9.80%
ARTHROPODA (Shrimp, Crabs, Lobsters, etc.)	19	4.23%
MOLLUSCA (Oysters, Conch, Squid, etc.)	15	3.34%
ECHINODERMATA (Starfish, Sea Urchins/Cucumbers, etc.)	14	3.12%
ANNELIDA (Segmented Worms)	8	1.78%
ECTOPROCTA	2	0.45%
CTENOPHORA (Comb Jellies)	1	0.22%
PLATHELMINTHES (Flatworms)	1	0.22%
<b>TOTAL</b>	<b>449</b>	<b>100.00%</b>

In mid 1994 the GOB, UCB and CCC entered into a Marine Research Centre (MRC) Memorandum of Understanding which explicitly recognised the need for a Turneffe Islands Master Plan (TIMP) and further recognised the role of ‘authorising agency’ which the MRC should play in coordinating the production of the plan which will also serve as a model for future CZMU coastal/caye plans. In early 1995, the CZMP began the assessment of terrestrial resource characteristics and corresponding existing uses and in June 1995 the author received a small grant from the UCB/University of Montana linkage project to assist the development of a TIMP. (McGill, 1995)

Four critical reasons have been identified as justification or rationale for the TIMP:

1. **The National Economic Importance of Fisheries;** mangroves are nursery and feeding areas for many commercially important fish and invertebrates. The extensive area that this vegetation covers contributes to the importance of Turneffe as a major national fishing ground. A significant portion of the lobster catches of the National, Northern and Caribena Co-operatives comes from Turneffe and there are a number of grouper and mutton snapper spawning grounds. In several cases worldwide, decreases in Mangrove forest stands have been correlated with fisheries production declines. Whatever the path of development for the Turneffe Islands, a prime requirement should be to maintain the rich fisheries for conch, lobster and finfish.
2. **The National Economic Importance of Tourism;** as the nearest atoll to Belize City and it's international airport, Turneffe provides visitors with an opportunity to visit a relatively pristine atoll environment. The fact that the three existing resorts on the atoll cater to the more exclusive specialist visitor indicates that this is already perceived as a particular value of the Turneffe Islands. Dive boats from a number of resorts country-wide, including San Pedro (Belize's most popular coastal tourism destination), visit the atoll for it's reefs; sport fishing also makes the atoll an important destination.
3. **Regional Importance for Biodiversity/Protection of Endangered Species;** Turneffe is the largest of Belize's three atolls, islands which - along with their large predominately marine mangrove cayes - are unique in the Caribbean. The comparatively remote location of Turneffe, combined with it's productive

mangrove and reef habitats has meant that the atoll is home to a number of species that are now rare or declining elsewhere in the world. Of particular interest is the population of American crocodiles; this species has declined dramatically elsewhere in the Caribbean and early data give strong indications that Turneffe has one of the largest remaining populations. The atoll also provides an important habitat for marine turtles, manatee, dolphins and seabirds.

4. **Regional Importance for Marine Scientific Research and Education;** The MRC has already attracted substantial interest from the international scientific community, as evidenced by a growing number of requests for research and/or training uses such as the July 1995 regional Coral Reef Monitoring Workshop sponsored by the Paseo Pantera Project (funded by USAID, Wildlife Conservation Society and the Caribbean Conservation Corporation). Key studies of the reef and caye habitats were carried out on the atoll in the early 1960's before and after Hurricane Hattie, making Turneffe an ideal and unique location to study the recovery of natural habitats from hurricane damage, in an environment of few human impacts. Turneffe is already recognised as a valuable site for teaching and training: the Smithsonian Institute (SI) has conducted mangrove workshops there for Belizean high school teachers for the past three years and the MRC will receive grant funds from the McArthur Foundation to collaborate with SI to carry out the 1996 workshop (Raines, P. & A. Gill, 1994).

## **2. DESCRIPTION OF TURNEFFE ISLANDS MASTER PLAN AREA**

### **2.1 Boundaries**

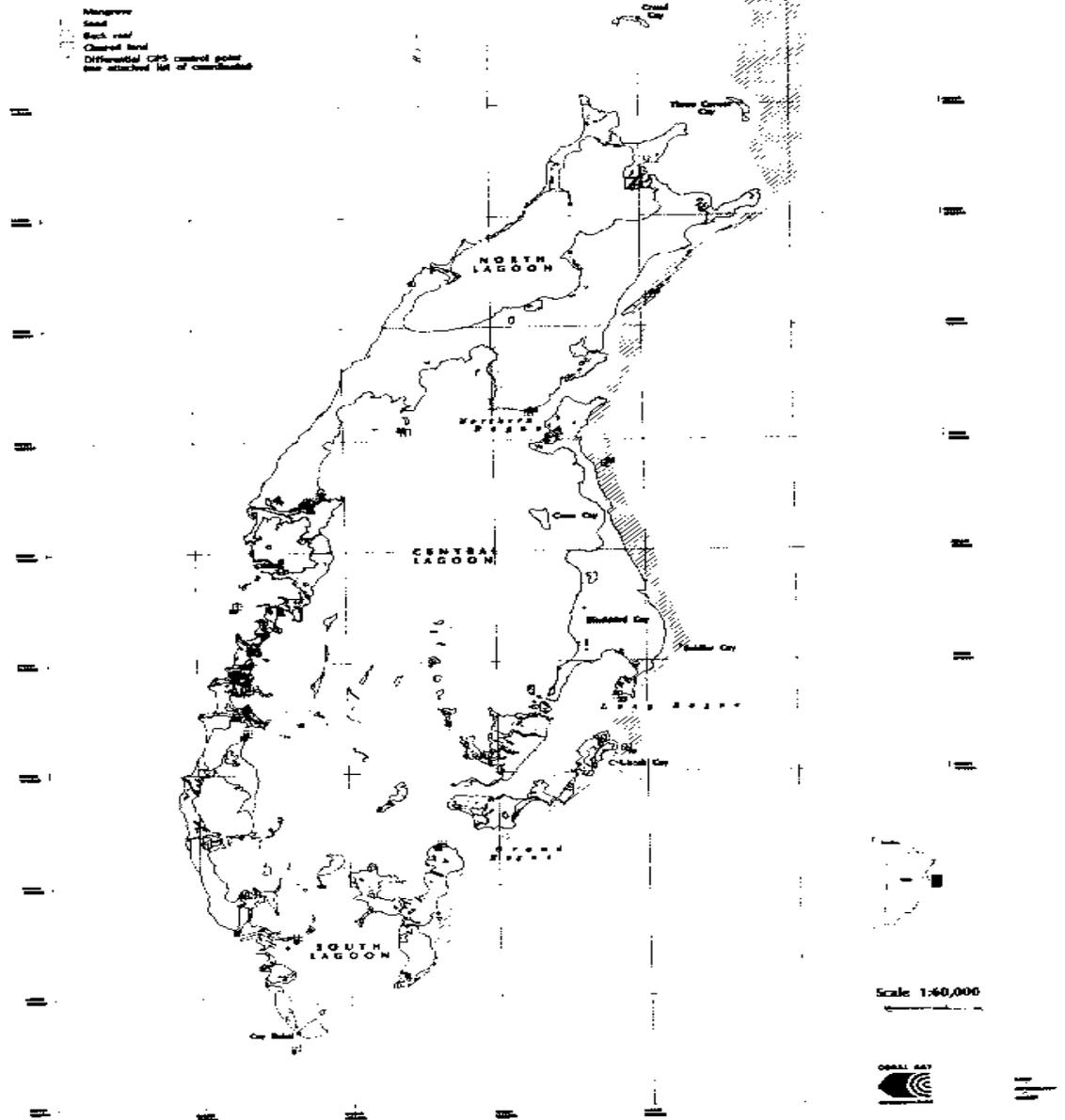
The legal description of the area to be covered by declaration is proposed according to the Universal Trans Mercator (UTM) grid plotted by CCC, the Land Information Centre (LIC) and the CZMP as follows:

**416 500 E / 1949 500 N**, then 600 metres E to **422 500 E / 1949 500 N**, then 11,500 metres S to **422 500 E / 1938 000 N**, then 26,750 metres SWS to **416 500 E / 1912 000 N**, then 19,000 metres SW to **406 500 E / 1896 000 N**, then 4,000 metres W to **402 500 E / 1896 000 N**, then 10,000 metres NW to **398 500 E / 1904 000 N**, then 16,000 metres to **398 500 E / 1920 000 N**, then 35,700 NE to commencement. (See figure 1 below)

# Turneffe Atoll

Revised base map

Preliminary classification / DGPS control



**Digitised Base Map of Turneffe Islands Atoll delineating terrestrial cays and water bodies (accuracy +/- 5 metres. Produced in 1994 by CCC in collaboration with the Lands Information Centre of the Ministry of Natural Resources of the Government of Belize.**

## **2.2 Description of Natural Resources and Products**

(To be provided by proposed KMT thesis research project)

## **2.3 Description of Human Uses and Impacts**

(To be provided by proposed KMT thesis research project)

# **3. PLANNING OBJECTIVES<sup>1</sup>**

## **3.1 Long Term Objectives**

Among previously identified planning objectives (protection of fishery resources, fishing rights & the atoll's terrestrial/marine ecosystems; prevention of overdevelopment & speculation; and acting as a model for coastal/caye planning in Belize) the following long-term objectives are suggested as the principal targets for TIMP recommendations:

- A. To identify Turneffe Islands bio-physical resources, their current socio-economic uses and present as well as future conflicts between ecological needs and economic demands;** in order to foster sustainable development of the atoll. Involve current stakeholders (MRC committees, fishermen, tourism interests and conservation NGOs) through workshops, surveys, interviews and field visits. Incorporate their expressed needs and aspirations in the planning recommendations without compromise of ecologically sound planning;
- B. To protect high water quality throughout the Turneffe Islands;** with particular attention to water quality in the lagoon complex;
- C. To maintain the integrity of the Turneffe Islands ecosystem by developing a protected areas strategy;** (consistent with national policy) for its designation as either part of Belize's proposed World Heritage Site application, as an independent Biosphere Reserve or as a Ramsar Convention site;
- D. To balance a wide array of land and sea use interests; including environmental education & research, ecotourism, fishing & other marine resource extraction and appropriate residential development with the need to conserve the terrestrial and marine biological diversity** within the Turneffe Islands, including developing recommendations to protect the endangered American crocodile, the hawksbill turtle and other economically valuable living marine resources; &
- E. To plan for sustained resource use specifically maintaining traditional resource use patterns.** Develop recommendations that will allow resident fishermen and tour operators to pursue ecologically sound economic opportunities that ensure the future quality of life in the region.

Planning recommendations for the Turneffe Islands Master Plan (TIMP) should seek to maintain compatible human use of area resources while securing their long-term stability and health. Recommended planning zones should include

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<sup>1</sup>Based on Draft Manatee Special Development Area Planning Objectives; 1993(?), Horwich et. al. DRAFT MANATEE SPECIAL DEVELOPMENT AREA MANAGEMENT PLAN.

areas that allow for varying levels of use, building, sustained resource harvest and protection of natural resources.

### **3.2 Elaboration of Planning Objectives for TIMP Recommendations**

- A. Identify Turneffe Islands bio-physical resources, their current socio-economic uses and present as well as future conflicts between ecological needs and economic demands in order to foster sustainable development of the atoll; establish spatially referenced Geographic Information System (GIS) database. Involve current stakeholders (MRC committees, fishermen, tourism interests and conservation NGOs) through surveys, interviews and field visits. The goal is to incorporate the expressed and perceived needs/aspirations of present/future resource users into the planning recommendations without compromising ecologically sound planning.**

(Detailed identification and analysis to be accomplished using existing CCC survey data, LIC/CZMP data and results of proposed KMT thesis research project)

- B. Protection of high water quality throughout Turneffe with particular attention to water quality in the lagoon complex.**

The Turneffe Islands are dominated by water. An estimated \_\_\_\_? acres or \_\_\_\_? percent of Turneffe is either open water or designated as wetland or mangrove (data to be provided by proposed KMT thesis research project).

- \* Describe, quantify and qualify Turneffe lagoon and coastal waters
- \* Describe and update results of MRC EIA water quality testing project with Dept. of Hydrology collaboration.

Water is the single most important unifying resource within the MSDA. Therefore, a major thrust in the planning goals of the TIMP is overall water quality and water body protection. Planning efforts for water quality will focus on protection of water edges (lagoons and shorelines), controlling erosion and preventing pollution. All water protection measures will further benefit the crocodiles, turtles and other living marine resources particularly within the lagoon areas and will help maintain public health standards in the area.

As a dominant focus in the TIMP, water quality will serve as an indicator for the overall ecosystem health. In addition to hosting a number of important endangered species, Turneffe supports a number of commercially valuable fish including the Nassau grouper, Caribbean spiny lobster, conch and game fish including tarpon and permit.

- C. Maintain integrity of the Turneffe Islands ecosystem and develop a protected areas strategy (consistent with national policy) for its designation as either part of Belize's proposed World Heritage Site application, as an independent Biosphere Reserve or as a Ramsar Convention site.**

By maintaining the present functioning of the Turneffe Islands ecosystem, it is possible to ensure long-term viability of habitat areas which the atoll's species require for breeding, feeding, resting, and recreation. Inventories of the TIMP must also consider areas of archeological and cultural importance such as ship wrecks, colonial-era settlements and ancient Maya remains.

To protect species of local, national and international importance, the ecosystems that support these animals are being specifically targeted for management. Species of particular interest in the TIMP, and for whom management recommendations are targeted include: the American crocodile; the hawksbill turtle; local game fish species (e.g. tarpon, permit etc.); & local commercial fishery species. In addition important bird nesting areas, or rookeries (once identified) will also be specifically recommended for protection.

- D. Balance a wide array of land and sea use interests including environmental education & research, ecotourism, fishing & other marine resource extraction and appropriate residential development with the need to conserve the terrestrial and marine biological diversity within the Turneffe Islands, including developing recommendations to protect the endangered American crocodile, the hawksbill turtle and other economically valuable living marine resources.**

(To be derived from inputs of persons and agencies proposed for inclusion in planning process and results of proposed KMT thesis research project)

- E. Plan for sustained resource use specifically maintaining traditional resource use patterns. Develop recommendations that will allow resident fishermen and tour operators to pursue ecologically sound economic opportunities that ensure the future quality of life in the region.**

(To be derived from inputs of appropriate persons and agencies and results of proposed KMT thesis research project)

### **3.2 Recommended TIMP Physical Planning Guidelines**

Five sectoral areas of significance have been identified and draft physical planning policies suggested (McGill, 1995):

- 1. Commercial Fishing;** It is recommended that all existing fishing camps, previously used but abandoned fishing camps and suitable sites for fishing camps be identified and included in the plan for monitoring. All such sites meeting ecological criteria should be “zoned” for “fishing”, including ancillary uses. Fishermen may also be allowed to convert fishing zones to “residential” for full or part-time residences meeting plan guidelines or “guest-houses” which meet plan requirements. The idea is to provide a large measure of security of tenure to the fishing camp owners while regulating land use in accordance with TIMP provisions. Only these lands should be used for authorised commercial fishing activities; private lands and National lands leased out and zoned for other uses should not be permitted to present competition to fishermen.
- 2. Tourism;** it is recommended that all three existing resorts be zoned for “resort” use with other appropriate private/national leased lands to be zoned for resort, “residential tourism” and/or “residential” use. The recommended number of resorts and residences permitted for the whole atoll should be in accord with estimated carrying capacity; McGill (1995) recommends an

absolute limit of six (6) resorts. All such developments must be low density (see Table 2 below); all fishing camps are recommended to be given the option to develop guest houses in accord with plan guidelines. No other lands, apart from resorts, should be able to offer such services.

**Table 3. Recommended TIMP Low Density Residential Requirements**

1)	Primary use shall be residential which includes occupation by owner as a fishing abode or for the purposes of a family home or a vacation home or occupied by the owner or rented to tenants for certain times or periods of the year as a "guesthouse".
2)	Secondary Uses permitted are: Conservation and open space Parks and playgrounds Small scale ecotourism facilities
3)	Minimum lot size is four acres.
4)	Minimum lot frontage along lagoons is 400'-0".
5)	Net density shall not exceed one dwelling per four acres.
6)	Site density shall not exceed ten habitable rooms per 10 acres.
7)	One guest bed is allowed for every two acres.
8)	A construction setback from all lagoon edges and the high water mark on the coast of two chains, or 112'-0".
9)	All proposals for development are subject to the conditions of waste disposal and must have sewage and waste disposal plans which meet the approval of the Department of Public Health, the Water and Sewage Authority and the TIMP management authority. Plans for how fresh water requirements will be met must also be submitted.
10)	Building setbacks as follows: a) 50'-0" from side boundary. b) 50'-0" from rear boundary. c) 50'-0" from front boundary of lots not directly fronting lagoons.
11)	Building height shall not exceed two stories or 28 feet.
12)	A 66'-0" reserve along lagoon edges to protect existing natural vegetation. Access to dwellings may be created by selectively clearing a 20'-0" wide pathway, one per lot.
13)	Cluster development is permitted, including ecotourism facilities and extended family dwellings, to promote leaving the majority of the property in its natural, or undisturbed, state with its existing vegetation cover and drainage conditions. Site plans are to be submitted for review and approval.
14)	Properties of a minimum of 16 acres or greater may build an additional 20% buildings, 20% habitable rooms and 25% guest beds if construction occurs contiguously on one quarter of the total land area. Site plans to be reviewed and approved.
15)	Piers, where permitted, are to be a minimum of 1600'-0" apart. Pole or piling type construction only. No dredging or altering of the shore is permitted. All piers are publicly accessible.
16)	Construction of roads will not be permitted.

**3. Social Infrastructure and Amenities;** It is recommended that all existing and future resorts be obliged to offer "health clinic" (para-medical) services to the general community. Accommodation at a suitable centrally located site (the MRC or an existing resort) should be made for meetings of the general community or specific groups/committees on the atoll. A hurricane shelter is recommended for construction on the large inland area of Blackbird Caye, with a possible second site on the large inland area by Snake Point.

**4. Solid Waste and Sewage Disposal;** in accord with the provisions of the draft Cayes Development Policy, two collective solid waste landfill sites (located in the least environmentally damaging locations) are recommended for non-burnable wastes, bio-degradable wastes recommended to be composted and burnable organic wastes are recommended to be incinerated in a safe and environmentally sound manner. All sewage disposal systems, including septic tanks and composting toilets, should be subject to a comprehensive assessment prior to approval for installation. The storage and disposal means for other liquid wastes (including chemicals, hazardous substances, oil and detergents) should also be subject to a comprehensive assessment prior to their approval and grey water treatment facilities should be installed where

applicable; relevant provisions of the National Oil Waste Management Plan should be fully complied with upon it's final approval.

5. **Protected and Conservation Areas;** areas within the TIMP recommended for protected status include:
- a. (Lagoons and Bogues to be identified by KMT thesis research)
  - b. All mangrove forests within the TIMP area; to be identified by KMT thesis research.
  - c. The turtle nesting zones; to be identified by KMT thesis research.
  - d. Crocodile management zone; to be identified by KMT thesis research.
  - e. Marine buffer; to be identified by KMT thesis research.

### **3.3 TIMP Process Stakeholders**

The TIMP process should include the following stakeholders in addition to MRC committee members:

1. Local Fishermen and their Representatives;
2. Resort Owners/Operators;
3. National NGO's with Specific Interests in Turneffe;
4. Dive Operators and Tour Guides who use Turneffe;
5. Relevant GOB Departments (Fisheries, Forestry (Mangrove Section), Environment, Lands & Surveys, Belize Tourist Board, Housing & Planning, Geology & Petroleum and Belize Ports Authority.

# ANNEX 1 Draft Document Outline for the Turneffe Islands Master Plan

## 1.0 ABSTRACT

## 2.0 GENERAL INTRODUCTION

### 2.1 Authority for Designation

### 2.2 Terms of Statutory Designation

### 2.3 Mission and Goals of the Marine Research Centre

(UCB/GOB/CCC MRC Memorandum of Understanding)

(Description of Belize Coastal Environment and Coastal Resources

Management Institutional Assessment-Appendix 1 below)

(Description of the Turneffe Islands-KMT proposed thesis)

### 2.4 Draft Master Plan Requirements

(See draft Cayes Development Policy, 1995)

After the Florida Keys National Marine Sanctuary and Protection Act:

-facilitate all public & private uses consistent with the primary objective of resource conservation;

-consider temporal & geographic zoning to ensure protection;

-incorporate regulations to enforce comprehensive water quality protection;

-identify research needs and establish a long-term ecological monitoring

programme;

-identify alternative sources of funding needed to fully implement the plan as well as supplement UCB/GOB/CCC financial support;

-ensure coordination and cooperation between TIMP, the MRC and other national authorities with jurisdiction within or adjacent to the TIMP area;

-promote education and public awareness among users and the Belizean public about the coral reef/seagrass/mangrove ecosystem and its conservation, also to promote navigational and marine safety;

-incorporate the existing Lighthouse Reef Natural Monument & Blue Hole and the Glover's Reef Marine Reserve into a wider Belize Atoll Conservation Strategy.

### 2.5 Turneffe Islands Master Plan Draft Goal:

TO PRESERVE AND PROTECT THE PHYSICAL AND BIOLOGICAL COMPONENTS OF THE TURNEFFE ISLANDS' INTEGRATED ECOSYSTEMS (TERRESTRIAL AND MARINE) TO ENSURE THEIR VIABILITY FOR THE SUSTAINABLE USE AND ENJOYMENT OF PRESENT AND FUTURE GENERATIONS;

### 2.6 Turneffe Islands Master Plan Draft Objectives:

A. To identify Turneffe Islands bio-physical resources, their current socio-economic uses and present as well as future conflicts between ecological needs and economic demands;

B. To protect of high water quality throughout the Turneffe Islands;

C. To maintain the integrity of the Turneffe Islands ecosystem by developing a protected areas strategy;

D. To balance a wide array of land and sea use interests; including environmental education & research, ecotourism, fishing & other marine resource extraction and appropriate residential development with the need to conserve the terrestrial and marine biological diversity; &

E. To plan for sustained resource use specifically maintaining traditional resource use patterns.

### 2.7 Overview of the Proposed Planning Process

A. Comprehensive Approach

B. Participatory Consensus-Building

C. Focus on Long-Term Integrated Management

## 2.8 Environmental Impact Assessment Follow-up and Update

### 3. ENVIRONMENTAL DESCRIPTION

#### 3.1 Introduction

- A. Turneffe Islands and the Belize Barrier Reef
- B. The Population of Turneffe
- C. Accessibility
- D. Existing Management Areas

#### 3.2 Physical Environments

- A. Belize Coastal Physiographic Regions:
  - a1) Continental Shelf
  - a2) Barrier Reef
  - A3) Atolls
- B. Climatology:
  - b1) Temperature and Humidity
  - b2) Precipitation
- C. Storm Systems:
  - c1) Large-scale Synoptic Systems
  - c2) Tropical Depressions and Hurricanes
    - Effects
    - System Dynamics
  - c3) Thunderstorms
- D. Hydrology:
  - d1) Historic Patterns
  - d2) Past Human Alterations
  - d3) Proposed Future Human Alterations
  - d4) Relationship of Hydrology to the TIMP
  - d5) Groundwater
- E. Hydrography:
  - e1) Regional Currents
  - e2) Local Transport Currents
- F. Water Quality:
  - f1) Types of Pollutant Inputs
  - f2) Sources of Pollutant Inputs
    - Point Sources
    - Nonpoint Sources
    - External Sources
  - f3) Environmental Effects
    - Seagrass Beds
    - Coral Reefs
    - Mangrove Forest

#### 3.3 Natural Resources

- A. Biogeographic Overview
  - a1) Biogeographic Variation
  - a2) A Holistic Systems Perspective
- B. Biogeographic Regions
  - Geomorphologically Distinct Subareas
  - Major Ecological Zones
  - b1) Geographic Extents
  - b2) Biological Components
    - Mangrove Wetlands/Lagoon Habitats & Inhabitants
    - Seagrass Bed Habitats & Inhabitants
    - Coral Reef Habitats & Inhabitants
  - b3) Ecological Importance
- C. Threatened and Endangered Species

- c1) Plants
- c2) Animals
  - Invertebrates
  - Fishes
  - Amphibians and Reptiles
  - Birds
  - Mammals

### **3.4 Cultural and Historic Resources**

- A. Submerged Pre-Columbian Archeological sites
- B. Terrestrial Pre-Columbian Archeological sites
- C. Lighthouses
- D. Shipwrecks
  - d1) Location and Causes
  - d2) Shipwreck Concentration
  - d3) Historical Data
  - d4) Modern Shipwrecks

### **3.5 Human Activities and Uses**

- A. Population
  - a1) Historic Population
  - a2) Seasonal Population
  - a3) Population Characteristics
  - a4) Population Characteristics
- B. Economic Characteristics
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    - Mangrove Protection Regulations
    - Conservation Unit
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      - \*National Parks System
      - \*Draft Protected Areas Conservation Trust
  - a3) Lands and Survey Department/Ministry of Natural Resources
    - Land Utilisation Authority
      - \*Special Development Areas
    - Lands Information Centre
      - \*Geographic Information System Unit
      - \*Conservation and Environmental Data System Unit
  - a4) Housing and Planning Department/Ministry of Housing and Urban Development
    - Central Housing and Planning Authority

- Town and Country Planning Regulations
- a5) Environment Department/Ministry of Tourism & the Environment
  - Draft Environmental Impact Assessment Regulations
- a6) Water and Sanitation Authority/Ministry of Natural Resources
  - Water and Sewerage Code Bye Laws
- a7) Hydrology Department/Ministry of Science, Energy and Transportation
  - Draft Water Resources Act
- a8) Public Health Department/Ministry of Health
  - Public Health Ordinance
  - Draft Effluent Limitations Regulations
  - Solid Waste Management Authority Act
- a9) Pesticides Control Board/Ministry of Agriculture and Fisheries
  - Registered and Restricted Pesticides Regulation
- a10) Geology and Petroleum Department/Ministry of Science, Energy & Transportation
  - Mines and Minerals Regulations
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  - Draft Petroleum Regulations
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  - Tonnage/Wharfage Regulations
  - Public Wharves Regulations
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  - Ancient Monuments and Antiquities Ordinance
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- a14) North Ambergris Caye Development Corporation/Ministry of Natural Resources
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**COASTAL RESOURCES MANAGEMENT IN BELIZE:**  
**Institutional Capacity - Issues & Answers**

**BY:**

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## **ABSTRACT**

After a brief description of Belize's natural resources, the importance of Coastal Zone Management to its national development is analysed. A review of the history, legal provisions and administrative framework for CZM follows. The major issues relating to CZM institutional capacity are examined, an update on related national environmental management developments is given and recommendations are made for future action.

## **ACKNOWLEDGMENTS**

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## **1. BELIZE AND ITS COASTAL ZONE**

Belize is a country of 200,000 persons, whose population has grown by an estimated 30,000 in the last ten years as a result of a large influx of Central American refugees, primarily Salvadorans and Guatemalans. It has an exceptionally low population density of seven persons per square kilometer, one of the lowest in the world, although its ratio of three hundred and six persons per square kilometer of cultivated land is higher than nearby Honduras and Nicaragua.

Ethnically, the country is diverse, although predominately of African descent (Creole and Garifuna) with over 40% of its population Spanish speakers (Mestizo). Descendants of the Maya are the third largest ethnic group; persons of East Indian, Arab, Asian, Central American, European and North American ancestry also make up portions of the population.

Belize has a GNP per capita of US\$1,500 (1988); its adjusted real GDP per capita is US\$2,600 (1988). It ranked sixty-seventh among nations on the 1993 United Nations Human Development Index (HDI=.7), which places it near the top of the Medium Human Development category. Demographic pressures (exploding population growth, poor health and extreme poverty), all factors which have driven populations in other Central American and Caribbean countries to over-exploit their environments, are not as prevalent in Belize. While pressure has been rising, especially in the last ten years, Belize still remains free from many of the demographic pressures which make it so hard for other developing states to enact sustainable resource management policies.<sup>1</sup>

### **1.1 PHYSICAL FEATURES**

Belize is located in northern Central America, bordered by Mexico on the North, Guatemala to the West and South and the Caribbean Sea to the East (See Figure 1 below). Including its territorial waters in the Caribbean, Belize's geographic coordinates are 15 53' to 18 30' North latitude and 87 15' to 89 15' West longitude. Using an offshore territorial limit of 20 km (12 miles), the national territory covers about 46,620 square kilometers (18,000 square miles), of which 49% is land. Belize's land mass includes 450 tiny islands known as cayes (pronounced keys), totaling about 690 square kilometers (266 square miles). However, there are about 1540 square kilometers (595 square miles) of lagoons on the mainland, reducing effective land area to some 21,400 square kilometers (8,263 square miles). The average dimensions of the Belize rectangle are about 260 km (156 miles) north-south and 180 km (109 miles) east-west; the mainland has 280 km (168 miles) of coastline.

Belize's major physiographic feature is its barrier reef, the second longest in the world and the longest in the Northern hemisphere. It extends 220 km (132 miles) from the Mexican border to the Sapodilla Cayes; in the north along Ambergris Caye the barrier reef is only a few hundred meters offshore, whereas in the south it is over 40 km (25 miles) offshore at Placencia. At 15 53' - 18 30' North latitude, Belize lies in the outer tropics or subtropical geographic belt. Mean monthly minimum temperatures range seasonally from 16-17 C to 33 C.<sup>2</sup>

## **1.2 COASTAL & MARINE ECOSYSTEMS**

### **1.2a - Coastal Ecology**

The Belize coastal area is exposed to Southeast trade winds averaging 10-13 knots that attain greatest constancy in July. Although only 5% of the cyclones in the tropical Atlantic Ocean reach Belize, the country has had a history of devastating encounters with them. In the last century, major storms in 1931, 1955, 1961, 1974(2) and 1978 have killed thousands of people and left many more homeless, causing damage in the hundreds of millions of US\$. Chiefly because of Belize City's vulnerability to hurricanes, the capital was moved 80 km (48 miles) inland to Belmopan in 1971. Streams draining south-eastern and eastern slopes of the Maya Mountains have well-developed branching patterns; on the coastal plain, streams become progressively more sluggish and drainage is less effective. Near the submerging coast, numerous lagoons, mangrove swamps, deep estuaries and river-mouth bars are well-developed.

Few countries have the extent and diversity of highly productive tropical coastal and marine ecosystems that are characteristic of Belize. These include coastal lagoons, mangroves, sea grass beds and coral reefs. Coastal lagoons provide nursery and feeding grounds for many near-shore fish species, act as sinks for terrestrial run-off, supply abundant nutrients to coastal waters and provide critical habitat for many species of Belizean wildlife, such as the manatee and crocodile.

### **1.2b - Marine Ecology**

Beyond the barrier reef the sea floor drops sharply to form the deep sea where, only a few hundred feet from the reef, the water becomes very deep -- 305 metres (1007 ft.) Conditions are much harsher there, hence the deep sea does not support the diverse abundance of life of the reef and shoreward coast zone. Important pelagic (open ocean) species may however be found in this area along with other non-living resources. Seaward of the barrier reef, the continental margin is a series of discontinuous marine ridges with NNE-SSW orientation; three of these ridges have coral atolls upon them, known as Glover's, Lighthouse and Turneffe Island Reefs, separated by waters 360-1100 m deep. Seaward of the marine ridge supporting these atolls is an escarpment descending more than 4,000 m into the Cayman Trough.<sup>3</sup>

### **1.2c - Environmental Status**

Although coastal and marine resources in Belize are still plentiful there is evidence that stocks of the most important economic species within the barrier reef, where most fishing activities presently occur, are being seriously depleted, largely because of over-fishing. Also, while the overall level of known contamination of rivers, streams, underground and marine water sources is still low, there are certain areas (particularly around Belize City and other urban coastal areas) where there is evidence of serious water pollution.

Despite their general good health, coastal and marine resources in Belize are under threat from the effects of the following specific activities:

- 1 - housing and industrial developments which at the expense of mangrove swamps produce sewage & toxic contaminants that impact water quality (e.g. Belize City);
- 2 - tourism projects located in the coastal zone or on the cayes;

- 3 - dredging for landfill and beach development which undermine shoreline stability;
- 4 - agriculturally cultivated areas with increase in run-off sediment and agro-chemicals;
- 5 - solid waste on beaches from urban sources and dumping at sea;
- 6 - inadequate coastal engineering resulting in coastal erosion (e.g. Belize City, Ambergris Caye & Monkey River).<sup>4</sup>

It is considered by many (Harrison, 1994) that the social and economic well-being of Belize is intimately linked to the health of its coastal resources.

### **1.3 COASTAL ZONE MANAGEMENT AND NATIONAL SUSTAINABLE DEVELOPMENT**

Belize's coastal ecosystem components act as effective anchors for shoreline stability and create low-energy environments on their leeward sides which are important to many coastal/marine species. The reef reduces shoreline erosion by curtailing the impact of coastal currents; seagrasses bind sediments which could choke the coral reef; mangroves trap silts and toxic substances from terrestrial runoff, thereby purifying the water before it enters coastal lagoons, contributing to the health and productivity of the sea grass beds and coral reef. Mangroves also buffer the physical effects of storms, and their elaborate network of prop roots acts to stabilize the shoreline.

Two of Belize's main economic sectors, fisheries and tourism, are fully dependent on the management of its coastal/marine ecosystems if they are to provide continued and sustainable yields. Unchecked rapid mangrove deforestation, resulting in increased rates of erosion, will adversely affect the health of these ecosystems by depositing high silt loads into the sea; unsound agricultural practices will have the same effect. The impacts of unmanaged land-based pollution (eutrophication and toxic chemicals) are well known, and would be especially serious in the Belizean aquatic environment. The effect of over-fishing for short term profit on the long term productivity of fisheries is also well known. The future success of tourism in Belize, given an increasing industry trend towards eco-tourism, depends explicitly on a healthy coastal/marine environment.

In summary, the coastal/marine ecosystems of Belize are important to national sustainable development for many reasons (Scoseria & Camber et al, 1994):

- a. They are essential to the survival of many marine species;
- b. They protect the coast from high wave energy;
- c. They are a nursery ground for juvenile fish and invertebrates;
- d. They provide habitat for many endangered species e.g. manatees, crocodile, turtles and many species of birds; &
- e. They are essential for vibrant fishing and eco-tourism industries.

## **2. COASTAL ZONE MANAGEMENT INFRASTRUCTURE**

### **2.1 HISTORIC VIEW OF NATURAL RESOURCE MANAGEMENT LAWS**

The 1984 Country Environmental Profile describes a large number of laws designed to guide and regulate activities involving natural resources in Belize (Hartshorn et. al., 1984). At that time the existing laws for protection and regulation of natural resources were:

#### **1984 BELIZE LAWS-NATURAL RESOURCES PROTECTION**

Wildlife Protection Act (1981, No. 4)  
National Parks System Act (1981, No. 5)  
Land Utilization Ordinance (1981, No. 16)  
Land Tax (revised 1982)  
Ancient Monuments and Antiquity Act (1971, No. 22)  
Public Health Ordinance (1983)  
Development Incentives Ordinance (1960 & 1973)

#### **1984 BELIZE LAWS-REGULATION OF NATURAL RESOURCES EXPLOITATION**

Crown Lands Ordinance (1939, Chapter 110, revised in 1958)  
Forests Ordinance (revised 1958, Chapter 115)  
Minerals Ordinance (revised 1958, Chapter 125)  
Petroleum Ordinance (1938, Chapter 126, revised 1958)  
Fisheries Ordinance revised 1958, Chapter 133)  
Plant Protection Ordinance (1953, Chapter 124)

The lack of implementing regulations for many of these acts in 1984 was well described along with the critical lack of government personnel to implement/enforce them. The coastal/marine management infrastructure of Belize, at that time, suffered from jurisdictional conflicts and institutional constraints in the following areas: Fisheries, Water, Agriculture, and Pollution. The then Fisheries Unit had been switched between three Ministries and was at the time within the Ministry of Health, Housing & Cooperatives while the state of management of the barrier reef was called a "*major jurisdictional problem*", recognising that "*Though no single Ministry has responsibility for safeguarding the reef, almost every Ministry has a stake in its use or development.*" The solution then enunciated was that "*Belize should have a separate regulatory authority to oversee and coordinate activities on the reef.*"<sup>5</sup>

### **2.2 PRESENT CZM LEGAL AND REGULATORY FRAMEWORK**

The present legal and regulatory framework for Coastal Zone Management (CZM) in Belize began with the Marine Reserves amendment (to Section 13A, Chapter 174) of 1983 to the Fisheries Ordinance (1958, Chapter 133). This important piece of legislation allowed the Minister responsible to "*declare any area within the fishing limits of Belize, and as appropriate any surrounding land, to be a marine reserve:*

- a. *to afford special protection to the aquatic flora and fauna of such areas and to protect and preserve the natural breeding grounds and habitats of aquatic life;*

- b. *to allow for the natural regeneration of aquatic life in areas where such life has been depleted;*
- c. *to promote scientific study and research in respect of such areas; &*
- d. *to preserve and enhance the natural beauty of such areas."*<sup>6</sup>

This was augmented by Statutory Instrument No. 34 of 1987 which extended the application of the Fisheries Ordinance to "***apply to all the rivers, streams, watercourses, lakes, lagoons and other inland waters of Belize.***"<sup>7</sup> Marine reserve provisions were strengthened by the Fisheries (Amendment) Act of 1988 which gave the Minister responsible powers beyond declaration of a reserve to include authority "***generally for all matters connected with the control and regulation of marine reserves.***"<sup>8</sup>

Oceanic marine management was included in 1992 with the passage of the Maritime Areas Act (No. 1 of 1992) which made "***provision with respect to the Territorial Sea, Internal Waters and the Exclusive Economic Zone (EEZ) of Belize.***" This enabled the legal basis for the establishment of an EEZ and the establishment of Belizean sovereign rights in a number of areas; included in respect of the EEZ [Section 9 (b) (ii) & (iii)] is jurisdiction with regard to "***Maritime Scientific Research, and The Protection and Preservation of the Marine Environment***"<sup>9</sup>

## 2.3 PRESENT CZM ADMINISTRATIVE STRUCTURE AND GOALS

In 1989, recognising the increasingly negative impacts of national development on its coastal/marine resources, the Government of Belize co-sponsored an International Coastal Resources Management Workshop which recommended the establishment of a Coastal Zone Management Unit (CZMU). This recommendation was endorsed by government in its 1990 -1994 Development Plan as a priority programme target for the achievement of Natural Resources Management in the Fisheries component of the plan's productive sector strategy.<sup>10</sup> With technical assistance from the International Union for the Conservation of Nature (IUCN), this unit was set up in 1990 under the control of the Ministry of Agriculture's Fisheries Department. The Fisheries Department is responsible for implementing the Fisheries Act. Its functions include management and conservation of fisheries resources, coastal zone management, and designation and management of marine reserves. The Department is headed by a Fisheries Administrator with a staff of 16, including Fisheries Officers who enforce the other Fisheries Act requirements; it is organized into Conservation Compliance, Coastal Zone Management, and Aquaculture Units (Scoseria & Camber et al, 1994). The CZMU head functions at the same level as the two other Fisheries Officers in the department. The Belize CZMU's role is "***to develop integrated management plans for the protection and sustainable use of the country's coastal marine resources***"<sup>11</sup>; it has since developed a comprehensive planning document on the management of the coastal zone of Belize resulting in a major three phase project with the following outputs to date:<sup>12</sup>

### Phase 1 (on-going)

- Literature Search, Fieldwork, Expert Interviews;
- Digital Mapping of Data, Database Establishment;
- GIS (Geographic Information System) Establishment;
- Integrated Data Coverage (Physical Parameters, Habitats & Resources, Uses & Impacts, Land Ownership/Use Inventory); &

Use of Maps & Databases in Planning/Policy Making, Continuous Updating & Revision.

Phase 2 (on-going)

Special Area Management Plans Prepared;  
Expansion of Network of Marine/Coastal Protected Areas; &  
Introduction of Coral Reef & Coastal Water Quality Monitoring Programmes.

Phase 3 (yet to be undertaken)

Development of a National CZM Action Plan, including

- i. A Coastal Zoning Scheme,
- ii. Definitions for a Management Framework, &
- iii. Appropriate Policies & Legislation;

Recommendations for Additional Protected Areas;  
Introduction of Further Monitoring Mechanisms; &  
Description of Priority Areas for Future Research.

The unit has identified four types of issues confronting CZM in Belize: (1) Impacts of Industries, (2) Management of Coastal Habitats & Protection of Biodiversity, (3) Insufficient Public Awareness & Participation in Management and (4) Weak Institutional Arrangements for Management (Bijlsma et. al. Editors, 1994).

### **3. INSTITUTIONAL CAPACITY ASSESSMENT**

The Government of Belize (GOB) currently lacks adequate monitoring and enforcing capacity to implement the present environmental and CZM regulations. This lack of sufficient institutional capacity in general is considered serious, given indications that the coastal/marine threats of waste disposal, contamination of rivers and other aquatic systems, mangrove degradation, and beach contamination and erosion (not yet at dramatic levels) are likely to significantly worsen in the next three to five years (Scoseria & Cambers, 1994). We look now at the major institutional capacity issues.

#### **3.1 MAJOR ISSUES: COORDINATION, RESOURCE ALLOCATION & TECHNICAL SKILLS**

The passage of an Environmental Protection Act (EPA) in 1992 by the GOB highlights the major issue for CZM institutional capacity in the country: Institutional Coordination. The Department of the Environment (DOE) created by the Act is headed by a Director of the Environment (Chief Environmental Officer) and is responsible to the Minister of Tourism & the Environment. The Department is responsible for monitoring the implementation of the Act and the regulations made under it; and for taking necessary action to enforce its provisions. The Act specifies 27 areas of responsibility under the heading of powers, duties and functions of the Department. Those related to various aspects of CZM are: Assessment of Natural Resources; Development Control (EIA Process); Land Use Planning; Control of Waste Discharges; Pollution Control; Pollution Monitoring; Enforcement; Natural Resources Use; Policy Formulation; Inter-Ministerial Co-operation & Public Awareness/Education. (Harrison, 1994)

Including DOE, legislated authority for environmental & natural resources related planning and management in Belize is now shared by a number of ministries, departments, quasi-governmental authorities, and non-governmental institutions. Though the portfolio for environment now rests with the Ministry of Tourism and the Environment, major environmental responsibilities are also held by three other Ministries: (1) Health (e.g., water quality monitoring & solid waste management), (2) Agriculture and Fisheries (e.g., fisheries, CZM & pesticides) and (3) Natural Resources (e.g., forestry, national parks and protected areas, wildlife, water supply and sanitation, & land use planning). Two quasi-governmental authorities, the Water and Sewerage Authority (WASA) and the Solid Waste Management Authority (SWMA), also carry out specific environmental responsibilities and a third (the Pro-Tem Water Commission-PTWC) is in the final stages of preparing draft legislation for a National Water Commission (Harrison, 1994). Finally, several non-governmental organizations (NGOs) are carrying out certain natural resource management functions for the Government of Belize (Scoseria & Cambers et al, 1994).

This proliferation of institutions with environment/natural resource management responsibilities but without a coordinating mechanism has given rise to a number of implementation and enforcement problems. The current lack of clear roles and responsibilities also results in unnecessary confusion and wasteful duplication of effort;. On pollution control, for example, the Ministry of Health has been given authority to prevent or reduce pollution of air, soil and water; the same responsibilities have been assigned to the DOE. Another example of duplication is water quality monitoring authority where the Ministry of Health, WASA and the Department of the Environment

have all been authorized through different acts to monitor and take samples of water resources.

Serious institutional problems also arise from the second major capacity issue for GOB ministries and agencies: Lack of Consistency Between Resource Allocation and Responsibilities Assigned. The most dramatic case is that of the Department of the Environment, which faces the enormous task of implementing the provisions of the EPA including the issuance of the vital implementing regulations, with a total staff of six. Another example of underallocation of resources is the Fisheries Department which has a staff of 20 including 2 marine biologists and 2 rangers to protect marine reserves plus another 10 people belonging to the CZMU. This is clearly insufficient to manage a sea area 200 miles wide with more than 1,000 cayes. Other departments or ministries are better endowed with personnel and financial resources. For example, the budget of the Ministry of Natural Resources is about 30% larger than the Ministry of Agriculture (including the Fisheries Department) and almost four times larger than that of the Ministry of Tourism and the Environment whose budget allocation also includes the Department of Archaeology.

The third major capacity constraint is the Lack Of Technical Capacity for environmental and especially coastal resources management which seriously undermines Belize's ability to provide credible environmental protection. Again, the problem is most acute in the DOE, which essentially has five Environmental Officers to carry out its EIA review, regulation development, monitoring and enforcement functions; but it is also true in many of the other departments with environmental responsibilities including the CZMU. However, a number of ongoing aid projects include institutional development components that aim to address this issue:

- (a) The U.S. AID-sponsored NARMAP Project for the Department of Environment will build capacity within the DOE by providing long-term university training; short-term training courses on environmental monitoring, education, solid/hazardous waste management, and analysis of pollutants; and equipment and training for a Conservation and Environmental Data System (CEDS);
- (b) The ODA Forest Planning and Management Project for the Forest Department provides training for Forest Officers and technical assistance in preparation of forest management plans;
- (c) The UNDP/World Bank Global Environmental Facility Coastal Zone Management Project provides staff development and training for the Fisheries Department;
- (d) The University College of Belize(UCB)/University of Montana Natural Resources Management (NRM) & Sustainable Development Project which offers short courses in EIA, Solid Waste Management, Environmental Education and a number of other related subjects; UCB is also planning to begin an Associate Degree programme in NRM by late 1996 as an output of this project. In a recent related development, UCB has signed a Memorandum of Understanding with the three main GOB environmental ministries (Tourism & the Environment, Natural Resources and Agriculture & Fisheries) and Coral Caye Conservation Ltd. of the UK to establish a multi-purpose Marine Research Centre (MRC) on Turneffe Atoll; this project has particular relevance for the CZMU which is represented on the MRC's management committee.

### 3.2 RELATED DEVELOPMENTS

Recognising the problem of integrating its role as overall environmental policy coordinator with that of other public and private/NGO agencies, the Ministry of Tourism & the Environment recently held a national workshop on the issue. Facilitated by the Central American Council on Environment & Development (CCAD) and the World Resources Institute (WRI) on behalf of the GOB and USAID, the workshop was subtitled "*Strengthening the Institutional Framework for Environmental and Natural Resources Management Planning in Belize.*"<sup>13</sup>

Common concerns of the workshop, all of which apply to CZM, were: Inter-Ministerial Coordination, Policy Development, Enforcement, Investigation/Analysis, Monitoring, Resource Management, Information/Data and Regulation. Workshop participants from the public and private/NGO sectors, during the institutional analysis segment, agreed on the following as key GOB environmental management issues:

- Excessive Ministerial Control
- Lack of Inter- Ministerial Coordination
- Inadequate Constitutional Framework of Belize
- Legislative 'Over-Laps'
- 'Turf' Protection by Ministries & Departments
- Duplication of Efforts
- Unbalanced National Social & Economic Council-NASEC (Belize's 5-Year Strategic Planning Management Mechanism, coordinated by the Ministry of Economic Development)

Along with the improvement of national environmental institutional management, six other strategic objectives which were recommended for attention are:

- i. Waste Control Management;
- ii. Coastal & Marine Resources Management;
- iii. Reducing Deforestation & Unsustainable Agricultural Practices;
- iv. Use Economic Incentives to Improve National Parks & Protected Areas;
- v. Control Environmentally Related Diseases; &
- vi. Break the Poverty - Environmental Degradation Cycle.

### 3.3 RECOMMENDED MEASURES

The DOE workshop recommended a number of specific actions (relevant to CZM) on four fronts in order to implement effective environmental management in Belize:

1. REGULATIONS, STANDARDS & ENFORCEMENT
  - Prepare EPA Regulations (especially EIA) that complement existing sectoral ones;
  - Establish Standards and Monitoring Objectives;
  - Support the Proposed Protected Areas Conservation Trust (PACT);
  - Revise the Forest Protection Act; &

- Strengthen Existing Monitoring & Legal Enforcement Capabilities.
2. GOVERNMENT OF BELIZE POLICY COORDINATION
    - Give the DOE's National Environmental Appraisal Committee (NEAC) A Mandate for Overall Inter-Ministerial Policy Coordination, particularly in respect of EIA Process;
    - Design Mechanism for Consolidation of Existing Inter-Ministerial Bodies - CZMU, Pro-Temp Water Commission (PTWC) and Land Utilisation Authority (LUA); &
    - Strengthen the NASEC by Integrating All Sectors into National Strategic (5 year) Planning Process.
  3. THE JUDICIARY
    - Incorporate Environmental Considerations into the Judicial System;
    - Establish Environmental Training Programmes for Judges & Prosecutors;
    - Explore Establishment of Environmental Court; &
    - Build Environmental Law and Rule Making Capacity in Solicitor General's Office.
  4. INFORMATION, PARTICIPATION & ADVOCACY
    - Incorporate All National Environmental Information into Existing National Information Systems (i.e. Ministry of Natural Resources Land Information System, Natural Resources Management Project-NARMAP Conservation & Environmental Data System-CEDS);
    - Build Participatory Consensus into the Environmental Planning Process; &
    - Strengthen Role of NGO's in Advocacy, Information Dissemination & Analysis.

In the context of CZM, it has been noted that the large number of agencies involved in managing the broad array of coastal area activities leads to the types of conflicts currently experienced in Belize (Lowry, 1989). Four types of management structures are identified for the resolution of these policy and jurisdictional problems:

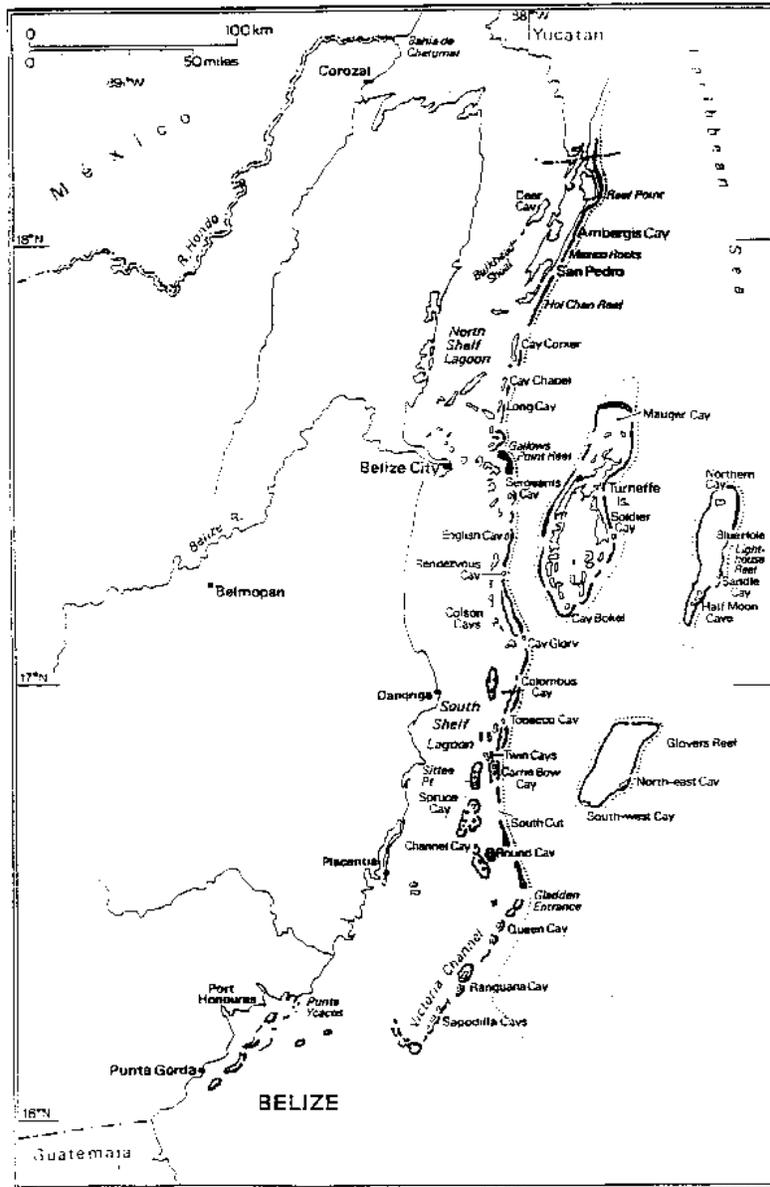
1. CENTRALISE AUTHORITY IN A NEW OR EXISTING COASTAL AGENCY;
2. CENTRALISE AUTHORITY IN A NEW OR EXISTING AGENCY AND CREATE AN INTER-AGENCY UNIT TO DEAL WITH CONFLICTS;
3. DEVELOP A "LEAD" AGENCY TO DIRECT AN INTER-AGENCY COORDINATION NETWORK; &
4. RELY ON AN INTER-AGENCY COMMISSION OR COUNCIL OF EQUALS (OR NEAR-EQUALS)<sup>14</sup>

The Barbados experience with integrated coastal area management may prove a useful guide for Belize at this juncture. Although the two countries are physically at the two extremes of the Caribbean region, Belize could gain from the comprehensive interdisciplinary approach of Barbados in formulating its CZM plan. The resolution of the coordination and information/data base problem in Barbados is especially relevant in respect of Belize. Perhaps utilising the proposed linkage of UCB with the University of the West Indies (UWI), a collaborative project could be elaborated which would allow Belize to profit from Barbados' lengthy and thorough CZM process. In addition, the Belize CZM programme has already adopted the Geographic Information System (GIS) approach to integrated physical planning and would be in a position to immediately

accept the transfer of skills in this area; however, Belize's geo-physical as well as socio-cultural differences mitigate against attempting to 'copy' the 'Bajan' model in its entirety.

## **4. MAP OF BELIZE**

**Figure 1. Map of Belize, Highlighting the Barrier Reef and the Three Atolls**  
(Reproduced from IUCN/UNEP Publication : *Coral Reefs of the World*, 1988)



## **5. REFERENCES**

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<sup>3</sup> Moguel, L. & Jenkins, V. 1993 **Belize Marine Life: Environmental Education (Teacher's Manual)** Education Development Centre, Ministry of Education, Government of Belize. Belize City, Belize. 55 pp.

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<sup>8</sup> Ibid.

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