GLOBAL ENVIRONMENT FACILITY

Belize

Sustainable Development and Management of Biologically Diverse Coastal Resources

Project Document

This Project Document has been edited to facilitate public dissemination.
The original is on file in the GEF Office at UNDP Headquarters in New York.

ABBREVIATIONS AND ACRONYMS

CZM	Coastal Zone Management
CZMU	Coastal Zone Management Unit
PPSC	Physical Planning Sub-committee
UNESCO	United Nations Educational, Scientific, and Cultural Organization

UNITED NATIONS DEVELOPMENT PROGRAMME

GLOBAL ENVIRONMENT FACILITY

Project of the Government of Belize

Title:	Sustainable Development and Management of Biologically Diverse Coastal Resources
Number:	BZE/92/G31/A/1G/31
Duration:	Five years
Project Site:	Belize
UNDP Sector:	Natural Resources
Subsector:	Land and Water
Government Implementing Agency:	Ministry of Agriculture and Fisheries
Executing Agency:	Office of Project Services (OPS) of the United Nations Development Programme (UNDP)
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UNDP/GEF Inputs:	US $3 million

Brief Description:

This project aims to develop the capabilities of the Coastal Zone Management Unit in Belize to manage and conserve the country's coastal resources through:

- Institutional strengthening
- Introduction of adequate monitoring and planning techniques
- Execution of applied research
- Enhancement of public awareness about the value of coastal ecosystems.

As integrated coastal zone management requires coordination amongst several sectors, a multi-sectoral approach is a necessary and important facet of this project.

A. CONTEXT

1. Description of subsector

Introduction

The coastal area of Belize is a complex system consisting of the largest barrier reef in the Atlantic, three offshore atolls, patch reefs, seagrass beds, several hundred cays of sand and mangrove, extensive mangrove forests, coastal lagoons, and estuaries.

The Belize coastal zone can be broadly defined to include the shoreline as well as the coastal alluvial plains and watersheds, the lagoons and estuaries, the cays and atolls, and the subtidal area within the 12-mile territorial limit and the 200-mile Exclusive Economic Zone (EEZ).

Biodiversity and uniqueness

Coral reefs are known to be one of the most diverse ecosystems on earth. The variety of reef formations occurring within the territorial limits of Belize are unparalleled in the Caribbean. The most striking feature is the 220-kilometer barrier reef stretching from the Mexican border in the north to the Sapodilla Cays in the Gulf of Honduras in the south. Between the reef and the mainland are myriads of patch reefs and unique reef formations known as faros. Offshore are three atolls: Lighthouse Reef which contains the Blue Hole; the Turneffe Islands which have extensive mangrove forests and a population of the American crocodile; and Glover's Reef which has been described as the best example of an atoll in the Caribbean.

These reefs are essential to the survival of many commercial species and could prove to be the source of a range of valuable pharmaceutical compounds. New species continue to be discovered by marine researchers working in the area.

Ecological value

The various coastal habitats including reefs, seagrass beds, mangroves, and beaches are essential for flood and erosion control. They help maintain coastal water quality and serve as breeding grounds for fish and invertebrates. Coastal habitats are also important for endangered species such as manatees, crocodiles, marine turtles, and many species of birds. Industry related to fisheries, agriculture, and tourism depends on the health of coastal zone ecosystems.

Socioeconomic context

The coastal area supports two of Belize's major industries—tourism and fisheries. Tourism, particularly ecotourism, has been the fastest growing sector over the past five years and is now the number one industry in the country. In 1990, tourism generated over BZ $100 million (US $50 million). Fishery products remain the fourth most important export commodity,

valued at BZ $17 million (US $8.5 million). These two industries are a valuable source of foreign exchange, and provide employment for a significant percentage of the coastal inhabitants, with approximately 2,000 inhabitants involved in fishing and 2,500 in tourism related activities. Many inhabitants of the smaller coastal communities are also subsistence fishermen, with marine products providing an important source of protein in their diet.

Linked to the coastal zone are the coastal plains and watersheds which support the most important agricultural areas, producing primarily sugarcane, citrus fruit and bananas. Agriculture is the second most important sector in the Belizean economy.

Other activities in the coastal zone include port development, mariculture, shipping, oil exploration, dredge-and-fill operations, mangrove clearance, and the salvaging of wrecks.

Development context

Approximately 37 percent of the country's population lives in the coastal cities, towns and villages. The coastal population has increased by about 8.2 percent in the last eleven years, leading to a tremendous expansion in development in the area. Most of the development concessions granted over the past ten years have been located here, and tourism related to development is taking place mainly along the coast and cays. The coastal towns, in particular Belize City, are expanding rapidly with several new housing projects underway. This rate of development has resulted in the dredging and clearing of coastal wetlands.

An expansion has also occurred in the production of citrus fruit and banana on the coastal plains and along the coastal watersheds, resulting in deforestation along riverbanks and an increase in erosion and siltation. This often results in the run-off of agro-chemicals, causing a deterioration in coastal water quality and raising concerns for shrimp mariculture projects.

Recognizing that the impacts of development activities in this critical zone need to be monitored and guidelines introduced to protect the country's coastal resources, an approach based on the principle of integrated coastal zone management is in the process of being formulated. The convergence of multiple sectoral interests in the area renders the institutional and legal arrangements required for management rather complex.

2. Host country strategy

The government's Development Plan for 1990-1994 stresses the need for sustainable growth. For the sectors of fisheries and agriculture, it states that "optimal use of land and fisheries resources will be achieved through the implementation of land use and coastal zone management plans." Special attention is planned for the development of aquaculture projects.

Similarly, for the tourism and environment sectors, the strategy is one of "increased environmental planning for key development areas such as coastal zone management and tourism sites." The plan also recognizes that public education programmes are crucial to the successful

implementation of management plans. Inherent in such planning are provisions for "conservation programmes...for critical marine and fresh water ecosystems, the creation of marine parks, reserves and sanctuaries, and the protection of endangered species." The plan emphasizes the need for institution building and considers human resources development a major facet of its social sector development programme.

Belize has a comprehensive legal framework for the management of its coastal zone. The Fisheries Ordinance and related regulations govern the marine resources and fishing activities, and provide for the protection of species and habitats. The Forestry Act governs natural resources down to the high water mark and gives specific protection through the establishment of forest reserves which protect watersheds. Also under the jurisdiction of the Forestry Department are the National Parks System Act, the Wildlife Protection Act, and the Mangrove Protection Act which provide for the conservation of threatened species and habitats. Other relevant legislation requires environmental impact assessments; regulates mining and dredging, and the use of pesticides; and provides for the monitoring of environmental pollution.

Belize also has international legal responsibilities as a signatory to the following: Convention on International Trade in Endangered Species (CITES), the Law of the Sea, and the International Whaling Commission (IWC).

Belize currently has a Coastal Zone Management Unit which has drafted planning guidelines for a project to address the pressing environmental problems of the coast. Phase I of the project, which includes the collection and compilation of data relevant to the coastal zone, is an ongoing activity. Initial studies and mapping have been completed. These maps and databases are currently being used as a management tool to guide development and the use of resources, and to assist in the policy-making process. They are also a very useful reference for environmental impact assessments.

Sufficient data has been gathered in Phase I of the project to start the analysis of mapped data and various coastal issues which constitute Phase II. Several major issues have been identified through interaction with the coastal communities. Concurrent with Phase II, special management plans are being prepared for critical areas, and an environmental education and public awareness campaign is underway.

Phase III of the project will involve the development of an action plan which includes a zoning scheme for the coastal zone; definitions of a management framework, policies and legislation; recommendations for additional protected areas; protocols for monitoring mechanisms; and a description of priority areas for further research.

The latter two phases of the planning process of this Coastal Zone Management (CZM) initiative will be funded by the Global Environment Facility (GEF).

3. Prior and ongoing assistance

The subsector of coastal resources management has been receiving technical assistance from a variety of institutions. The Coastal Zone Management Unit was established under the Fisheries Department in March 1990 with support from Wildlife Conservation International (WCI), World Wide Fund for Nature-US (WWF-US), World Conservation Union (IUCN, hitherto the International Union for the Conservation of Nature and Natural Resources), and several local non-governmental organizations (NGOs) including the Belize Audubon Society.

The United States Agency for International Development (USAID) is providing assistance to Belize in the fisheries, environment, and tourism sectors. USAID-funded projects focus primarily on coastal zone management activities; development of environmental policies; establishment of environmental monitoring systems; development of sustainable tourism; and issues related to protected areas and land-use analysis. Several agencies are active in natural resource management in Belize: the Overseas Development Agency; the Tropical Forestry Action Plan; the United Nations Educational, Scientific, and Cultural Organization (UNESCO); the United Nations Development Programme (UNDP) in collaboration with the Food and Agriculture Organization of the United Nations (FAO); international NGOs; and bilateral donors. Activities focus on research, institution building, monitoring, evaluation, and technical assistance.

However, some of these activities remain incomplete due to a lack of sufficient funds and trained personnel. They represent a patchwork of initiatives that need to be coordinated and focused for the achievement of a common goal. Work funded by the GEF will expand the capabilities of the ongoing CZM project and assist in completing the comprehensive coastal zone management plan, in setting up the institutional arrangements required to achieve the necessary coordination of activities of the various sectors, and in conducting basic research upon which appropriate management strategies can be based to conserve the biodiversity of Belize's coastal resources.

4. Institutional framework

The three principle ministries involved in coastal resources management are the Ministry of Agriculture and Fisheries, the Ministry of Natural Resources, and the Ministry of Tourism and the Environment. By definition, integrated management of coastal resources requires coordination among many sectors. To date, this coordination has been spearheaded by the Fisheries Department, through the Coastal Zone Management Unit (CZMU).

The Ministry of Agriculture and Fisheries regulates and manages the industries related to these sectors through its Departments of Agriculture and Fisheries. The Fisheries Department is also responsible for marine resources, including coral reefs and marine reserves. The Ministry of Natural Resources too has several departments with mandates in the coastal area including the management of forest reserves, protected areas, mangroves, and wildlife. The Ministry of Tourism and the Environment manages the tourism industry through its Tourism

Board, and environmental pollution through its Department of the Environment. At the local level, the management of fishing activities is carried out by fishing cooperatives.

Non-governmental organizations in Belize play a very important role in complementing the activities of government. For example, the Belize Audubon Society, a conservation NGO with a wealth of experience in environmental education, is cooperating with the CZMU (CZMU) to promote the awareness of environmental issues. Coral Cay Conservation, a British marine non-profit organization for conservation, is presently assisting with the development of baseline reef data and a management plan for a central portion of the barrier reef. The Belize Centre for Environmental Studies provides technical assistance, and has produced a Critical Habitat Survey and a management plan for the Monkey River Special Development Area.

The CZMU is recognized for its leading role in coordinating the activities of government departments, community groups, NGOs, and research institutions, either through the CZM Technical Committee or on an informal basis. The Technical Committee of the CZMU has been appointed to facilitate inter-departmental working relationships, encourage the sharing of information, and contribute to the creation of feasible government policies, plans and programmes. Recommendations of the Committee are currently passed directly to the Permanent Secretaries of the three major ministries.

B. PROJECT JUSTIFICATION

1. Problem to be addressed and the present situation

Mounting pressures on the barrier reef complex

The Belize barrier reef has been designated one of the Seven Underwater Wonders of the world. It is of global importance in terms of its biodiversity and its contribution as a sink for carbon dioxide, a greenhouse gas. It supports an unquantified wealth of species, some of which have been found to have great commercial value. The ecosystems in this barrier reef complex are closely interlinked, with activities in one ecosystem having far-reaching effects on another. For example, the clearance of mangroves may result in the loss of critical habitat for many reef species, and lead to a deterioration of coastal water quality due to the loss of the filtering role of mangroves.

The number of tourists has trebled in the past ten years, rising from 66,735 in 1980 to over 200,000 in 1990. Many tourism related activities occur in the coastal region, with 75 percent of all hotels being situated along the coast or on the cays. One small reserve, the Hol Chan Marine Reserve, receives over 25,000 visitors annually.

Approximately 37 percent of the population lives along the coast. The rate of growth of population has increased from 2.6 percent in 1981 to 6.9 percent in 1991. This has led to a sharp rise in the demand for land and resources. Unhygienic waste disposal on the cays has

resulted in the contamination of ground water and a deterioration in the quality of coastal water, with algae blooming on nearby reefs. The reefs themselves are being destroyed by divers and boats; inappropriate shoreline development is eroding the coastline; and critical habitats, in particular mangroves, are under threat. The Belize City area has already lost at least 48 percent of its mangroves.

Over-exploitation by traditional fisheries has led to a decline in the size of catches. For example, the catches of conch (*Strombus gigas*) have fallen from a peak of 1.25 million pounds in 1972 to a mere 365,000 pounds in 1990. Statistics compiled by the Fisheries Department suggest that the catch-per-unit effort for the lucrative spiny lobster (*Panulirus argus*) has also decreased. In general, the enforcement of fishing regulations has been inadequate.

Many development projects now underway in the coastal area are proceeding without any regard for guidelines designed to ensure that development is appropriate or sustainable. Concessions are often granted without following the procedures established for addressing environmental concerns.

If uncontrolled development in fishing, tourism, agriculture, and housing is allowed to continue thus, the very resource base upon which the economic growth of the country depends will be diminished. In addition, critical habitats for several endangered species and the rich biodiversity of the marine complex will be lost. This predicament is compounded by the fact that pressure is focused on the coastal zone where the most productive ecosystems are located. It is imperative that the problems affecting the barrier reef be addressed immediately to ensure resilience to possible future global environmental changes such as sea-level rise and a warming of the oceans.

Lack of a strong legal and institutional framework for coordinated coastal zone management

The Fisheries Department has taken the lead in addressing some of the most pressing conservation and development problems. The first marine reserve was established in 1987 to demonstrate the role of protected areas in conserving fisheries and attracting tourists. The Hol Chan Marine Reserve has proved to be a very successful model for future marine protected areas. It has stimulated tourism while improving catches in adjacent fisheries. A management plan has been completed for a second reserve and a formal declaration regarding its establishment is expected shortly.

Existing legislation related to the coast is complex and contains many areas of overlap. For example, both the Forestry and Fisheries Departments manage marine protected areas. The Forestry Department is responsible for marine mammals and crocodiles, while the Fisheries Ordinance also regulates fishing and the export of fish, where "fish" is defined as all or any of the varieties of marine or freshwater animal or plant life. Many gaps are also apparent in the laws which are very general and often fail to specify standards. Penalties can be inappropriate and regulations difficult to enforce. Many departments are understaffed and lack the funds necessary to conduct adequate surveillance and enforcement.

With respect to overall management of the coastal complex, the CZMU has collected data, initiated management plans for critical areas, and coordinated the activities of other agencies involved in coastal issues and resource management. To attain its objectives and complete its programmes, however, the Unit needs to be formally designated as the central coordinating body for all activities which have a potential impact on the country's coastal resources. Such a designation would give the Unit the authority to decide on priorities, and simplify procedures by making it the only organization that interest groups, community-based organizations, and international agencies would interact with on matters related to coastal zone management. Until such legislation is passed, formal memoranda of understanding between the CZMU, the Fisheries Department, and the various agencies involved in coastal resources management could serve to underline its authority.

Additional staff for the CZMU is needed to carry out its monitoring and data analysis programmes. Technical assistance is required in preparing a zoning scheme, reviewing legislation and policies, setting up monitoring methodologies and conducting relevant research. Training in the areas of coastal resources management, environmental impact assessment, and data analysis is necessary for the development of staff capabilities to manage resources. More funds are required for laboratory facilities and equipment, for long-term investment in headquarters of marine reserves, and general operating expenses.

All of this will, however, be impossible to achieve as long as no comprehensive investment and revenue-generating strategy for coastal zone management exists. Such a strategy would ideally allow revenues generated by coastal zone activities to be funneled directly back into the sector to address long-term investment needs for the enhancement of coastal zone management.

Many intricacies of the ecosystems are poorly understood, and the full extent of their biodiversity is unknown. Many proposed strategies for managing coastal systems, such as the establishment of protected areas, lack sufficient empirical support to convince the public of their validity as management tools. A vital need therefore exists for more research on marine and coastal systems.

The coast cannot be considered in isolation from the inland areas. Many of the coastal watersheds are experiencing a rapid expansion in citrus and banana plantations. A potential risk lies in the unknown effects of deforestation and the often indiscriminate use of agro-chemicals, which result in sedimentation and chemical run-off on vulnerable marine ecosystems. Thus, an insufficient monitoring of water quality is an important constraint to understanding the link between terrestrial and marine environments.

Public awareness campaigns and environmental education programmes also need to be strengthened to ensure that the general public, along with key interest groups such as the tourism industry, private developers, and public sector managers understand the value of coastal ecosystems.

Summary

There is a lack of both planning and coordinated policies to promote the conservation of coastal resources. Institutional capacity and inter-sectoral coordination are weak, with jurisdictional and legislative gaps and overlaps that often result in poor decision-making or inaction. Institutional strengthening is urgently required to update the legal and regulatory framework, to formulate investment and revenue-generating strategies, to devise a zoning scheme for planning and conservation purposes, and to provide an emergency response plan.

Institutions involved in coastal resources management lack trained personnel and updated information to adequately enforce regulations. Overcoming this constraint will require an investment in human development, focusing on improving monitoring and research capacities linked to informed decision-making. Public participation will be crucial: sustainable coastal resource management cannot succeed without a long-term commitment by all sectors to ecologically sound development.

The sustainable development of the coastal zone of Belize is critical to the economic and social well-being of the country, and to the protection of its biological diversity. The future of two of the country's most important industries is ultimately tied to the health of the coastal zone. Integrated coastal zone management is urgently required to guarantee that critical habitats and ecological processes are maintained.

2. Expected end-of-project situation

By the end of the project it is anticipated that a CZM Action Plan will have been completed and approved, and that its implementation will have begun. The CZMU will be staffed with trained personnel, and the necessary policies and legislative framework will be in place. The Unit will have begun to coordinate all activities in the coastal zone and to streamline the decision-making process. The CZMU will continue its role as the point organization for community-based initiatives and for liaison with the private sector, thereby keeping government managers well-informed of needs and developments at the grassroots and community levels, as well as in the private sector.

A comprehensive long-term investment and revenue-generating strategy will have been designed and put into place, as well as plans and regulations to deal with emergency situations threatening the coastal zone environment. Environmental impact assessments will have been systematically carried out for all large development projects. New permit systems will have been introduced to regulate specific activities.

The necessary monitoring programmes will be fully functional and providing results regularly to management personnel. A zoning scheme which provides for a mosaic of different uses within the coastal zone will have been introduced. The network of marine and coastal protected areas will have been expanded, with management plans in place for each area.

Priority areas of scientific research and training in the fields of marine conservation biology and fisheries will have been identified. Carefully selected community-based research projects, conducted in collaboration with Belizean agencies such as the Fisheries Department and the University College of Belize (UCB), will have been completed. A simple field station sufficient for supporting GEF-sponsored research will have been established on Middle Cay at Glover's Reef Atoll. (This facility will be linked formally with the proposed Glover's Reef Marine Reserve headquarters and will facilitate research and educational linkages with UCB and the international scientific community.) It is also expected that a tertiary educational programme will have been developed in coastal studies, possibly through UCB, to cultivate a sense of stewardship of these unique resources.

All project planning and implementation processes will have been carried out in close collaboration with both international and local NGOs, and research and government institutions.

With the required training and equipment, the personnel of key government departments will have an improved capability to carry out their planning and management functions. Better planning will result from the development of comprehensive policies and clear lines of authority. Coordination between the various agencies will be enhanced, resulting in good working relationships, and a decrease in duplication or conflicts of effort.

This improved planning and management should lead to orderly development in the coastal region that will not jeopardize the future use of its natural resources. In turn, this will be advantageous for the indirect beneficiaries by securing, over the long term, a healthy and productive environment for fishermen, the tourism related private sector, and the coastal population in general. The consequent sustainable development of the country's two major industries, fisheries and tourism, should indirectly benefit the entire population.

3. Target beneficiaries

The direct beneficiaries of the technical assistance provided by this project will be the staff of the CZMU, the Fisheries Department, the Department of Environment, the Forestry Department, and the NGOs and research institutions involved in coastal resources management. The decision-makers in government could also be considered direct beneficiaries since the project should make the rationale for specific development choices much clearer. The indirect beneficiaries will be the fishermen and fishing cooperatives, and those involved in the tourism industry.

4. Project strategy and implementation arrangements

Strategy

The project can be divided into two phases: the formulation of a Coastal Zone Management Plan, and the initial implementation of this plan. It should be noted, however, that it is important to close the gap between planning and implementation as quickly as possible. By

demonstrating tangible results, the public's interest can be maintained, and the programme can retain its importance on the government's agenda of priorities. Therefore, some activities will be implemented alongside the formulation of the Action Plan.

The project consists of a number of linked activities, divided into three major sections:

- Coastal zone management and regulatory mechanisms
- Training and education
- Monitoring and research.

Annual strategic plans will be established, along with six-month work programmes that will clearly define objectives, activities, outputs, and the financial resources required for each six-month period.

Implementation

The government implementing agency is the Ministry of Agriculture and Fisheries which will act through the CZMU of the Fisheries Department. The Unit is represented on the CZM Technical Committee which provides technical advice to policy-makers on coastal issues. The CZM Technical Committee will also include representatives from the Belize Export and Investment Promotion Unit (BEIPU) as well as two conservation NGOs, the Belize Audubon Society, and the Programme for Belize.

The government will appoint a Steering Committee for the project, comprised of the Permanent Secretaries of the Ministries of Agriculture and Fisheries, Natural Resources, and Tourism and Environment; department heads; the Fisheries Administrator; UNDP; and the project staff. The Steering Committee will receive technical advice from the CZM Technical Committee, set priorities, and establish and enforce policies. An Interministerial Council may be appointed to ensure that coastal zone management issues are recognized at the cabinet level.

Technical expertise may be required from external sources, and short-term consultants may be hired to assist in some aspects of the project, such as the preparation of a zoning scheme, coral reef monitoring, legal and policy reviews, and the design and conduct of specific research studies. Project consultants, however, should be Belizeans wherever suitably qualified candidates are available. The UNDP Office of Project Services (OPS) will provide technical assistance to the project through short-term international experts, subcontracts with other parties, training, procurement, and capacity building to improve the government's ability to implement complex development programmes. The project will also use researchers with the appropriate technical skills to gather the required data, and educated and highly trained coastal managers with the skills to evaluate scientific information and apply this knowledge to management strategies. It is expected that local and international NGOs will implement a large number of the project's components.

During the first phase of the project, high priority will be given to investigating the feasibility of establishing a Coastal Zone Management Authority, to be formed as a Statutory Board under the Ministry of Agriculture and Fisheries. This Authority will be responsible for coordinating the activities of government departments and NGOs on a day-to-day basis. It will play an important role in implementing such activities as the monitoring of water quality and coral reefs. This will require enabling legislation for which firm recommendations should be submitted within the first eighteen months of the project.

The establishment of a Statutory Body would confer a degree of autonomy and impartiality on the management authority. This is desirable in a situation of multi-sectoral management intended to ensure the coordination of long-term planning efforts. In addition, such a body would handle its own finances.

Training

Foreign training programmes alone frequently result in the loss of qualified individuals who choose to emigrate. The absence of a programme in Belize does little to encourage Belizeans to pursue a career in coastal zone planning and marine research. Therefore, a research, training, and educational facility will be built on Middle Cay to train Belizeans interested in pursuing degrees and careers in coastal zone management or environmental science. Scientists and trainees at the facility will conduct basic and applied marine research and monitor the status of the reef in that area.

Foreign training programmes will also be offered but participants in foreign training will be obligated to return to Belize or face penalties. This measure, standard practice for a country like Belize which suffers severely from the phenomenon of brain drain, will be supported with enhanced employment opportunities for those who choose to pursue a career in coastal management in Belize.

5. Reasons for assistance from UNDP/GEF

The barrier reef complex of Belize is the largest coral reef system in the Western Hemisphere and is very rich in species, many of which are commercially important, and many more of which are yet to be discovered and identified. It is also home to several endangered species such as marine turtles, manatees and crocodiles. Although the management of coastal resources has been recognized as being of great importance, the Government of Belize is unable to fully fund the required activities and develop the necessary human resources, at least in the short term, to establish a coastal resources management programme.

Integrated coastal zone management in a developing country is an innovative approach that has not been fully demonstrated or evaluated. Because of Belize's relatively small population and the containable threats to its coastal resources, this approach has a high chance of succeeding here. The strategy could serve as a model for the sustainable use of tropical coastal resources for the entire region.

UNDP is an especially appropriate partner since this project will contribute directly to human resources development and institutional strengthening through training and education. It will build directly on an ongoing national initiative. From a regional perspective too, UNDP/GEF is the preferred funding source, as Belize will be able to learn from the experience of other GEF biodiversity projects, as well as participate in regional United Nations activities (such as UNEP's Regional Seas Programme for the Wider Caribbean).

6. Special considerations

Public participation and support at all levels are of utmost importance to the success of this project. It is essential that the planning and implementation phases should include input, from the very outset, from the various communities and sectors affected. The proposed zoning scheme, for example, must be devised according to the needs of coastal resource users and be reviewed by the public at all stages of its development.

To date, planning in the coastal zone has been based on community participation. For example, the establishment of the Hol Chan Marine Reserve was based on a need expressed by the community, and the planning process involved the major user groups. Similarly, planning strategies in the coastal Special Development Areas of Monkey River and Gales Point are using the community participatory approach. The CZMU has used interviews with the coastal population to compile its database and to determine the major issues facing the coastal communities.

To build public support for environmentally sustainable resource management, emphasis must be placed on increasing public knowledge of coastal issues and the value of coastal ecosystems. NGOs, the scientific community, educators, media representatives, and local communities will take an active role in discussing key issues and in building support and consensus for the CZM programme. The public awareness campaign will demonstrate the value of the coastal zone to Belize, so that the majority of the population will have a sufficient understanding of the issues related to the implementation of sustainable development practices.

To maximize the available financial and human resources, it is intended that conservation NGOs such as the Belize Audubon Society, Programme for Belize, Coral Cay Conservation (CCC), and the Belize Centre for Environmental Studies (BCES) participate fully in the project. These NGOs provide valuable links to grassroots groups and can assist with training, compiling information, conducting research, and disseminating information. For example, the Belize Audubon Society is presently conducting the CZMU's environmental education and public awareness programme.

The project can also benefit extensively from the expertise and in-country experience available from international organizations and institutions such as Wildlife Conservation International, the Smithsonian Institution, World Wide Fund for Nature, universities, research laboratories, zoos, and museums. These organizations are likely to play an important role within the research component of the project.

Another critical factor to be considered is the need for coordination of activities in various sectors. As this project is multi-sectoral, its success will depend to a large extent on enhancing the cooperation amongst government departments and NGOs. A detailed analysis of existing arrangements, policies, and laws focusing on the major coastal issues should be conducted in an effort to determine the jurisdictional gaps, overlaps, duplication of effort between agencies, and effectiveness of penalties, in order to make recommendations to resolve these problems.

The only possible negative impacts envisaged are the restrictions placed on certain types of development within the target area. This negative impact will, however, only be a factor in the short term since the project will enhance and protect the agricultural, tourism, and fishing industries in the long run.

7. Coordination arrangements

As mentioned above, coordination amongst the many agencies in coastal resources management is a crucial element for the success of the project. Apart from the interministerial coordination to be established (through the project's Steering Committee, the Interministerial Council, and the complementary CZM Technical Committee), a further forum for information-sharing and coordination within the environmental and natural resources sector will be provided by the government's Physical Planning Sub-committee (PPSC). The PPSC is comprised of the three key ministries (Natural Resources; Agriculture and Fisheries; and Tourism and Environment), along with representatives from the private sector, NGOs, and major environmental projects. It meets regularly to exchange information and to avoid overlap between projects.

8. Counterpart support capacity

Coastal zone management is a central feature of the country's 1990-1994 Development Plan and has high priority on the national agenda. The CZM Technical Committee has recently been granted cabinet approval, thereby demonstrating that the country's top decision-makers have recognized the importance of the efficient management of the country's coastal resources. This commitment is further demonstrated by the establishment of a new Department of the Environment in the Ministry of Tourism and Environment, and a Conservation Division in the Ministry of Natural Resources.

The Coastal Zone Management Project has received considerable support from the Ministry of Agriculture and Fisheries. A staff member has been provided office space in the Fisheries Department. The use of equipment such as vehicles, boats, photocopiers, and computers has also been provided.

The University College of Belize is presently upgrading its capability to conduct educational programmes in natural resources management in a joint programme with the

University of Montana. This will help provide a sustainable cadre of locally-trained managers. Working in close collaboration with the Fisheries Department, this programme is currently being revised to include coastal studies. A proposal to introduce a programme in marine and coastal studies is also being updated.

The government is also reviewing the possibility of introducing a revenue-generating mechanism to fund environmental projects through the formation of a Conservation Trust Fund. The government is committed to identifying, with UNDP/GEF assistance, additional mechanisms which, in conjunction with a long-term investment strategy, would ensure the financial sustainability of the CZM programme after the termination of the GEF project.

C. DEVELOPMENT OBJECTIVE

The objective of this project is to preserve the high biodiversity of the coastal zone of Belize by ensuring the sustainable management of its resources.

The two major economic activities in the region are ecotourism and fisheries, both of which rank high in the country's priorities for development, as stated in the 1990-1994 Development Plan. The government is committed to the achievement of sustainable economic growth based on sound environmental practices.

The project falls within one of the three focal areas of the Fourth UNDP Country Programme (Environmental Management) which emphasizes institution building.

In order to achieve the development objective, the project will build upon an ongoing national initiative to develop and implement a Coastal Zone Management Plan. This plan incorporates policy formulation, training, research, and environmental education with participatory design, as well as the development of resource management plans and the strengthening of the CZMU.

D. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

IMMEDIATE OBJECTIVE 1

To establish and strengthen national institutions responsible for ensuring the sustainable use and conservation of the coastal resources of Belize.

Achievement Indicators

- The adoption of new policies; the establishment and enforcement of a zoning scheme with permits issued and fines imposed; and a decrease in the incidence of user conflicts as a direct result of the zoning scheme

- Effective interagency coordination leading to an avoidance of duplication of effort, and issues addressed systematically according to accepted guidelines and procedures

- Environmental impact assessments for development projects and their timely incorporation into development planning

- The provision of qualified staff to carry out management activities, environmental impact assessments, programme monitoring, data analysis, and planning

- An increase in the number of Belizeans pursuing careers in coastal resources management and research.

Output 1.1

Firmly established institutional arrangements for governing and coordinating activities in the coastal zone.

Activities for Output 1.1

1.1.1 Completion of CZM Action Plan and approval by government.

1.1.2 Establishment of an Interministerial Council for Coastal Zone Management, and a Steering Committee to oversee project implementation and interministerial coordination.

1.1.3 Investigation of the feasibility of establishing the CZM Authority as a Statutory Board, and if found viable, formulation of enabling legislation.

1.1.4 Regular issuance of recommendations by the CZM Technical Committee, with cabinet approval, to ministers, Permanent Secretaries and the National Economic Mobilization Commission (NEMOC).

1.1.5 Issuance of recommendations for the establishment of lines of authority between the CZMU and other government agencies, and establishment of clear lines of communication between those agencies and the CZMU.

1.1.6 Identification of specific roles for NGOs in support of the CZM programme.

1.1.7 Establishment of a CZM Disaster Preparedness Committee to cope with emergency situations, such as an oil spill.

Output 1.2

Policies, strategies, laws, and regulations guiding development of the coastal zone.

Activities for Output 1.2

1.2.1 Revision of current governance arrangements, legislation and policies.

1.2.2 Submission of recommendations for: new laws required to introduce standards and fill jurisdictional gaps; amendments to correct overlaps and conflicts; and revision and signing of regional agreements, such as the Cartagena Convention.

1.2.3 Drafting of regulations to accompany new pieces of legislation, including regulations related to petroleum development in the coastal zone.

1.2.4 Drafting of comprehensive policies (cays development and aquaculture development policies) in consultation with the CZM Technical Committee and the Lands and Survey Department.

1.2.5 Drafting of policy governing environmental impact assessments for coastal development in consultation with the CZM Technical Committee and the Department of the Environment. These policies will clearly state the required process by which applications are processed and the responsibilities of each agency.

1.2.6 Where appropriate, establishment of formal memoranda of agreement between agencies to act as an interim measure until required legislation is passed.

1.2.7 Development of an Emergency Response Plan—an interagency plan to respond to emergency situations that threaten the biodiversity of the coastal zone.

1.2.8 Presentation to the Interministerial Council of all policies pertaining to the coastal zone, as well as the strategies to be used by all relevant agencies to guide development in the area.

1.2.9 Review of the recommended legislation by the Solicitor General and approval by the government.

1.2.10 Enforcement of regulations related to development within the coastal zone by the appropriate ministries.

1.2.11 When required, implementation of additional remedial actions, by order of the Interministerial Council and based upon the recommendations of the CZM Technical Committee, to ensure that the legislation of coordinating agencies is adequately enforced.

1.2.12 When appropriate, formulation of other policies and regulations.

Output 1.3

Strategies for financing the sustainable operation of the CZM programme.

Activities for Output 1.3

1.3.1 Implementation of studies to investigate long-term investment requirements along with alternative mechanisms to ensure the financial sustainability of the CZM programme after termination of the project.

1.3.2 Determination of optimal revenue-generating strategies that are compatible with long-term investment plans.

1.3.3 Introduction of a system of permit and licence fees for coastal resources development activities such as mining and dredging; and for recreational activities such as sportfishing.

1.3.4 Finalization of arrangements to have penalties and fines paid into an Ecological Trust which can then be used to fund research and special studies.

1.3.5 Creation of an arrangement to allow a percentage of funds collected under the proposed Resource Generation Strategy for Protected Areas to be allocated to the CZM programme.

1.3.6 Creation of other revenue-generating mechanisms, as proposed by revenue-generating study.

1.3.7 Gradual assumption by the government of all costs of the CZM programme.

Output 1.4

Ten Belizeans trained and working in aspects of integrated coastal zone management.

Activities for Output 1.4

1.4.1 Assessment of training needs.

1.4.2 Selection of candidates for participation in overseas studies programmes at undergraduate and postgraduate levels.

1.4.3 Organization of study tours early enough to ensure training of personnel during first stages of implementation of plan.

Output 1.5

A coastal studies programme to train teachers, at the tertiary level, in marine environmental education.

Activities for Output 1.5

1.5.1 Training of environmental education specialist to train teachers.

1.5.2 Training of teachers.

1.5.3 Identification of appropriate topics for curriculum manuals for primary schools.

1.5.4 Establishment of marine facility to serve as an education centre for teacher workshops and student summer camps.

IMMEDIATE OBJECTIVE 2

To update and improve the information base related to coastal resources which can be used for informed decision-making.

Output 2.1

A preliminary zoning scheme for coastal areas.

Activities for Output 2.1

2.1.1 Ongoing data collection; analysis of the data compiled; upgrading of accuracy of data, using remote sensing.

2.1.2 Transfer of data to a Geographic Information System (GIS).

2.1.3 Designation of zones in close collaboration with the land-use planning project, and with the participation of local communities.

2.1.4 Identification of areas requiring special management plans, and designation of a network of protected areas, with management plans developed for selected reserves.

2.1.5 Implementation of plans for priority areas.

2.1.6 Negotiation with UNESCO to prepare designation of the barrier reef as a Biosphere Reserve and/or World Heritage Site.

2.1.7 Preparation of reports and maps for zoning scheme.

2.1.8 Countrywide meetings to discuss scheme with the public.

2.1.9 Establishment of recommended protected areas and implementation of their respective management plans.

2.1.10 Enforcement of the recommended zoning scheme through: the issue of permits where required; and surveillance by the Fisheries Department's Conservation Compliance Unit, and by rangers in the marine protected areas.

Output 2.2

Mechanisms for monitoring changes in coral reefs and water quality.

Activities for Output 2.2

2.2.1 Drafting, in collaboration with the Caribbean Environmental Health Institute (CEHI), the Caribbean Coastal Marine Productivity Project (CARICOMP), and Coral Cay Conservation (CCC), of the *modus operandi* documents for monitoring the coastal zone, detailing methodology, monitoring sites, analysis techniques, and equipment needs.

2.2.2 Monitoring of sea temperature and sea-level rise in collaboration with the Departments of Hydrology and Meteorology.

2.2.3 Establishment of a countrywide mooring buoy system.

2.2.4 Provision of essential equipment and laboratory facilities.

2.2.5 Provision of equipment for laboratory to monitor coastal water quality.

2.2.6 Implementation of coral reef monitoring programmes documenting the status of the reef and changes in its ecology, covering at least twenty-eight critical sites along the reefs.

2.2.7 Completion of the Conservation Division's guard stations in Gales Point and Temash River.

2.2.8 Monitoring by CZMU, the Conservation Division, and NGO staff of the use of cays, mangrove clearance, dredging sites, and fisheries catch statistics on a regular basis.

2.2.9 Production of data analyst reports on changes and trends for use by CZMU and CZM Technical Committee.

2.2.10 The use of remote sensing and GIS to keep a log of large-scale trends in habitat changes over time.

2.2.11 Identification of practices that are causing degradation of the coastal systems, based on the results of monitoring programmes.

2.2.12 Notification of such practices to authorities, and ongoing monitoring by the CZMU to ensure that any remedial actions required are taken.

Output 2.3

Short-, medium- and long-term research projects integrated into a process of informed decision-making.

Activities for Output 2.3

2.3.1 Identification of research needs through consultation with the CZM Technical Committee, NGOs and community organizations.

2.3.2 Execution of research projects in collaboration with international institutions and the University College of Belize, in priority areas such as:

- The effect of protected areas on commercial yields and abundance of ecologically important marine organisms
- Determination of optimal size and boundaries of protected areas to maximize biodiversity
- Guidelines for aquaculture development and habitat assessment

- Life history studies and development of management plans for crocodiles, manatees, and other endangered species

- Inventory of critical habitats.

2.3.3 Identification of principal investigators from local and international institutions for recommended long-term research projects.

2.3.4 Construction of a field station on Middle Cay, and implementation of a study testing the link between protected areas and fisheries production.

2.3.5 Completion of studies on endangered species, such as crocodiles and manatees, and on aquaculture and reef indicator species.

2.3.6 Reformulation of policies or legislation where a need is indicated by research results.

Output 2.4

Basic physical infrastructure for efficient monitoring and research.

Activities for Output 2.4

2.4.1 Review of equipment lists and purchase of equipment.

2.4.2 Design and construction of CZMU facilities.

IMMEDIATE OBJECTIVE 3

To develop a strong commitment, amongst all sectors, to maintaining the environmentally sound development of coastal resources through sustainable management.

Achievement Indicators

- The clear existence of broad-based support for coastal zone management

- Participation and input from all "stakeholders" in the planning process

- Continuing priority for the CZM on the country's development agenda

- The adoption of coastal policies by decision-makers in local and central government.

Output 3.1

Forums for periodic public reviews during the planning and implementation process.

Activities for Output 3.1

3.1.1 Implementation of a public awareness campaign through television, radio and newspapers.

3.1.2 Presentation of exhibitions at key locations to highlight specific issues.

3.1.3 Development of a series of education-extension and public discussion programmes for print, radio, and television which will periodically inform the public and promote discussion of issues related to the conservation of Belize's marine resources, and the major issues that threaten their sustainable use.

3.1.4 Production of a standardized set of field guides and handbooks on major coastal zone habitats and endangered species that emphasize the need for their conservation.

3.1.5 Development of methodologies for workshops with special interest groups, such as decision-makers, tourist guides, fishermen, farmers, and developers, which give these key actors the opportunity to identify specific resource management problems and to participate in recommending solutions.

3.1.6 Organization of workshops and other public reviews throughout the planning process.

3.1.7 Appointment of community committees for the special management of protected areas where these do not already exist.

Output 3.2

Meetings, presentations, and reports to ensure that decision-makers in central and local governments have a clear understanding of coastal management issues.

Activities for Output 3.2

3.2.1 Appointment of an Interministerial Council for Coastal Management to assist with gaining interest, support, and coordination at the cabinet level.

3.2.2 Production and distribution of a concise video documentary with high

visual impact on the fragility of coastal ecosystems, existing hazards, and the socioeconomic contribution of the coastal zone to Belize's development. This should be targeted at an audience of high level government officials.

3.2.3 Organization of meetings with decision-makers and distribution of regular reports to update them on the programme's progress.

3.2.4 Provision by the CZM Technical Committee to individual ministers of sound, well-informed recommendations.

3.2.5 Follow-up activities by CZM Technical Committee to ensure that recommendations are implemented.

Output 3.3

An environmental education programme, developed in collaboration with environmental NGOs, introduced in primary and secondary schools to form part of the established curriculum.

Activities for Output 3.3

3.3.1 Development of educational material such as posters, brochures, booklets, and slide shows, by building on efforts made with the Belize Audubon Society.

3.3.2 Development of school curriculums and additional materials which focus on environmental topics suitable for classroom use, in collaboration with the Curriculum Development Department.

3.3.3 Sponsorship of a series of short courses and seminars for primary and secondary school teachers to assist them with the instruction of environmental curriculums.

3.3.4 Organization of special events for students such as beach clean-ups, field trips and competitions.

3.3.5 Training of teachers at the Teachers Training College/University College of Belize by an environmental education specialist.

3.3.6 Scheduling of teachers and students to promote regular use of the educational facility on Glover's Reef.

E. INPUTS

1. Government of Belize

Personnel: US $450,000

CZMU staff (in man-months(mm))

Director/Fisheries Administrator	60 mm
2 field/research biologists	120 mm
1 marine chemist (from third year)	36 mm
1 data and remote sensing analyst (from fourth year)	24 mm
Support staff of technicians, secretary, and accountant from Fisheries Department.	60 mm

Training: US $150,000 (partial support)

Office accommodation, supplies and services: US $300,000

Office accommodation for interim period until construction of new offices
Basic office equipment, transportation, and laboratory space
Supplies such as maps, reports and aerial photos
Services such as customs clearance of project equipment and supplies; in-country travel; and some telephone, mail and fax services.

2. Donor inputs (UNDP/GEF)

Personnel and administration

International professionals

UNDP Chief Technical Advisor	30 mm
Consultant in planning and zoning	3 mm
Consultant in environmental law and policy	4 mm
Consultant in fiscal planning	4 mm
Consultant in aquaculture development	2 mm
Consultant in wildlife management	2 mm
Consultant in public relations and environmental education	2 mm

National professionals

National project manager	60 mm
Marine chemist	24 mm
Data analyst	36 mm
Managers of protected areas (2)	66 mm
Rangers for protected areas (3)	135 mm

Administrative staff

Administrative assistant	60 mm

In-country travel
Mission costs

Training

Study tours
In-service training

Research subcontracts

Glover's Reef research project
Crocodile research project
Manatee research project
Inventories of critical habitats
Coral reef studies

Facilities

Office and laboratory extension (four offices, data storage room, marine chemistry laboratory)
Rangers' quarters, visitor's centre, research facilities at Glover's Reef
Rangers' quarters at Half Moon Cay
Guard stations (Temash River and Gales Point).

Equipment

Non-expendable equipment

Field and laboratory equipment for coral reef monitoring and water quality analysis programmes; GIS; communications equipment; office equipment; vehicles; computers, software and laser printer; boats and outboard engines; cameras.

Expendable equipment

Monitoring equipment, snorkeling gear, desk top calculator, office equipment, binoculars, glassware, mooring buoys, tape recorders.

Miscellaneous

Operations and maintenance; reporting costs; and other sundry costs.

F. RISKS

The major risks foreseen are: insufficient commitment or political will to adhere to policies and enforce regulations; and difficulties in recruiting and retaining trained personnel. These factors are, however, unlikely to pose a serious threat to the project's progress.

A potential risk to project progress lies in the particular vulnerability of the coastal area to hurricanes. Such a natural disaster could considerably delay research and monitoring activities.

G. PRIOR OBLIGATIONS AND PREREQUISITES

1. Prior obligations

None.

2. Prerequisites and conditions

None.

H. PROJECT REVIEWS, REPORTING AND EVALUATION

The project will prepare six-month workplans, outlining activities and proposed expenditures for the period. The project will prepare regular reports to be submitted to the Steering Committee to keep its members informed of progress made toward the project's objectives.

The project will be subject to joint review by representatives of the government and UNDP at least once every twelve months. The first such meeting will be held within the first twelve months of the start of full implementation. The National Project Manager and the Chief Technical Advisor of UNDP shall prepare and submit to each review meeting a Project

Performance Evaluation Report (PPER). Additional PPERs will be requested every six months. Tripartite review meetings will provide useful inputs for workplans for the following year.

Recommendations to improve project progress will be made through occasional evaluations by independent agencies and organizations. A project terminal report will be prepared for the terminal review meeting. It shall be prepared in draft at least four months prior to the meeting to allow review by the government and UNDP/GEF.

I. LEGAL CONTEXT

This Project Document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of Belize and the UNDP. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government cooperating agency described in that agreement.

The following types of revisions may be made to this Project Document with the signature of the UNDP resident representative only, provided he or she is assured that the other signatories of the document have no objections to the proposed changes:

- Revisions in, or additions to, any of the annexes of the original Project Document
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by the rearrangement of inputs already agreed to, or by cost increases due to inflation
- Mandatory annual revisions which rephase the delivery of agreed project inputs; increase expert or other costs due to inflation; or draw upon agency expenditure flexibility.

J. BUDGET

The budget for the project is attached.

COUNTRY: BELIZE

PROJECT NUMBER: BZE/92/G31
PROJECT TITLE: SUSTAINABLE DEVELOPMENT AND MANAGEMENT OF BIOLOGICALLY DIVERSE COASTAL RESOURCES

LAST REV: 02/04/93

PROJECT BUDGET COVERING UNDP CONTRIBUTION (in U.S. dollars)

PROJECT COMPONENTS	TOTAL AMT M/M	1993 AMT M/M	1994 AMT M/M	1995 AMT M/M	1996 AMT M/M	1997 AMT M/M
*010 PROJECT PERSONNEL						
*11 Experts:						
011-001 Chief Technical Advisor	296,000	100,000	120,000	48,000	14,000	14,000
	28.0	10.0	12.0	4.0	1.0	1.0
011-051 Planning and Zoning	36,000	36,000				
	3.0	3.0				
011-052 Environmental Law, Policy	48,000	24,000	24,000			
	4.0	2.0	2.0			
011-053 Fiscal Planning	48,000	24,000	24,000			
	4.0	2.0	2.0			
011-054 Environmental Education	24,000	24,000				
	2.0	2.0				
011-055 Aquaculture	24,000	24,000				
	2.0	2.0				
011-056 Wildlife Management	24,000			24,000		
	2.0			2.0		
11-99 Subtotal (*)	500,000	232,000	168,000	72,000	14,000	14,000
	45.0	21.0	16.0	6.0	1.0	1.0
*13 Admin. support personnel:						
013-001 Admin. Assistant	46,000	8,000	9,250	9,500	9,750	9,500
13-99 Subtotal (*)	46,000	8,000	9,250	9,500	9,750	9,500
*15 Official Travel:						
015-001 Local Travel	12,000	2,000	3,000	3,000	3,000	1,000
15-99 Subtotal (*)	12,000	2,000	3,000	3,000	3,000	1,000
*16 Mission costs:						
016-001 Agency Missions	12,000	2,000	3,000	3,000	3,000	1,000

PROJECT BUDGET COVERING UNDP CONTRIBUTION (in U.S. dollars)

PROJECT COMPONENTS	TOTAL AMT M/M	1993 AMT M/M	1994 AMT M/M	1995 AMT M/M	1996 AMT M/M	1997 AMT M/M
016-002 GEF Missions	15,034	2,000	3,000	3,500	3,500	3,034
16-99 Subtotal (*)	27,034	4,000	6,000	6,500	6,500	4,034
*17 National Professionals:						
017-001 National Advisor	125,500	22,000	25,000	26,000	26,000	26,000
	58.0	10.0	12.0	12.0	12.0	12.0
017-002 Marine Chemist	23,500	11,000	12,500			
	22.0	10.0	12.0			
017-003 Data Analyst	39,000		12,500	13,000	13,500	
	36.0		12.0	12.0	12.0	
017-004 Reserve Manager 1	14,000	1,500	6,000	6,500		
	27.0	3.0	12.0	12.0		
017-005 Reserve Manager 2	14,000	1,500	6,000	6,500		
	27.0	3.0	12.0	12.0		
017-006 Reserve Ranger 1	14,200	900	4,200	4,500	4,600	
	39.0	3.0	12.0	12.0	12.0	
017-007 Reserve Ranger 2	14,200	900	4,200	4,500	4,600	
	39.0	3.0	12.0	12.0	12.0	
017-008 Reserve Ranger 3	14,200	900	4,200	4,500	4,600	
	39.0	3.0	12.0	12.0	12.0	
17-99 Subtotal	258,600	38,700	74,600	65,500	53,300	26,500
	287.0	35.0	96.0	84.0	60.0	12.0
019 COMPONENT TOTAL (**)	843,634	284,700	260,850	156,500	86,550	55,034
	332.0	56.0	112.0	90.0	61.0	13.0
*020 SUBCONTRACTS						
021-001 Office and Lab Expansion	250,000	125,000	125,000			
021-002 Facilities/Glovers Reef	125,000	125,000				

PROJECT BUDGET COVERING UNDP CONTRIBUTION (in U.S. dollars)

PROJECT COMPONENTS	TOTAL AMT M/M	1993 AMT M/M	1994 AMT M/M	1995 AMT M/M	1996 AMT M/M	1997 AMT M/M
021-003 Guard Stations	60,000	30,000	30,000			
021-004 Facilities/Half Moon Bay	50,000	50,000				
022-001 Research/Glovers Reef	120,000	60,000	40,000	20,000		
022-002 Research/Crocodiles	45,000	20,000	25,000			
022-003 Research/Manatees	45,000		15,000	30,000		
022-004 Inventories/Coral Reef	70,000		20,000	20,000	20,000	10,000
029 COMPONENT TOTAL (**)	765,000	410,000	255,000	70,000	20,000	10,000
*030 TRAINING						
031-001 MSc/PhD Programmes	216,000	24,000	54,000	54,000	54,000	30,000
031-002 BSc programmes	216,000	24,000	54,000	54,000	54,000	30,000
032-001 Study Tours	75,000	10,000	20,000	20,000	15,000	10,000
033-001 In-Service Training	112,000	17,000	26,000	26,000	26,000	17,000
039 COMPONENT TOTAL (**)	619,000	75,000	154,000	154,000	149,000	87,000
*040 EQUIPMENT						
045-001 Office and Lab Equipment	41,500	25,000	8,000	2,000	3,000	3,500
045-002 Educational Materials	40,000	5,000	10,000	10,000	10,000	5,000
047-001 Remote Sensing Equipment	30,000		10,000	10,000	10,000	
047-002 4 WD Vehicles (2)	36,000	36,000				
047-003 Boats	36,000	36,000				
047-004 Water Quality Lab, Equipment	30,000		30,000			
047-005 Computers	8,500	6,000	2,500			
047-006 Wildlife Protection Equipment	40,000	20,000	20,000			
047-007 Equipment for Reserves Fac.	5,000	5,000				
047-008 Monitoring Equipment	20,000	10,000	10,000			
047-009 Office Equipment	21,000	12,000	9,000			
047-010 GIS Equipment	40,000		40,000			

PROJECT BUDGET COVERING UNDP CONTRIBUTION (in U.S. dollars)

PROJECT COMPONENTS	TOTAL AMT M/M	1993 AMT M/M	1994 AMT M/M	1995 AMT M/M	1996 AMT M/M	1997 AMT M/M
049 COMPONENT TOTAL (**)	348,000	155,000	139,500	22,000	23,000	8,500
*050 MISCELLANEOUS						
051-001 Boat Maintenance	53,588	8,000	12,000	12,000	12,000	9,588
051-002 Vehicle Maintenance	25,000	5,000	5,000	5,000	5,000	5,000
052-001 Reports and Publications	25,000	3,000	5,000	5,000	7,000	5,000
053-001 Telephone/Fax	25,000	4,000	5,000	6,000	6,000	4,000
053-002 Film Development	24,000	4,000	5,000	5,000	5,000	5,000
053-003 Sundry	19,000	3,500	4,000	4,000	4,000	3,500
054-001 Field Office Support Costs	84,966	30,000	15,000	15,000	15,000	9,966
059 COMPONENT TOTAL (**)	256,554	57,500	51,000	52,000	54,000	42,054
099 BUDGET TYPE TOTAL (***)	2,832,188 332.0	982,200 56.0	860,350 112.0	454,400 90.0	332,550 61.0	202,588 13.0
999 UNDP TOTAL (***)	2,832,188 332.0	982,200 56.0	860,350 112.0	454,400 90.0	332,550 61.0	202,588 13.0

Annex 1

TRAINING PROGRAMME

Three categories of training will be provided under the project to national staff in order to strengthen human resource capabilities in coastal zone management:

- Undergraduate academic studies
- Graduate academic studies
- Short-term courses.

The provision of such training reflects the lack of formal, advanced level training in areas related to coastal zone management in Belize. This training is essential for the long-term, local management of coastal resources.

Undergraduate and graduate academic studies

The provision of four scholarships for national personnel to pursue undergraduate studies in conservation biology, marine chemistry, environmental education, and tourism management is an attempt to enhance local capabilities at the technical and operational levels.

The project provides for four staff members from the Ministries of Agriculture and Fisheries, Natural Resources, and Tourism and Environment to pursue postgraduate studies in a number of disciplines related to coastal zone management. These include coastal resources management; remote sensing and Geographic Information System (GIS) training; marine economics and planning; and environmental law.

CZMU personnel can only be awarded scholarships after having served for at least two years with the Unit. This is intended to ensure the commitment of staff members to the programme. Since this requisite service period will also imply some degree of seniority within the Unit, it is hoped that trainees will in turn be able to pass on the skills acquired to junior staff members.

The cost of these scholarships is estimated to be in the range of US $300,000, amounting to about US $13,500 per person per annum.

Proposed postgraduate scholarships

Subject	*No. of staff*	*Duration*	*Degree*
Coastal resources management	1	2-4 years	M.Sc./Ph.D.
Remote sensing and GIS	1	2 years	M.Sc.
Marine economics & planning	1	2-4 years	M.Sc/Ph.D.
Environmental law	1	2 years	M.A.

Proposed undergraduate scholarships

Subject	*No. of staff*	*Duration*	*Degree*
Marine conservation biology	1	2-3 years	B.Sc.
Marine chemistry	1	2-3 years	B.Sc.
Environmental education	1	2-3 years	B.Sc.
Tourism management	1	2-3 years	B.Sc.

Short-term courses

Short-term courses, both in the form of study tours and in-service training, will be provided for staff from participating agencies to improve their level of training in areas essential for the coordination and implementation of the integrated CZM programme. Such courses, workshops, and seminars will include environmental monitoring technology, socioeconomic analysis, policy analysis, environmental impact assessment, coastal hazards, and the basic skills required for planning and project implementation. Study tours by staff to visit similar coastal areas and study their development, organization, and management will also be undertaken.

US $150,000 has been allocated for this form of training.

Annex 2

RESEARCH PRIORITIES

Scientific research is an essential component for achieving this project's goal of preserving the biodiversity of marine and coastal resources in Belize. Specific studies in priority areas of research will therefore be undertaken in the course of the project. Such research will adopt a multidisciplinary approach, involve the local community at all levels, and address the immediate need for coastal zone management. Results from these studies will provide managers and planners with information and planning guidelines vital to the operations of the Coastal Zone Management Unit.

Priority areas of research

1. Large-scale, long-term and community-based ecological research to test hypotheses regarding:

   - The optimal size and distribution of harvest refugia to maximize sustained fisheries yields

   - The relative effectiveness of this knowledge as a management tool for increasing yields of commercially important species.

2. Detailed studies on the distribution, population, reproduction, behavior, feeding habits, and ecological interactions of the American crocodile (*Crocodylus acutus*) in Belize. Research results will lead to the formulation of a management plan and specific recommendations for the conservation of this species.

3. Detailed studies on the distribution, population, behavior, feeding habits, and ecological interactions of the manatee (*Trichechus manatus*) in Belize. Research results will lead to the formulation of a management plan and specific recommendations for the conservation of this species.

4. Surveys to classify coastal zone habitats in terms of their suitability for aquaculture. Research to determine the environmental impact of aquaculture on the local environment, particularly with respect to the introduction of exotic species and the impact of effluents.

Recommended areas of research

1. Library research to establish a database for techniques used to restore degraded tropical marine habitats.

2. Research on population genetics of reef organisms that will determine the origins and spatial boundaries of both natural and commercially exploited stocks.

3. Identification of easily monitored organisms (indicator species) which provide early indications of coral reef degradation.

4. Studies to determine the causes of coral bleaching and coral black-band disease.