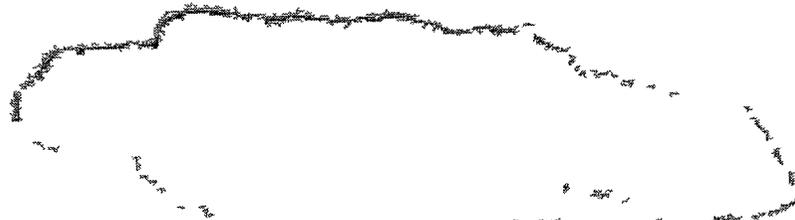


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*STUDY TOUR OF U.S. AND CARIBBEAN PARKS
AND PROTECTED AREAS*

July 1997



U.S. Agency for International Development
Development of Environmental Management Organizations Project
USAID Contract No 532 0173 C-00-3188-00



Natural Resources Conservation Authority

Technical Support Services, Inc.
Technical Assistance and Training Contractor



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DEVELOPMENT OF ENVIRONMENTAL
MANAGEMENT ORGANIZATIONS (DEMO) PROJECT
(USAID CONTRACT NO 532-0173-C-00-4188)

STUDY TOUR OF U.S. AND CARIBBEAN
PARKS AND PROTECTED AREAS

NEEDS ASSESSMENT AND
PROPOSED ITINERARY



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February 1997

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Funding Support Provided Through the GOJ and USAID/Kingston
Development of Environmental Management Organizations (DEMO) Project

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STUDY TOUR OF U S AND BELIZEAN PARKS AND PROTECTED AREAS

NEEDS ASSESSMENT AND PROPOSED ITINERARY

INTRODUCTION

TSS in support of USAID's DEMO project, has designed and conducted two study tours of parks and protected areas in the United States. These tours have been attended by NRCA personnel including the Chairman of the NRCA board, the Executive Director and other key individuals from the National Parks Protected Areas and Wildlife Branch and the Watershed Protection and Management Branch. Individuals from agencies other than the NRCA, such as the Commissioner of Lands and the Tourist Product Development Company, have also attended.

These study tours were designed to cover specific protected area-related topic areas such as revenue generation/financial sustainability, tourism and recreation, multiple use scenarios and other management issues in order to meet specific organizational learning objectives. Post-tour evaluations and interviews of participants have shown that study tour learning objectives were achieved and that many participants feel that their participation helped to broaden their perspectives and they have been able to apply newly-learned principles in their day-to-day activities.

Based on the success of previous DEMO-sponsored study tours, a similar tour of U S and Caribbean terrestrial, coastal and marine protected areas is being planned. The objective of this tour, set to take place in mid-March of 1997, is to expose participants to parks and protected areas that encompass ecological, socio-cultural, and socio-economic factors that are comparable to the Jamaican reality. It is hoped that visits to successful protected areas and related projects in other countries would give participants the opportunity to gain valuable knowledge of programs that may be replicated or adapted to a Jamaican context and thereby contribute to improved environmental management in Jamaica. Equally important, the study tour would allow the Jamaican participants to share recent initiatives with their counterparts in Florida and Belize. The opportunity to exchange information and ideas across borders and cultures would be valuable as the exchange could contribute to the development of a regional professional network and eventually to improved regional conservation initiatives.

NEEDS ASSESSMENT

In order to ensure that the planned study tour is of high professional interest and relevance to participants, a needs assessment was undertaken in Jamaica over the first two weeks of December, 1996. To gather relevant information, a brief questionnaire was administered to prospective participants and organizational representatives from the NRCA and various eNGOS active in coastal

zone protection This questionnaire was designed to discover key information including

-what protected areas or conservation programs does the respondent feel that he/she (or another representative from the organization) would most benefit from visiting?, and,

-what specific topics are of particular importance to the respondent from both an organizational and individual perspective?

The questionnaire also included questions regarding previous study tour experiences in order to ensure that negative experiences are not repeated and positive experiences can be replicated where possible

Prior to the administration of the questionnaire, discussions were held with Mr Learie Miller, NRCA Deputy Senior Director, Alison Massa, DEMO Chief of Party, and Conrad Ornstein, DEMO Senior Financial Director These discussions, particularly those held with Mr Miller, helped to clarify organizational needs that were subsequently reinforced by the findings of the questionnaire

The following table is a synopsis of each prospective participant's or organizational representative's response to the questionnaire

Respondent/ Organization	Question/Response				
	Preferred Countries, Protected Areas, Conservation Programs	Priority Topics to be Covered	Individual to Participate	Previous Study Tour Experience positive, negative	Comments
NRCA B Byfield NPPAW	Belize-marine & terrestrial parks St Lucia financial sustainability Costa Rica INBIO	Revenue generation income generation through biodiversity (a la INBIO) management of biodiversity NGO-Govt relations/co-management structures overarching system management structures and issues protected area land use management issues	B Byfield other NPPAW personnel	N/A	Important to visit area of similar social ecological and economic context
NRCA- M Hamilton NPPAW	Florida Everglades-NGO contributions Keys Saba, Antigua turtle hatching program	Wildlife management practices NGO involvement in wildlife preservation financial management, use and training of volunteers local community income generation environmental awareness training partnerships	M Hamilton other NPPAW personnel	N/A	Would be good to experience both developed and developing country PPAs
NRCA S McKenzie CZM	Belize marine and terrestrial PPAs Costa Rica St Lucia co management	Coastal zone mgmt practices establishment & mgmt of PPAs community-based mgmt NGO-Govt partnerships	S McKenzie	N/A	

Respondent/ Organization	Question/Response				
	Preferred Protected Areas Conservation Programs Countries	Priority Topics to be Covered	Individual to Participate	Previous Study Tour Experience positives negatives	Comments
Negril Environmental Protection Trust (NEPT) Louis Daly	Cayman Is Saba Orlando Fl wetlands wastewater treatment	Mgmt practices revenue generation/financial sustainability wastewater treatment	Louis Daly	N/A	
Negril Environmental Protection Trust (NEPT) Jean Brown	Cayman Islands Saba Belize marine and terrestrial protected areas public education St Lucia co management Virgin Islands user fees Florida Keys	Financial sustainability co management regulations/guidelines participatory planning and management conflict resolution public education	Field personnel public education personnel	N/A	Would be good to experience both developed and developing country PPAs
Negril Coral Reef Preservation Society (NCRPS) Katy Thacker	Florida Keys 1st world Govt top down approach Virgin Islands user fees Cayman Is trust Costa Rica conservation area w/private lands Belize Marine and Terrestrial PPAs	Co management participatory planning & management conflict resolution financial sustainability	Park Manager or Head Ranger need exposure to programs in other countries	Belize Dom Rep Saba, St Lucia, Cayman Study tours valuable for exposure to real projects More time in sites would be help	If possible tour should focus on Carib Countries with similar realities
South Coast Conservation Foundation SCCF- Harvey Webb Technical Officer	St Lucia co management framework GIS system Saba Grenada Curacao/Bonaire-enforcement community involvement	Revenue generation enforcement co-management information systems-feedback, modeling GIS	Technical/ field personnel to gain exposure to information systems abroad	N/A	
Friends of the Sea (FOS)- Barbara Hahn President	Cayman Is St Lucia Irish Moss farming	Enforcement education management practices revenue generation alternative income-generating activities community-based management	Barbara Hahn	N/A	
Port Antonio Environmental Protection Association (PEPA) Simon Shepara Exec Dir	Belize St Lucia	Alternative income-generating activities Irish moss open water shrimp mariculture revenue generation marine park networks	Simon Shepara	Has conducted tours Important to give participants time and space for them to relax and explore on their own	It would be difficult to get away for more than 10 days

Respondent/ Organization	Question/Response				
	Preferred Countries Protected Areas Conservation Programs	Priority Topics to be Covered	Individual to Participate	Previous Study Tour Experience positive negative	Comments
St Ann Environmental Protection Association (STAEPA) Wendy Van Barneveld	St Lucia se urchin and mangrove mgmt revenue generation Belize Dom Rep Costa Rica	Revenue generation/financial sustainability education scientific endeavors NGO Govt partnerships alternative income generating activities	Wendy Van Barneveld	N/A	Would like to see examples of PPAs in developing countries whose economic realities are similar to JAs
Fisheries Division Steve Smikle	Mexico lobster program Trinidad Puerto Rico Marine reserves Cuba Venezuela conch reserves Turks & Caicos Farm/Ranch	Marine reserves marine parks regulated multiple use scenarios sustainable use of specific resources PPAs with fisheries component areas where specific uses have been prohibited how reconciled	Fisheries officers	N/A	

SUMMARY OF FINDINGS

The questionnaire revealed similar organizational learning objectives for NRCA, the Fisheries Division, and the various NGOs that were included in the survey. Although only two of the respondents had previously participated in a study tour, all respondents had heard positive feedback from participants from prior study tours and were enthusiastic about the possibility that they or a member of their organization might be included in a future tour.

Countries

Respondents expressed interest in visiting a number of countries in order to learn more about specific parks and programs. The countries most often mentioned were, in order according to frequency of request:

St. Lucia (6), Belize (5), U.S.-Florida (4), Costa Rica (4), Cayman Islands (4), US/British Virgin Islands (2), Saba (2)

Priority Topics of Interest

Topics of high organizational interest are listed in order of frequency of mention:

- revenue generation
- financial sustainability
- alternative income-generating activities for local communities
- co-management structures and practices

- environmental awareness/public education and outreach
- PPA management practices
- NGO-government partnerships
- participatory planning
- conflict resolution

Other topics were mentioned as organizational and individual learning priorities, but only those topics that were cited by three or more individuals are listed here

RECOMMENDATIONS

The individuals surveyed conveyed their interest in a variety of countries, programs and topic areas. They expressed that exposure to parks and protected areas and conservation programs in several countries in particular would benefit them professionally. St. Lucia, Belize, and the USA (Florida) were the three countries most cited as having the type of programs and projects that would provide a rich learning experience focused on priority topics such as revenue generation, financial sustainability, and co-management structures. The following are examples of protected areas and programs that would be of particular value to Jamaican natural resource management personnel.

TSS recommends that the proposed study tour include visits to the sites outlined below. Sites in Florida and Belize have been chosen for their relevance to Jamaican needs. St. Lucia, though cited repeatedly by prospective participants as having examples of conservation programs of relevance to Jamaica, is not included in this proposal because it has been determined that Belize would provide participants with exposure to a wider range of protected areas and programs with significant applicability to the Jamaican situation.

Florida

Florida, which has an extensive state and national protected areas system that encompasses ecological conditions similar to Jamaica's, would provide many opportunities for exposure to protected areas-related conservation programs and strategies. Parks and programs of particular relevance to Jamaica could include

- John Pennekamp Coral Reef State Park was the first park in the U.S. to encompass both terrestrial and marine resources. It is heavily used by both national and international visitors. Of particular relevance to Jamaica are the revenue-generating activities undertaken by the park. The park charges entrance fees that average US\$5 per vehicle. The park also maintains campsites for visitors for which they charge US\$25. The most lucrative revenue-generating arrangement is a concession that the park leases to the operators of boat tours of the reef areas. The concession operator, who takes visitors scuba diving, snorkeling, and on glass-bottom boats, has an arrangement with the park by which they pay the park, on a

monthly basis US\$25,000 or 12.5% of revenues, whichever is greater. In addition to these arrangements, the park also receives revenue from locker rental, drink vending machines, and pay telephones. All revenue generated by the park goes into the Florida State Park Trust Fund and is subsequently distributed to parks as individual budgets necessitate. As the John Pennekamp Coral Reef State Park generates revenue that far exceeds its budget of US\$200,000, excess revenues subsidize other, less lucrative parks and programs.

The park also leverages funds and bolsters its public awareness programs through the use of volunteers. Park campsites are maintained by visitors who volunteer, in exchange for a free long-term (2-3 month) campsite, up to 30 hours a week. The park also has a cadre of local volunteers who donate their time to maintain park landscaping, paint buildings, remove exotic vegetation, and perform a variety of other important tasks. Educational programs in which volunteers participate include nature walks for visitors, presentation of educational slide shows, presentations, and lectures. The "Parknership" program, in which volunteers and park staff work with school groups on specific projects such as trail maintenance and sign building, fosters ownership and responsibility among students and volunteers alike.

A visit to this park would expose study tour participants to several successful programs that would be of immediate relevance to Jamaica. Study tour participants would learn about critical themes such as revenue generation, financial sustainability, and environmental awareness/public education by meeting and speaking with the individuals that both developed and currently manage the programs mentioned above.

- Florida Keys National Marine Sanctuary, encompassing 2800 square nautical miles of marine ecosystems surrounding the Keys, is the second largest marine sanctuary in the U.S. The Florida Keys National Marine Sanctuary and Protection Act, signed by the President in 1990, established the Sanctuary. The Sanctuary was established in response to rapidly deteriorating ecological conditions due to poor water quality and increased human activity in the area. The Act called for the National Oceanic and Atmospheric Administration (NOAA) to prepare a comprehensive management plan for the Sanctuary in consultation with the public and with federal, state, and local government authorities. In order to facilitate the process, an Advisory Council that is representative of all public and private interests was formed to assist in the drafting of the management plan. Over the past six years, planners, marine resources management experts, and the public have been involved in the drafting of a comprehensive management plan that addresses critical issues through ten action plans: Channel/Reef Marking, Education/Outreach, Enforcement, Mooring Buoys, Regulatory, Research and Monitoring, Submerged Cultural Resources, Water Quality, Volunteer, and Zoning.

Several programs that are being implemented in support of the Sanctuary are of major relevance to Jamaica.

-the public consultations process employed to foster consensus and cooperation among

stakeholders in the area is very similar to the "Environmental Policy Framework" process that the NRCA is implementing in the establishment of protected areas in Jamaica. This process, which is considered to be innovative, has been successfully employed over the last six years in the drafting of the Sanctuary management plan. An advisory council, comprised of representatives of all sectors of local society, played a key role in ensuring that all stakeholder interests were considered in the process of establishing the Sanctuary and drafting of the protected area management plan. The participation of the advisory board coupled with a long series of public meetings, helped to resolve many major issues and promote community ownership and support of the protected area. A public consultations process of this scope was unprecedented in the history of marine sanctuaries in the U.S. Over the course of the process, thousands of individuals and organizations contributed and commented on the plan, and although some issues were debated intensely, many solutions and compromises were reached that shaped the management plan into its present form,

-the recommended zoning plan for the Sanctuary includes 18 Sanctuary Preservation Areas at the most heavily used reefs, 27 wildlife management zones, 21 Existing Management Areas, four Special Use Areas or research-only reef sites and two Ecological Reserves. Each type of zone is governed by different regulations which allow or disallow certain uses.

-the Sanctuary enjoys the support of several volunteer programs. One program, managed jointly by the National Marine Sanctuary and The Nature Conservancy and supported by over 400 local and regional volunteers, sponsors a variety of activities including a conch restoration project, coral reef monitoring projects, coral reef education, and water quality monitoring projects among others. Volunteers also participate in environmental education programs with local schools. This program, as it capitalizes on the goodwill of volunteers, has been cost-effective, has enjoyed a high degree of success and is an excellent example of government-NGO partnerships working to accomplish ambitious objectives on restricted budgets.

Each of the programs mentioned above have strong applicability to the Jamaican context. Participants will have the opportunity to speak with government and nongovernmental personnel that have been involved in the long and difficult process leading to the establishment of a major protected area. Specific management issues such as enforcement, regulations, zoning and others may also be discussed in addition to NGO-government partnerships, volunteer programs, and education/outreach.

- The Florida Marine Research Institute, an entity of the South Florida Department of Environmental Protection, is involved in the study and conservation of commercially important marine species such as conch, lobster, and fishes. This entity, whose programs also benefit from the volunteer program mentioned above, monitors populations and conducts species rehabilitation programs. Using groups of volunteers, the Institute has increased its ability to monitor populations, work with commercial fishermen, and conduct public awareness campaigns. This organization would provide an excellent example of a

government organization that leverages its resources through interagency cooperation and partnerships with NGO and community interests

- Center for Marine Conservation (CMC) is a nongovernmental organization dedicated to the preservation of marine habitat and species worldwide. The CMC's Florida Keys programs focus primarily on supporting the establishment of the Florida Keys National Marine Sanctuary. The CMC, working in partnership with federal and state agencies, as well as other NGOs, has supported the Sanctuary's participatory planning process through public outreach, education, advocacy, and lobbying programs. The organization is also spearheading a related project called the "Sustainable Everglades Initiative", which also involves substantial government-NGO partnerships in public outreach, education and water quality monitoring initiatives.

Participants would meet with Mr. David Holtz, Project Director, and Susan White, Interpretive Biology Consultant to discuss the CMC's partnerships with government organizations and its public outreach and education programs.

- Biscayne National Park is a 180,000 acre national park that consists of mangrove wetlands, shallow bay habitat, small islands, and living coral reefs. The park's budget is maintained through federal government allocations and at present, it charges no user fees. Until recently, federal funds had been sufficient to cover O&M costs of the park. Dwindling federal funds, however, have forced the park to examine options that will generate revenue to offset the decrease in federal funding. For this reason, Biscayne National Park would provide a marked contrast when compared to John Pennekamp Coral Reef State Park, which has generated huge revenues for many years.

Recognizing that the park must become more sustainable, Biscayne personnel are developing programs that they hope will fill the fiscal void. The park, in conjunction with interested local residents, has established an organization called Friends of Biscayne Bay and Biscayne National Park. This group was formed with the express purpose of raising funds for park activities education to operations and maintenance. In addition, the park will begin to charge mooring fees at two of the more popular island destinations within park boundaries. It is hoped that these steps will help create sustainability over the long-term.

In addition, the park has an unusual education program that is offered to inner-city youths from Miami. From December to April, schoolchildren from Miami come to the park for 3 day, 2 night educational camping trips which teach them about all aspects of the park's ecosystems and general ecology. This program, in place since 1976, has successfully introduced youths to the concepts of safe and minimum impact enjoyment of natural resources and concern for human impact on ecosystems for many years.

A visit to Biscayne National Park would be valuable for the contrast it would provide with John Pennekamp Coral Reef State Park. It is a good example of a park that is under pressure.

to become financially sustainable and that is taking the first steps toward that goal

Belize

Belize is an extremely varied country for its size. Its terrestrial landscape comprises mountains, karst limestone hills, and lowland forests and plains. The diversity of Belize's marine zone is exceptional. The Belize barrier reef, the second largest in the world, runs the entire length of the country and supports an enormous number of patch reefs, shoals, and over 1000 cays which are ringed to varying degrees by mangrove vegetation. Belize is highly committed to the conservation of its natural resources. To this end, the country has placed over one-third of its territory under some degree of protected status.

Nongovernmental organizations play a prominent role in the management of Belize's protected areas. NGOs manage and operate many of Belize's major parks and protected areas. Programme for Belize, for example, manages the 300,000 acre Rio Bravo Conservation and Management Area. The Belize Audubon Society manages six major protected areas in various parts of the country. Both of these NGOs have formal agreements with the Belize government that delineate the roles and responsibilities of each party. Belize, as it shares many ecological, social, and cultural similarities with Jamaica, would provide participants with the opportunity to learn about relatively well-developed conservation programs in a developing country context similar to their own.

Some specific entities, protected areas and conservation programs in Belize that would be of interest to Jamaica include

- The Forestry Department is responsible for ensuring the conservation and wise use of Belize's natural resources. The department controls and manages the utilization of timber throughout the country. Five years ago the Department established a Conservation Division to oversee all parks and protected areas that fall under the Forestry Department's jurisdiction. The Conservation Division is presently responsible for the sound management of nearly all of Belize's terrestrial parks and protected areas. The division delegates authority to NGOs when it sees fit, and has done so in several cases, but is ultimately responsible for any and all successes or failures.

A major concern of Jamaican officials is implementation of co-management programs for protected areas. Meetings with Forestry Department personnel, including members of the Conservation Division, could be of great value because Belizean officials would be able to share their experience with various co-management structures and arrangements. Department officials would also give a comprehensive overview of Belize's parks and protected areas system and answer any questions the group might have about the system's genesis, past and present problems and successes, and future plans.

- The Fisheries Department is responsible for the sound management of Belize's coastal and

marine resources. The Department has recently adopted a comprehensive participatory planning process that involves all relevant stakeholders in conservation initiatives. This process has included the establishment of steering and technical committees made up of individuals from government, NGO and private interest groups. The Coastal Zone Management Programme is a project, funded by the UNDP's Global Environment Fund (GEF) that serves within the structure of the Fisheries Department to assist in the coordination of conservation and development activities in coastal areas. The Fisheries Department, with support from the Coastal Zone Management Programme, is presently working to strengthen and expand Belize's system of marine protected areas.

Meetings with Department personnel would include discussion of coordinated coastal zone management, strategies for establishing and managing successful marine parks, NGO-government partnerships, and community outreach.

- Programme for Belize (PFB), a nongovernmental organization that manages the 300,000 acre *Rio Bravo Conservation and Management Area*, raised the major part of the funding necessary to purchase the land and is responsible for all expenses associated with its management. The NGO has instituted many programs whose objective is to generate revenue for park maintenance as well as for the economic well-being of neighboring communities. Specific programs have included sustainable production of hardwood lumber and the sustainable harvesting of chicle and other forest products. In addition, PFB hosts groups of scientists, archaeologists, and tourists in order to both increase knowledge of the area and raise funds for operating and maintenance costs. PFB is constantly exploring new ways to sustainably exploit forest products to raise revenues.

Revenue generation and financial sustainability are themes of critical importance to Jamaica, therefore first-hand exposure to Programme for Belize's programs could be of great value to study tour participants. Additionally, discussions of the pros and cons of NGO-government partnerships (from an NGO perspective) could help participants to conceive of other roles that NGOs could play in the management of Jamaica's parks and protected areas system.

- The Belize Audubon Society (BAS) is a nongovernmental organization "dedicated to the promotion of the sustainable use and preservation of Belize's natural resources in order to maintain a balance between people and the environment." BAS has several organizational foci, the most important being public awareness and policy campaigns, environmental education, community development, and protected areas management. Protected areas management has historically been the major focus of the organization, and the group's additional activities serve to support this focus. BAS, through a formal agreement with the Belize government, manages six major protected areas. Revenue is generated through user fees and grants from international donors. The Belize Audubon Society is an excellent example of a nongovernmental organization that works in partnership with the government to operate and manage PPAs.

Meetings with BAS personnel and site visits to PPAs managed by the NGO would expose participants to examples of programs that have direct applicability to Jamaica. Formal NGO-government partnerships and co-management agreements, statutory revenue generation agreements and community development programs are some of the topics that participants would experience first-hand

- Hol Chan Marine Reserve is Belize's first marine park, and was established as a community-based initiative. Concern over unregulated exploitation of this area's fisheries resources and uncontrolled visitation of its coral reefs led to its establishment in 1987 as one of the most highly protected parks in Belize. The park is remarkable in that it has been divided into several special use zones that denote specific types of protection. Managed by the Fisheries Department, the park was originally funded by USAID and WWF. Presently, the park is funded partially through user fees (US\$2.50) charged to the 30-35,000 visitors to the park's coral reef zone. All revenues, including those from user fees, sales of t-shirts and posters, as well as grants and donations, are placed in the park's trust fund. The park can also access funds from the Protected Areas Conservation Trust (PACT) to offset O&M and other costs.

Participants would meet with Park personnel to discuss revenue generation and collection, management strategies and the unique challenges that marine parks present, and education and outreach.

- University College of Belize (UCB), Marine Research Center (MRC) has been working to establish a Marine Studies Programme and an associated research station since 1989. In 1994, UCB signed a Memorandum of Understanding with the Government of Belize and Coral Cay Conservation (a UK-based, non-profit marine conservation organization) to establish a Marine Research Center on the Turneffe Islands atoll. This Center, which was opened in 1995, is called the Calabash Cay Field Station.

The MRC's field station provides facilities for scientific monitoring, research and environmental awareness programs with an immediate focus on shallow water tropical marine ecosystems. The station also supports UCB's developing degree programs in Natural Resources Management and Coastal/Marine Studies and provides a venue for training courses and workshops on marine-related topics.

The MRC's main objectives include: 1) the establishment of a financially self-sustaining field facility which will complement UCB's programs, 2) the development of UCB's technical capacity to independently provide training, research and education on coastal issues to students, teachers, Government of Belize and NGO staff, 3) the provision of training in coastal/marine science-oriented field work in Belize and improvement in environmental awareness amongst Belizeans and visitors, 4) support of the Coastal Zone Management Programme's (UNDP/GEF-funded project) activities to ensure the conservation and sustainable integrated management of the biodiversity and natural resources of the entire

Turneffe Islands atoll including the designation and implementation of a protected areas strategy 5) the establishment of collaborative links (including educational and data exchange agreements) with regional and international research and educational agencies

Discussions with MRC personnel will allow participants to share experiences in marine research and education. A meeting with the MRC will provide a forum for exchange of ideas and information on marine and coastal educational and research initiatives

- Five Blues Lake National Park was established on Earth Day 1991. It is managed by a local community-based organization. Tour guides from the local community facilitate nature walks and local families host guests to generate revenue for park operations and management.

A visit to this park would allow participants to experience real grass-roots park management. The local community has had some rough times as it has developed capacity and management strategies, but many of the people are dedicated to conserving their natural heritage and are working hard to make their project a success.

- Protected Areas Conservation Trust (PACT) is a national trust fund that was established as a “trust for the protection, conservation and enhancement of the natural and cultural resources of Belize for the benefit of all Belizeans and visitors.” The Trust generates revenue through an exit tax which is levied on all visitors to the country. In addition, the Trust is able to receive grant funding from donor organizations. It is Belize’s hope that the PACT will be able to support its national protected areas system. The Trust, however, is still in its initial stages of development.

Discussions with PACT personnel would provide the Jamaicans with the opportunity to discuss the PACT in relation to their own natural resources conservation trust.

CONCLUSION

The needs assessment conducted in Jamaica indicated that parks and protected areas-related learning objectives are similar for members of both government and nongovernment agencies and organizations. Revenue generation, financial sustainability, alternative income-generating activities for local communities, co-management structures and practices, NGO-government partnerships, environmental awareness/public education and outreach and participatory planning were noted as the topics of high organizational and personal importance. All individuals interviewed expressed that exposure to projects or programs that incorporate these elements would provide valuable experience that could increase their professional capacity.

The organizations, protected areas, and projects that are summarized above would all provide excellent examples of the priority topic areas identified through the needs assessment. Participants

would have the opportunity to meet with a wide range of U S and Belizean conservation personnel to discuss these issues compare experiences, and tour protected area facilities in both countries Of particular value would be the opportunity to compare and contrast conservation practices in a developed (U S) and developing (Belize) country context

The proposed study tour would provide a valuable learning experience not only for the Jamaican participants but also for their counterparts in Florida and Belize The NRCA, the UWI, and the many active NGOs in Jamaica have programmes ideas and lessons-learned to share that host countries may find interesting and valuable A study tour such as this one could contribute to effective conservation in all countries involved by promoting the establishment of long-term relationships that foster regional exchange of ideas and information

The proposed tour would take place over a period of 11 days Participants would depart from Kingston on Sunday March 16, 1997 and would return on Wednesday, March 26, 1997 This schedule would allow sufficient time for participants to visit all of the sites outlined above while missing only 8 business days Senior personnel at all sites listed above and in the draft itinerary (Annex I) have been contacted and are prepared to host the group

ANNEX I:

Itinerary

ITINERARY

STUDY TOUR OF PARKS AND PROTECTED AREAS IN FLORIDA AND BELIZE

FLORIDA

Transportation in Florida will be provided by GO TOURS. A 22 passenger bus will pick participants up at the airport on Sunday March 16. The contact person at GO TOURS is Mike, at 305-743-9876.

Sunday, March 16

Depart Kingston, 8:15am, arrive Miami 9:45am then travel to Key Largo

12pm arrival in Key Largo and lunch

Key Largo Hammocks State Botanical Site

2pm tour of site which is undergoing restoration which involves removal of exotic species and rehabilitation of native species. This program relies heavily on volunteer support.

5pm Check-in to Ramada Inn Key Largo Tel 1-800-THE-KEYS at 5:00pm

Monday, March 17

John Pennekamp Coral Reef State Park

102 ½ Mile Marker, Key Largo, FL

9:00am meeting with Robert Wilhelm, Park Manager and Craig Liney, Asst Park Manager to discuss revenue generation (concessions, user fees), community outreach and education, volunteerism, and other relevant issues.

10:30am tour of facilities, glass-bottom boat tour of reef

12:00noon - 2:00pm Lunch and travel to Marathon Key

Florida Keys National Marine Sanctuary

5550 Overseas Highway, Main House, Marathon, FL 33050 Tel 305-743-2437

2:00pm meeting with Mary Enstrom, Marine Conservation Programs Manager, Fran Decker, Marine Stewardship Coordinator, and Julie Overing, Marine Ecologist of The Nature Conservancy to discuss NGO-government partnerships, volunteer programs, education and outreach.

4pm interpretive tour of Crane Point Hammock with "Captain Ed" Davidson

5 30pm check-in to Holiday Inn Marathon Tel 305-289-0222

Tuesday, March 18

Florida Marine Research Institute

Mile Marker 68 1/2 Bays Drive Long Key (across from post office) Tel 305-289-2330

9 00am meeting with Bob Glazer (conch), and Tom Mathews, (lobster) to discuss conch and lobster research and conservation programs Of special interest are partnerships with NGOs as well as other government agencies and the use of volunteers in research and education programs

10 00am tour of facilities

11 00am - 2 00pm travel to Key West and lunch

Florida Keys National Marine Sanctuary

216 Ann Street, Key West FL, 33040 Tel 305-292-0311

2 00pm meeting with Billy Causey, Florida Keys National Marine Sanctuary Superintendent and Alyson Simmons, Public Relations Officer to discuss public consultations in protected area establishment and management, protected area regulations, and other general issues relating to the establishment of new protected areas

5 00pm check-in to Holiday Inn Marathon and dinner

Wednesday, March 19

Center for Marine Conservation (CMC)

8075 Overseas Hwy, Marathon, FL 33050 Tel 743-5199 (Meeting to be held at Marine Sanctuary Offices at 5550 Overseas Hwy)

9 30am meeting with Mr David Holtz, Project Director, and Susan White, Interpretive Biology Consultant to discuss the CMC's partnerships with government organizations and its public outreach and education programs

11 00am - 2 00pm travel to Biscayne National Park and lunch

Biscayne National Park

Homestead, FL Tel 305-230-7275, 305-230-1144

2 30pm meeting with Louis Penna, Assistant Superintendent and Richard Curry, Science Coordinator of Biscayne National Park to discuss the park's management plan, educational programs, volunteer programs, and newly initiated revenue generation programs

4 00pm return to Airport Regency Hotel, 1000 NW 42nd Ave, Tel 305-441-1600, in Miami

BELIZE

Transportation in Belize will be provided by Mr Ramon Silva of International Archaeological Tours Tel 502-9-23991

Thursday, March 20

8 00am travel to Miami airport for flight to Belize City

12 30pm arrival in Belize City, travel to Belmopan

Forestry Department

Belmopan Tel 501-8-23412

4pm meeting with Richard Belisle, Chief Forestry Officer and Rafael Manzanero of the Conservation Unit Participants will have the opportunity to gain an understanding of the background of the Belizean Parks and Protected Areas movement from a government perspective This will be a chance for participants to learn about partnerships and co-management, revenue generation, financial sustainability, and parks planning and management from a Belizean point of view as well as to share the Jamaican situation

Protected Areas Conservation Trust (PACT)

#37 Nanche St , PO Box 443, Belmopan, Tel 501-8-23637

6pm meeting in Bullfrog Hotel conference room with PACT Executive Director Umberto Paredes to discuss this innovative funding mechanism

8pm to Bullfrog Hotel and dinner

Friday, March 21

Fisheries Department

Belize City Tel 501-2-44552

9 00am meeting with Lloyd Pariot, Chief Fisheries Officer and Jose Perez to discuss coastal zone management and marine PPAs Joining the meeting will be Ms Janet Gibson, Director of the UNDP-sponsored Coastal Zone Management Programme (CZMP) to discuss the CZMP's role as a coordinating body in CZM

1 00pm lunch and travel to Rio Bravo Conservation and Management Area

Rio Bravo Conservation and Management Area

Programme for Belize, #2 South Park St , Belize City, Tel 501-2-71248

4 30 arrival at Rio Bravo, where the group will be hosted by the Programme for Belize, the NGO that owns and manages the protected area Participants will overnight at the park-run facilities PFB personnel will make a presentation on park programs after dinner

Saturday, March 22

9 00am tour of Rio Bravo facilities and discussion of park initiatives in revenue generation, management and environmental education with NGO and park personnel

12 00noon lunch

1 00pm departure to Crooked Tree Wildlife Sanctuary

Crooked Tree Wildlife Sanctuary

Belize Audubon Society, Fort Street, Belize City, Tel 501-2-34987

3 00pm arrival to Crooked Tree Check-in to hotel and free time to speak with members of local community and relax

6 00pm dinner

Sunday, March 23

8 00am tour of Crooked Tree facilities and wetlands with local guides Discussion with Belize Audubon Society (BAS) park personnel and local community representatives including Mr Donald Tillet, Park Manager, and Mr Ozmani Salas, BAS Programme Coordinator, who are involved in the management of the protected area

12 00noon lunch in Crooked Tree

1 00pm departure to Five Blues Lake National Park

Five Blues Lake National Park

4 00pm arrival to Five Blues Lake Brief meeting with community leaders and dispersal to homes of families involved in conservation effort Dinner will be taken with families

Monday, March 24

8 00am tour of Five Blues Lake National Park and facilities Conversation with park personnel and leaders of the community-based conservation movement

12 00noon lunch and departure to Belize City

University College of Belize Marine Research Center

PO Box 990, Belize City, Tel 501-2-3732

3 00pm Meeting with Mr K Mustafa Toure to discuss the Marine Research Center's programmes

5 00pm Dinner and return to hotel

Tuesday, March 25

Hol Chan Marine Reserve

Jose Perez Tel 501-2-44552

8 30am departure to Hol Chan Marine Reserve After arrival, tour of Reserve and facilities and meetings with reserve personnel

12 00noon lunch at Cay Caulker

2pm meeting with Emmanuel Rodriguez, chair of the Cay Caulker Village Council Group will discuss the grass-roots movement to establish Cay Caulker and surrounding area as a protected area

4pm return to Belize City

6 00pm dinner and return to hotel

Wednesday, March 26

8am depart for airport for 11 30 flight to Miami

Study Tour of Parks and Protected Areas in Florida and Belize

March 1997

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
8 15 AM Depart Kingston 2 00 PM - 4 00 PM Key Largo Hammocks	9 00 AM - 12 00 PM John Pennackamp 2 00 PM - 5 00 PM Marine Sanctuary/ Crane Pt	9 00 AM - 11 00 AM Marine Research Institute 2 00 PM - 4 00 PM Marine Sanctuary	9 30 AM - 11 00 AM Center for Marine Conservation 2 30 PM - 4 00 PM Biscayne Natl Park	3 30 PM - 5 30 PM Forestry Department 6 00 PM - 7 00 PM Protected Areas Conservation Trust (PACT)	9 00 AM - 11 00 AM Fisheries Department 4 30 PM Rio Bravo Programme for Belize	8 30 AM - 12 00 PM Rio Bravo Programme for Belize 1 00 PM Crooked Tree Wildlife Sanctuary
23	24	25	26	27	28	29
8 30 AM - 12 00 PM Crooked Tree Wildlife Sanctuary 4 00 PM Five Blues Lake National Park	8 00 AM - 12 00 PM Five Blues Lake 3 00 PM - 5 00 PM UCB Marine Research Center	8 30 AM - 12 00 PM Hol Chan Marine Reserve 2 00 PM - 4 00 PM Cay Caulker	8 30 AM Flight to Miami			
30	31					

S	M	T	W	T	F	S
	1	2	3	4	5	6
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14	15	16	17	18	19	20
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28	29	30				

S	M	T	W	T	F	S
	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

ANNEX II

Budget

**Study Tour of Parks and Protected Areas
Budget**

Item	# of Persons	Units/Days	Cost	Total
General			Subtotal	15904 00
RT Air Ja US Bel	17		700	11900 00
Health Insurance	16		130 25	2084 00
US Visa	16		30	480 00
Medical Exams	16		90	1440 00
FLORIDA				
Transportation			Subtotal	1925 00
22 Passenger Bus				1500 00
Boat Tour of State Park	17		25	425 00
Lodging			Subtotal	6683 30
Miami Airport Regency 3/19	17	1	73 125	1243 13
Key Largo-Ramada 3/16	17	1	121 54	2066 18
Marathon Holiday Inn 3/17 & 3/18	17	2	99 235	3373 99
M&IE			Subtotal	3034 50
3/16/1997 1/4 Miami	17		10 5	178 50
3/16/1997 2/4 Keys	17		21	357 00
3/17/1997 4/4 Keys	17		42	714 00
3/18/1997 4/4 Keys	17		42	714 00
3/19/1997 3/4 Keys	17		31 5	535 50
3/19/1997 1/4 Miami	17		10 5	178 50
3/20/1997 2/4 Miami	17		21	357 00
Other			Subtotal	510 00
Tour of Crane Pt	17		10	170 00
Entrance fees	17	2	10	340 00
Driver Gratuity				100 00
SUBTOTAL FLORIDA				12152 80
BELIZE				
Transport			Subtotal	3787 94
Van				3022 94
Boat to Hol Chan	17		45	765 00
Lodging			Subtotal	6941 94
Belize City Chateau Canb	17	2	82 8	2815 20
Belmopan-Bullfrog Hotel	17	2	73 125	2486 25
Rio Bravo-Dorms	17	1	60 5	1028 50
Crooked Tree-Birds Eye	9	1	67 9985	611 99
M&IE			Subtotal	6426 26
3/20/1997 3/4 Belize	17		47 25	803 25
3/21/1997 4/4 Belize	17		54 255	922 34
3/22/1997 4/4 Belize	17		45 51	773 67
3/23/1997 4/4 Belize	17		63	1071 00
3/24/1997 4/4 Belize	17		63	1071 00
3/25/1997 4/4 Belize	17		63	1071 00
3/26/1997 2/4 Belize	17		31 5	535 50
3/26/1997 1/4 Miami	17		10 5	178 50
Other			Subtotal	1866 94
Airport Exit Tax	17	1	20	340 00
Entrance fees Rio Bravo	17		20	340 00
Entrance fees Crooked Tree	17		5	85 00
Entrance fees Hol Chan	17		2 5	42 50
Entrance fees Five Blues Lake	17		8 82	149 94
Rio Bravo Meals	17		26 5	450 50
Rio Bravo Tours	17		27	459 00
SUBTOTAL BELIZE				19023 07
			TOTAL.	47079 87

ANNEX III:

Contact Lists-Florida and Belize

CONTACT LIST FLORIDA

*Florida Keys National Marine Sanctuary
Key Largo Office*
John Halas Biologist
w 305-451-1644
h 305-451-5984

*Florida Keys National Marine Sanctuary,
Lower Keys Office*
216 Anne Street, Key West, FL
Alyson Simmons, Public Relations Officer
June Kradick
Billy Causey Superintendent
T 305-292-0311
F 305-292-5065

*Florida Keys National Marine Sanctuary,
Middle Keys Office*
5550 Overseas Hwy, Main House
Marathon, FL 33050
Mary Enstrom, Marine Conservation
Program Officer
T 305-743-2437
F 305-743-2357

John Pennnekamp Coral Reef State Park
Craig Liney, Asst Park Manager, Robert
Wilhelm, Park Manager
102 ½ Mile Marker
PO Box 487
Key Largo, FL 33037
T 305-451-1202
F 305-451-1410/853-3555

Florida Marine Research Institute
2796 Overseas Hwy, Suite 119
Marathon, FL 33050 or
Lab-68 ½ mile Bayside, Long Key (across
from post office
Bob Glazer (conch), Tom Mathews,
(lobster)
T 305-289-2330
F 305-289-2334

Center for Marine Conservation
8075 Overseas Hwy, Marathon, FL
Dave Holtz
Marathon T 305-743-5199
Key West T 305-294-9727

*National Marine Fisheries Agency,
Sanctuary Enforcement Agency*
Mac Fuss, Bill Kruczinsky
T 305-743-0537

Biscayne National Park
Homestead, FL
Richard Frost, Superintendent
305-230-7275
Louis Penna, Asst Superintendent
305-230-1144
Richard Curry, Science Coordinator
305-230-1144 x3010
Rob Shanks, Education
305-230-1144 x 3033
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CONTACT LIST - BELIZE

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Ismael Fabro Chief Environmental Officer,
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email envirodept@btl.net

Forestry Department

Ministry of Natural Resources
Market Square Belmopan, Belize
Richard Belisle Chief Forestry Officer
T 501-8-23412*/23629/22249/22630
Fax 501-8-22333

Conservation Unit

Rafael Manzanero
T 501-8-22079
F 501-8-22083

Fisheries Department

Lloyd Pariot, Chief Fisheries Officer
Jose Perez, Community Development
T 501-2-44552/32187
F 501-2-32983

Belize Audubon Society

Teodore Castillo, Director
Ozman Salas, Operations person,
Programme Coordinator
T 501-2-34987
Fax 501-2-34985
email base@btl.net
Website www.bas.org

Programme for Belize

Joy Grant, Director, Ana Davis, Mary
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T 501-2-71248
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David Vaustin
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2-30719/2-35739
*30719/35739
Fax 501-2-35738

Cay Caulker Village Council

Emmanuel Rodriguez, Chair
501-2-22235

Community Baboon Sanctuary

Filate Young, Robin Bracket, Eric Schnider
T 501-2-12001

International Archaeological Tours

Ramon Silva, Tour Guide
Tel 501-9-23991
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Protected Areas Conservation Trust (PACT)

Umberto Paredes, Exec Dir
#37 Nanche St
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Belize Centre for Environmental Studies

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University College of Belize, Marine Research Center

PO Box 990, Belize City
K Mustafa Toure
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Fax 501-2-30255

ANNEX IV

Letter to Host Organizations

MEMORANDUM

TO

FROM

RE **Study Tour of Parks And Protected Areas In Florida and Belize
for Jamaican Natural Resource Management Personnel**

DATE

I would like to take this opportunity to thank you and others of your organization who will be hosting the Jamaican group during their visit. It is fortunate that people like yourselves are so willing to share your experience and expertise with others.

This study tour was conceived of by the Jamaican government as a way to expose Jamaican government and NGO parks and protected areas personnel to protected areas and related conservation programs in countries with similar ecological and/or socio-cultural conditions. The study tour will be attended by approximately 16 persons, of whom 5-6 will be from the Natural Resources Conservation Authority (NRCA) (the Jamaican government natural resources management entity), and 6-8 from nongovernmental organizations based in Montego Bay, Negril, Port Antonio, Black River, and other sites in Jamaica. All of these persons have similar learning objectives: revenue generation/financial sustainability, NGO-government partnerships/co-management structures, education and outreach, and participatory planning being the most-mentioned topics of interest.

Based on research into programs that would expose participants to the topic areas listed above, the Florida Keys and Belize have been selected as the most suitable destinations for the participants. In Florida, the John Pennekamp Coral Reef State Park and the Florida Keys National Marine Sanctuary, and other protected areas and organizations would provide many examples of successful programs in revenue generation, participatory planning, education and outreach, and NGO-government partnerships. Meetings with personnel involved in programs of this kind would be invaluable to the Jamaicans as they would allow them a forum in which to discuss successful and/or not-so-successful initiatives with their U.S. contemporaries and examine opportunities for replication or adaptation of similar initiatives in Jamaica.

Similarly, exposure to parks and protected areas and related conservation programs in Belize will be of great value. Although Belize has only a fraction of Jamaica's population, the two countries share similar geographical, ecological, and socio-cultural characteristics. Over the last 20 years, Belize has benefitted from a strong environmental movement. Successful examples of community-

based conservation initiatives, revenue generation, and NGO-government partnerships in a developing country context make Belize a natural site for a study tour such as this one

Meetings do not have to be formal. The venue and type of meeting is up to the host's discretion. Roundtable discussions and/or walking/driving/boating tours can provide an adequate forum for learning and sharing of experiences. Discussion is important, but additionally, the group would benefit greatly from carrying as much literature home with them as possible. Park management plans, regulations, financial statements, budgets, educational materials, brochures, posters, and anything else could prove useful as a model for adaptation to a Jamaican context. One or two copies of larger items would be sufficient as those who would like copies can make them on return to Jamaica.

Conservation methods and processes are developing quickly and independently in both developed and developing countries around the globe. Conservation personnel from developing countries, though they design and implement creative programs, often wonder how things are done in other countries. Questions about protected areas and related programs that are asked frequently include

- What is the best way to establish a protected area?
- What should be the government's and NGO's roles and responsibilities in both the establishment and management of protected areas?
- What are the most successful revenue generation strategies and how are they implemented?
- How are local communities best involved in conservation efforts?
- What kind of education/outreach programs are effective?

It is the objective of this study tour to provide participants and their hosts with ample opportunities to discuss and explore possible answers to these and other questions with their counterparts in the U S and Belize. It is hoped that all participants, both Jamaican and host country counterparts, will gain valuable knowledge of programmes and initiatives that may be adapted or replicated to meet individual countries' needs. A study tour such as this one can and should contribute to improved conservation practices in all countries involved by promoting the exchange of ideas and information and the establishment of long-term professional relationships. We hope that this tour can meet those important objectives.

On behalf of the Jamaican government and USAID, I would like to thank you in advance for taking the time to contribute to this effort. We hope that the relationships that are forged and the lessons that are learned during this study tour will be fruitful and contribute to more effective environmental management practices in Jamaica, Belize, and the U S.

DEVELOPMENT OF ENVIRONMENTAL
MANAGEMENT ORGANIZATIONS (DEMO) PROJECT
(USAID CONTRACT NO 532-0173-C-00-4188)

**STUDY TOUR OF U.S. AND CARIBBEAN
PARKS AND PROTECTED AREAS**

**PARTICIPANT
BRIEFING MATERIALS**



Technical Support Services, Inc.
1012 N Street, NW
Washington, DC 20001-4297

February 1997

Prepared by J Gordon Arbuckle, Jr , TSS Environmental Management Specialist
Funding Support Provided Through the GOJ and USAID/Kingston
Development of Environmental Management Organizations (DEMO) Project

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INTRODUCTION

This briefing booklet was compiled as an orientation for participants in the *Study Tour of Parks and Protected Areas in Florida and Belize*. It provides key information on the sites that participants will visit over the 10 days of the tour. This booklet is a resource that will prepare the reader for the activity by presenting background information on the sites that will be visited during the tour. It is a large packet, and participants are not required to read it in its entirety. However, the first 14 pages comprise summaries of all of the sites that are on the tour, as well as the itinerary. Participants should read these pages first, and review the rest of the booklet as they have time. Familiarity with this booklet will help participants get the most out of the study tour.

A needs assessment, conducted in Jamaica, indicated that parks and protected areas-related learning objectives are similar for members of both government and nongovernment agencies and organizations. Revenue generation, financial sustainability, alternative income-generating activities for local communities, co-management structures and practices, NGO-government partnerships, environmental awareness/public education and outreach, and participatory planning were cited as being topics of the highest organizational and personal importance. All individuals interviewed expressed that exposure to projects or programs that incorporate these elements would provide valuable experience that could increase their professional capacity.

Sites in Florida and Belize have been included in this study tour for their relevance to Jamaica's developing parks and protected areas system. These sites have been selected because they will provide participants with exposure to excellent examples of protected areas, management organizations, projects and programs which incorporate many of the topic areas that are of critical importance to Jamaica.

The following are concise summaries of the organizations, protected areas, projects and programs which are included in this study tour. Interaction and discussion with the personnel who have developed and manage these programs will provide opportunities to examine conservation strategies that are employed to varying degrees of success by government and nongovernmental organizations in different settings.

SITES

Florida

Florida, which has an extensive state and national protected areas system that encompasses ecological conditions similar to Jamaica's, would provide many opportunities for exposure to protected areas-related conservation programs and strategies. Parks and programs of particular relevance to Jamaica could include

- Florida Keys National Marine Sanctuary, encompassing 2800 square nautical miles of marine ecosystems surrounding the Keys, is the second largest marine sanctuary in the U S

The Florida Keys National Marine Sanctuary and Protection Act, signed by the President in 1990, established the Sanctuary. The Sanctuary was established in response to rapidly deteriorating ecological conditions due to poor water quality and increased human activity in the area. The Act called for the National Oceanic and Atmospheric Administration (NOAA) to prepare a comprehensive management plan for the Sanctuary in consultation with the public and with federal, state, and local government authorities. In order to facilitate the process, an Advisory Council that is representative of all public and private interests was formed to assist in the drafting of the management plan. Over the past six years planners, marine resources management experts and the public have been involved in the drafting of a comprehensive management plan that addresses critical issues through ten action plans: Channel/Reef Marking, Education/Outreach, Enforcement, Mooring Buoys, Regulatory, Research and Monitoring, Submerged Cultural Resources, Water Quality, Volunteer, and Zoning.

Several programs that are being implemented in support of the Sanctuary are of major relevance to Jamaica:

-the public consultations process employed to foster consensus and cooperation among stakeholders in the area is very similar to the "Environmental Policy Framework" process that the NRCA is implementing in the establishment of protected areas in Jamaica. This process, which is considered to be innovative, has been successfully employed over the last six years in the drafting of the Sanctuary Management Plan. An advisory council, comprised of representatives of all sectors of local society, played a key role in ensuring that all stakeholder interests were considered in the process of establishing the Sanctuary and drafting of the protected area management plan. The participation of the advisory board, coupled with a long series of public meetings, helped to resolve many major issues and promote community ownership and support of the protected area. A public consultations process of this scope was unprecedented in the history of marine sanctuaries in the U.S. Over the course of the process, thousands of individuals and organizations contributed and commented on the plan, and although some issues were debated intensely, many solutions and compromises were reached that shaped the management plan into its present form,

-the recommended zoning plan for the Sanctuary includes 18 Sanctuary Preservation Areas at the most heavily used reefs, 27 wildlife management zones, 21 Existing Management Areas, four Special Use Areas or research-only reef sites and two Ecological Reserves. Each type of zone is governed by different regulations which allow or disallow certain uses.

-the Sanctuary enjoys the support of several volunteer programs. One program, managed jointly by the National Marine Sanctuary and The Nature Conservancy and supported by over 400 local and regional volunteers, sponsors a variety of activities including a conch restoration project, coral reef monitoring projects, coral reef education, and water quality monitoring projects among others. Volunteers also participate in environmental education programs with local schools. This program, as it capitalizes on the goodwill of local

volunteers, has been cost-effective, has enjoyed a high degree of success and is an excellent example of government-NGO partnerships working to accomplish ambitious objectives on restricted budgets

Each of the programs mentioned above have strong applicability to the Jamaican context. Participants will have the opportunity to speak with government and nongovernmental personnel that have been involved in the long and difficult process leading to the establishment of a major protected area. Specific management issues such as enforcement, regulations, zoning and others may be discussed in addition to NGO-government partnerships, volunteer programs, and education/outreach

- John Pennekamp Coral Reef State Park was the first park in the U S to encompass both terrestrial and marine resources. It is heavily used by both national and international visitors. Of particular relevance to Jamaica are the revenue-generating activities undertaken by the park. The park charges entrance fees that average US\$5 per vehicle. The park also maintains campsites for visitors for which they charge US\$25. The most lucrative revenue-generating arrangement is a concession that the park leases to the operators of boat tours of the reef areas. The concession operator, who takes visitors scuba diving, snorkeling, and on glass-bottom boats, has an arrangement with the park by which they pay the park, on a monthly basis, US\$25,000 or 12.5% of revenues, whichever is greater. In addition to these arrangements, the park also receives revenue from locker rental, drink vending machines, and pay telephones. All revenue generated by the park goes into the Florida State Park Trust Fund and is subsequently distributed to parks as individual budgets necessitate. As the John Pennekamp Coral Reef State Park generates revenue that far exceeds its budget of US\$200,000, excess revenues subsidize other, less lucrative parks and programs.

The park also leverages funds and bolsters its public awareness programs through the use of volunteers. Park campsites are maintained by visitors who volunteer, in exchange for a free long-term (2-3 month) campsite, up to 30 hours a week. The park also has a cadre of local volunteers who donate their time to maintain park landscaping, paint buildings, remove exotic vegetation, and perform a variety of other important tasks. Educational programs in which volunteers participate include nature walks for visitors, presentation of educational slide shows, presentations, and lectures. The "Parknership" program, in which volunteers and park staff work with school groups on specific projects such as trail maintenance and sign building, fosters ownership and responsibility among students and volunteers alike.

A visit to this park will expose study tour participants to several successful programs that are of immediate relevance to Jamaica. Participants will learn about critical themes such as revenue generation, financial sustainability, and environmental awareness/public education by meeting and speaking with the individuals that both developed and currently manage the programs mentioned above.

- Biscayne National Park is a 180,000 acre national park that consists of mangrove wetlands,

shallow bay habitat, small islands, and living coral reefs. The park's budget is maintained through federal government allocations and at present, it charges no user fees. Until recently, federal funds had been sufficient to cover O&M costs of the park. Dwindling federal funds, however, have forced the park to examine options that will generate revenue to offset the decrease in federal funding. For this reason, Biscayne National Park would provide a marked contrast when compared to John Pennekamp Coral Reef State Park, which has generated huge revenues for many years.

Recognizing that the park must become more sustainable, Biscayne personnel are developing programs that they hope will fill the fiscal void. The park, in conjunction with interested local residents, has established an organization called Friends of Biscayne Bay and Biscayne National Park. This group was formed with the express purpose of raising funds for park activities, education to operations and maintenance. In addition, the park will begin to charge mooring fees at two of the more popular island destinations within park boundaries. It is hoped that these steps will help create sustainability over the long-term.

In addition, the park has an unusual education program that is offered to inner-city youths from Miami. From December to April, schoolchildren from Miami come to the park for 3 day, 2 night educational camping trips which teach them about all aspects of the park's ecosystems and general ecology. This program, in place since 1976, has successfully introduced youths to the concepts of safe and minimum impact enjoyment of natural resources and concern for human impact on ecosystems for many years.

A visit to Biscayne National Park will be valuable for the contrast it would provide with John Pennekamp Coral Reef State Park. It is a good example of a park that is under pressure to become financially sustainable and that is taking the first steps toward that goal.

- Center for Marine Conservation (CMC) is a nongovernmental organization dedicated to the preservation of marine habitat and species worldwide. The CMC's Florida Keys programs focus primarily on supporting the establishment of the Florida Keys National Marine Sanctuary. The CMC, working in partnership with federal and state agencies, as well as other NGOs, has supported the Sanctuary's participatory planning process through public outreach, education, advocacy, and lobbying programs. The organization is also spearheading a related project called the "Sustainable Everglades Initiative", which also involves substantial government-NGO partnerships in public outreach, education and water quality monitoring initiatives.

Participants will meet with Mr. David Holtz, Project Director, and Susan White, Interpretive Biology Consultant to discuss the CMC's partnerships with government organizations and its public outreach and education programs.

- The Florida Marine Research Institute, an entity of the South Florida Department of Environmental Protection, is involved in the study and conservation of commercially

important marine species such as conch, lobster, and fishes. This entity, whose programs also benefit from the volunteer program mentioned above, monitors populations and conducts species rehabilitation programs. Using groups of volunteers, the Institute has increased its ability to monitor populations, work with commercial fishermen, and conduct public awareness campaigns. This organization will provide an excellent example of a government organization that leverages its resources through interagency cooperation and partnerships with NGO and community interests.

Belize

Belize is an extremely varied country for its size. Its terrestrial landscape comprises mountains, karst limestone hills, and lowland forests and plains. The diversity of Belize's marine zone is exceptional. The Belize barrier reef, the second largest in the world, runs the entire length of the country and supports an enormous number of patch reefs, shoals, and over 1000 cays which are ringed to varying degrees by mangrove vegetation. Belize is highly committed to the conservation of its natural resources. To this end, the country has placed over one-third of its territory under some degree of protected status.

Nongovernmental organizations play a prominent role in the management of Belize's protected areas. NGOs manage and operate many of Belize's major parks and protected areas. Programme for Belize, for example, manages the 300,000 acre Rio Bravo Conservation and Management Area. The Belize Audubon Society manages seven major protected areas in various parts of the country. Both of these NGOs have formal agreements with the Belize government that delineate the roles and responsibilities of each party. Belize, as it shares many ecological, social, and cultural similarities with Jamaica, would provide participants with the opportunity to learn about relatively well-developed conservation programs in a developing country context.

Some specific entities, protected areas and conservation programs in Belize that would be of interest to Jamaica include

- The Forestry Department is responsible for ensuring the conservation and wise use of Belize's natural resources. The department controls and manages the utilization of forest resources throughout the country. Five years ago the Department established a Conservation Division to oversee all parks and protected areas that fall under the Forestry Department's jurisdiction. The Conservation Division is presently responsible for the sound management of nearly all of Belize's terrestrial parks and protected areas. The division delegates authority to NGOs when it sees fit, and has done so in several cases, but is ultimately responsible for any and all successes or failures.

A major concern of Jamaican officials is implementation of co-management programs for protected areas. Meetings with Forestry Department personnel, including members of the Conservation Division, will be of great value because Belizean officials and Jamaican

participants will be able to share their experience with various co-management structures and arrangements. Department officials will also give a comprehensive overview of Belize's parks and protected areas system and answer any questions the group might have about the system's genesis, past and present problems and successes, and future plans.

- The Fisheries Department is responsible for the sound management of Belize's coastal and marine resources. The Department has recently adopted a comprehensive participatory planning process that involves all relevant stakeholders in conservation initiatives. This process has included the establishment of steering and technical committees made up of individuals from government, NGO and private interest groups. The Coastal Zone Management Programme is a project, funded by the UNDP's Global Environment Fund (GEF), that serves within the structure of the Fisheries Department to assist in the coordination of conservation and development activities in coastal areas. The Fisheries Department, with support from the Coastal Zone Management Programme, is presently working to strengthen and expand Belize's system of marine protected areas.

Meetings with Department personnel may consist of discussion of coordinated coastal zone management, strategies for establishing and managing successful marine parks, NGO-government partnerships, and community outreach.

- Programme for Belize (PFB), a nongovernmental organization that manages the 300,000 acre *Rio Bravo Conservation and Management Area*, raised the major part of the funding necessary to purchase the land and is responsible for all expenses associated with its management. The NGO has instituted many programs whose objective is to generate revenue for park maintenance as well as for the economic well-being of neighboring communities. Specific programs have included sustainable production of hardwood lumber and the sustainable harvesting of chicle and other forest products. In addition, PFB hosts groups of scientists, archaeologists, and tourists in order to both increase knowledge of the area and raise funds for operating and maintenance costs. PFB is constantly exploring new ways to sustainably exploit forest products to raise revenues.

Revenue generation and financial sustainability are themes of critical importance to Jamaica, therefore first-hand exposure to Programme for Belize's programs could be of great value to study tour participants. Additionally, the knowledge that participants will receive on NGO-government partnerships may help them to conceive of additional roles that NGOs might play in the management of Jamaica's parks and protected areas system.

- The Belize Audubon Society (BAS) is a nongovernmental organization "dedicated to the promotion of the sustainable use and preservation of Belize's natural resources in order to maintain a balance between people and the environment." BAS has several organizational foci, the most important being public awareness and policy campaigns, environmental education, community development, and protected areas management. Protected areas management has historically been the major focus of the organization, and the group's

additional activities serve to support this focus. BAS, through a formal agreement with the Belize government, manages six major protected areas. Revenue is generated through user fees and grants from international donors. The Belize Audubon Society is an excellent example of a nongovernmental organization that works in partnership with the government to operate and manage PPAs.

Meetings with BAS personnel and site visits to PPAs managed by the NGO will expose participants to successful examples of programs that have direct applicability to Jamaica. Formal NGO-government partnerships and co-management agreements, statutory revenue generation agreements, and community development programs are some of the topics that participants will experience first-hand.

- Hol Chan Marine Reserve is Belize's first marine park, and was established as a community-based initiative. Concern over unregulated exploitation of this area's fisheries resources and uncontrolled visitation of its coral reefs led to its establishment in 1987 as one of the most highly protected parks in Belize. The park is remarkable in that it has been divided into several special use zones that denote specific types of protection. Managed by the Fisheries Department, the park was originally funded by USAID and WWF. Presently, the park is funded partially through user fees (US\$2.50) charged to the 30-35,000 visitors to the park's coral reef zone. All revenues, including those from user fees, sales of t-shirts and posters, as well as grants and donations, are placed in the park's trust fund. The park can also access funds from the Protected Areas Conservation Trust (PACT) to offset O&M and other costs.

Participants will meet with park personnel to discuss revenue generation and collection, management strategies and the unique challenges that marine parks present, and education and outreach.

- University College of Belize (UCB), Marine Research Center (MRC) has been working to establish a Marine Studies Programme and an associated research station since 1989. In 1994, UCB signed a Memorandum of Understanding with the Government of Belize and Coral Cay Conservation (a UK-based, non-profit marine conservation organization) to establish a Marine Research Center on the Turneffe Islands atoll. This Center, which was opened in 1995, is called the Calabash Cay Field Station.

The MRC's field station provides facilities for scientific monitoring, research and environmental awareness programs with an immediate focus on shallow water tropical marine ecosystems. The station also supports UCB's developing degree programs in Natural Resources Management and Coastal/Marine Studies and provides a venue for training courses and workshops on marine-related topics.

The MRC's main objectives include 1) the establishment of a financially self-sustaining field facility which will complement UCB's programs, 2) the development of UCB's technical capacity to independently provide training, research and education on coastal issues.

to students, teachers, Government of Belize and NGO staff, 3) the provision of training in coastal/marine science-oriented field work in Belize and improvement in environmental awareness amongst Belizeans and visitors, 4) support of the Coastal Zone Management Programme's (UNDP/GEF-funded project) activities to ensure the conservation and sustainable integrated management of the biodiversity and natural resources of the entire Turneffe Islands atoll including the designation and implementation of a protected areas strategy, 5) the establishment of collaborative links (including educational and data exchange agreements) with regional and international research and educational agencies

Discussions with MRC personnel will allow participants to share experiences in marine research and education. A meeting with the MRC will provide a forum for exchange of ideas and information on marine and coastal educational and research initiatives

- Five Blues Lake National Park was established on Earth Day 1991. It is managed by a local community-based organization. Tour guides from the local community facilitate nature walks, and local families host guests to generate revenue for park operations and management.

A visit to this park will allow participants to experience real grass-roots park management. The local community has experienced some difficulty as it has developed capacity and management strategies, but many local people are dedicated to conserving their natural heritage and are working hard to make their project a success.

- Protected Areas Conservation Trust (PACT) is a national trust fund that was established "for the protection, conservation and enhancement of the natural and cultural resources of Belize for the benefit of all Belizeans and visitors." The Trust generates revenue through an exit tax which is levied on all visitors to the country. In addition, the Trust is able to receive grant funding from donor organizations. It is Belize's hope that the PACT will be able to support its national protected areas system. The Trust, however, is still in its initial stages of development.

Discussions with PACT personnel will provide the participants with the opportunity to discuss the PACT in relation to their own natural resources conservation trust.

CONCLUSION

Further information on the majority of the sites summarized above is included in the annexes to this document. Participant's experiences will be heightened by familiarity with the sites that will be visited. Self-briefing will help participants to formulate specific questions for their host-country counterparts.

A study tour is not a one-way flow of information. Jamaica's government agencies and NGO's have

recently developed and implemented unique and successful initiatives and projects that should be shared with host country counterparts. It is hoped that all participants, both Jamaican and host country counterparts, will gain valuable knowledge of programmes and initiatives that may be adapted or replicated to meet individual countries' needs. Participants may wish to bring examples of educational materials, management plans, or other materials to share with host organizations. Study tours can and should contribute to improved conservation practices in all countries involved by promoting the exchange of ideas and information and the establishment of long-term relationships. It is up to the participants, however, to make the most of the activity through proactive inquiry and exchange.

ITINERARY

STUDY TOUR OF PARKS AND PROTECTED AREAS IN FLORIDA AND BELIZE

FLORIDA

Transportation in Florida will be provided by GO TOURS. A 22 passenger bus will pick participants up at the airport on Sunday March 16. The contact person at GO TOURS is Mike, at 305-743-9876.

Sunday, March 16

Depart Kingston, 8 15am, arrive Miami 9 45am then travel to Key Largo

12pm arrival in Key Largo and lunch

Key Largo Hammocks State Botanical Site

2pm tour of site which is undergoing restoration which involves removal of exotic species and rehabilitation of native species. This program relies heavily on volunteer support.

5pm Check-in to Ramada Inn Key Largo Tel 1-800-THE-KEYS at 5 00pm

Monday, March 17

John Pennekamp Coral Reef State Park

102 ½ Mile Marker, Key Largo, FL

9 00am meeting with Robert Wilhelm, Park Manager and Craig Liney, Asst Park Manager to discuss revenue generation (concessions, user fees), community outreach and education, volunteerism, and other relevant issues.

10 30am tour of facilities, glass-bottom boat tour of reef

12 00noon - 2 00pm Lunch and travel to Marathon Key

Florida Keys National Marine Sanctuary

5550 Overseas Highway, Main House, Marathon, FL 33050 Tel 305-743-2437

2 00pm meeting with Mary Enstrom, Marine Conservation Programs Manager, Fran Decker, Marine Stewardship Coordinator, and Julie Overing, Marine Ecologist of The Nature Conservancy to discuss NGO-government partnerships, volunteer programs, education and outreach.

4pm interpretive tour of Crane Point Hammock with "Captain Ed" Davidson

5 30pm check-in to Holiday Inn Marathon Tel 305-289-0222

Tuesday, March 18

Florida Marine Research Institute

Mile Marker 68 ½, Bays Drive, Long Key (across from post office) Tel 305-289-2330

9 00am meeting with Bob Glazer (conch), and Tom Mathews, (lobster) to discuss conch and lobster research and conservation programs Of special interest are partnerships with NGOs as well as other government agencies and the use of volunteers in research and education programs

10 00am tour of facilities

11 00am - 2 00pm travel to Key West and lunch

Florida Keys National Marine Sanctuary

216 Ann Street, Key West FL, 33040 Tel 305-292-0311

2 00pm meeting with Billy Causey, Florida Keys National Marine Sanctuary Superintendent and Alyson Simmons, Public Relations Officer to discuss public consultations in protected area establishment and management, protected area regulations, and other general issues relating to the establishment of new protected areas

5 00pm check-in to Holiday Inn Marathon and dinner

Wednesday, March 19

Center for Marine Conservation (CMC)

8075 Overseas Hwy, Marathon, FL 33050 Tel 743-5199 (Meeting to be held at Marine Sanctuary Offices at 5550 Overseas Hwy)

9 30am meeting with Mr David Holtz, Project Director, and Susan White, Interpretive Biology Consultant to discuss the CMC's partnerships with government organizations and its public outreach and education programs

11 00am - 2 00pm travel to Biscayne National Park and lunch

Biscayne National Park

Homestead, FL Tel 305-230-7275, 305-230-1144

2 30pm meeting with Louis Penna, Assistant Superintendent and Richard Curry, Science Coordinator of Biscayne National Park to discuss the park's management plan, educational programs, volunteer programs, and newly initiated revenue generation programs

4 00pm return to Airport Regency Hotel, 1000 NW 42nd Ave, Tel 305-441-1600, in Miami

BELIZE

Transportation in Belize will be provided by Mr Ramon Silva, of International Archaeological Tours, Tel 502-9-23991 Participants will be met at the airport

Thursday, March 20

9 00am travel to Miami airport for flight to Belize City

12 30pm arrival in Belize City, travel to Belmopan

Forestry Department

Belmopan, Tel 501-8-23412

4pm meeting with Richard Belisle, Chief Forestry Officer and Rafael Manzanero of the Conservation Unit Participants will have the opportunity to gain an understanding of the background of the Belizean Parks and Protected Areas movement from a government perspective This will be a chance for participants to learn about partnerships and co-management, revenue generation, financial sustainability, and parks planning and management from a Belizean point of view as well as to share the Jamaican situation

Protected Areas Conservation Trust (PACT)

#37 Nanche St , PO Box 443, Belmopan, Tel 501-8-23637

6pm meeting in Bullfrog Hotel conference room with PACT Executive Director Umberto Paredes to discuss this innovative funding mechanism

8pm to Bullfrog Hotel and dinner

Friday, March 21

Fisheries Department

Belize City, Tel 501-2-44552

9 00am meeting with Lloyd Patriot, Chief Fisheries Officer and Jose Perez, Fisheries Officer to discuss coastal zone management and marine PPAs Joining the meeting will be Ms Janet Gibson, Director of the UNDP-sponsored Coastal Zone Management Programme (CZMP) to discuss the CZMP's role as a coordinating body in CZM

1 00pm lunch and travel to Rio Bravo Conservation and Management Area

Rio Bravo Conservation and Management Area

Programme for Belize, #2 South Park St , Belize City, Tel 501-2-71248

4 30 arrival at Rio Bravo, where the group will be hosted by the Programme for Belize, the NGO that owns and manages the protected area Participants will overnight at the park-run facilities PFB

personnel will make a presentation on park programs after dinner

Saturday, March 22

9 00am tour of Rio Bravo facilities and discussion of park initiatives in revenue generation, management and environmental education with NGO and park personnel

12 00noon lunch

1 00pm departure to Crooked Tree Wildlife Sanctuary

Crooked Tree Wildlife Sanctuary

Belize Audubon Society, Fort Street, Belize City, Tel 501-2-34987

3 00pm arrival to Crooked Tree Check-in to hotel and free time to speak with members of local community and relax

6 00pm dinner

Sunday, March 23

8 00am tour of Crooked Tree facilities and wetlands with local guides Discussion with Belize Audubon Society (BAS) park personnel and local community representatives including Mr Donald Tillet, Park Manager, and Mr Ozmani Salas, BAS Programme Coordinator, who are involved in the management of the protected area

12 00noon lunch in Crooked Tree

1 00pm departure to Five Blues Lake National Park

Five Blues Lake National Park

4 00pm arrival to Five Blues Lake Brief meeting with community leaders and dispersal to homes of families involved in conservation effort Dinner will be taken with families

Monday, March 24

8 00am tour of Five Blues Lake National Park and facilities Conversation with park personnel and leaders of the community-based conservation movement

12 00noon lunch and departure to Belize City

University College of Belize Marine Research Center

PO Box 990, Belize City, Tel 501-2-3732

3 00pm Meeting with Mr K Mustafa Toure to discuss the Marine Research Center's programmes

5 00pm Dinner and return to hotel

Tuesday, March 25

Hol Chan Marine Reserve

Jose Perez, Fisheries Department, Belize City, Tel 501-44552

8 30am departure to Hol Chan Marine Reserve After arrival, tour of Reserve and facilities and meetings with reserve personnel

12 00noon lunch at Cay Caulker

Cay Caulker Village Council

Cay Caulker, Tel 501-2-22235

2pm meeting with Emmanuel Rodriguez, chair of the Cay Caulker Village Council Group will discuss the grass-roots movement to establish Cay Caulker and surrounding area as a protected area

4pm return to Belize City

6 00pm dinner and return to hotel

Wednesday, March 26

8am depart for airport for 11 30 flight to Miami

Study Tour of Parks and Protected Areas in Florida and Belize

March 1997

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16 Florida 8 15 AM Depart Kingston 2 00 PM 4 00 PM Key Largo Hammocks	17 9 00 AM 12 00 PM John Pennekamp 2 00 PM 5 00 PM Marine Sanctuary/ Crane Pt	18 9 00 AM - 11 00 AM Marine Research Institute 2 00 PM 4 00 PM Marine Sanctuary	19 9 30 AM - 11 00 AM Center for Marine Conservation 2 30 PM - 4 00 PM Biscayne Natl Park	20 Belize 3 30 PM - 5 30 PM Forestry Department 6 00 PM 7 00 PM Protected Areas Cons ervation Trust (PACT)	21 9 00 AM - 11 00 AM Fisheries Department 4 30 PM Rio Bravo Programme for Belize	22 8 30 AM - 12 00 PM Rio Bravo Programme for Belize 3 00 PM Crooked Tree Wildlife Sanctuary
23 8 30 AM - 12 00 PM Crooked Tree Wildlife Sanctuary 4 00 PM Five Blues Lake National Park	24 8 00 AM 12 00 PM Five Blues Lake 3 00 PM 5 00 PM UCB Marine Research Center	25 8 30 AM - 12 00 PM Hol Chan Marine Reserve 2 00 PM - 4 00 PM Cay Caulker	26 8 30 AM Flight to Miami	27	28	29
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FLORIDA

**FLORIDA KEYS NATIONAL
MARINE SANCTUARY**

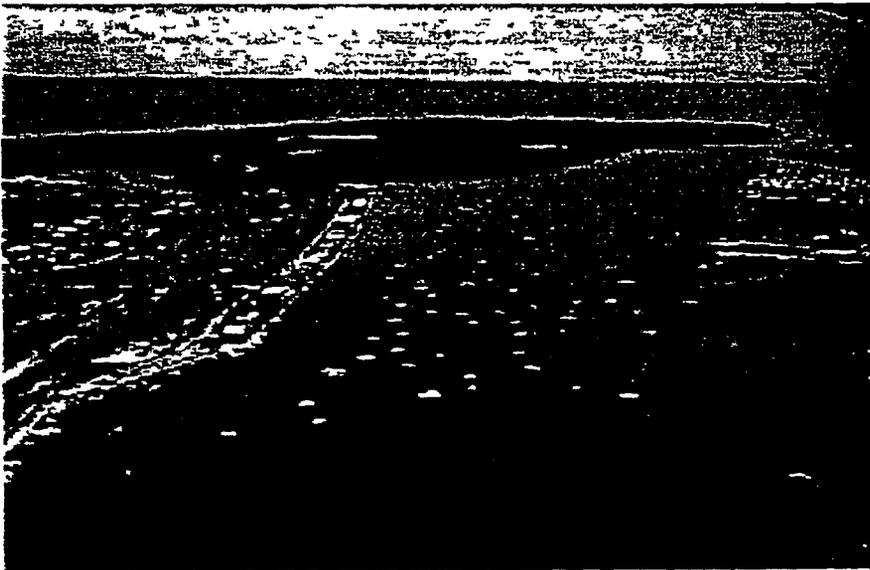


Florida Keys National Marine Sanctuary

Background

Few marine environments in the U S compare to the Florida Keys in terms of natural beauty and natural resources. The most extensive living coral reef in the United States is adjacent to the 126 mile island chain of the Florida Keys. The Keys are located on the southern tip of the Florida peninsula, beginning 60 miles south of Miami and ending just 90 miles north of Cuba. These coral reefs are intimately linked to a marine ecosystem that supports one of the most unique and diverse assemblages of plants and animals in North America. The 2 800 square nautical mile Florida Keys National Marine Sanctuary (FKNMS) surrounds the entire archipelago of the Florida Keys and includes the productive waters of Florida Bay, the Gulf of Mexico and the Atlantic Ocean. Cultural resources are also contained within the sanctuary. The proximity of coral reefs to centuries old shipping routes has resulted in a high concentration of shipwrecks and an abundance of artifacts.

This complex marine ecosystem also supports tourism and commercial fishing, the economic foundation of the Florida Keys. In the last 20 years the tourism industry has grown to over four million domestic and foreign visitors who drive, fly or cruise each year to the most accessible tropical paradise in the Caribbean Basin. The Keys support 82 000 full-time residents. Tourists and semi-permanent residents increase this population by 75% during 'season' (November to April). This ecosystem's extensive nursery, feeding and breeding grounds also support a multi-million dollar commercial fishing industry that lands nearly 20 million pounds of seafood and marine products annually.



Designation

Responding to a growing awareness of the intrinsic environmental and cultural value of our marine resources, Congress passed the Marine Protection, Research, and Sanctuaries Act in 1972. Title III of the Act authorizes the designation of unique areas as National Marine Sanctuaries to promote comprehensive management of their special ecological, historical and aesthetic resources. National

Marine Sanctuaries must permit "multiple compatible use" of their resources by public and private interests. This includes both commercial and recreational activities as long as the activity does not threaten the basic integrity of the sites' resource values. The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) is responsible for the management of the National Marine Sanctuary Program.

For well over a decade, Key Largo NMS (100 nm²) and Looe Key NMS (5 nm²) have provided protection to exemplary portions of Florida's Reef Tract. However, public concern about increasing threats to each of the habitats that comprise this sub-tropical ecosystem resulted in the establishment of the Florida Keys National Marine Sanctuary in 1990.



Florida Keys National Marine Sanctuary

National Marine Sanctuary Program: Protecting Our Precious Resources

Marine sanctuaries belong to all of us

Grassroots support is vital to the success of marine sanctuaries. Marine sanctuaries protect our nation's most important marine ecosystems. Without grassroots support and continued public involvement, they would not exist. Since 1972, citizens have fought for 14 national marine sanctuaries in areas such as Massachusetts, Florida, California, and Washington. Once designated, sanctuaries belong to all of us, and come with a responsibility to preserve these special places for our children, and their children.

Ecosystem management works

Marine sanctuaries strive to protect entire ecosystems by balancing resource protection with commercial, recreational, cultural, scientific, and educational uses. Marine sanctuaries are where we earn our living, experience the thrill of a whale watch or a first SCUBA dive, teach our children, connect with our cultural past, and research natural and human processes. Our challenge is to balance these and other important uses with long-term protection of the marine environment.

Sanctuaries work. They are a good investment.

Sanctuaries are excelling in every phase of marine resource management: research, education, community involvement, volunteerism, international relations, state-federal partnerships.

As important as what we do is how we do it (partnerships)

One of the most important roles a sanctuary plays is bringing people together. With a \$12 million federal budget for 14 marine sanctuaries and two more in the designation process, we look to partners to join us in our resource protection efforts. The list of partners includes local and state governments, large and small businesses, environmental organizations, other federal agencies, and thousands of citizens.

Marine sanctuaries are important for all Americans, not just those living along the coast.

Protecting our coasts and oceans is as important for people living in Iowa, Kansas, or Colorado, as it is for those in Florida, California, or Hawaii. Our oceans and Great Lakes provide jobs, act as our favorite vacation spots, serve as natural classrooms for children across the country, hold the secrets to our past and the promises for the future. They are a national trust that we all have a responsibility to protect and enjoy.

We're still growing, still learning

The National Marine Sanctuary Program is relatively young, and we continue to learn more and more about the challenges faced in balancing the many uses of the ocean. Since 1990, we have designated six

new sanctuaries (Flower Garden Banks, TX, Stellwagen Bank, MA, Florida Keys, Monterey Bay, Olympic Coast, WA, Hawaiian Islands Humpback Whale) covering over 14,000-square miles. This reflects both the need for resource protection of the marine environment, and the success of the sanctuary program in providing that protection.

Four of these (Keys, Monterey, Olympic, Hawaii) include state waters for the first time. This brings new challenges for us and citizens, and by working together we will meet these challenges.



working together

PROGRAM

The unique areas designated as National Marine Sanctuaries are meant to be managed for the long term benefit and enjoyment of the public. Specifically, resources are to be protected, the public is to be given a better awareness of the marine environment, and scientific research and ecological monitoring are to be encouraged. Traditional commercial activities, which are mostly banned in National Parks, are allowed in National Marine Sanctuaries as long as they do not undermine the fundamental health and integrity of the area.

The Key Largo and Looe Key National Marine Sanctuaries were established in 1975 and 1981 respectively. According to the Act, they will be incorporated into the new Florida Keys National Marine Sanctuary when the management plan is adopted.

Currently, regulations at the two existing sanctuaries permit the following:

- * sport and commercial fishing with hook and line,
- * taking of spiny lobsters and stone crabs in accordance with the fishery management plan,
- * swimming, snorkeling, scuba diving, photography, and recreational boating.

Currently, the following are prohibited:

- * removing or damaging natural features, non-permitted marine life, or archaeological and historical resources,
- * dredging, filling, excavating, and building,
- * anchoring in a manner that damages coral,
- * discharging harmful substances into the water,
- * tampering with markers, mooring buoys and scientific equipment,
- * spearfishing or using wire fish traps,
- * handling or standing on coral formations.

With the large size of the new Sanctuary, the opportunity exists to set up differing regulations for separate areas within the Sanctuary, similar to a system already in place at the Great Barrier Reef Marine Park of Australia. Some areas can continue to be used in the accustomed ways, while other areas can be designated for preservation, restoration or scientific research. This system provides for multiple uses within the Sanctuary while also making certain its resources are protected for the future.

Although the best known feature of the Keys marine environment is its coral reefs, the shallow waters near the shore are actually composed of a series of interconnecting — and interdependent — natural habitats. These include fringing mangroves and seagrass meadows as well as hardbottom regions, patch reefs and bank reefs.

When healthy, the communities of mangroves, seagrasses and corals protect and enhance one another. Upland, hardwood hammocks are equally important: they protect the soil from erosion while their decaying vegetation provides necessary nutrients to the mangrove and seagrass communities. In turn, mangroves, seagrass beds and coral reefs serve as self-repairing breakwaters to protect the hammocks — and the rest of the Keys — by absorbing the force of waves.

Fringing mangroves filter material washed from the land, trapping debris and sediment. The remains of plants and animals are broken down by bacteria and fungi, into nutrients. Mangrove roots provide nursery grounds to many species of fish and invertebrates. Mangrove forests near North Key Largo also are habitat for the endangered American crocodile.

Seagrass meadows grow in much of Florida Bay and the shallow waters seaward out to the reef line. They are a natural trap for sediments. The predominant turtle grasses, which happen to be particularly vulnerable to pollution, are nursery and feeding grounds for a host of attaching invertebrates and for the larvae and young of many organisms. These include shrimp, spiny lobster, sea urchins, sponges, snapper, sea trout, barracuda and grunts. Adult fish from the reefs often feed among the seagrasses, and endangered species of green sea turtles and manatees browse there regularly.

The Florida reef tract is the most extensive living coral reef system in North American waters and the third largest reef system in the world. It provides habitat, refuge, and feeding grounds for countless colorful and exotic creatures. Colonies of tiny polyps form the complex structure of coral reefs by secreting calcium carbonate. The waving forests of sea whips and sea fans in the Keys are a uniquely Caribbean feature and are not found on reefs in the Pacific and Indian Oceans.

Few places in the U.S. compare to the Florida Keys in terms of natural beauty and natural resources. These assets, in turn, are the foundation for two of the region's most important industries: tourism and commercial fishing.

The vistas of sunrise and sunset over blue-green waters and the year-round access to the joys of diving, fishing and boating draw more than two million visitors each year to the Keys. One million water sport enthusiasts (divers, snorkelers, swimmers, photographers, boaters, sport and recreational fishermen) visit the waters off Key Largo alone, generating more than \$50 million annually in local revenue. These visitors directly support charter boats for diving, snorkeling, sailing and fishing, dive shops, bait and tackle shops, marinas, restaurants, hotels, motels and camp ground and, indirectly, a multitude of businesses from gas stations to barber shops.



Photo by Larry Lipsky

Commercial fishing is the second largest industry in the Keys. In 1985, commercial fish landings for the South Florida Region were valued at almost \$60 million. Some of the most important commercial species are spiny lobster, stone crab, pink shrimp, mackerel, grouper and snapper. Collectors of tropical fish and other marine life also profit from the reef environment.

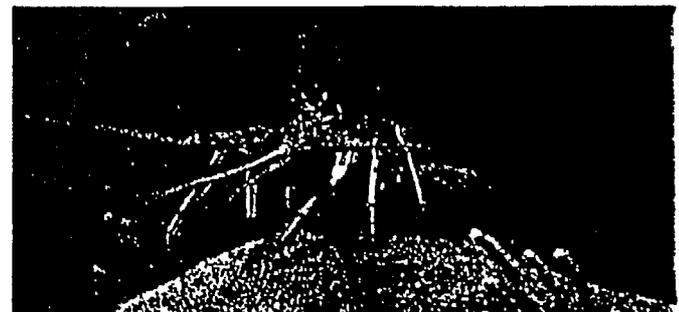


Photo by Larry Lipsky

THE FLORIDA KEYS NATIONAL MARINE SANCTUARY

To protect the spectacular marine ecosystem of the Florida Keys, the Florida Keys National Marine Sanctuary and Protection Act was enacted by Congress and signed into law by President Bush on November 16, 1990. The Act, first and foremost, creates the Florida Keys National Marine Sanctuary. Encompassing approximately 2800 square nautical miles, the Sanctuary is now the second largest of its kind in the United States.

In addition, the Act calls for the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce to prepare a comprehensive management plan for the Sanctuary after consulting with the public and with federal, state, and local government authorities. An Advisory Council has been established to act as a conduit of public opinion and to assist in developing the plan.

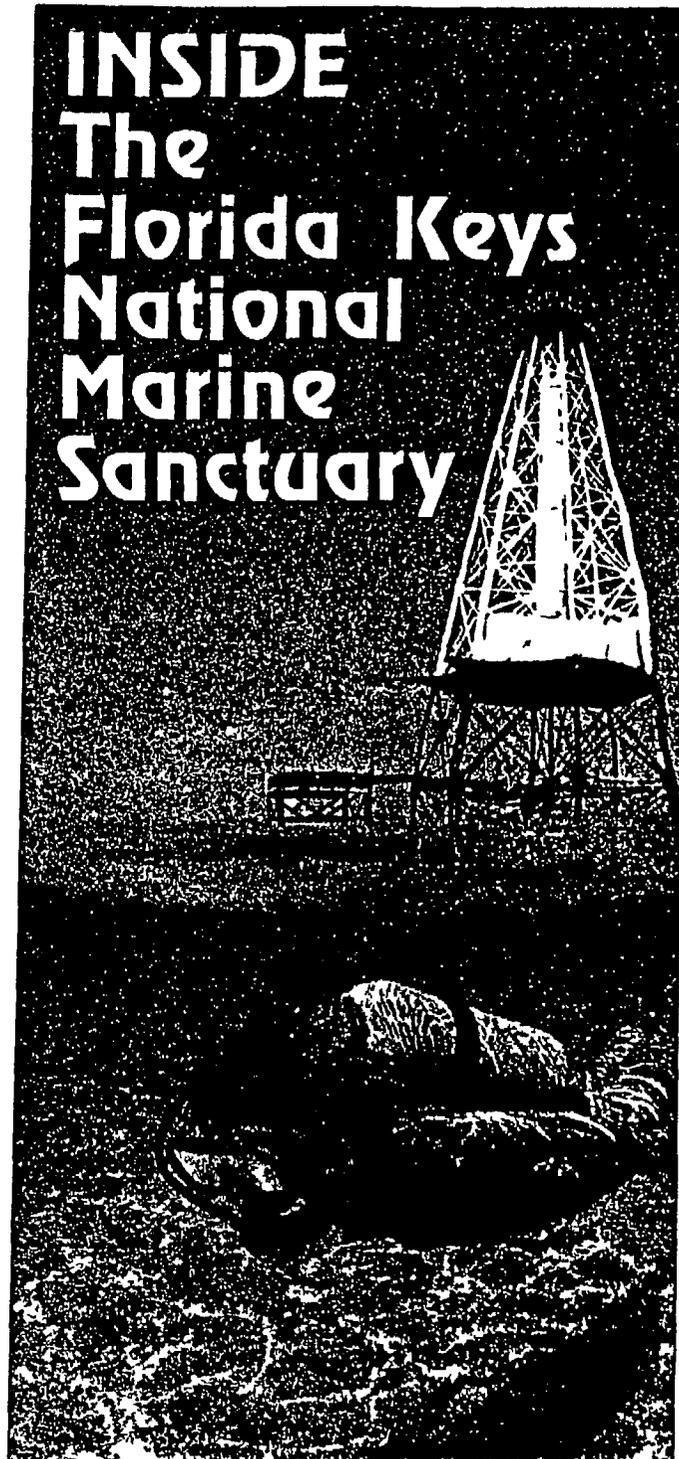
The Act itself lays out certain rules for the Sanctuary:

- * *Oil and gas development are prohibited, and*
- * *Commercial vessel traffic is restricted within an internationally designated 'Area to be Avoided'.*

The Act also places particular emphasis on improving water quality throughout the area. The U.S. Environmental Protection Agency and the Governor of Florida, in consultation with NOAA, are directed to prepare a water quality protection program to be included in the comprehensive management plan.

Several major objectives are set out for the Sanctuary management plan. According to the Act, the plan must:

- 1) *Facilitate those public and private uses of the Sanctuary which by their nature do not deplete or damage the integrity of the resources,*
- 2) *Consider setting up a system of zones with varying levels of restrictions to ensure protection of resources,*
- 3) *Establish regulations necessary to enforce the new plan for water quality,*
- 4) *Identify the priorities for research and establish a long-term ecological monitoring program,*
- 5) *Identify a variety of sources for funds needed to implement the plan and to supplement federal appropriations under the National Marine Sanctuary Program,*
- 6) *Ensure coordination and cooperation between Sanctuary managers and other federal, state, and local authorities.*
- 7) *Help inform users of the Sanctuary about coral reef*



INSIDE The Florida Keys National Marine Sanctuary

The health of the reef starts on the land. Gilbert Voss



PHYSICAL IMPACTS

The most visible and familiar physical damage results from the carelessness or, on occasion, the deliberate recklessness of ship captains, boaters, divers, fishermen, snorkelers and beachgoers. A sanctuary program is perhaps best equipped to curb and prevent this type of damage, and it can be accomplished in a user-friendly manner, as has proved to be the case over the years at the Key Largo and Looe Key National Marine Sanctuaries. While willful violators of the laws may be prosecuted and punished, people are encouraged to be better stewards through the use of mooring buoys, navigational aids, and educational programs.

Vessel Groundings

Centuries of coral growth can be destroyed or broken into fragments in the first moments of a collision with a large ship. The framework of the reef can be damaged from the sheer weight of the vessel and attempts to then free the ship result in additional harm caused by prop wash. The potential exists for further damage from the spilling of the cargo or fuel onto the reef or from the breakup of the ship. Groundings by smaller boats are also a major problem because of their frequency and continual chipping away at the shallower reefs. The harm from groundings is prolonged as disease and algae invade the damaged area and young corals are unable to grow on the unstable reef rubble.



Anchor Damage

In almost no time at all a boat anchor can inflict injury to a reef that has been growing since before the arrival of Columbus. The reef may not recover for decades or centuries, or it may never recover. As anchors are dropped or dragged, branching corals are broken, while boulder corals are injured and scarred, creating places for disease and algae to invade. The use of mooring buoys helps to dramatically reduce this damage.

Diver Damage

Divers on the reefs often do considerable damage by grabbing hold of corals to pull themselves along, standing on corals or knocking into them with flippers, and breaking pieces off for souvenirs. A recent study revealed that, for every half hour in the water, scuba divers on average contacted corals seven times and snorkelers at least once. Snorkelers were also seen to create clouds of sediments when treading water, and were apt to stand on corals when tired or when adjusting their gear.

Prop Dredging

Prop dredging occurs when boaters enter shallow waters and their propellers stir up the bottom sediments. At best, this leaves behind a milky white trail of calcium carbonate silt, blocking sunlight and smothering bottom-dwelling organisms. Propellers also often uproot and shred seagrasses and cut channels that then remain raw for years.

Destructive Fishing Methods

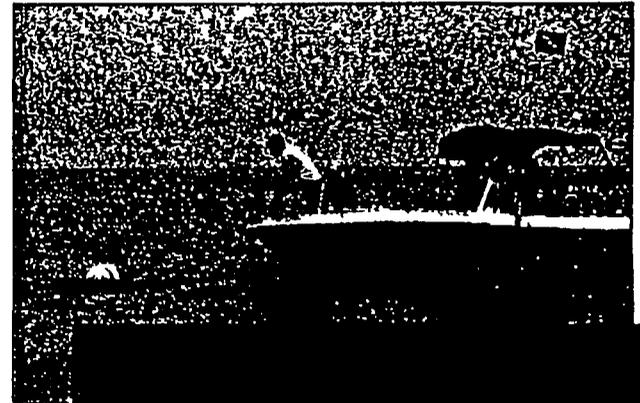
Improperly placed or lost fishing gear inflicts serious injury to the reefs. Careless setting of lobster and fish traps in reef areas can crush or scar corals and can damage traps. Non-selective fishing methods such as wire traps also reduce the numbers of important fish species which eat algae. When lost wire fish traps wreak further damage continuing as "ghost traps" to lure fish and lobsters to a meaningless death.

Trash

Debris tossed overboard from boats, cruise ships or larger vessels is visible as litter along the Florida coast line, but it is only a portion of what enters the marine environment. Often mistaken for food, plastic bags and packaging pellets end up in the gullets of sea turtles and birds, killing them by suffocation. Fishing line, trap line and plastic bags get wrapped around corals, scarring or smothering the underlying organisms.

Offshore Oil and Mineral Mining

Exploration and development of the seabed results in stirred up waters and changes in oxygen supply, light and temperature. There are additional problems from chemical pollution and oil spills. This potential damage has been eliminated in the new Sanctuary because the Act prohibits all future exploration, development or production of minerals or hydrocarbons.



Photos by Larry Lusk

THREATS TO THE ENVIRONMENT

The deterioration of the marine environment in the Keys is no longer a matter of debate. There is a decline of healthy corals, an increase of coral bleaching and black band disease, a decline in certain fisheries, an invasion by algae into seagrass beds and reefs, and in Florida Bay, reduced freshwater flow has resulted in an increase in plankton blooms, sponge and seagrass die-offs, and fish kills.

Storms, heat waves and other natural events can be blamed for some of the deterioration, but the activities of people are also responsible. The damage done by people hinders the ability of marine life to recover from naturally occurring stresses.

Certain sources, such as the activities associated with oceangoing ships, can sometimes be singled out for causing a disproportionate amount of damage. Generally speaking, though, everyone who spends time on and around the Keys - residents and visitors alike - has a share of the responsibility.

By including most of the waters surrounding the Florida Keys into the new Sanctuary, ecological problems from throughout the ecosystem can be addressed. As required by the Act, a report on the primary threats to the Sanctuary ecosystem has been compiled by NOAA with the cooperation of the State of Florida and U.S. Environmental Protection Agency.

Many of these threats are already evident to those who know the Keys.



A number of pollutants contribute to the degradation of water quality in the Keys. Among them are excess nutrients, heavy metals, petroleum hydrocarbons and pesticides. Rapid or dramatic changes in salinity and temperature are also factors. Together, their impact is substantial. However, because of the diffuse, widespread nature of these pollutants, there is a special challenge in controlling them.

Excess Nutrients

Corals thrive under conditions of low nutrients. Damage can occur when excess nutrients coming from human sewage, fertilizers, detergents and decaying plant material stimulate the growth of phytoplankton (microscopic algae), which clouds the water and blocks sunlight from seagrasses and corals. Larger species of algae also flourish, quickly overgrowing and smothering the corals. When algae die, their decay consumes oxygen which may at times leave certain areas incapable of supporting sea life. The coral-killing "black band disease" has also been associated with high-nutrient waters.

A major source of excess nitrogen and phosphorus in Keys waters is sewage — from 200 sewage treatment plants, 22,000 septic tanks, 5,000 cesspools and 139 marinas harboring 15,000 boats. These nutrients are carried through the region by more than 700 canals and channels. Removing nitrogen and phosphorus from wastewater requires a technology that, at present, is lacking from sewage treatment facilities in the Keys.

Heavy Metals and Oil

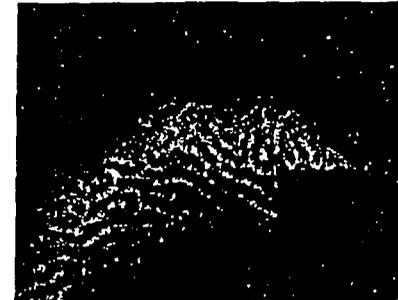
Pollution can lead to disease in marine organisms, even though the exact mechanisms remain unknown. Corals exposed to oil and heavy metals are more susceptible to disease and are likely to grow and reproduce more slowly. Antifouling paints and preservatives on boat hulls can damage or destroy zooplankton or bottom dwelling communities. In heavily polluted areas elsewhere around the country, fish diseases such as ulcers and fin erosion are on the increase, as are shell diseases in crustaceans. Heavy metals and oil are picked up by algae and ascend through the food chain, contaminating fish and invertebrates.

WATER QUALITY

Stormwater, flowing off road surfaces and marinas into waters of the Keys, contains large amounts of oil and heavy metals. Additionally, oil and gas spills from local boats, ships and tankers, as well as exhaust fumes, bilge water and tank cleaning operations, all contribute to the pollution. Oil coated fish and lobster traps have also been

recognized as a source of petroleum pollution.

Brain Coral with Black Band Disease



Healthy Brain Coral



Photos by Larry Lipsky

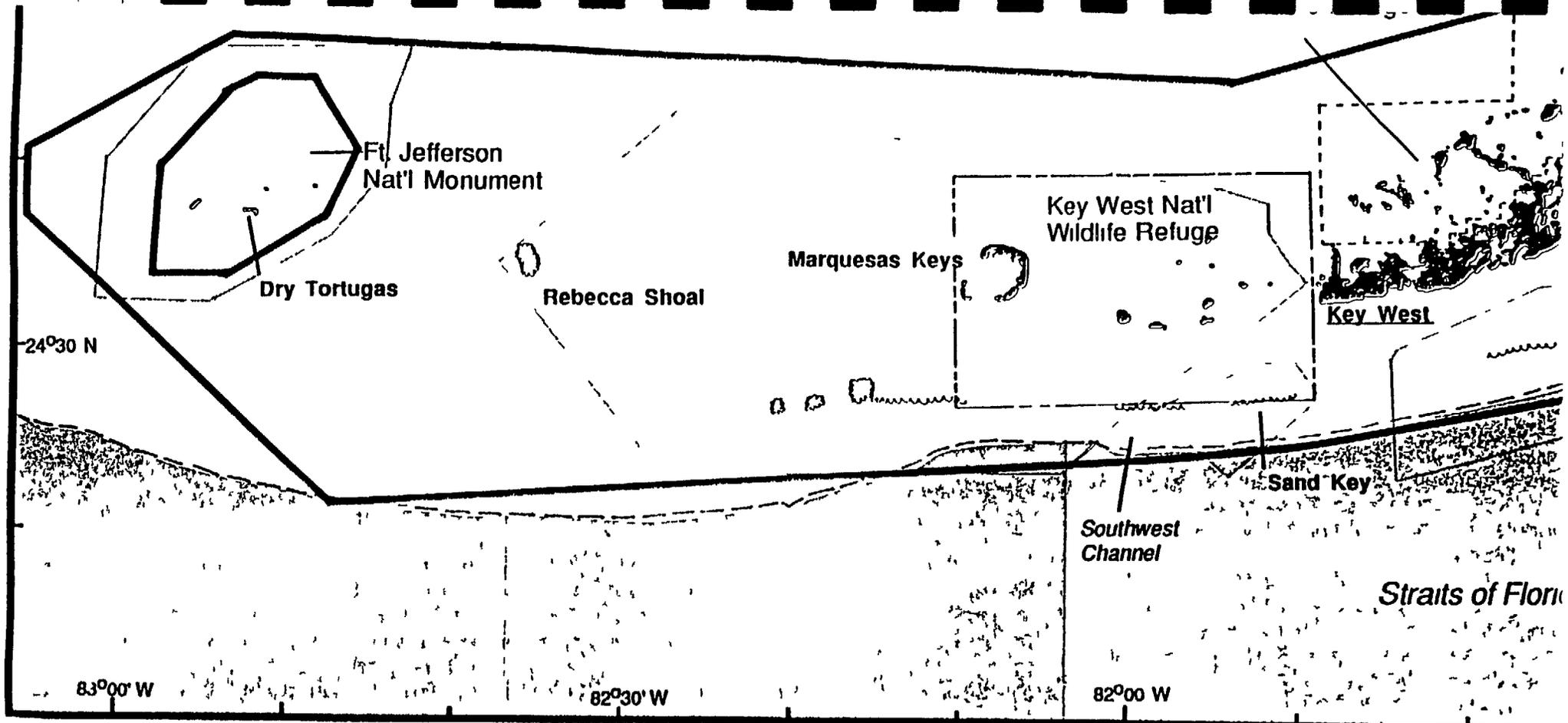
Pesticides

Pesticides are suspected of slowing the growth and interfering with the reproduction of corals. DDT is known to reduce photosynthesis in plankton. Pesticides persist for years in the tissues of marine organisms or become entrapped in marine sediments. Scientists continue to study the impacts of pesticides on marine life and their implications for human health.

An obvious source of pesticides is aerial spraying for mosquito control, which occurs as frequently as twice a week during the rainy season throughout the Keys. The runoff from lawns and agricultural areas also dumps pesticides into waters of the Keys.

Saltwater/Freshwater Imbalances

During the past quarter century the hydrology of the Kissimmee-Okeechobee-Everglades ecosystem has been so altered by canals, ditches and dams that the relation between saltwater and freshwater is now out of balance. It is clear that this change is adversely affecting the marine life of Florida Bay and the Keys. Scientists have linked the decline in the health of the ecosystem



WHAT YOU CAN DO!

An active and informed public is necessary to make the Florida Keys National Marine Sanctuary a model for generations to come. We hope the information contained in this brochure will encourage you to join with others in developing a plan to protect the living treasures of the Florida Keys.

The National Oceanic and Atmospheric Administration is required to prepare a management plan for administering the sanctuary. This process will provide some of the most important opportunities for public participation.

* Educate yourself on current issues concerning the Florida Keys National Marine Sanctuary. A monthly newsletter titled *Sounding Line* is now available. To ensure that you will be kept up to date on all sanctuary plan developments, write to the following address and

ask to be included on the mailing list

NOAA

Sanctuaries and Reserves Division

SSMC - 4, 12th Floor

1305 East West Highway

Silver Spring, MD 20910, 301-713-3125

* Attend Sanctuary Advisory Council meetings and provide input. Contact your regional sanctuary office, read your local newspaper or listen to local radio stations for announcements.

* Write a letter regarding the sanctuary to Florida's Governor and express your opinions concerning restoring the flow of freshwater into Florida Bay.

Governor Lawton Chiles

The Capitol

Tallahassee, FL 32399 0001

* Attend the public hearings and comment on the Draft Environmental Impact Statement when it is completed.

This is also an opportunity to submit written comment.

* Think of ten ways to improve the health of the Florida Keys marine environment and present them at the public meetings for the Sanctuary.

On the Water .

* Use mooring buoys when they are available, otherwise anchor in sandy areas away from the coral.

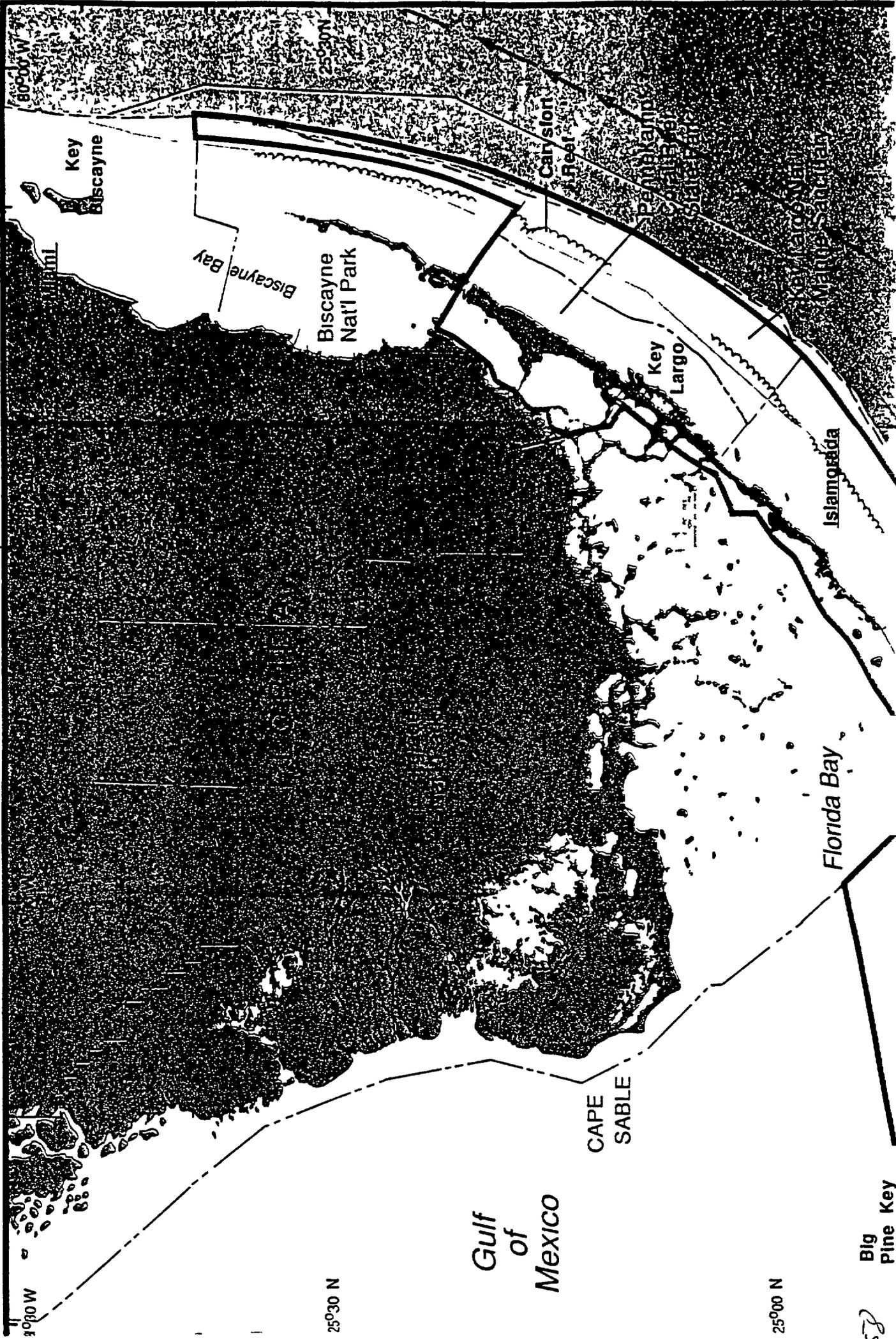
* Do not touch coral or other marine life with your fingers, feet or your equipment. Resist the impulse to collect souvenirs, whether it's alive, dead or an artifact.

* When diving, avoid contact with the ocean bottom, controlling buoyancy and using only the weight needed.

* When snorkeling, especially if you are a weak swimmer, wear a snorkeling vest to provide support when adjusting gear or resting.

* Don't feed the fish, it destroys natural feeding habits.

Florida Keys National Marine Sanctuary



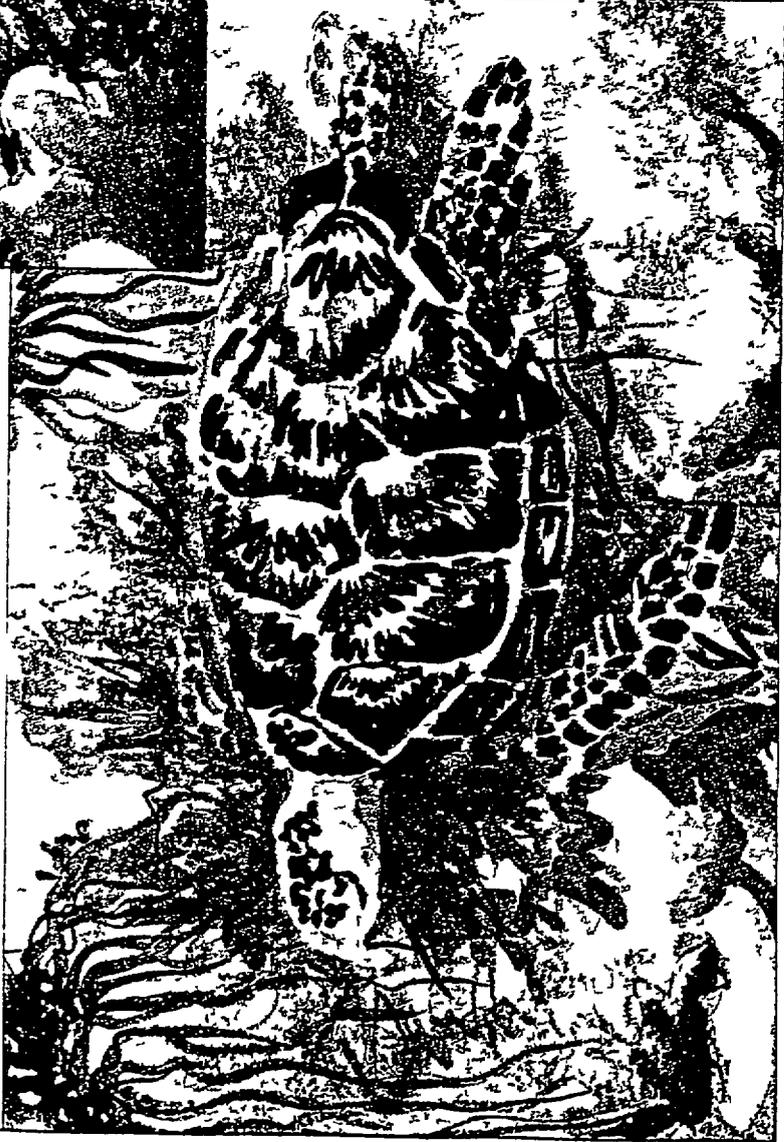
Big Pine Key

85

ENDANGERED AND THREATENED SPECIES

Many endangered species live in or near the new Sanctuary area, including the American Crocodile, the Arctic Peregrine Falcon the Atlantic Green Turtle, the Atlantic Ridley Sea Turtle, the Grasshopper Sparrow, the Hawksbill Sea Turtle, the Key Deer, the Key Largo Cotton Mouse, the Key Largo Wood Rat, the Key Mud Turtle, the Leatherback Sea Turtle, the Lower Keys Marsh Rabbit, the Schaus' Swallowtail Butterfly, the Silver Rice Rat, the Stock Island Tree Snail, and the West Indian Manatee and the Woodstork

Threatened species include the Key Silver Side, the Atlantic Loggerhead Turtle, the Bald Eagle, the Big Pine King Ringneck Snake, the Eastern Indigo Snake, the Florida Brown Snake, the Florida Ribbon Snake, the Least Tern, the Miami Black-headed Snake, the Roseate Tern, the Southeastern Kestrel, the Southeastern Snowy Plover, the Piping Plover and the White Crowned Pigeon



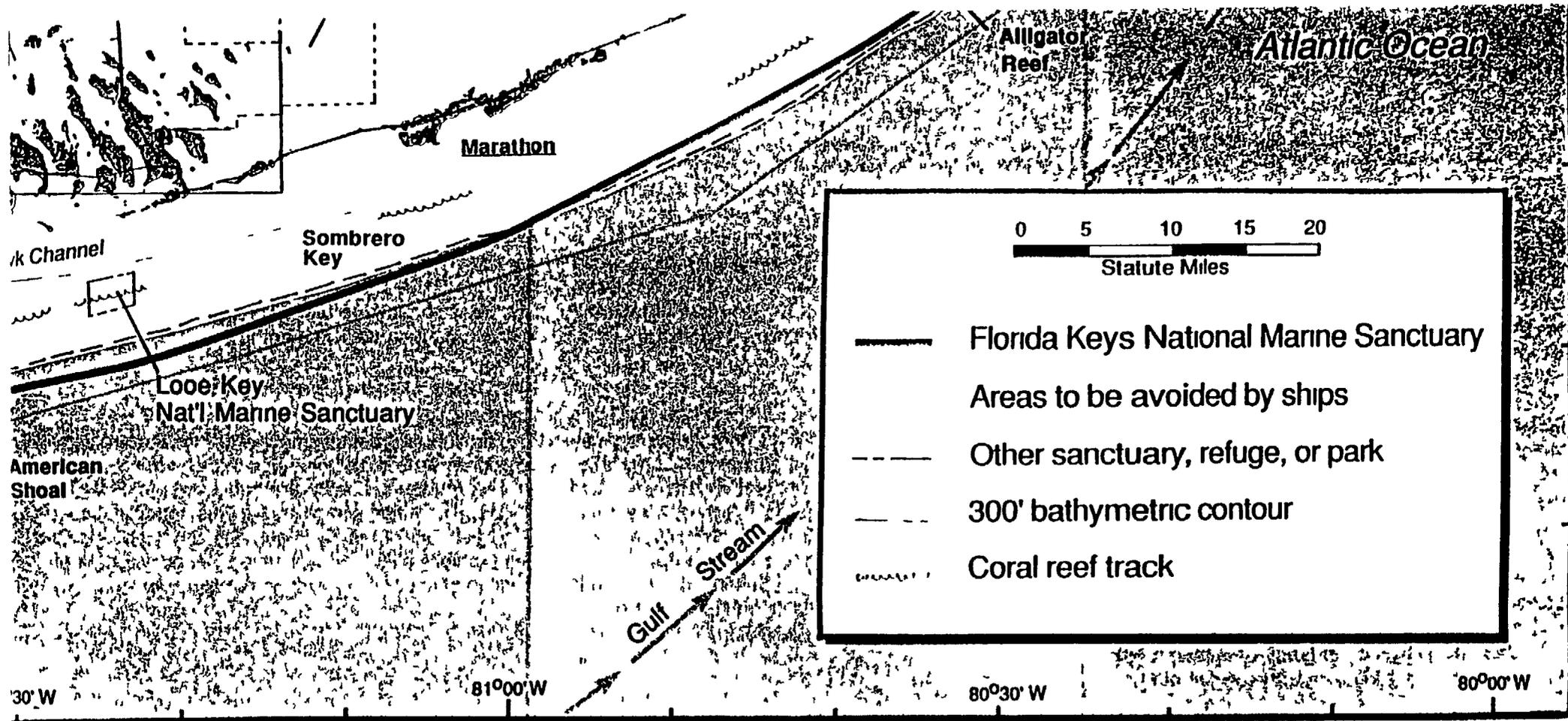
The Hawksbill Sea Turtles live around coral reefs and in shallow coastal waters and eat a variety of reef associated species including seagrasses, jellyfish, sponges and shrimp. It is common to find their nests on beaches near their feeding grounds.

The West Indian Manatee is a large, gentle aquatic mammal inhabiting shallow coastal waters, particularly in the seagrass beds of the upper and middle Keys. Manatees spend about five hours a day feeding and can eat one hundred pounds of seagrass in a single day. The destruction of seagrasses, notably by dredging, is a serious threat to the manatees. The most serious threat, however, is the boat itself. Government statistics indicate that manatees, despite their shrinking numbers, are being killed at increasing rates by collisions with boat hulls and propellers.

83°00 W

82°30 W

82°00 W



Release sport fish unharmed
 Be sure to retrieve fishing gear and equipment, but do so carefully
 Recycle used oil from your boat, and avoid releasing contaminated bilge water into the sea Use bilge cleaners and other boat products that are biodegradable
 Learn to read the water take a course in boating safety and learn to use a navigational chart
 Take all your trash, as well as any you find on the water, to the beach or the reef, back to shore — then recycle it
 Read and learn more about the marine environment of the Keys and discuss it with family and friends
 Move slowly and be quiet around mangrove islands with nesting and roosting birds
 Stay in marked channels Motoring through shallow seagrass beds leaves scars Constant "prop dredging" reduces the vitality of this habitat that fish and other marine life depend upon

* Contact Looe Key National Marine Sanctuary or Key Largo National Marine Sanctuary for more information on these topics

On the Land

- * Do not use soaps or detergents that contain phosphates
- * Recycle used oil from your car
- * Reduce toxic water runoff through landscaping and porous pavements, use hardy native plants to landscape your yard and to reduce or eliminate the need for insecticides and fertilizers Learn new methods of integrated pest management
- * Keep your septic system working properly
- * Read the "Household Guide to Coral Reef Protection", available from Reef Relief, 201 Williams St., or P O Box 430, Key West, FL 33041
- * Read "Stepping Lightly on the Earth Everyone's Guide

to Toxics in the Home", available from Greenpeace, 1436 U St N W, Washington D C 20009

* Whether visitor or resident, contact any of the Sanctuary offices and request a presentation to your group

Special thanks to the following organizations for their help and support

*Environmental Solutions International
 National Boat Owners Association*

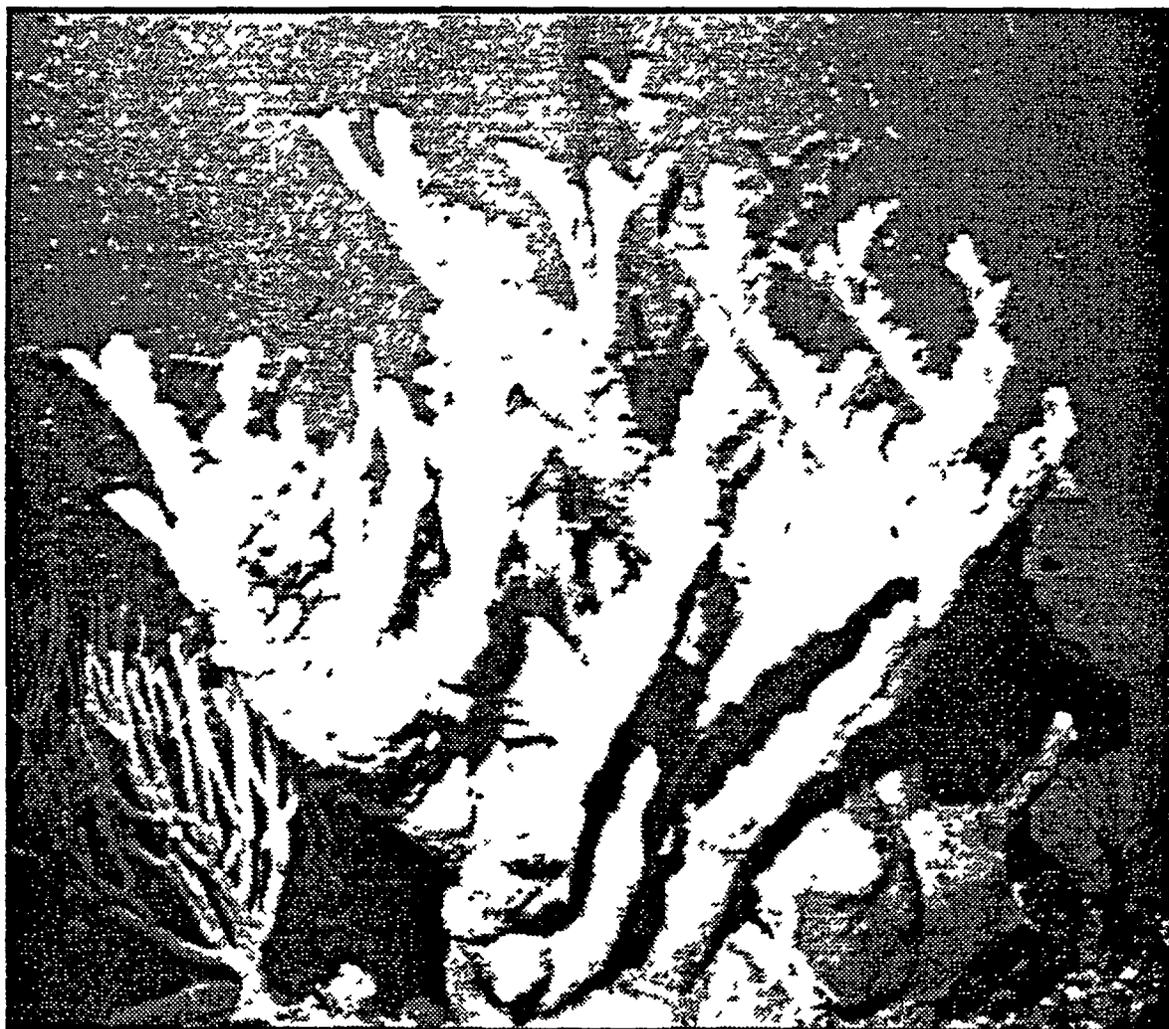
Additional thanks to the following members of the Coral Reef Coalition for their help and support

*American Oceans Campaign / Center for Marine Conservation
 The Florida Keys Chapter of the Izaak Walton League
 Greenpeace / Harbor Branch Oceanographic Institution
 Florida Keys National Marine Sanctuary
 National Oceanic and Atmospheric Administration
 The Nature Conservancy / Reef Relief / The Wilderness Society*

Funding for this project was provided by the Florida Department of Natural Resources and the National Oceanic and Atmospheric Administration

Conserving Our Marine Resources

STRATEGY FOR STEWARDSHIP



FLORIDA KEYS NATIONAL MARINE SANCTUARY
FINAL MANAGEMENT PLAN AN OVERVIEW

Dear Friends of the Coral Reef

It is with great pleasure that I announce the completion of the Final Management Plan and Environmental Impact Statement (FMP/EIS) for the Florida Keys National Marine Sanctuary. This final plan represents our nation's most comprehensive attempt to protect a discrete marine environment. It is a result of years of planning for the protection of America's coral reef, its associated marine communities, and the quality of water that surrounds them. I want to take this opportunity to reflect on the significance of this important milestone and to thank all of those who have assisted us.

The Florida Keys comprises one of this nation's most biologically diverse environments, surrounded by one of this country's most diverse socio-economic settings. As simple as the lure of the living coral reef and its rich marine life may seem, it is the complexity of this unique marine environment and the activities of its many users that has challenged managers to strike a balance between protection and continued use. The path to striking a balance between environmental protection and economic utilization of marine resources is a long and difficult one to travel. However, a community as closely linked to the environment as the Keys cannot afford to hesitate taking this sometimes controversial journey. The completion of the final management plan for the Sanctuary has been no different. At times the debate was long and intense, but solutions were found and compromises were made. Fortunately, many citizens and leaders in the Keys community chose to join us in the development of the management plan, and through these individuals a common sense approach has been applied to the development of this final plan.

There has never been a more public process in the development of a management plan in the history of National Marine Sanctuaries. Literally thousands of individuals and organizations have contributed and commented on various aspects of this plan. In a bottoms-up planning process, a Sanctuary Advisory Council consisting of 22 stakeholders, agency representatives, and citizens worked diligently with Sanctuary staff and an Interagency Core Group to develop this final plan. The process took thousands of people hours to complete and is unparalleled in scope regarding public participation at the State and local level.

I want to express my most sincere thanks to those who assisted in the development of this plan through their review and comments, both for and against an issue. Without a variety of opinions and positions, balance could have never been gained. I am confident that this final management plan will help strike that balance and will carry us forward, well into the 21st Century with the tools necessary to protect and preserve the fragile coral reefs of the Florida Keys for the use and enjoyment of future generations.

Sincerely,



Superintendent, Florida Keys National Marine Sanctuary

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About this Overview

It is with great pride that we provide this overview of the Final Management Plan and Environmental Impact Statement for the Florida Keys National Marine Sanctuary which will direct our management efforts for this significant national resource into the 21st century

The complete management plan and impact statement for the Sanctuary is a three-volume document which is available at our offices in Key Largo, Marathon and Key West. However, we have developed this Overview to give you a concise summary of our management tools and programs

Section I of the Overview presents background information about the need for the Florida Keys National Marine Sanctuary and the tools that have been developed for its management

Section II is a summary of the changes that we made as a result of public review of the draft plan, and building on decades of experience that we have had managing the Looe Key and Key Largo National Marine Sanctuaries

Section III is a summary of the final regulations for the Sanctuary

Finally, we have developed questions and answers to help you understand how the Sanctuary will protect our marine resources and maintain the quality of life here in the Florida Keys

Section I: PROTECTING THE LIVING CORAL REEF

This Overview highlights the ways that the Management Plan for the Florida Keys National Marine Sanctuary addresses the issues that you told us were the most important

NATIONAL MARINE SANCTUARIES

The Florida Keys National Marine Sanctuary is part of a national system of marine sanctuaries around the United States. There are fourteen National Marine Sanctuaries established in areas where the natural or cultural resources are so significant that they warrant special status and protection. The Florida Keys coral reef system is just such an area. Marine Sanctuaries are not new to the Florida Keys, the National Oceanic and Atmospheric Administration (NOAA) has a successful history here in the Keys. The Key Largo National Marine Sanctuary, located in the upper Keys, was designated in 1975 and just celebrated its 20th anniversary. The Looe Key National Marine Sanctuary in the middle Keys was designated in 1981, and just celebrated 15 years of protecting and managing the coral reef.

The Florida Keys are a unique national treasure of international notoriety. The natural and cultural resources and environmental setting of the area make it among the most diverse in North America. The special resources found in the waters of the Florida Keys that qualify the area for the status of a National Marine Sanctuary include America's only living barrier coral reef, patch reefs, hardbottoms, vast seagrass meadows, mangrove fringed islands, and all of the rich marine life these marine communities support.

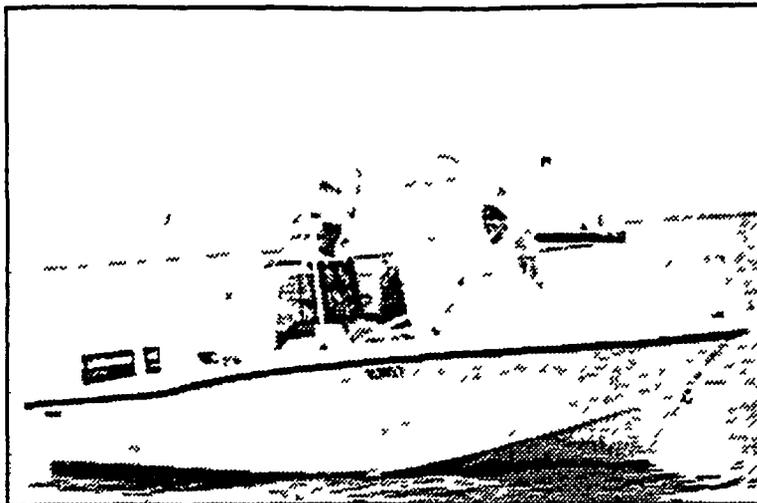
ABOUT THE FLORIDA KEYS -- ECONOMIC SIGNIFICANCE

The deterioration of the marine environment in the Keys is not a matter of debate. There is a decline of healthy corals, signaled by an increase of coral diseases, coral bleaching, and decreased living coral cover. Marine scientists have reported an invasion of algae into seagrass beds and onto the coral reefs. Fisheries scientists are reporting declines in some fish stocks, thus affecting certain fisheries. Additionally, Florida Bay has undergone changes during the past decade that have resulted in degradation of the ecosystem, in terms of the productivity, health, and stability of its living marine resources. Reduced freshwater flow in Florida Bay is one of the factors that has resulted in an increase in plankton blooms, sponge and seagrass die-offs, and fish kills.

The very special marine resources of the Florida Keys that qualify the area as a National Marine Sanctuary contribute to the high quality of life in the Keys. Indisputably, without these unique marine resources the quality of life and the economy of the Keys would surely decline. The living coral reefs and seagrass meadows of the Florida Keys are not only aesthetically appealing, but they serve a more basic function by providing the shelter and source of food for the recreationally and commercially important species of fish, lobster, crabs, shrimp, and other marine life.

Millions of visitors come to the Keys because this is the only tropical environment within reach by automobile in the continental United States where a person can readily dive on the living coral reef or catch and release a bonefish on a seagrass flat. According to a recently completed visitor survey sponsored by the Monroe County Tourist Development Council, The Nature Conservancy, and NOAA titled *Linking the Economy and Environment of Florida Keys/Florida Bay*, there were 6,005,723 visitors to the Florida Keys between June 1995 and May 1996. Among those visitors, 4,761,253 came to recreate in the Keys, of which 1,596,470 were snorkelers and scuba divers, 1,086,373 were recreational fishers, and 1,456,303 came to view the wildlife and study nature. Probably what is more important, is that 94.4% of the visitors to the Keys are concerned about the protection of the environment and nearly 38% place a very high priority on protection of the environment.

Clearly, protecting the marine resources of the Sanctuary is not only good for the environment of the Florida Keys, but it is also good for the economy. The total annual spending by recreating visitors to the Florida Keys and Key West is about \$2.1 billion dollars, according to the results of the survey. The economy of the Keys cannot afford to lose the living resources of the Sanctuary, nor can those who simply appreciate the experience that the Keys brings, afford to see the environment decline.



FLORIDA KEYS NATIONAL MARINE SANCTUARY

Team OCEAN (Ocean Conservation Education Action Network) volunteers distribute information packets at the coral reef

In 1989, mounting threats to the health and ecological future of the coral reef ecosystem in the Florida Keys prompted Congress to take action to protect this fragile natural resource. The threat of oil drilling in the mid to late 1980's off the Florida Keys, combined with reports of deteriorating water quality throughout the region, occurred at the same time scientists were assessing the adverse affects of coral bleaching, the die-off of the long-spined urchin, loss of living coral cover on reefs, a major seagrass die-off, declines in reef fish populations, and the spread of coral diseases. These were topics of major scientific concern, and the focus of several scientific workshops, when three large ships ran aground on the coral reef tract within a brief 18 day period in the fall of 1989. Coincidental as it may seem, it was this final physical insult to the reef that prompted Congress to take action to protect the coral reef ecosystem of the Florida Keys. Although most remember the ship groundings as having triggered Congressional action, it was in fact the cumulative events of environmental degradation, in conjunction with the physical impacts that prompted Congress to designate the 2800 square nautical mile Florida Keys National Marine Sanctuary and called for the development of a comprehensive management plan.

PUBLIC CONCERN IN THE FLORIDA KEYS

During the development of the Final Management Plan and Environmental Impact Statement for the Sanctuary, those responsible for writing the plan had the benefit of considerable public input. It was apparent that the public was concerned about issues that affect the quality of the marine resources in the Florida Keys and the quality of life for those who live, work, and recreate in the Keys. There was an enormous amount of consistency in the opinions and concerns expressed by the public at preliminary meetings in 1991 and at public hearings on the draft management plan in 1995. Written comments on the draft plan largely reiterated the views voiced at the public hearings.

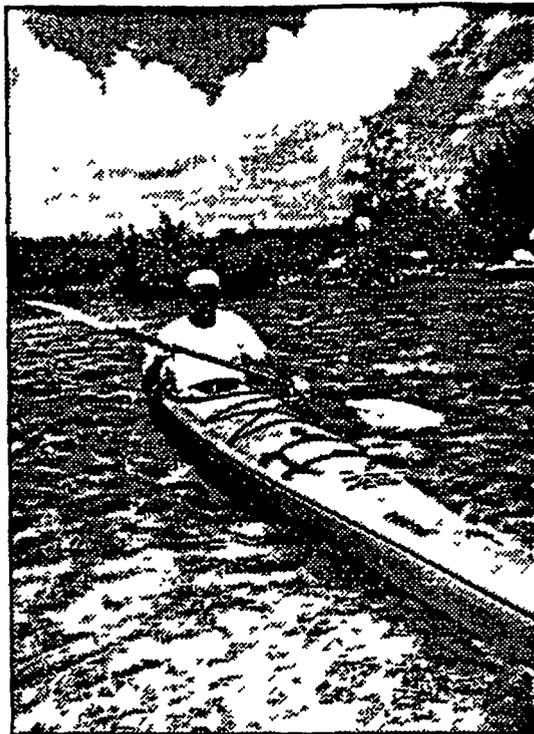
During those meetings, the public told Sanctuary planners that their main concerns were declining water quality, protecting America's only living coral reef, increased pressures on declining resources, increased boating activity, affecting the quality of life and personal safety on Keys waters, lack of enforcement, and finding ways to keep the precious marine resources of the Keys healthy for future generations.

There was more agreement on some issues than others. Most expressed concern over declining water quality. Although there was not agreement on the cause of the declining water quality, most recognized it was the major factor affecting the health of the living coral reef, the seagrasses, and fisheries stocks in the Florida Keys. While nearly everyone agreed that America's living coral reef had to be protected and preserved for the use and enjoyment of future generations, there was not always agreement on the methods. Much of the public recognized the importance of the links between a healthy environment and a healthy economy. The majority of the public expressed concern over continued decline of marine resources in the Keys, including declines relating to overuse and overharvest.

The development of the Final Management Plan has not been without controversy. Some were concerned about the administration of the Sanctuary being an additional agency to oversee activities in the Keys. Some expressed concern about the cost of managing the Sanctuary, while others were simply against federal involvement in the management of the resources in the Keys. Like all the public comments received on the draft plan, these comments were considered by Sanctuary staff in the development of the Final Management Plan.

THE TOOLS TO SUSTAIN AMERICA'S CORAL REEF

The Final Management Plan for the Florida Keys National Marine Sanctuary contains some of the most innovative tools available for protecting America's coral reef and its surrounding marine communities for the use and enjoyment of future generations. Sanctuary planners are confident that they have achieved the best balanced approach to protecting Sanctuary resources through a management plan based on common sense and practical solutions. The final plan represents the most comprehensive approach ever attempted at protecting a marine community as diverse as that in the Florida Keys and in a socio-economic setting as complex as that in the Keys.



Each year over 1.4 million visitors come to the Keys to view the wildlife and study nature.

The Sanctuary's final management plan was compiled using the best available science and most current management planning techniques available in this country. Dozens of experts in managing marine resources were consulted in the development of the Sanctuary plan. The final plan provides management tools to solve major problems occurring in the marine environment of the Keys that were identified during the planning process. Those problems are separated into the following major categories: deteriorating water quality, declining health of the living coral reefs, physical damage to coral reefs and seagrass communities, user conflicts, visitor safety, and quality of life issues, and declining marine resources.

The final management plan contains both innovative and practical solutions to solving the problems in the marine environment of the Sanctuary that were identified during the planning process. Most of the solutions in the Sanctuary plan are non-regulatory in nature and serve to provide resource protection through simple management actions. Those solutions are found in the following broad management categories: improvement of water quality, coral reef and seagrass protection, resource enhancement, education and outreach, research and monitoring, volunteerism, and quality of life issues. These issues are addressed in the following ten action plans: Channel/Reef Marking, Education/Outreach, Enforcement, Mooring Buoys, Regulatory, Research and Monitoring, Submerged Cultural Resources, Water Quality, Volunteer, and Zoning.

Improvement of Water Quality The decline in the nearshore water quality of the Florida Keys was recognized by Congress when they designated the Sanctuary and directed the EPA to work with the State and NOAA to develop a Water Quality Protection Program (WQPP). The final plan contains a Water Quality Action Plan that has specific solutions for addressing water quality problems and establishes corrective actions to solve water quality problems. The purpose of the WQPP is to recommend priority corrective actions and compliance schedules addressing point and non-point sources of pollution to restore and maintain the living coral reefs and other critical marine life in the Sanctuary. The WQPP addresses these issues through 1) corrective actions that reduce water pollution directly by using engineering methods, prohibiting or restricting certain activities, tightening existing regulations, and/or increasing enforcement, 2) a comprehensive, long-term water quality monitoring program designed to provide information about the status and trends of water quality and biological resources in the Sanctuary, 3) research/special studies designed to identify and understand cause and effect relationships.

involving pollutants, transport pathways, and biological communities of the Sanctuary, and 4) public education and outreach programs designed to increase public awareness of the Sanctuary, the WQPP, and pollution sources and impacts on Sanctuary resources

The final plan also addresses water quality problems ranging from Florida Bay to the nearshore waters of the Keys. The Sanctuary brings National, as well as State interests and resources to resolving the water quality problems in the Keys. The final plan provides tools for improving water quality within the Sanctuary and identifies specific projects to determine sources of water quality problems. The plan uses demonstration projects to assess the best available technology for treating waste water and provides for monitoring to determine what is or is not working. The Water Quality Action Plan outlines research and monitoring programs that will provide the best scientific data for basing management decisions.

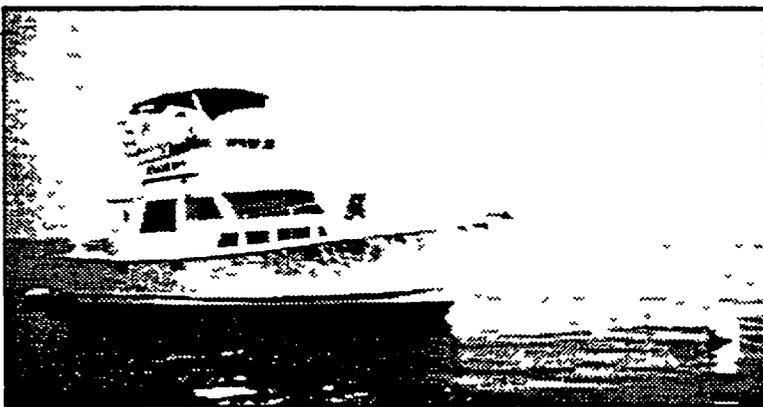
The final management plan integrates the Sanctuary into the South Florida ecosystem restoration effort as a major ecological component of the ecosystem. The plan integrates the Sanctuary's water quality protection program with local, State, and other Federal programs that address water quality in the Sanctuary. The National significance of the Sanctuary resources has attracted other Federal and State agency interests in restoring the water quality of the Sanctuary.

When the planning process began in 1991 there was little attention given to the degradation of water quality in Florida Bay. During Sanctuary Advisory Council meetings, beginning in 1992, fishermen familiar with Florida Bay testified that the deterioration of the water quality in Florida Bay was critical. They warned that the deteriorating water quality was affecting both the environment and economy of the area. Sanctuary planners have subsequently worked with other agency representatives in South Florida to address water quality problems on an ecosystem basis.

Undoubtedly, if the water quality of the Keys is not restored, the decline in the health of the living coral reef resources will continue. Without these resources the economy of the Keys will decline and the quality of life for those who live here will be affected. Income and property values in the Keys will decline if the natural resources are lost.

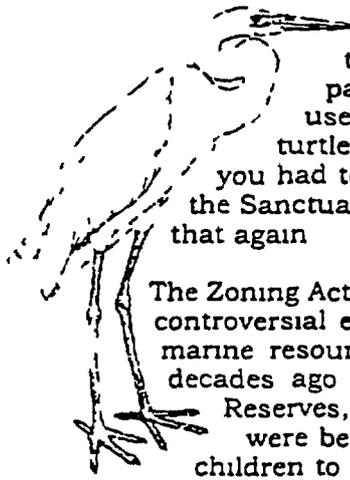
Coral Reef and Seagrass Protection The final management plan contains a wide range of common sense approaches to protecting America's coral reef and the seagrasses of the Florida Keys. The channel and reef marking plan uses Federal, State, and local funds to mark channels and shallow reef areas. This will help prevent damage to these important marine communities from boat groundings and prop-scarring. Sanctuary planners and partners will select the most important channels and reefs to mark by working with the public.

The Mooring Buoy Action Plan is one of the most simple and effective management tools used to protect Sanctuary resources, and it is one of the most effective. The Sanctuary staff invent-



Sanctuary staff first invented the mooring buoy system in Key Largo in 1981. The system is now used in the Keys and internationally to protect coral reefs from anchor damage.

ed the reef mooring buoy system used on coral reefs throughout the Keys in 1981. Today, this mooring buoy system is used all over the world to protect coral reefs from anchor damage. Sanctuary staff have trained others, such as volunteers with *Reef Relief*, on the techniques of mooring buoy installation. Today, *Reef Relief* maintains about one-third of the mooring buoys in the Sanctuary and we encourage them to continue and for others to support such efforts. There are many opportunities for the citizens to be involved in projects like this and we encourage as much of this public support as possible. The Sanctuary is a place where these opportunities can occur.



Resource Enhancement The coral reefs of the Florida Keys have been the focus of harvesting activities since before the invention of SCUBA in the 1940's. Naturally, these activities have increased in intensity over the past few decades and today many Keys residents simply talk about what it use to be like in the "old days". Stories of beds of Queen Conch, rafts of sea turtles, huge schools of tropical fish, grouper, snapper and so many lobster all you had to do was wade out from shore for them are common. The final plan for the Sanctuary has included a tool that will make it possible for the coral reef to be like that again.

The Zoning Action Plan contained in the final management plan has been one of the most controversial elements of the planning process, yet it provides the opportunity for the marine resources, in some areas, to be like they were when they were undisturbed, decades ago. By setting aside portions of the coral reef community as Ecological Reserves, the coral reefs and other marine communities can return to what they were before man started harvesting them. What a gift it would be for our grandchildren to see walls of colorful tropical fish and marinelife the way they used to be. Compared to the overall size of the Sanctuary the areas in the final plan are small, but necessary to accomplish the goals of the Sanctuary.

The Zoning Action Plan provides a very common sense approach to focusing protection in small critical portions of sensitive habitats, while not restricting activities any more than necessary. For example, the 18 Sanctuary Preservation Areas that are in the final plan protect over 65% of the shallow, spur and groove reef habitat, while capturing approximately 80% of the year-round diving activity. These areas displace very few commercial and recreational fishermen and their "no harvest" status will lead to resource enhancement of the coral reefs. Today, those that harvest in these areas are not primarily the divers aboard commercial charter boats, but those in their recreational boats or rental boats. By making these areas "no harvest" areas the visiting divers will be directed to reef habitat where their activity will have less impact. Approximately 2 to 3 % of the Sanctuary is designated as "no harvest" in the final plan. In the remaining 97-98% of the Sanctuary the focus for management is on improving water quality and providing habitat protection.

Education and Outreach The primary management tool used in National Marine Sanctuaries is education and outreach. The Education and Outreach Action Plan, compiled by some of the very best environmental educators and outreach experts in South Florida, provides ways that education efforts can directly enhance the various programs to protect the living coral reef. Public awareness and understanding through education are critical ways to achieve resource protection. This plan details how information gets from scientists to managers, and then to the educators. The educators and outreach specialists then prepare various tools to convey the information to the general public.

Research and Monitoring Wise management decisions must be based on the best science available to managers. Although there has been a lot of research done in the Keys, nobody has ever been responsible for focusing the research on specific problems in order to assist managers in answering difficult questions about the natural environment. The Research and Monitoring Action Plan helps focus research addressing specific management problems. Some of the world's best coral reef scientists helped prepare or comment on this action plan. This action plan will help us prioritize research in the Sanctuary and focus agency scientists, academic scientists, industry scientists, and private researchers on Sanctuary problems. This has and will continue to help leverage funding from outside sources to be spent here in the Keys. At a time when budgets are lean, it is important that managers maximize research efforts to get direct answers to management problems.

The monitoring program contained in the final plan will enable scientists and managers to keep a pulse on the health of the living coral reef and related communities while the public continues to use and enjoy them. It is critical for managers to know when certain environmental changes are taking place and how those changes relate to management activities. Managers need to know when their actions are working, and if they are not working. This can only be answered through the well designed monitoring program which has been developed for the Sanctuary.

Volunteerism One of the best ways to get people to understand the importance of protecting living resources such as the coral reef is to involve them in volunteer projects. The Volunteer Action Plan links with all of the other management programs in the Sanctuary. This action plan lays out all the various ways citizens can become involved in assisting managers in protecting the Sanctuary. The volunteer program became extremely successful even before the completion of the final plan, because of the desire of hundreds of citizens who want to help make a difference in protecting America's living coral reef. When budgets are lean and there is a volunteer work force out there waiting for a blueprint to follow, it makes sense that their interests and enthusiasm are used to benefit the Sanctuary.



Sanctuary volunteers participate in a variety of coral reef monitoring projects

Quality of Life Issues The depletion of natural resources or the disturbance of a tailing school of bonefish on a seagrass flat by a personal watercraft are issues that ultimately affect the quality of life in the Keys. Many people moved here to enjoy the bountiful natural resources of the Florida Keys and if those were to disappear it would surely affect their quality of life. People standing on and walking around on living coral reefs will affect the health of the living corals and will over time affect the quality of life of those who moved to the Keys to enjoy the living coral reefs. The Regulatory Action Plan contains some common sense regulations that will help managers protect the resources of the Sanctuary while having the least amount of impact on those who enjoy them. The regulations address important concerns that were raised by the public and apply restrictions in a way that will achieve resource protection without unduly restricting activities. This regulatory action plan will provide safety provisions to the residents and visitors to the Keys that were not previously available. The provisions aimed at boating activities will have a direct positive result of the quality of life of those who visit, work, and play in the Florida Keys.

The thrill of exploring for treasure is a way of life for some in the Keys, while protecting and preserving archaeological resources should be important to all. The Submerged Cultural Resources Action Plan balances both of these concerns with those of natural resource protection and preservation of the historic record.

In order to maximize on existing enforcement programs, the final plan contains an Enforcement Action Plan that serves to help focus enforcement on priority problems within the Sanctuary. As a means of saving money, the action plan lays out a blueprint for coordination of all the enforcement agencies in the Keys. By sharing resources and focusing on common concerns, the Sanctuary resources will receive the highest level of protection under current funding levels, thus protecting the quality of life for the citizens of the Florida Keys.

Improving our water quality, protecting our magnificent coral reef, providing for the safety and enjoyment of those who use the marine resources, and instilling a sense of stewardship to ensure that this fabulous ecosystem is here for future generations, this is why cooperative management of this precious resource is so important. The Sanctuary is a special place where people are an integral part of the equation. We must join together to make sure that this living coral reef continues to thrive.

Section II: CHANGES YOU'LL SEE BY ACTION PLAN

This Overview highlights the changes that were incorporated in the Final Management Plan as a result of the public comment period. It focuses on the substantive changes, rather than those places where a word or punctuation may have been corrected. We recommend referring to the Management Plan in its entirety for details.



Channel/Reef Marking Action Plan

The title of the Channel Marking Action Plan was changed to reflect that the plan addresses the marking of coral reefs and other shallow water habitats, as well as channels. In addition, reviewers recommended the inclusion of a criteria for prioritizing channel/reef marking. The criteria establishes a process for identifying and prioritizing channels to be marked. Also, language was added to evaluate the effectiveness of channel/reef markers and to address the removal of markers that are found to have a detrimental effect on marine resources.

Education and Outreach Action Plan

Changes to this action plan included a name change. Outreach was added. Reviewers recognized the importance of public outreach in an area where there is such heavy use of the resources by local residents and by vast numbers of tourists. Clearly, the education of the general public and user groups that must be reached in a very short time frame calls for the use of outreach strategies. In addition, a number of suggestions coming from the local education community have been integrated to better address learner outcome goals.

Some comments suggested that products developed through this plan be multi-lingual when necessary and appropriate. Other comments included increasing the priority of establishing a Sanctuary Advisory Board for education and outreach and the need to use the existing network of educators and environmental education organizations and institutions already in place. The Final Plan was revised the document to reflect these comments.

Enforcement Action Plan

Changes to the Enforcement Action Plan were made in response to comments received. The figure illustrating Law Enforcement Organization was deleted because it misrepresented the chain of command. Language was added to indicate that patrol priorities will be based on the protection of cultural and natural resources as opposed to user conflicts.

Mooring Buoy Action Plan

In response to numerous public comments the third of three mooring buoy strategies (R 5 carrying capacity) has been deleted from the Mooring Buoy Action Plan. Although many reviewers expressed concern that the Keys have exceeded their carrying capacity for a healthy environment, others felt that mooring buoys were not necessarily the mechanism for limiting impacts until further research is complete. Thus, the carrying capacity strategy has been moved into the Research and Monitoring Action Plan. In addition, an activity was added to establish a monitoring program to assess the effectiveness and influence of mooring buoys on coral reefs and other sensitive habitats. We responded to comments to establish a mooring buoy working group and encourage the use of volunteer assistance in mooring buoy maintenance by adding this language to the Action Plan.



Monroe County 8th graders participate each year in Coral Reef Classroom, one of many Sanctuary education programs

Regulatory Action Plan

We made every attempt to address the substantive concerns raised regarding the draft regulations. This section includes a description of the revisions to the draft regulations.

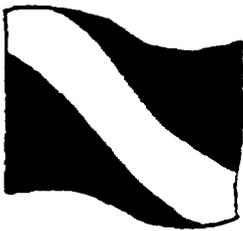
New definitions including those for coral, coral area, coral reefs, hardbottom, and residential shorelines were added to the final regulations based on public comments and to clarify the applicability of the regulations.

Allowed activities

All activities (e.g., fishing, boating, diving, research, education) may be conducted unless prohibited or otherwise regulated here or by any other Federal, State, or local authority of competent jurisdiction.

Prohibited activities - Sanctuary Wide

There were some revisions to the Sanctuary-wide draft regulations based on the public comment. These changes were made in the operation of vessels section of the Sanctuary-wide prohibited activities.



Anchoring on corals is a threat to the health of coral reefs in the Florida Keys. Anchoring a vessel on coral in depths less than 40 feet of water when visibility is such that corals on the seabed can be seen is restricted. This prohibition does not apply to anchoring on hardbottom. The Sanctuary Advisory Council (SAC) recommended this regulation in their comments, while some groups requested the prohibition apply throughout the Sanctuary, and others wanted no prohibition at all.

Based on public comments and SAC recommendations, we established a series of regulations that address the operation of all vessels, including personal watercraft.

The final regulation prohibits operating a vessel at a speed greater than idle speed only/no-wake, except in marked channels and other less restrictive marked areas:

- in areas designated idle speed only/no wake zones,
- within 100 yards of navigational aides indicating emergent or shallow reefs (international diamond warning symbol),
- within 100 feet of the red and white "divers down" flag (or the blue and white "alpha" flag in Federal waters),
- within 100 yards of residential shorelines, or
- within 100 yards of stationary vessels

Additional regulations on the operation of vessels will include (1) a prohibition on operating a vessel in such a manner as to injure, take or cause disturbance to wading, roosting, or nesting birds or marine mammals and (2) operating a vessel in a manner which unreasonably or unnecessarily endangers life, limb, marine resources, or property, including but not limited to, weaving through congested vessel traffic, jumping the wake of another vessel unreasonably or

unnecessarily close to such other vessel or when visibility around such other vessel is obstructed, or waiting until the last possible moment to avoid a collision

In addition to regulations that apply to all vessels, we will work with the Personal Watercraft (PWC) Industry to develop effective strategies for PWC management. The PWC industry has indicated it is seriously committed to "self regulation" and is willing to work with us to develop successful educational efforts geared toward changing user behavior. In particular, the PWC industry agreed to work with Sanctuary staff to establish criteria for the management of commercial PWC rental operations. The final component of our approach to PWC's is a modification of the SAC's recommendations. If initial efforts are not successful at significantly reducing or eliminating the nuisance and safety problems, we will consider establishing broad zoning restrictions consistent with SAC recommendations.



Additional Activity Regulations by Sanctuary area

The regulations in the Final Management Plan for the zones primarily changed in geographical extent and number of specific zones, as opposed to the specific regulations within the different zones. Those changes are described in the Zoning Action Plan.

In the Final Management Plan the following regulated activities are those that were revised for the Ecological Reserves (ER) and the Sanctuary Preservation Areas (SPA) as a result of public comment, including comments from the SAC:

Possessing, moving, harvesting, removing, taking, damaging, disturbing, breaking, cutting, spearing, or otherwise injuring any coral, marine invertebrate, fish, bottom formation, algae, seagrass or other living or dead organism, including shells, or attempting any of these activities. However, fish, invertebrate, and marine plants may be possessed aboard a vessel in an ER or SPA, provided such resources can be shown not to have been harvested within, removed from, or taken within, the ER or SPA, as applicable, by being stowed in a cabin, locker, or similar storage area prior to entering and during transit through such reserves or areas.

Except for catch and release fishing by trolling in the Conch Reef, Alligator Reef, Sombrero Reef, and Sand Key SPAs, fishing by any means. However, gear capable of harvesting fish may be aboard a vessel in an ER or SPA, provided such gear is not available for immediate use when entering and during transit through such ER or SPA and no presumption of fishing activity shall be drawn therefrom.

Emergency Regulations

There was some public concern about the ability of the Director or his designee to establish emergency regulations which could affect access or activities. In public comments, there was a general request to establish some kind of time limit or process to close areas to public access for emergency reasons. We have revised the regulation to read as follows:

Any such temporary [emergency] regulation may be in effect for up to 60 days, with one 60-day extension. Additional or extended action will require public notice and comment, notice in local newspapers, Notice to Mariners, and press releases.

National Marine Sanctuary Permits - Application Procedures and Issuance Criteria

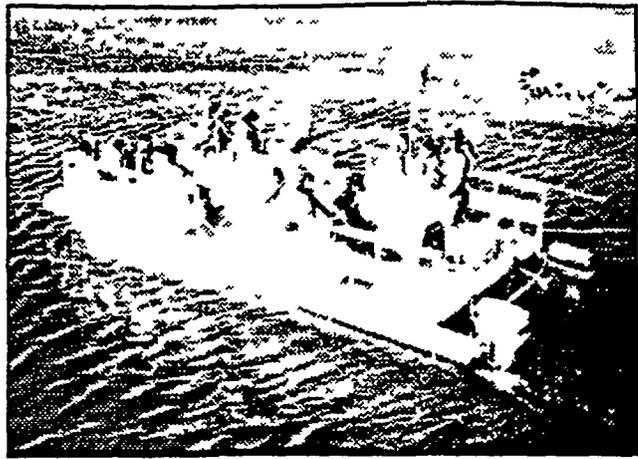
Permits are required in National Marine Sanctuaries for conducting activities that are prohibited by Sanctuary regulations. In addition to permits for research, education, salvage and recovery operations, and management, a Sanctuary general permit may now be issued for an activity that otherwise furthers Sanctuary purposes, including facilitating multiple use of the Sanctuary, to the extent compatible with the primary objective of resource protection.

Sanctuary Historical Resources permits and Special-use permits, respectively, have been incorporated into this section so there is only one permit section addressing all types of Sanctuary permits. The deaccession/transfer of public historical resources to private permittees will be

done through a Special-use permit

Historical Resource Permits - Application Procedures and Issuance Criteria

In response to comments, this section was revised to make the permit management system more pragmatic from the perspective of the commercial salvors without compromising the primary objectives of protecting the submerged cultural resources



Responsible boating is one way we can enhance the quality of life in the Keys

After consultation with the State of Florida, we deleted the regulatory provisions requiring a performance bond for all applicants. We have also modified the regulations to clarify that other security instruments may be utilized in lieu of insurance policies. Additionally, we modified regulatory language to clarify that the scope of coverage required is for "potential claims for damages to Sanctuary resources arising out of permitted activities" and to clarify that the amount of insurance or security should be reasonably equivalent with an estimated value of the Sanctuary resources in the vicinity of the permitted area and activities

Sanctuary Registry - Research Notice (Deleted)

This section was removed from the final regulations because the Sanctuary registry is voluntary and no regulation is necessary for its establishment

Research and Monitoring Action Plan

In response to public comments, minor changes were made to the Research and Monitoring Action Plan. Most public comments on the plan called for monitoring the no-take zones to determine their effectiveness. Research and monitoring of the zones was emphasized in the plan to accommodate this comment. The Sanctuary Advisory Council requested that the carrying capacity strategy be added to the plan which has been done. One State agency commented on the Strategy F 3 (moratorium on stocking) stating that it would curtail the State's ongoing queen conch stocking program. In response, the strategy was changed to call for permitting of all stocking programs.

The revised Research and Monitoring Action Plan will provide better scientific information in a more timely manner than was called for in the Draft Plan. Therefore, resource protection will be enhanced through better informed resource managers. Resource protection will be further enhanced by the permitting of research activities and the research on carrying capacity.

Submerged Cultural Resources Action Plan

As a result of consultation with the State of Florida, we deleted the regulatory provisions requiring a performance bond for all applicants. While the removal of this regulatory requirement should reduce the costs for meeting the permit criteria for most applicants, such performance bond may still be reasonable and appropriate in certain cases where applicants have not finished projects or have difficulty demonstrating their financial ability to complete the proposed project.

The general liability insurance is a statutory requirement under Section 310 of the NMSA. However, reviewers indicated that insurance companies were not providing policies for such coverage. We modified the regulatory provision in the final regulations to clarify that other security instruments may be utilized in lieu of an insurance policy so the requirement is more flexible. In addition, we modified regulatory language to clarify that the scope of coverage required

is for "potential claims for destruction, loss, or injury to Sanctuary resources arising out of permitted activities" and to clarify that the amount of insurance or security should be reasonably equivalent with an estimated value of the Sanctuary resources in the vicinity of the permitted area and activities

With regard to the requirement that SCRs be publicly displayed, we did not intend to require that all SCRs be publicly displayed for all time. Instead, it was expected that this would be addressed in the curation agreements and that standard museum practices would be followed, consistent with the Federal Archaeological Program (FAP). The regulations have therefore been modified to indicate that permittees must provide public access and "periodic" public display. The regulations also provide for a permit to deaccession certain SCRs.

The requirement that a professional archaeologist be in charge of the archaeological research and recovery, that requirement has not been changed. It is imperative for environmental and socioeconomic reasons that a professional archaeologist supervise the recovery operations to ensure preservation standards are met. That is not to say that, as supervisor, the archaeologist needs to be on site at all times in every permit. However, the archaeologist needs to oversee the operations.

With regard to the requirement of a professional nautical conservator, the plan has been modified to delete "professional" and insert "authorized" as suggested in comments in order to provide more flexibility in the permit system and allow for the consideration of field experience.

In response to comments, additional changes were made in the final regulations and plan in an effort to make the permit management system more pragmatic from the perspective of the commercial salvors without compromising the primary objectives of protecting significant natural and historic Sanctuary resources. The permit conditions may be more rigorous than the requirements of the Admiralty court or the State contract system, and thus may involve additional costs, for permittees to continue working their sites.

The regulations indicate that permits may provide for limited manual alteration of the seabed, including handfanning, provided there is no adverse effect on Sanctuary resources. Such activity will continue to be considered on a case-by-case basis.

Reviewers suggested exclusive rights for a survey-inventory permit but also suggested that remote sensing not require a permit. The final plan clarifies that non-intrusive remote sensing is not prohibited. The regulations expressly state that non-intrusive remote sensing does not require a permit. However, NOAA and the State are cognizant of the underlying economic concerns of applicants and permittees in investing and expending financial resources. The regulations have been modified to indicate that we will not grant survey and inventory permits or research and recovery permits for areas covered by existing permits, unless authorized by such permittee. There is no entitlement to these and other permits, rather it involves the discretionary authority of NOAA and the State in granting a privilege which is determined to be in the public's interest.

Volunteer Action Plan

While all comments on the Volunteer Action Plan were positive, some specific comments were made requesting modifications to the plan. The goals of the Volunteer Plan were updated to include the future development of a strategy to target volunteer recruitment and strategy B 8 User Fees was deleted in response to comments.

Water Quality Action Plan

Public comment precipitated changes to both the WQPP document and the Water Quality Action Plan. Changes were also needed to update the information in the action plan and to make it more consistent with the actual programs which are now underway. Some strategies were

renamed, some activities were moved between strategies, and a few new activities were added. Also, existing programs and activities that have already been completed were noted.

Specifically, strategies to address the management of domestic wastewater were reworded to emphasize innovative technologies and pilot projects. Also, rewritten was the process by which illegal cesspits and legal but inefficient septic systems would eventually be replaced or upgraded. The strategy for stormwater management was reworded to emphasize that a public education program would be included.

The strategy addressing pollution discharges now emphasizes implementing the 1994 Florida Clean Vessel Act and educating the boating public about discharge regulations. New activities were added to the strategy for special-use areas to evaluate the feasibility of mooring fields and establish criteria for setting them up. Under marina operations, new activities were added that would encourage marina owners to participate in environmentally-oriented organizations such as the International Marina Institute. They would also be encouraged to provide a user manual with local environmental information such as locations of pumpout facilities and trash receptacles.

Mosquito spraying was changed to include a field survey of the full suite of pesticides, herbicides, fungicides, etc. used in the Sanctuary. Several new activities were added to address canal water quality, including a pilot project and a community education and involvement program. The revised strategy better describes the detailed process that would be used to improve canal water quality.

Zoning Action Plan

There were five zone types proposed in the draft plan that was reviewed by the public. Those zone types were Wildlife Management Areas, Replenishment Reserves (renamed to Ecological Reserves), Sanctuary Preservation Areas, Existing Management Areas, and Special-use Areas. All of these zone types remain in the Final Management Plan to be implemented in the Sanctuary.

Wildlife Management Areas (WMA) There are 27 WMA's established in the Final Plan. The majority of these areas (20) fall under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) and Sanctuary regulations have been established to complement the USFWS criminal sanctions with Sanctuary civil penalties. Public access restrictions in these areas include idle speed only/no wake, no access buffer, no motor, and closed. Only a few minor changes were made to the WMA's based on public comment. As a result, consistent with existing USFWS regulations, access to Jewfish Creek and Steamboat Creek in the Crocodile Lake Wildlife Management Area is not restricted, as appropriate.

Also, the Final Plan includes one additional area over what was proposed in the Draft Management Plan. An idle speed only/no wake zone has been established in the area of Lake Surprise east of the highway US 1. This zone was established to protect the endangered American Crocodiles and West Indian Manatees that inhabit the area.

Ecological Reserves (ER, formerly Replenishment Reserves) In the Draft Preferred Alternative this zone type was called Replenishment Reserves. NOAA has changed the name to reflect public concerns over the purpose of these areas. NOAA has redrawn the zoning boundaries to minimize costs to fishing industry (i.e. deleted Key Largo ER and delayed Dry Tortugas ER).

All activities that do not result in removal of marine life or damage to the resources will be allowed in these areas. Spearfishing, shell collecting, tropical fish collecting, and other activities that result in the harvest of marine life by divers and snorkelers, and fishing activities will be prohibited in this zone type. In addition, direct physical impact to corals in these areas will be restricted.



This zone type has received the most revisions from the Draft to the Final Management Plan as compared to other zone types. Three Ecological Reserves were proposed in the draft plan. NOAA has eliminated one of these proposed reserves, maintained the proposed boundaries of another, and delayed action on the third for two years after the final plan is implemented in order to minimize the socioeconomic impact on fishermen.

We have eliminated the Key Largo Reserve from the final plan and regulations. The resource protection provided by the existing protected areas, John Pennekamp Coral Reef State Park and the Key Largo National Marine Sanctuary contributed to this decision. Many prohibitions already exist in these areas, on activities such as spearfishing, tropical fish collecting, shell collecting, wire fish trapping, trawling, and the removal of any marine life by divers except for spiny lobster. Establishing an Ecological Reserve in these areas would have resulted in few additional environmental benefits. The full environmental benefit of the protection provided by Ecological Reserves will best be monitored and observed in areas where these harvesting activities are currently conducted.

We have maintained the boundary that was proposed in the Draft for the Western Sambos Ecological Reserve. High environmental benefits will be gained by protecting this important portion of the coral reef environment. This Ecological Reserve is located adjacent to public property (Boca Chica Naval Airstation) and contains all the habitats that are typically found in an onshore/offshore cross-section of the Keys coral reef environment.

We did not finalize the implementation of the Dry Tortugas ER in the regulations. Instead, we will postpone final implementation of the boundary and regulations of the Dry Tortugas ER until it undertakes a process, in coordination with the National Park Service, to identify an appropriate final boundary for the Reserve, which will include portions of the Dry Tortugas National Park. To identify the final boundary, NOAA and the National Park Service will use the information gathered as part of the public review of the draft management plan, and hold workshops with users, agency representatives, environmental organizations and the public. Prior to making a final decision, the proposed final boundary of the Dry Tortugas Ecological Reserve will be published for public comment.

Sanctuary Preservation Areas (SPA) All activities that do not result in removal of marine life or damage to the resources will be allowed in these areas. Activities that will be prohibited in the Sanctuary Preservation Areas include spearfishing, shell collecting, tropical fish collecting, fishing and other activities that result in the harvest of marine life by divers, snorkelers, and fishermen. In addition, direct physical impact to corals in these areas will be restricted.

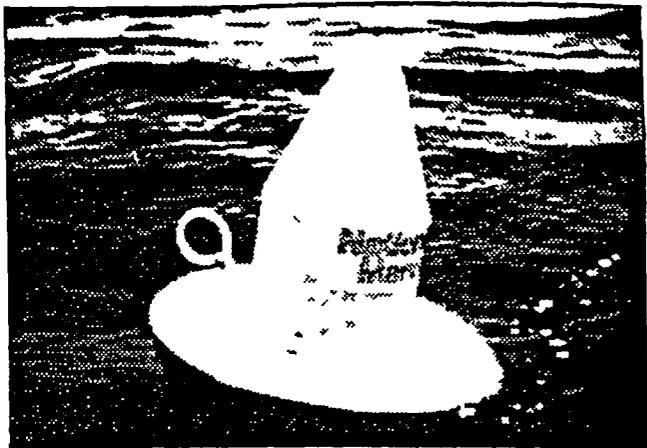
We are implementing all of the SPAs that were proposed in the Draft Plan (19) with the exception of the one for Western Sambos Reef. Since that reef is designated an Ecological Reserve, which has the same restrictions as the SPA's, NOAA has eliminated this duplicate protection. Therefore, a total of 18 SPAs are contained in the Final Plan. Since we have removed the Key Largo Ecological Reserve from the final plan, the SPA around Carysfort has been enlarged to encompass more of the coral reef community, including patch reefs, coral rubble areas, and intermediate reef habitat, the site of a known grouper spawning aggregation. The size of the SPA will only be expanded by one-half (1/2) of a square nautical mile over the proposed SPA.



We received considerable public comment on the draft plan regarding baitfishing activities in the shallow reef habitat. NOAA has revised the management plan and regulations to allow limited baitfishing in the SPA's rather than reduce the number of SPA's. We will give permits for the netting of ballyhoo for bait in these areas and does not feel this activity will compromise the overall objective of the SPA's.

In another effort to reduce socioeconomic costs from the SPA's, we have modified the management plan and regulations to allow catch and release fishing by trolling in four of the Sanctuary

Preservation Areas Conch Reef, Alligator Reef, Sombrero Key, and Sand Key This should avoid or minimize the socioeconomic impacts on fishermen in these areas This will also give us places to compare and contrast catch and release SPAs with those where no fishing takes place These areas were selected on the basis of public comment and data from the aerial surveys This will help us assess the environmental costs of allowing this activity and the socioeconomic impacts of prohibiting it in the other SPA's



The areas outlined in the marine zoning action plan will be clearly marked

Existing Management Areas (EMA) Out of the total 21 existing management zones, 15 are administered by the State of Florida Department of Environmental Protection, 4 by the U S Fish and Wildlife Service, and 2 by NOAA Managing these areas within the Sanctuary may require additional regulations or restrictions to provide complete resource protection These additional management needs will be developed in cooperation with the relevant agency and will be implemented with those agencies No change occurred to EMA's as a result of public comment

Special Use Areas (SUA) These zones address special use activities and concerns within the Sanctuary, and may be established for education, science, restoration, monitoring, or research Activities in these areas will be conducted by permit only

There are only four special use areas in the Final Management Plan Conch Reef, Tennessee Reef, Looe Key (patch reef), and Eastern Sambos Reef These are all designated as research-only areas Due to the consideration of socioeconomic impact described by the public during the review process, we have eliminated the Pelican Shoal research-only Special-use Area and replaced it with the Eastern Sambos research-only Special-use Area suggested by the State in its comments on the DMP/EIS This change will provide a better research and monitoring site, while simultaneously lessening the socioeconomic impact to the public that would have occurred by limiting access to the reef around Pelican Shoal However, in order to complement the State's seasonal closure of the land area, we designated a no-access 50 yard buffer around the Pelican Shoal between April 1 and August 31 These dates coincide with those established by the Florida Game and Freshwater Fish Commission for this area

Section III: OVERVIEW OF SANCTUARY REGULATIONS

*Summary of the Final Regulations for the Florida Keys National Marine Sanctuary
This summary is prepared as an expanded outline
Please refer to the text of the regulations for additional information*

Allowed activities

All activities (e g , fishing, boating, diving, research, education) may be conducted unless prohibited or otherwise regulated here or by any other Federal, State, or local authority of competent jurisdiction

Prohibited activities - Sanctuary-wide

(a) Except as specified in paragraph (b) through (e) of this section in the full set of regulations, the following activities are prohibited

(1) Mineral and hydrocarbon exploration, development and production

(2) Removal of, injury to, or possession of coral or live rock

(3) Alteration of, or construction on, the seabed Drilling into, dredging, or otherwise altering the seabed of the Sanctuary (including prop-dredging or abandoning any material on the seabed), except as an incidental result of

(i) Anchoring vessels in a manner not otherwise prohibited,

(ii) Traditional fishing activities not otherwise prohibited,

(iii) Authorized installation and maintenance of navigational aids,

(iv) Harbor maintenance including dredging of entrance channels and repair, replacement, or rehabilitation of breakwaters or jetties,

(v) Authorized construction, repair, replacement, or rehabilitation of docks, seawalls, breakwaters, piers, or marinas with less than ten slips

(4) Discharge or deposit of materials or other matter

(i) Discharging or depositing, from within the boundary of the Sanctuary, any material or other matter, except

(A) Fish, fish parts, chumming materials, or bait used or produced while conducting a traditional fishing activity,

(B) Biodegradable effluent incidental to vessel use and generated by a marine sanitation device approved in accordance with Section 312 of the Federal Water Pollution Control Act, as amended,

(C) Water generated by routine vessel operations (e g , deck wash down and graywater), excluding oily wastes from bilge pumping, or

(D) Cooling water from vessels or engine exhaust,

(ii) Discharging or depositing, from beyond the boundary of the Sanctuary, any material or other matter that subsequently enters the Sanctuary and injures a Sanctuary resource, except those listed in paragraph (a)(4)(i)(A) through (D) above and those authorized under Monroe County land use permits

(5) Operation of vessels

- (i) Operating a vessel in such a manner as to strike or otherwise injure coral, sea-grass, or any other immobile organism attached to the seabed
- (ii) Anchoring a vessel on coral other than hardbottom in water depths less than 40 feet when visibility is such that the seabed can be seen
- (iii) Except in officially marked channels, operating a vessel at a speed greater than 4 knots or in manner which creates a wake
 - (A) within an area designated idle speed only/no wake,
 - (B) within 100 yards of navigational aids indicating emergent or shallow reefs (international diamond warning symbol),
 - (C) within 100 feet of the red and white "divers down" flag (or the blue and white "alpha" flag in Federal waters),
 - (D) within 100 yards of residential shorelines, or
 - (E) within 100 yards of stationary vessels
- (iv) Operating a vessel in such a manner as to injure, take or cause disturbance to wading, roosting, or nesting birds or marine mammals
- (v) Operating a vessel in a manner which unreasonably or unnecessarily endangers life, limb, marine resources, or property, including but not limited to, weaving through congested vessel traffic, jumping the wake of another vessel unreasonably or unnecessarily close to such other vessel or when visibility around such other vessel is obstructed, or waiting until the last possible moment to avoid a collision

(6) Conduct of diving/snorkeling without flying a "divers down" flag

(7) Release of exotic species of plant, invertebrate, fish, amphibian or mammals

(8) Damage or removal of markers, buoys and scientific equipment

(9) Movement of, removal of, injury to, or possession of Sanctuary historical resources

(10) Take or possession of protected wildlife

(11) Possession or use of explosives or electrical charges

(12) Harvest or possession of marine life species as protected by State law

(13) Interference with law enforcement

Additional activity regulations by Sanctuary area

In addition to the prohibitions set forth in the previous section, which apply throughout the Sanctuary, the following regulations apply with respect to activities conducted within the Sanctuary areas

(a) Areas To Be Avoided Operating a tank vessel or a vessel greater than 50 meters in registered length is prohibited in all areas to be avoided (unless essential for national defense, law enforcement, or responses to emergencies)

(b) Existing Management Areas

(1) Key Largo and Looe Key Management Areas The following activities are prohibited within the Key Largo and Looe Key Management Areas (also known as the Key Largo and Looe Key National Marine Sanctuaries)

(i) Removing taking damaging, harmfully disturbing, breaking, cutting, spearing or similarly injuring any coral or other marine invertebrate, or any plant, soil, rock, or other material, except commercial taking of spiny lobster and stone crab by trap and recreational taking of spiny lobster by hand or by hand gear which is consistent with these regulations and the applicable regulations implementing the applicable Fishery Management Plan

(ii) Taking any tropical fish

(iii) Fishing with wire fish traps, bottom trawls, dredges, fish sleds, or similar vessel-towed or anchored bottom fishing gear or nets

(iv) Fishing with, carrying or possessing, except while passing through without interruption or for law enforcement purposes pole spears, air rifles, bows and arrows, slings, Hawaiian slings, rubber powered arbaletes, pneumatic and spring-loaded guns or similar devices known as spearguns

(2) Great White Heron and Key West National Wildlife Refuge Management Areas The following activities are prohibited within the marine portions of the Great White Heron and Key West National Wildlife Refuge Management Areas

(i) Operating a personal watercraft, operating an airboat, or water skung (Refer to the full set of regulations for exceptions)

(ii) Discharging or depositing any material or other matter except cooling water or engine exhaust

(c) Wildlife Management Areas

Marine portions of the Wildlife Management Areas may be designated "idle speed only/no-wake," "no-motor" or "no-access buffer" zones or "closed" Signs shall be posted conspicuously and shall display the official logo of the Sanctuary

(d) Ecological Reserves and Sanctuary Preservation Areas

(1) The following activities are prohibited within the Ecological Reserves and Sanctuary Preservation Areas

(i) Discharging or depositing any material or other matter except cooling water or engine exhaust

(ii) Possessing, moving, harvesting, removing, taking, damaging, disturbing, breaking, cutting, spearing, or otherwise injuring any coral, marine invertebrate, fish, bottom formation, algae, seagrass or other living or dead organism, including shells, or attempting any of these activities However, fish, invertebrate, and marine plants may be possessed aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such resources can be shown not to have been harvested within, removed from, or taken within, the Ecological Reserve or Sanctuary Preservation Area, as applicable, by being stowed in a cabin, locker, or similar storage area prior to entering and during transit through such reserves or areas

(iii) Fishing by any means except for catch and release fishing by trolling in the Conch Reef, Alligator Reef, Sombrero Reef, and Sand Key SPAs However, gear capable of harvesting fish may be aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such gear is not available for immediate use when entering and during transit through such Ecological Reserve or Sanctuary

Preservation Area, and no presumption of fishing activity shall be drawn therefrom

(iv) Touching living or dead coral, including but not limited to, standing on a living or dead coral formation

(v) Placing any anchor (including the anchor, chain or rope) to touch living or dead coral, or any attached organism

(vi) Anchoring instead of mooring when a mooring buoy is available or anchoring in other than a designated anchoring area when such areas have been designated and are available

(vii) Violating a temporary access restriction imposed by the Director

(2) The Director may temporarily restrict access to any portion of any Sanctuary Preservation Area or Ecological Reserve if it is determined that a concentration of use appears to be causing or contributing to significant degradation of the living resources. The Director will provide public notice of the restriction by publishing a notice in the Federal Register, and by such other means. The Director may only restrict access to an area for a period of 60 days, with one additional 60 day renewal. The Director may restrict access to an area for a longer period pursuant to a notice and opportunity for public comment. Such restrictions will be kept to the minimum amount of area necessary to achieve the purposes thereof.

(e) Special-use Areas

(1) The Director may set aside discrete areas of the Sanctuary as Special-use Areas and impose access and use restrictions. The following types of Special-use Areas are allowed:

(i) "Recovery area" to provide for the recovery of Sanctuary resources from degradation or other injury attributable to human uses,

(ii) "Restoration area" to provide for restoration of degraded or otherwise injured Sanctuary resources,

(iii) "Research-only area" to provide for scientific research or education relating to protection and management, and

(iv) "Facilitated-use area" to provide for the prevention of use or user conflicts or the facilitation of access and use, or to promote public use and understanding of Sanctuary resources

(2) A Special-use Area shall be no larger than the size that is reasonably necessary to accomplish the applicable objective.

(3) Except for passage without interruption through the area, no person may enter a Special-use Area except to conduct the activities for which the area was set aside.

(4) The Director may modify the number of, location of, or designations applicable to, Special-use Areas by publishing in the Federal Register, after notice and an opportunity for public comment.

Emergency regulations

Where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary resource or quality, or minimize the imminent risk of such destruction, loss, or injury, any and all activities are subject to immediate temporary regulation, including prohibition. Any

such temporary regulation may be in effect for up to 60 days, with one 60-day extension. Additional or extended action will require notice and comment rulemaking under the Administrative Procedure Act, notice in local newspapers, notice to Mariners, and press releases.

Penalties

(a) Each violation of the NMSA or FKNMSPA, any regulation in this part, or any permit issued pursuant thereto, is subject to a civil penalty of not more than \$100,000. Each day of a continuing violation constitutes a separate violation.

(b) Regulations setting forth the procedures governing administrative proceedings for assessment of civil penalties, permit sanctions, and denials for enforcement reasons, issuance and use of written warnings, and release or forfeiture of seized property appear at 15 CFR part 904.

Response costs and damages

Under section 312 of the Act, any person who destroys, causes the loss of, or injures any Sanctuary resource is liable to the United States for response costs and damages resulting from such destruction, loss or injury, and any vessel used to destroy, cause the loss of, or injure any Sanctuary resource is liable *in rem* to the United States for response costs and damages resulting from such destruction, loss or injury.

Permits - application procedures and issuance criteria

(a) National Marine Sanctuary General Permit (Refer to the full set of regulations for application procedures and issuance criteria for permits)

(b) National Marine Sanctuary Survey/Inventory of Historical Resources Permit (Refer to the full set of regulations for application procedures and issuance criteria for permits)

(c) National Marine Sanctuary Research/Recovery of Sanctuary Historical Resources Permit (Refer to the full set of regulations for application procedures and issuance criteria for permits)

(d) National Marine Sanctuary Special-use Permit (Refer to the full set of regulations for application procedures and issuance criteria for permits)

Certification of preexisting leases, licenses, permits, approvals, other authorizations, or rights to conduct a prohibited activity

A person may conduct a prohibited activity if such activity is specifically authorized by a valid Federal, State, or local lease, permit, license, approval, or other authorization in existence on the effective date of these regulations, or by any valid right of subsistence use or access in existence on the effective date of these regulations. (For details of restrictions please refer to the full set of regulations)

Notification and review of applications for leases, licenses, permits, approvals, or other authorizations to conduct a prohibited activity

A person may conduct a prohibited activity if such activity is specifically authorized by any valid Federal, State, or local lease, permit, license, approval, or other authorization issued after the effective date of these regulations. (For details of restrictions please refer to the full set of regulations)

Appeals of administrative action

An appeal under paragraph (a) of this section must be in writing, state the action(s) by the Director appealed and the reason(s) for the appeal, and be received within 30 days of receipt of notice of the action by the Director.

Questions and Answers about the Florida Keys National Marine Sanctuary

Question #1 Can I SWIM, SNORKEL and SCUBA in the Sanctuary?

Answer With the exception of four research only areas, swimming, snorkeling and scuba diving are encouraged throughout the Sanctuary. Designated Sanctuary Preservation Areas and the Sambos Ecological Reserve are protected from most harvesting of marine life. These may be particularly attractive areas for those activities within the Sanctuary. The research areas total less than 1 square mile and require a scientific/monitoring research permit for access.

Question #2 Can I FISH in the Sanctuary?

Answer Fishing is allowed in 98% of the Sanctuary, consistent with existing Federal and State fisheries regulations. Fishing is only restricted within specific zones.

Question #3 How will the Sanctuary affect LANDOWNERS in the Florida Keys?

Answer Sanctuary regulations only apply in the marine environment, they do not apply to land-based activities.

Question #4 Will PERSONAL WATERCRAFT be regulated in the Sanctuary?

Answer Reckless boating behavior that endangers the safety of swimmers and boaters will not be tolerated regardless of the vessel. Recognizing that personal watercraft have been a particular concern in some areas of the Florida Keys, new no wake and idle zone rules for personal watercraft and other boats will address public safety concerns along residential shorelines. The Personal Watercraft Industry has been advised that it must improve safety education among users and that there may be a need to consider additional regulatory action if safety problems persist.

Question #5 How will the Sanctuary Management Plan improve WATER QUALITY in the Florida Keys?

Answer There is no higher priority for researchers and managers than improving water quality in the Florida Keys and Florida Bay. The management plan focuses on solutions for problems related to stormwater runoff, inadequate sewage treatment, marinas, live-aboards, landfills, hazardous spills, pesticides and herbicides.

Question #6 While these REGULATIONS appear to be reasonable, I am concerned that more restrictive regulations will be put in place in the future.

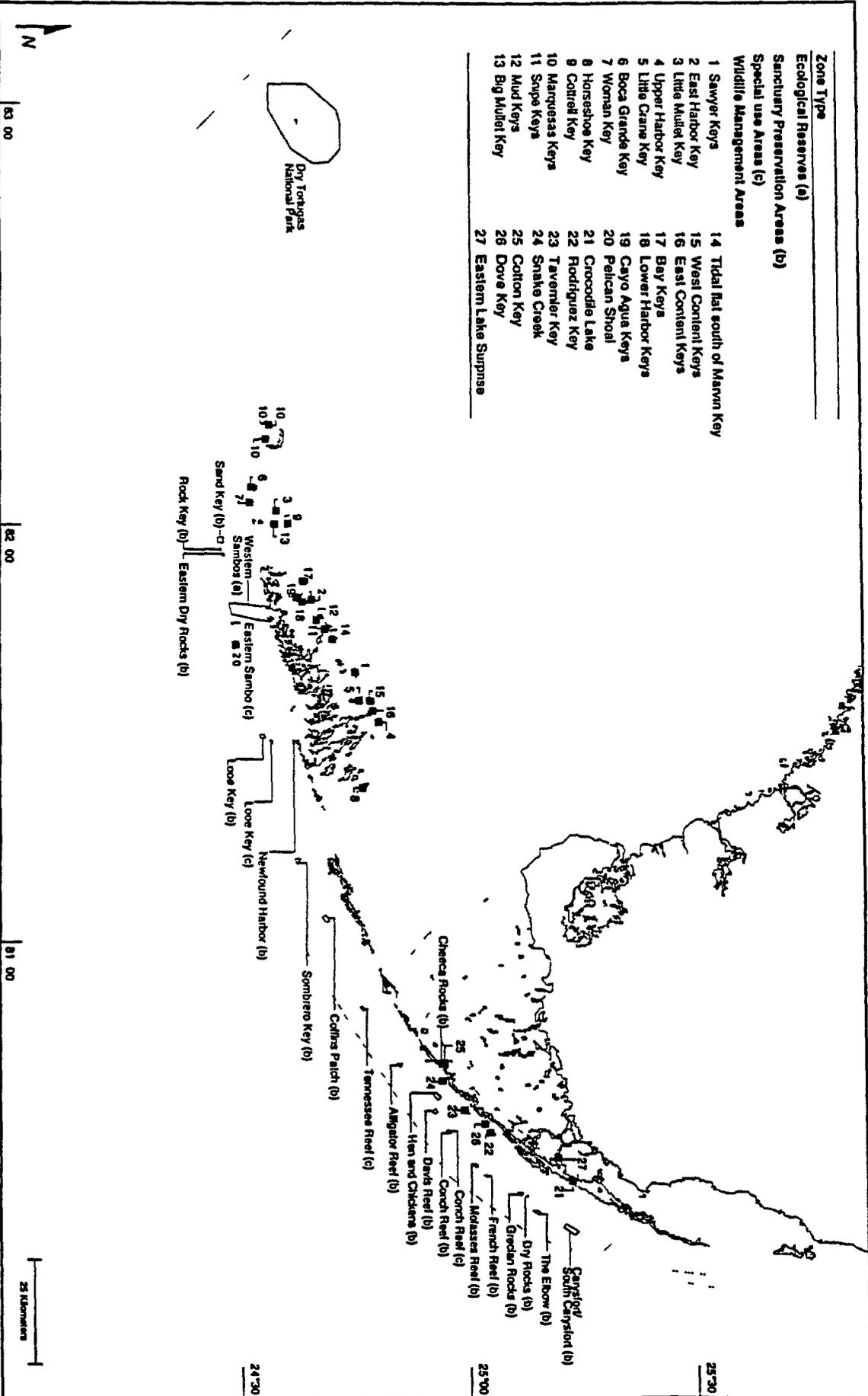
Answer Sanctuary Managers have very limited authority to unilaterally establish regulations. Except for restricted access to a limited area in the event of an emergency, all changes to Sanctuary regulations will require much the same process as the development of this final plan including public notice and comment before a change can occur. Even emergency closures will require consultation with the Governor who will have the ability to appeal closures in state waters.

Question #7 WHAT CAN I DO TO HELP PROTECT THE SANCTUARY?

Answer We can each make a difference in the effort to protect Sanctuary resources. Options available to us ranging from something as simple as making sure we use only bio-degradable products around the water to opportunities like joining one of our many volunteer efforts in the Sanctuary.

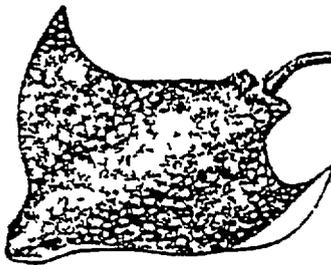
MARINE ZONING IN THE SANCTUARY

- Zone Type**
- Ecological Reserves (a)**
- Sanctuary Preservation Areas (b)**
- Special Use Areas (c)**
- Wildlife Management Areas**
- 1 Sawyer Keys
 - 2 East Harbor Key
 - 3 Little Mullet Key
 - 4 Upper Harbor Key
 - 5 Little Crane Key
 - 6 Boca Grande Key
 - 7 Woman Key
 - 8 Horseshoe Key
 - 9 Catrill Key
 - 10 Marquesas Keys
 - 11 Sopa Keys
 - 12 Mud Keys
 - 13 Big Mullet Key
 - 14 Tidal flat south of Manzan Key
 - 15 West Contenti Keys
 - 16 East Contenti Keys
 - 17 Bay Keys
 - 18 Lower Harbor Keys
 - 19 Cayo Agua Keys
 - 20 Pelican Shoal
 - 21 Crocodile Lake
 - 22 Rodriguez Key
 - 23 Tavernier Key
 - 24 Snake Creek
 - 25 Cotton Key
 - 26 Dove Key
 - 27 Eastern Lake Surprise



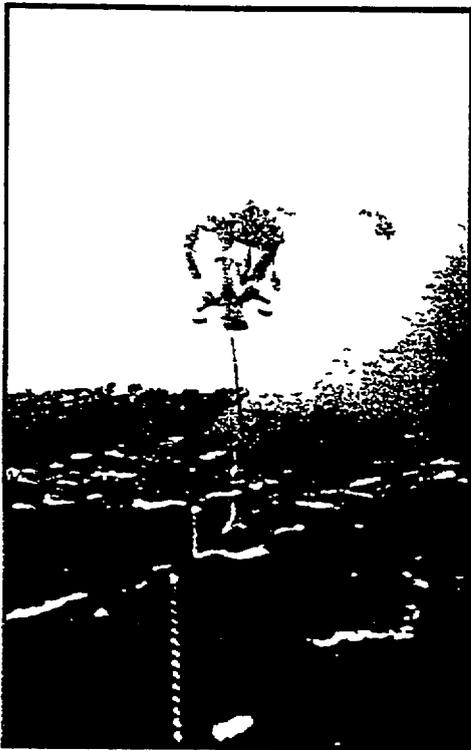


FLORIDA KEYS
NATIONAL MARINE
SANCTUARY



Sounding Line

Volume 5 Number 1



A Banner Year for Research and Monitoring in the Sanctuary

While most of the news this past year has focused on the political aspects of the Florida Keys National Marine Sanctuary with the release of the final management plan and the lively debate over some of its contents, the Sanctuary has continued quietly doing what it does best: educating and facilitating research.

It may surprise some people to know how little long-term research has been conducted in our complex coral reef ecosystem. Much of what we know has been anecdotal. With the quick decline of water quality and the troubles that have plagued Florida Bay, the Water Quality Protection Program -- a crucial component of the Sanctuary -- has set a spectrum of study on its way. Better baseline data means better responses to crisis, and better management decisions that affect the long-term health of the reef and its surrounding ecosystem.

The Coral Reef and Hardbottom Habitat Monitoring Project promises to provide much-needed data about the growth of coral and the effects of water quality on that growth. It has been over a year since the monitoring stations

In This Issue

- **FKNMS Provides Support for Numerous Research Projects**
- **Update on Special Studies for Water Quality Protection Program**
- **Coast Weeks Come to the Keys for a Coastal Cleanup**



Continued on page 2



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were installed and a number of video and photo transects have been collected. These periodic measurements of life along the reef tract will be the backbone of future decisions.

Another project may seem more glamorous in this world of high tech using satellites to monitor and site coral monitoring stations. This technology is so precise that a satellite image can differentiate various coral species!

But coral monitoring is not the only science happening in the Sanctuary. Two studies focused their efforts on the sex life of nurse sharks. Doctors Jose Castro and Jeff Carrier conducted their research with the support of Sanctuary staff and vessels.

The influence of Florida Bay and wastewater on our nearshore waters is the focus of eight on-going special studies projects that are part of the Water Quality Protection Program. These projects are tackling some of the toughest issues threatening the Keys marine environment. Three projects are addressing the fate and effect of wastewater discharged in injection wells. Others are investigating environmental factors which may influence the amount of nutrient rich wastewater that enters surface water. Still others are investigating whether nearshore organisms can be used as sensitive measures of nutrient enrichment. Two others are looking at the movement of groundwater and currents in the major tidal passes to determine trends and influences.

Demonstration projects are a crucial step in making responsible informed decisions. This is especially true when looking at the expensive and controversial prospect of upgrading Keys wastewater treatment methods to protect and improve water quality. One such project is underway at the Big Pine Key Road Prison. The project is taking advantage of the predictable flow of wastewater at the prison to compare the effectiveness of five different systems designed to reduce nutrient output.

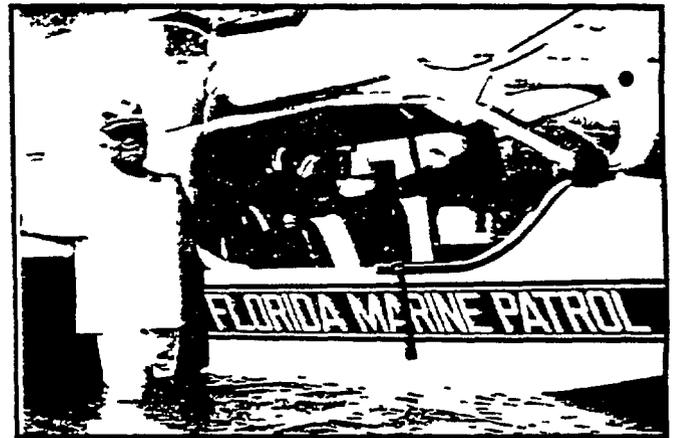
While much of the monitoring is providing baseline data for the long term, other scientists have had to respond to immediate problems. Coral diseases are often quick to develop and can devastate a colony in a matter of months or even weeks. This past summer saw an outbreak of what is unofficially being called "white plague II" a disease that progresses rapidly, leaving dead white coral tissue in its wake.

Scientists responded quickly taking samples of the diseased coral in hopes of identifying the pathogen that is killing the animals. Other diseases are being monitored closely as well. Black band disease, identified in 1983, continues to crop up during the warmer months, and Sanctuary scientists use successful methods to treat the affected coral heads.

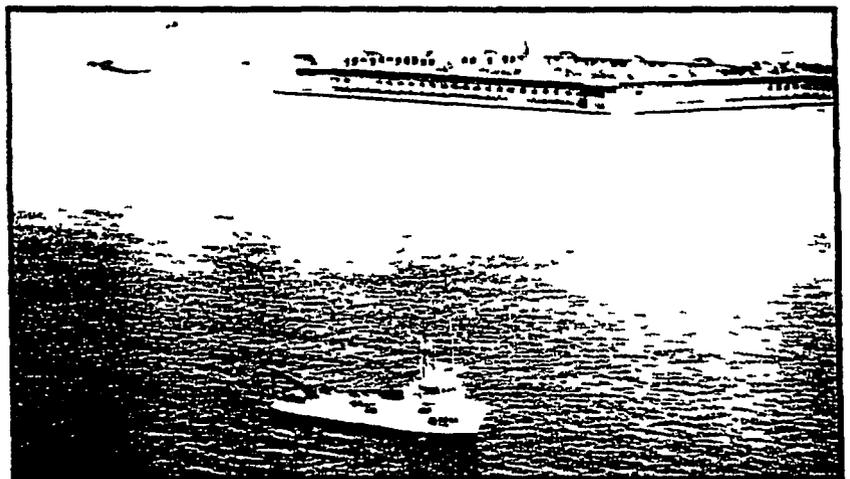
So, while some are questioning what the Sanctuary will do, it's important to know what the Sanctuary is doing to protect and preserve our coral reef ecosystem for this and future generation.



Video monitoring of coral and other benthic organisms is an important first step in understanding this unique marine ecosystem.

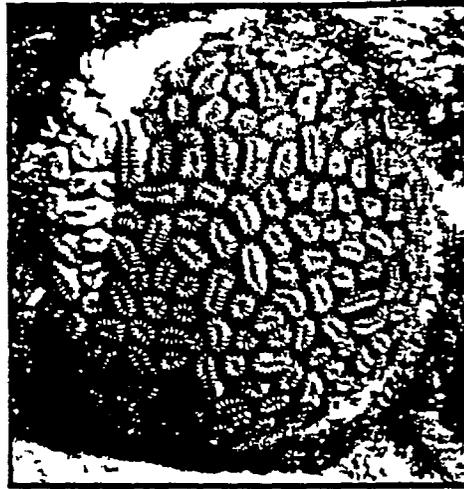


Teamwork is the key. NOAA Chief Scientist Michael Crosby was supported in his work by the Florida Marine Patrol.



Dr Crosby's project, as well as the coral monitoring program meshed aboard the NOAA vessel Ferrell. Although the projects were underway in the Sanctuary, a visit to Ft. Jefferson at the Dry Tortugas National Park was warranted!

Deborah Santavy, whose expertise in coral pathology first identified black band disease, responded immediately to the new and devastating coral disease being called white plague II. She hopes to uncover the cause of the disease and come closer to finding a cure.



This disease affects a coral head from the bottom up, moving at an alarming rate.

Reducing Results

Principal investigators of eight projects funded by the Environmental Protection Agency (EPA) and the South Florida Water Management District presented updates of their findings to the Water Quality Protection Program Technical Advisory Committee (TAC).

The first day of a two-day TAC meeting focused on these updates. The projects address the cause and effect linkages between sources of pollution and water quality in the Florida Keys National Marine Sanctuary. Some of the studies have explored the transport of pollutants through groundwater seepage and transport of tracers from injection wells, as well as studies to determine whether various algae and other organisms can serve as reliable measures of nutrient enrichment.

After a year of data collection, these studies are beginning to indicate trends in some cases. In others, the studies are showing just how complex the water quality issues affecting the Keys really are.

Studies measuring high nutrient levels in the tissues of algae -- both the larger plant-like macro algae and the tiny algae that live within the coral polyps -- show a trend of high nutrients in both nearshore and offshore samplings. Still, warns Harbor Branch



EPA's Fred McManus and Bill Kruczynski tour the wastewater demonstration project on Big Pine Key.

researcher Dr. Clayton Cook, the reasons for this might be can range from a response to cloudy water to higher levels of nutrients in the water column. Cook's study is exploring whether corals' symbiotic algae will be a good indicator of nutrient enrichment.

Dr. Jeffrey Granton, whose project is measuring the seepage flow of natural tracers from injection wells, likened pinpointing nutrient sources to "convicting O.J. There's lots of circumstantial evidence, but ultimately, you have to make up your own mind."

In addition to the eight special studies, the Water Quality Protection Program is funding and participating in a pilot study on wastewater treatment

alternatives in the Florida Keys. TAC members visited the demonstration project houses at the road prison on Big Pine Key. The project is exploring five different innovative methods of reducing nutrients in onsite wastewater systems.

The second day of the meeting was set aside to explore the projects to be funded for next year. Of the \$550,000 provided by the EPA, the TAC decided to set aside \$30,000 to produce and print a "primer" on water quality issues in the Keys. The layman's guide will summarize all the known data on water quality issues so that the general public can become more involved in the solutions.

The remainder of the funds will be used for further research projects. In addition to possibly continuing research projects from last year's Florida Bay and wastewater issues, the TAC will be requesting proposals on the following subjects: coral diseases, public health issues in residential canals, and the effect of mosquito spraying on marine areas.

As the proposals come in, they will be subject to a peer review process, then reviewed by the TAC. The Water Quality Steering Committee will have final approval of the projects funded for next year.

Coastal Cleanup a Great Success

The 10th annual International Coastal Cleanup was another huge success in pulling people together to collect debris off of our beaches. All the coastal areas within the Florida Keys were cleaned including each of the Adopt A Shore sites coordinated through "Clean Florida Keys"

Coco Plum Beach has been adopted by the Florida Keys National Marine Sanctuary and is cleaned twice a year by the adopting agency's staff. With 18 volunteers from both the sanctuary and St. Columba Episcopal Church, 1500 pounds of litter and debris were removed from the 1.5 mile stretch of shoreline.

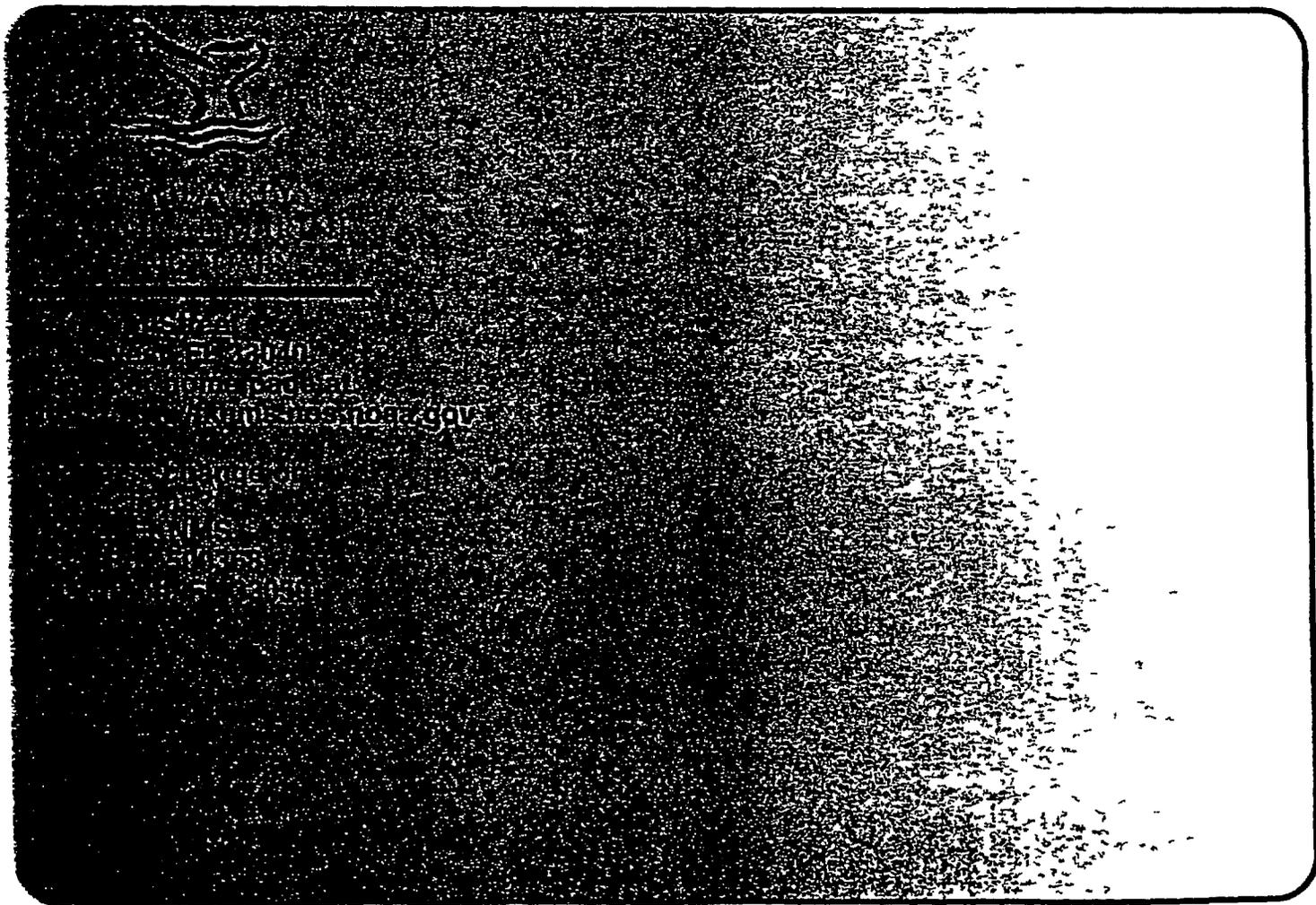
This annual cleanup is just one way that people can volunteer to make a difference in protecting the unique beauty of the Keys. Reef sweeps, water quality monitoring and involvement in educational programs like Coral Reef Classroom and Team OCEAN are great opportunities to make your mark in preserving our precious environment.

If you would like to join our team of volunteers, whether it be for a one-time only visit or on an on-going basis, please give our volunteer coordinators a call. You can talk to either Mary Enstrom or Fran Decker at 305, 743-2437.

Photo by Wendy Tegenhorst



FKNMS superintendent Billy Causey and 3rd grader Carrie Tatgenhorst help in the Coco Plum Cleanup





Florida Keys National Marine Sanctuary

Balancing the Economy and the Environment: it is Only Common Sense!

The following is the compilation of a series of columns that ran in the Key West Citizen They were written in response to some of the misinformation contained in Ed Swift's book entitled Common Sense Versus the Proposed Florida Keys National Marine Sanctuary in order to clarify the issues for the reading public

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- Ch 2: Sanctuary A Special Place, Deserving Of Special Attention
by Billy Causey
- Ch 3 Preserving And Sustaining Our Lifestyle
by Alyson Simmons
- Ch. 4-5 Without The Sanctuary, The End Is Closer Than You Think
by Billy Causey
- Ch 6 Don't Throw The Baby Out With The Bath Water!
by Alyson Simmons
- Ch. 7 Don't Change The Flavor By Mixing The Messages!
by Billy Causey
- Ch 8- Getting The Facts Out
by Alyson Simmons
- Ch 9 How A Thread Of Truth Becomes A Garment Of Misinformation
by Billy Causey
- Ch. 10: Marine Sanctuary Plan Is A Blueprint For More Effective
Efficient Government
by Billy Causey
- Ch 11-12 How Valuable Is Paradise . And Is It Worth Saving?
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Sanctuary: A Bottom's Up Approach!
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- Ch. 14: Commercial Fishermen Are Part Of The Process Too
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- Ch 15 Ecosystem Management. Fitting The Pieces Together
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- Ch 17 Finding Solutions To Urgent Problems
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by Billy Causey
- Ch. 19 Good Management Means Knowing Who Prefers The Train And Who
Prefers The Trolley
by Alyson Simmons
- Ch 20 EXCUSE Me Lady! Your Dog Buried My Bird Book!
by Billy Causey
- Ch. 21 The Truth About Areas of Environmental Stress
by Alyson Simmons
- Ch 22 "Reducing water pollution is a good idea." -- Well. . . Duh!
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by Billy Causey



Florida Keys National Marine Sanctuary

Final Insult to Our Living Coral Reefs Prompted Protection

Billy Causey

This is in response to an article that appeared in the Opinion section of last week's *Key West Citizen* entitled "Knee-jerk reactions don't usually solve problems "

No it was not a "knee-jerk" reaction that prompted the designation of the Florida Keys National Marine Sanctuary! It was the cumulative impacts of decades of various pressures on our vulnerable, living coral reefs that prompted Congress to give us the tools to manage and protect our nationally significant resource. The 3 ship groundings that were referred to in last week's article were the final insult on our living coral reefs, culminating a whole series of threats. The following is the chronology of only a decade of such threats.

In the summer of 1980, tens of thousands of reef fish began dying from Key Largo to Key West. Scientists never determined why there were wind rows of dead fish stretching for miles along the length of the Keys, but it was a wake-up call to those of us who love this magnificent environment. Coincidentally, it was in 1980 that the level of freshwater flowing down Taylor Slough to Florida Bay was essentially turned off, increasing the problems of drying up "the river of grass" that once flowed through the Everglades.

In the early 1980's the bridges along US 1 were widened and the Tourist Development Council was formed. The widened bridges made it easier to travel the length of the Keys, even for a day-trip, making it possible for our tourist economy to grow and have a positive impact on the Keys economy. These were improvements that were necessary to make travel safer, but increased traffic substantially.

In 1983, all of the shallow coral reefs turned white from Looe Key Reef all the way to Sand Key. The corals had been stressed to the point that they temporarily bleached.

Also in July of 1983, the long-spined sea urchin blight reached the Keys from the Caribbean, and this important algae-eater was essentially removed from our reefs. We're still witnessing the suffocating results of this loss as nutrient-fed algae smother our reefs.

In August of 1984 there were no restrictions on how close ships ran to the reef. Consequently a 450 ship ran aground on Molasses Reef in the Key Largo National Marine Sanctuary, due to a simple navigational error.

In 1986, scientists started reporting devastating outbreaks of black-band disease in the lower Keys. Coral heads that were over 200 years old died that summer. But this was just the beginning. Scientists had begun monitoring the health of our water quality and its impact on our reefs. It was clear that our nearshore waters were degrading because of a whole series of cascading events. Scientists pointed to

nutrient laden-waste water as the major contributor of this degradation

Simultaneously, tens of thousands of fishermen, divers and snorkelers were discovering the coral reefs of the Keys. Yet outside the existing Key Largo and Looe Key Sanctuaries and Pennekamp State Park, there were no specific management measures in place to address impacts to coral reefs from anchors, boat groundings, and direct contact by divers and snorkelers. The mooring buoy effort initiated by the National Marine Sanctuary Program and later joined by groups such as Reef Relief, was designed to reduce anchor damage on corals. This was important, because anchoring on coral is not prohibited outside the sanctuaries and park.

Again in 1987, we had a coral bleaching event in the Keys. This one was a global issue, another signal that our coral reefs were under assault from both environmental and human pressures. When managing a coral reef, it's difficult to distinguish between the two forms of stress, but it's obvious that the cumulative impact continues to push coral reefs to their limit. Who's here to manage all the reefs beyond Key Largo and Looe Key?

In about 1988, the debate over oil drilling off the Florida Keys was heating up. The sanctuaries were on record with the state and the environmental community, opposing oil drilling near the Keys. It was that year that Congress directed NOAA to investigate the expansion of the sanctuaries in the Florida Keys to protect more of our fragile environment.

Also in 1988 a group of 50 experts on coral reefs and their management gathered in Key Largo. They recommended "that action be taken immediately to initiate the necessary short and long term management, education, and research programs" to reverse the declining health of the Florida Keys reefs. In August of 1989, the devastating impact of the *Exxon Valdez* was yet another reminder to the state of Florida of what could happen if shipping traffic wasn't moved offshore. The state, sanctuary staff, and the US Coast Guard began working on establishing "an area to be avoided" along the length of the Keys.

It was only two months later, during an 18 day period, that we had 3 major ship groundings along our reef tract, all because ships could navigate as close as they wanted to. And believe me, they did! I was on the bridge of the two largest ships, following these groundings and was amazed at the gross navigational errors that had resulted in thousands of square yards of our living coral being pulverized. Reef markers weren't the problem, both ships had the markers in sight when they ran aground. They were just too close to respond!

No, it was not a "knee-jerk" reaction that prompted Congress to designate the Florida Keys National Marine Sanctuary! The 3 ship groundings on our living coral reefs were simply the LAST STRAW that prompted Congress to take action to protect our coral reef ecosystem for the enjoyment and economic stability of future generations.



Florida Keys National Marine Sanctuary

Sanctuary..... A Special Place, Deserving Of Special Attention

Billy Causey

In passing the Florida Keys National Marine Sanctuary and Protection Act in 1990, Congress declared that adjacent to the Florida Keys *"are located* spectacular, unique, and nationally significant marine environments, including *seagrass meadows, mangrove islands, and extensive living coral reefs* " They also declared that *"these marine environments give this area special national significance"* and are *"easily susceptible to damage from human activities, and possess high value to human beings if properly conserved"* National Marine Sanctuaries are designated to protect marine resources that are unique and possess high national significance Boundaries of marine sanctuaries only extend to the mean-high tide mark and do not include the land

The concept of National Marine Sanctuaries as a *"place"* seems to be left out of recent debates about the Florida Keys National Marine Sanctuary The Sanctuary is not a thing or *"bureaucratic goop,"* and it's not a collection of agencies, environmental groups, or user groups It's a very special place, deserving of protection for the use and enjoyment of present and future generations The waters and marine resources surrounding the Keys are unlike any other on earth and they need and deserve our immediate attention We can lose our coral reefs if the declines we've witnessed over the past two decades continue

When Congress designated the Sanctuary, they drew a line around this special area, and declared to the world that the marine resources of the Keys are special and unique They also selected an agency with experience in managing marine protected areas where the economy is highly dependent on healthy marine resources They selected a program internationally known for it's ability to manage marine resources for multiple uses, both recreational and commercial, a program that emphasizes an educational approach to management Congress declared in the Sanctuary Act that *" Nothing in this Act is intended to restrict activities that do not cause an adverse effect to the resources or property of the Sanctuary or that do not pose harm to users of the Sanctuary "*

The National Marine Sanctuary Program is not new to the Florida Keys The program has had a very successful 20 year history in the Keys, protecting some of the most heavily dived coral reefs in the world The Key Largo National Marine Sanctuary, designated in 1975, protects all the coral reefs along a 20 mile stretch of Key Largo The relationship of the Sanctuary with the business community has been excellent The Key Largo Chamber of Commerce continues to be a tremendous supporter of the Sanctuary where divers, dive operators, recreational and charter fishermen, and commercial fishermen continue to work and play

Looe Key National Marine Sanctuary was designated in 1981, following a very lengthy designation process where local businesses, divers, and commercial fishermen in the vicinity of Big Pine Key reacted in opposition Rumors, mis-information, and a basic misunderstanding of what a National Marine Sanctuary actually is were the fuels that fired lengthy debates Sound familiar? Shortly after Looe Key

started being managed, many of the fears such as commercial fishermen being "put out of business" disappeared. A good working relationship was established with the regular users of the Sanctuary and businesses dependent on a healthy coral reef continued to flourish.

During the past 15 years Looe Key and Key Largo NMS have been used as models for managing marine protected areas both domestically and internationally. This reputation was well known to the authors of the legislation that was passed to designate the FKNMS. The National Marine Sanctuary Program manages for continued compatible uses of the marine resources, both recreational and commercial. The goal of Marine Sanctuaries is to protect the marine resources while businesses that are economically dependent upon them continue to use those resources. This is the first step toward sustainability, but to be fully successful an integrated, comprehensive management plan and a water quality protection program must be in place.

National Marine Sanctuaries are known for their management through establishing partnerships. In Florida, the Sanctuary Program started "reinventing government" in 1980, by establishing a cooperative agreement with the State of Florida, Department of Natural Resources, for the management of Key Largo NMS and later, the Looe Key NMS. These were areas located entirely in federal waters, but managed by state staff, through 100% federal (NOAA) funding. Today, more than half of the Sanctuary staff are state employees paid entirely by federal funds. All of the education staff, Sanctuary Officers, and the lower Keys administration are conducted by state employees.

The concept of interagency partnerships has been expanded in the draft management plan for the FKNMS. Dozens of representatives from local, state, and federal agencies came to the table to assist in the development of the most comprehensive management plan ever attempted in a marine protected area. They also assisted in the development of the National Marine Sanctuary Program's first Water Quality Protection Plan. As a special place, I think the Keys are deserving of the best kind of management that could be afforded. There are many agencies involved in various management activities in the Keys. However, these activities have not been integrated in the past, and consequently there hasn't been a holistic approach to managing the fragile marine resources of the Keys. The benefits of integrated management are numerous including better protection of the marine resources, savings to taxpayers by agencies sharing resources, less duplication of efforts, opportunities for increased interagency coordination, and the list goes on. One example is that where we now have 3 sets of fishing regulations for recreational fishermen within the boundary of the Sanctuary, the fisheries management agencies have agreed to a protocol that will lead to one set of fishing regulations within the Sanctuary.

National Marine Sanctuaries do not usurp the authority or jurisdiction of other agencies within the boundary of the Sanctuary. Since 65% of the FKNMS lies in state waters, the state will continue to have its authority in state waters, and through a management agreement will have shared authority into federal waters.

Twice since 1984, there have been proposals by the State of Florida to manage the marine resources within the state waters of Monroe County. Each of the efforts would have addressed water quality problems in the near-shore waters of the Keys and each of the proposals could have prevented some of the water quality degradation that we have witnessed in the Keys. Yet, each of these proposals were met with the same kind of opposition from some of the same business leaders in Key West that are attacking the FKNMS. Specifically, those efforts were a proposed Aquatic Preserve for Monroe County in 1984 and a proposed Marine Reserve in 1990. What's wrong with this picture? Each time there were proposals that could have improved the health of our marine resources, they were met with strong opposition. Now, as a result of the decision made by a hearing officer, the Keys may be facing a building moratorium because the quality of our nearshore waters has degraded to the point that the waters cannot withstand any further degradation. We must have a comprehensive management plan and water quality protection.

program in place to save our coral reefs, restore the health of our marine resources, improve the quality of water throughout the Keys, and ultimately protect the economic future of the Keys. The place Congress has called a Sanctuary is the Keys to our future.



Florida Keys National Marine Sanctuary

Marine Sanctuary Plan Is A Blueprint For More Effective And Efficient Government

Billy Causey

Imagine a satellite photograph of the South Florida ecosystem, beginning above the Kissimmee River basin, including Lake Okeechobee, Big Cypress Swamp, the Everglades Agricultural Area, the Everglades, Florida Bay, and through the Florida Keys, all the way beyond the reef tract and the Dry Tortugas. Now, imagine this ecosystem broken up into pieces like a complicated puzzle, or like Humpty Dumpty after the big fall. Your vision should be an ecosystem segmented by 1200 miles of drainage canals, cities, towns, highways, roads, fences, developments, and agricultural lands, each of which are important to the built environment, but not without cost to the functions of the natural environment. Now, envision two tribes, 12 federal agencies, at least 7 state agencies, and a heap of local agencies with jurisdiction and responsibilities for management activities in this area. How in the world can we put all the pieces back together again?

It became obvious years ago that the agencies would never be successful in protecting their areas if they didn't communicate with their neighboring partners, and if their neighbors didn't communicate with those adjacent to them — and so on. Piecemeal management hasn't been successful, and as we squeeze more people into South Florida the challenges become even greater. That's why we started seeing terms creep into our literature such as "integrated management," "holistic approach to management," and "ecosystem management." These are just a few of the many buzz words and phrases describing the way resource managers need to apply their management tools in order to be successful. Resource managers are being forced to look upstream and beyond their boundaries at the sources of problems originating outside their area of jurisdiction. Not to mention the savings to taxpayers if the agencies started working together and sharing their limited resources and funding in such a way that duplication is reduced, or eliminated.

Well, what does this have to do with the draft management plan for the Florida Keys National Marine Sanctuary? The first important point to note is that in designating the Sanctuary, Congress recognized the importance of establishing a Sanctuary boundary that was of sufficient size and extent to include all of the marine communities necessary for maintaining a healthy coral reef. Another important point is that Congress was very clear in their directions to NOAA as to how to proceed in developing a draft plan for the Sanctuary. They directed NOAA to "ensure coordination and cooperation between Sanctuary managers and other Federal, State, and local authorities with jurisdiction within or adjacent to the Sanctuary." This wasn't by accident. Congress was aware that the major threat to the health of the coral reef was declining water quality, the sources of which are complex, but most assuredly originating upstream — in the direction of the Keys, Florida Bay, and South Florida. Congress was fully aware that, in order to be successful in preserving and protecting the living coral reef, the Sanctuary had to be managed through a partnership between all the agencies and the public. This partnership has been unique and has resulted in an integrated effort between agencies that is unlike anything ever done in this country. Some may poke fun at us, or criticize us for "the development of a comprehensive management plan that

represents a major departure from the nation's traditional approach to marine resource management " Fine, let the critics poke fun, be sarcastic, stretch the truth, spread fear, but the facts remain, status quo hasn't worked in the Florida Keys, or South Florida and Congress knew it when they drafted the legislation that designated the Sanctuary It seems those that fear the draft plan the most are those that have the most at stake if integrated planning works

Yes, everyone admits there are overlapping jurisdictions and authorities in the Florida Keys There are at least 26 agencies doing business down here Yet, are the waters clearer than they use to be, the corals healthier, conch more plentiful, habitats more intact, or can we declare victory over all the environmental woes, put our heads back in the sand and keep doing business as usual? Not!

The National Marine Sanctuary Program has had a presence in the Keys for 20 years and we have had a successful partnership with the State of Florida in managing Key Largo and Looe Key National Marine Sanctuaries Over half the Sanctuary staff are state employees, funded 100% by NOAA We have worked diligently to make this partnership work It has been a unique partnership where state employees have been charged with managing marine resources located in federal waters that in fact, lie beyond the jurisdictional boundary of the state, but whose health, speaking of the coral reef, is important to the local economy and the state, as a whole The Sanctuary program started giving authority back to the state a long time ago long before the current Congress began shifting authority back to the states We think this is good business and the draft management plan takes this partnership concept to greater lengths That's what interagency planning and an integrated approach will buy with your tax dollars, more coordination between programs, less duplication of efforts, and a common focus on priorities

Don't just take our word for the fact that this draft plan represents an integrated approach to planning An Ad Hoc Sanctuary Review Committee for Monroe County, headed up by Doug Gregory, just released their findings to the Board of County Commissioners The title of the report is "An Evaluation of the Potential Impacts of the Florida Keys National Marine Sanctuary Draft Plan on Monroe County Government " One statement in that report sums up the success of the integrated planning "A lot of the Sanctuary strategies are also included in the Monroe County Year 2010 Comprehensive Plan (Comp Plan) as a goal, objective, or policy, and such strategies or associated activities were not considered to represent an additional burden to county government above the already required Comp Plan In fact, Federal, and State funds allocated to these tasks may represent a significant cost savings to the county " In light of this conclusion, we would like to point out that Monroe County, DCA, and DEP were among the Core Group members who helped integrate the management tools in the draft plan with already mandated activities for the county

Congress directed NOAA to make this a public process, and we did The public process used to develop the draft management plan for the Sanctuary is unprecedented in the history of coastal planning in the United States, and probably the world This achievement was recognized recently in a report that was released by the United States General Accounting Office (October 1995) The report stated "the task force (South Florida Ecosystem Restoration Task Force) should develop a strategy to improve collaboration with nonfederal stakeholders in coordinating environmental restoration activities in South Florida and should view as examples the process (es) used by NOAA to develop a comprehensive management plan for the Florida Keys National Marine Sanctuary " We're proud of this recognition and would like to share our feelings with all of those in the public, such as our Sanctuary Advisory Council, countless regular attendees at planning meetings, and other citizens that have given of their time to help draft this plan It has truly been a team effort

The purpose of having such a lengthy planning process was to get more people (stakeholders) at the table to make this the very best draft plan possible Now, we've had a lengthy review period with the Sanctuary Advisory Council holding almost continuous working group meetings to increase the base of

public involvement In addition, we just finished holding 6 public hearings on the draft plan, 5 more than required by law All of this is to enable us to achieve effectively and efficiently our goal of marine protection in the Florida Keys

As a final note, I would like to address statements claiming that the Sanctuary Advisory Council is "housed and fed" by the Sanctuary They are not These selfless representatives of the people who use Sanctuary resources invest numerous hours voluntarily and travel at their own expense in order to assure that their constituency is well represented in this process There are fishermen, dive operators, and others who could be out on the water making a living who instead come together at the table to help hammer out a Management Plan that everyone can live with

Public Participation In The Florida Keys National Marine Sanctuary: A Bottom's Up Approach!

Billy Causey

The Act that designated the Florida Keys National Marine Sanctuary called for planners to "*provide for participation by the general public in development of the comprehensive management plan*" In addition, the Act called for the appointment of a Sanctuary Advisory Council to assist in the development of the draft management plan These two requirements were put in the Act to assure a bottoms up process, involving the public -- where the public sets the agenda rather than Washington DC

Instead of a process where management actions are developed predominately from the top down (from Washington to the field), we changed the way government does business The method used to develop the draft management plan for the Sanctuary has been the most public process ever attempted in this country, and probably the world We have involved the public in every step of the plan development

In fact, in late 1991, following a series of five workshops that covered everything from education to treasure hunting, and involving hundreds of public participants, one of our attorneys informed us that we had already exceeded the legal requirements for public participation This was several months before our Sanctuary Advisory Council (SAC) had been convened for their first meeting Since then the Advisory Council has held several dozen regular meetings and dozens of subcommittee meetings Each of which have allowed for public comment twice each day

Has anyone been listening? The answer is yes, but who is being heard? The controversial Zoning Action Plan is a good example of the wide range of requests that were heard The proposed zoning plan in the draft plan contained 100% of what the SAC recommended to the planners However, the environmental and scientific community had asked that 30% of the Sanctuary be set aside as "no take areas," while the fishing community only wanted the tops of the shallow reefs, less than 1%, be set aside as "no take" areas The first draft by the Interagency Core Group had proposed over 12% as "no take" The proposed area contained in the draft plan passed by the SAC was less than 6%, over one-half less than what the agencies were seeking, and less than one-quarter what the environmental and scientific community were requesting So, ask yourself, was the public heard? The answer is yes The SAC's recommendation was closer to what the fishermen were asking than what the environmental and scientific communities were requesting In short, the democratic process is messy Compromise means not everyone will get 100% of what they've asked for, especially when the interests involved are so different

Am I exaggerating about the level of public participation in the development of the plan? Decide for yourself in October 1995 the United States General Accounting Office released a report to Congress The report was titled "*Restoring the Everglades - Public Participation in Federal Efforts*" The report contained a draft recommendation that stated "The task force (South Florida Ecosystem Restoration Task Force) should develop a strategy to improve collaboration with nonfederal stakeholders in coordinating environmental restoration activities in South Florida and should view as examples the processes used by NOAA to develop a comprehensive management plan for the Florida Keys National Marine Sanctuary "

The SAC had an advisory role in the development of the draft management plan The planners followed 100% of their advise on the zoning and over 95% of the tools for managing the Sanctuary The SAC selected and voted on the preferred alternative for managing the Sanctuary The planners took the

proposed management tools and incorporated them into action plans. The action plans were the focus of the SAC's review of the draft plan over the past 9 months. Once again, with the close of the public comment on December 31, the SAC has again offered their advice to the Sanctuary planners. A major difference this time is that over 5,700 letters from the public have been received, offering their advice too.

Additionally, we were required to hold one public hearing on the draft plan. Instead, we held 6 public hearings scattered throughout the Keys, Miami, St. Petersburg, and Washington. Once again, our intent was to get the greatest amount of public input in order to make this the best plan possible. Organizing and holding these public hearings were far too exhausting to do for "show" as Mr. Swift has suggested. We listened, we took notes, and the meetings were recorded by court reporters. The next step is to prepare responses to the public comments from the transcripts.

In this response to Mr. Swift's Chapter 13, it's difficult to not respond to his digs at the way government bureaucracies do business. However, I have to admit, they are sometimes very frustrating. That's why in the Florida Keys and the South Florida ecosystem, the agencies are changing the way we work with one another. Hopefully, this will lead to better, more efficient government.

I know that it's hard to imagine that consensus is possible when so many diverse interests are at hand. But the current trend in South Florida like the Governor's Commission for a Sustainable South Florida and the South Florida Ecosystem Restoration Task Force are succeeding in bringing a broad range of interest to the table to agree on common goals. It's not an easy process, and it doesn't happen overnight. But the fact is, government, industry, and the public are learning that the only way we're going to ensure that our environment and economy survive for another generation is to hammer out solutions together.

These efforts are unique, and the eyes of the country are turned to South Florida. It's easy to sit back and dismiss this hard work as window dressing. But a closer look at the individuals involved, from the volunteer hours invested by the SAC to the workload above their regular duties that government, industry and tribal representatives take on, show that these so-called bureaucrats are dedicated to finding solutions to very real problems. Some individuals may prefer to sit back and accuse these people of perpetuating nothing more than their own jobs, but, in my opinion, people who can dismiss this difficult, ground-breaking work may just be trying to perpetuate the status quo for their own agendas.

One thing is clear: simply complaining about the way agencies do their job won't accomplish anything. It takes actions. We're working in a period of lean budgets and growing demand on the environment and the economy. We have to stretch the taxpayers' dollars, while protecting and preserving the fragile living coral reef of the Florida Keys. This is going to take planning, public and agency partnership, and action. Preserving these resources for the enjoyment, pleasure, and use of future generations is going to take a lot of action and less talk. Let's work together to accomplish these desired results.



Florida Keys National Marine Sanctuary

Commercial Fishermen Are Part Of The Process Too Alyson Simmons

As the pendulum of public sentiment swings toward a more careful and conservative government, a concept of balance has gained momentum. One of the most exciting aspects of the National Marine Sanctuary program is its overall mission of resource protection while sustaining a healthy economy.

In an area like the Keys -- where fishing and tourism and diving rely on a thriving environment -- this concept of balance is crucial.

Within the legislation designating the Florida Keys National Marine Sanctuary (FKNMS), Congress spelled out very clearly this environmental-economic link:

"It is the policy of the United States to protect and preserve living and other resources of the Florida Keys marine environment. The purpose of the Act is to protect the resources of the area described in section 5(b), to educate and interpret for the public regarding the Florida Keys marine environment, and to manage such human uses of the Sanctuary consistent with this Act. Nothing in this Act is intended to restrict activities that do not cause and adverse effect to the resources or property of the Sanctuary or that do not pose harm to users of the Sanctuary."

It is this goal of sustained uses that directed the creation of the Draft Management Plan. And despite absurd accusations that the plan singles out the fishermen as "vandals" or "bad guys," it is just common sense that balancing environmental protection and commercial use of our resource will guarantee that future generations of fishermen will be able to make a living here.

This is why the Water Quality and the Education Action Plans are two of the most important aspects of the plan. As population and use of these delicate resources increase, our water quality is suffering. By addressing this immediately, the sanctuary can insure a healthy future for local business and recreation. By bringing federal dollars to this national treasure, the sanctuary can also be a means of addressing priority issues like wastewater treatment without expecting the already stressed local residents to foot the bill.

The increased number of visitors and residents also means that they need to be reached so that they don't adversely impact the resource. This is where education -- traditional education and public outreach -- are crucial for protecting the habitat. Many visitors to the area have little idea how to best treat this unique habitat, and we need to educate them in order to protect the ecosystem.

Undoubtedly, without the programs initiated by the Sanctuary, such as the water quality protection program and habitat protection, the economy of the Keys will decline. The nearly 2 billion dollar economy is based almost entirely on a healthy environment. Without the sanctuary, the marine environment will probably decline, with a resultant decline in the economy.

Most of the controversy surrounding the draft management plan (aside from the furor generated by unfounded rumors) is a result of the marine zoning strategies that have been proposed. This action plan proposes that 6% of the 2800 square nautical miles of the FKNMS be set aside as no-harvest zones. It is understandable that fishermen are concerned about the impact this strategy will have on their livelihoods.

This concern is one of the reasons that drafting the management plan has taken the time and effort it has. Extensive aerial surveys, scoping meetings, and Sanctuary Advisory Council (SAC) meetings all helped shape the proposed zones. And, still, the shaping of them continues. We have just completed nine months of collecting public comment, both written and oral. In addition to your direct comments, the SAC held countless workshops to help them formulate their recommendations on the draft plan. During that time sanctuary staff went out on the water with commercial fishermen and charter operators to see exactly where they netted their ballyhoo, where they laid their traps. Now all of this input is being reviewed for incorporation into the final management plan.

Despite "recent history of federal regulation" the fact remains that the FKNMS is working with the fishermen so that their livelihoods can be protected along with the resource. Mr. Swifts' chapter 14 sets forth a "them versus us" paradigm that is counter-productive and generates fear. It is important to become familiar with the facts, and I have tried to get past this destructive posturing in order to encourage everyone to become involved in the planning process so that their concerns could be heard. Judging from the sheer numbers of comments we received, most people understand this and chose to get involved. By understanding that our economy is reliant upon a healthy environment, it is common sense that there is no "us and them." There is only "us," and we need to take responsibility for our own and for our children's future.



Florida Keys National Marine Sanctuary

Ecosystem Management: Fitting The Pieces Together

Billy Causey

Picture, if you will, a jigsaw puzzle on a table top. You've just dumped it from its box, and the pieces lay in a random pile. You can't tell by looking at this disconnected mass of jagged pieces that together they create a picture. But when you fit them together, finding where those jagged edges dovetail into another piece, the overall picture becomes clear. And once all of the pieces mesh with each of the other pieces, the random color that each piece bears becomes an integral part of the overall picture.

Over many years, concern for our unique and fragile Keys environment has prompted various government agencies to designate protected areas here in the Keys. As another part of the ecosystem became threatened or vulnerable, another piece of the agency puzzle was created.

As time passed, we have learned that, no matter how intensely you manage one piece of the ecosystem, it is still affected by surrounding impacts. And so the concept of fitting these pieces of the puzzle together for an overall goal of resource protection seemed the only way to address the broad array of impacts that are affecting the waters surrounding the Keys. The sanctuary is a place where the various agencies, whose goals and missions vary according to the piece of the puzzle they are designated to protect, can work together on the common goal of protecting our resources. NOAA is the hand that fits the puzzle together for the big picture of a sustained ecosystem.

The advantage of pulling these efforts toward one goal is clear. While each agency specializes in a particular aspect of resource management, a blueprint for sustainability helps each keep the big picture in focus while accomplishing their own missions. It's called coordination, and it avoids duplicative efforts and saves time and money.

Until the designation of the Florida Keys National Marine Sanctuary in 1990, the jigsaw puzzle of existing areas in south Florida did not encompass one very important part of the environment -- the reef itself. Most of the 220 mile long reef tract falls beyond state waters, and, with the exception of the Key Largo and Looe Key National Marine Sanctuaries, was virtually unprotected. The designation of the FKNMS, and the development of a comprehensive management plan, make it possible to address impacts to the reef. An added bonus is the national significance that designation brings, drawing federal dollars down that can help us address the key issues that are affecting the reef.

Just about anyone you talk to in the Keys will agree that declining water quality is one of -- if not the most -- crucial issue that must be addressed in order to keep our environment (and thus our economy) healthy and strong. The Water Quality Protection Program is one of the most significant steps forward in stopping and reversing the deteriorating water quality. And while Mr. Swift's chapter bemoans the establishment of an EPA office here in the Keys, this is an unprecedented opportunity for the residents of the Keys. The EPA brings with its office a national level of concern and funding that translates into critical research, necessary demonstration projects, and federal funding to begin reversing the decline.

But the Water Quality Protection Program is just one facet of what the FKNMS is doing to ensure the health and longevity of our marine resources. Channel marking is an on-going project that we, in partnership with other agencies, are continuing to improve. The mooring buoy system on the more heavily-used reefs helps protect living coral against inadvertent anchor damage.

The on-going projects are almost too numerous to mention here. Within the last month, a series of grants were let to Monroe County environmental educators for a variety of science projects for their students. This is the second year that educator grants have helped local teachers expand their curriculum. Team O C E A N -- a volunteer project that gets locals out on the water to provide visiting boaters with information -- will be expanding from Key Largo to include the Looe Key area. And Coral Reef Classroom will be beginning another successful spring of training local 8th graders how to use oceanographic tools and to identify marine species.

Our priority has always been protecting the living coral reef for future generations. The National Marine Sanctuary Program has twenty years of successful resource management in the Key Largo Marine Sanctuary, and fifteen at Looe Key. The concepts of cooperation, of habitat protection, and of sustainability are not new ones. Now, with the FKNMS, we have an opportunity to address the bigger picture of ecosystem management. And our goal continues to be the protection of this rare and delicate treasure for future generations.



Florida Keys National Marine Sanctuary

Working With Partners To Protect Our Resources

Alyson Simmons

Carrying capacity and visitor use surveys are two different concepts. The visitor use survey currently under way is an unprecedented partnership between the Monroe County Tourist Development Council, The Nature Conservancy, the National Oceanic and Atmospheric Administration, and the Florida Keys National Marine Sanctuary.

This project is the result of a community meeting held in Key Largo in September of 1993. The people who participated included members of the chambers of commerce, private businesses, local governments, and local non-profit organizations. The meeting was organized at the request of Spencer Slate, Chairman of the Keys Association of Dive Operators (KADO). The group discussed various information needs of the community and objectives they would like such a survey to achieve.

As a result of the joint proposal that NOAA, the TDC, and TNC submitted after this brainstorming session, a unique partnership project is underway that joins federal and local public agencies and a private non-profit organization.

The survey is not in any way aimed at establishing a carrying capacity on the reef, as Mr. Swift has misconstrued. The overall objectives are: 1) to estimate the market and non market values of recreation/tourism uses of the Keys marine resources, 2) to provide a practical demonstration of how both market and non market values of an ecosystem can be considered an integral component of the economy of a region when formulating sustainable development goals, and 3) to foster the goal of improving cooperative management processes.

The exciting aspect of this partnership is that the data compiled by the survey is crucial to every aspect of sustaining a viable economy for the Keys. These numbers and values have never been assessed at this level. The TDC has for years compiled estimates of the number of tourist visits to the Keys through the bed tax. But these numbers don't count the day-trippers who drive down US 1, nor do they include the ever-increasing number of people who disembark from the huge cruise ships in Key West Harbor. Finally, the survey will include a separate portion that assesses the values Monroe County residents place on the marine resources for recreational purposes.

And the survey takes the numbers a step further by assigning a value to a use. In other words, visitors and residents are asked to rate their enjoyment of various aspects of the marine resources, and assign satisfaction ratings regarding the facilities and the quality of the natural environment. The information gathered will tell all of us what draws people to the Keys, and what will keep them coming back. In addition, the survey will provide solid numbers about the economic contribution of both residents and visitors. The survey will shed light on the importance of water quality and the abundance and diversity of sealife as attractions for visitors engaged in water-based activities.

As early as 1983, sanctuary managers were conducting visitor head-counts to determine the highest use times in an area, and to schedule their presence accordingly. Visitor counts are not a new concept, and are necessary to be accountable for management strategies. Early numbers from the current study show that nearly 80 percent of our visitors participate in water-based activities while they're here, and 50 percent either dive or snorkel. These numbers are crucial for understanding the best way to approach management of marine resources.

The next part of Swift's chapter reiterates the misconception that sanctuary boundaries include the land of the Keys. As stated in the legislation that designated the FKNMS, the boundary of the sanctuary consists of all submerged lands and waters, from the mean high water mark to the outer boundary. The Florida Keys National Marine Sanctuary and Protection Act clearly states that the land above the mean high water mark is not within the boundary. Comments in the chapter stating that the law was written to "purposely include the densely-populated land of the Keys," are flat-out wrong.

Section "B" of Swift's article refers to fisheries issues and the 1976 Magnuson Act. That Act is designed to manage fisheries in federal waters, and State fisheries manage these issues in state waters. The various councils are thorough in addressing size and bag limits, fishing gear types, and seasons that fin and shell fish can be harvested. The FKNMS, how was established to manage the habitat that sustains these fisheries, and the biodiversity of our marine resources. While the draft plan addresses the various fisheries laws by establishing a protocol that would streamline the numerous jurisdictions within its boundaries, the primary concern is habitat protection.

In addition, none of these fisheries laws address -- outside of Key Largo and Looe Key NMS and Pennecamp State Park -- impacts to the coral reef. Standing on the coral, even throwing your anchor in the middle of living coral are not addressed by current law. The draft management plan, however, focuses on direct physical impact to our precious coral reef. Next to concerns over water quality, protection of our irreplaceable coral reef is an issue that is of utmost importance to all of us. Establishing regulations that address negative impacts is rudimentary in reaching this goal, as is an education program that helps people understand how devastating these impacts can be.

A strong and healthy economy here in the Keys is based upon a strong and healthy environment. A comprehensive management plan that protects our resources and pulls together the kinds of partnerships that the TDC, TNC, NOAA survey represents will help us all sustain our precious ecosystem.



Florida Keys National Marine Sanctuary

The Truth About Areas of Environmental Stress

Alyson Simmons

The South Florida ecosystem is a unique and fabulous combination of habitats. From pine rockland, through hardwood habitat and transitional wetlands, to nearshore seagrass beds, and finally the coral reef tract, this microcosm is a perfect example of the way in which interconnected but diverse habitats come together.

If you haven't had a chance to get to all of the volumes of the Draft Management Plan, and would like to learn a lot about this ecosystem, I strongly recommend perusing volume two, the draft environmental impact statement (DEIS). This required part of the document gives a great, comprehensive overview of our physical and natural environments. It explores the hydrology of our ecosystem, the effects of storm systems, the influence of water currents, and discusses the biological components of the various habitats. There is a first-time-ever description of the differences between the marine communities on the Gulf side of the Keys, which are more like those off the west coast of Florida, with those on the Ocean side of the Keys which are more tropical in nature, and resemble those of the rest of the Caribbean.

This document is an invaluable compilation of facts about our environment and is a rich reference. And, although none of the strategies proposed in the Draft Management Plan address human impacts to hardwood hammocks or sand beaches, the DEIS gives an in-depth description of these and many other habitats found throughout the ecosystem.

All of these habitats have been impacted by human influences, some more severely than others. Spurred by the rapid deterioration of many of these crucial components of our ecosystem, a number of restoration efforts are underway.

Two of the most exciting efforts are rooted in the fact that there is such a diversity of interests, both economic and agency-related, in South Florida. The South Florida Ecosystem Restoration Task Force and the Governor's Commission for a Sustainable South Florida bring all aspects of the area to the table to make consensus recommendations, to prioritize funding and concerns. This means that the Army Corps of Engineers, the Department of the Interior, EPA, NOAA, the Department of Agriculture, most of the other federal agencies, the South Florida Water Management District, all of the state agencies, the Seminoles and the Miccosukee, and even the sugar industry are among the users of these resources that are coming together to make our environment a sustainable one.

Mr. Swift specifically cited, in his Chapter 21, some of the impacts to hardwood hammocks. It is true that human activity is the largest single threat to this habitat -- a habitat that supports numerous species and is crucial to the overall health of the ecosystem, thus translating into being important to the overall economy of the region. Historically, land clearing has been the most severe impact to hardwood hammocks in the Keys. That's no surprise to anyone, and nowhere in the Draft Management Plan did we

suggest this practice continues today or needs to be regulated by NOAA. This is simply another example of the use of inferences in Mr. Swift's book to suggest NOAA is proposing something that it's not!

Additionally, Mr. Swift raised the issue of "exotic species" and stated, "Yet State or Federal money to do anything about exotics has not been forthcoming." Hardly! The US Army Corps of Engineers, the Department of Agriculture, the South Florida Water Management District, the US Fish and Wildlife Service, the National Park Service, and the list continues, are all involved in an enormous exotic species eradication program. Even Monroe County is eradicating exotics. Haven't you noticed the massive reduction in Australian pine in the Keys? Somebody is eradicating them and NOAA doesn't claim to be doing it, nor do we have the jurisdiction to require it!

The eradication of exotics has been identified as a high priority by the South Florida Ecosystem Restoration Task Force and the Governor's Commission for a Sustainable South Florida if we are to be successful in restoring this fabulous South Florida ecosystem for the use and enjoyment of future generations. The agencies are so committed to this effort that a quarantine facility will be constructed in the Everglades where investigations will be conducted on the long-term eradication of exotics by biological methods. The agencies feel this is the best approach since direct physical eradication is not accomplishing the task.

While the Florida Keys National Marine Sanctuary was designated to protect the marine habitats that surround the Florida Keys, there are other agencies who can help protect the rare hardwood hammocks that remain. Indeed, most have been set aside and protected by now. State and federal land acquisition of areas in Key Largo, Lignumvitae Key, Windley Key, Long Key, and Big Pine Key have insured the sustaining of these fabulous areas. In addition, private conservation organizations have acquired smaller tracts. And the county, too, addresses the removal of hardwood hammocks for development.

Next, Swift addressed protecting sandy beaches in the Keys from everything from development to shipping impacts and protection of beach nesting sites for turtles and birds. He goes on to cite the various agencies that already address the various levels of protection necessary.

What Mr. Swift has done in this odd chapter is point out the extreme importance of cooperation among management areas. This complex ecosystem is a delicate balance of habitats and of the species that rely upon them. The predominant species within this ecosystem is also the one that has the most impact -- but also has the power to reverse the decline and restore the natural balance: the human species.

By the way, just as we have found other quotes that were made in Mr. Swift's book that did not appear in the Draft Management Plan, but were implied to be in the draft, those of us who are familiar with the draft plan can't seem to find the quotes he used in his chapter 21. Another clue that makes us suspicious of the source of these citations is the misspelling of *Melaleuca* and the fragmented sentence at the bottom of page 103. That doesn't mean we are not capable of misspellings or fragmented sentences, but these are totally unfamiliar statements to some of us.

So, I'll answer Mr. Swift's question with another: what's the point of this tirade? Can't we just all agree that exotics are a problem in South Florida and bulldozing our only hardwood hammocks (historically) wasn't always a good idea? It's clear that we all share a concern about the future of all that our environment represents, whether it be a healthy reef for our children to enjoy, or clear waters that sustain our economy.



Florida Keys National Marine Sanctuary

Your Marine Sanctuary Plan

Billy Causey

There are many different ideas about how the living coral reefs of the Florida Keys should be managed and protected for future generations. On one occasion, I heard Congressman Dante Fascell jokingly say he "once had a chance to establish a National Park from Miami to the Dry Tortugas." On another occasion, I had a person tell me the coral reefs and marine resources of the Keys are just fine and don't need any management. These are very different viewpoints, and for the past five years we have been working on a Marine Sanctuary Plan that balances these approaches to managing this nation's only living barrier coral reef. Nobody ever said it would be easy and, just for your information, it hasn't been.

The Congressional Act that designated the Florida Keys National Marine Sanctuary guaranteed local, state, and federal agency involvement in the development of the Marine Sanctuary Plan. The Act also called for public involvement through a Sanctuary Advisory Council and laid out the main components that should be considered in the Marine Sanctuary Plan. This Congressional "blueprint," along with literally hundreds of public meetings over the past 5 years, has helped provide the kind of balance needed to manage your Marine Sanctuary for decades to come.

Our coral reefs deserve and need the very best management available, not business as usual or empty promises. The following is just a summary of some of the management actions in the Marine Sanctuary.

First, the Marine Sanctuary Act immediately addressed two major concerns of the residents of the Florida Keys: the threat of oil drilling, and the threat of damage by large ship groundings. It placed an instant prohibition on oil drilling—including mineral and hydrocarbon leasing, exploration, development, or production—within the Marine Sanctuary boundary. The Act also created an internationally recognized area to be avoided (ATBA) for ships greater than 164' (50 m) in length, with special designated access corridors to allow ships into Keys ports. Today the ATBA provides a considerable buffer zone along the coral reef tract to protect it from oil spills and groundings by large vessels. This protection was not provided in the previously existing National or State Parks and Marine Sanctuaries whose coral reefs were constantly threatened by ship groundings prior to 1990.

The greatest challenge to protecting the natural resources of the Keys and the economy they support is restoring and preserving water quality. Congress heard the public concern over water quality in the Florida Keys and brought various agencies together to develop a comprehensive Water Quality Protection Program (WQPP) for the Marine Sanctuary. The program provides tools for improving water quality by identifying specific projects to determine sources of problems and using demonstration projects to assess the best available technology for treating wastewater. It also outlines research and monitoring projects to provide data for the best scientific basis for management decisions and a program to provide baseline data of our natural resources.

The national significance of the Sanctuary resources has attracted other federal and state agency interests in restoring the quality of the water in the Sanctuary. Other good news is that this means predominantly outside funding will be used to address water quality problems in the Keys.

As manager of Looe Key National Marine Sanctuary, I learned something about the importance of ecosystem management. No matter how intensively I managed that portion of reef tract, influences outside of Looe Key were having detrimental effects on the reef. It was a clear illustration of the importance of not partitioning off small segments of our ecosystem and managing them as if they existed in a vacuum. It showed how crucial it is for management agencies to address the larger picture if they are going to be successful in protecting our precious resources for sustained use.

Because of its national significance, the Marine Sanctuary has been integrated into the South Florida Ecosystem Restoration effort. This gives the Marine Sanctuary a role in addressing water quality issues that originate outside of its boundaries. This gives you -- the Keys resident, a say in what's affecting your Marine Sanctuary from South Florida. And it acknowledges that the reef tract is indeed a part (a downstream part!) of a larger, interrelated ecosystem.

The Act also called for a variety of management tools to protect and preserve the important marine resources of the Florida Keys.

Over the past few months, we've talked extensively about strategies for protecting your Sanctuary, strategies such as a channel/reef marking action plan that protects sensitive habitat from boating mishaps in heavily used areas, a channel/reef marking system, providing mooring buoys in sensitive habitats to protect against anchor damage, a research and monitoring program that coordinates scientific data necessary for effective management, a volunteer program that involves you and your neighbors in protecting Sanctuary resources, an enforcement program that coordinates with existing enforcement programs within the Sanctuary without having to establish a new enforcement entity, and a marine zoning plan that protects the Marine Sanctuary's resources by setting aside special areas where people can take their friends to see what a coral reef should look like without everything being harvested.

The Final Management Plan and Environmental Impact Statement for the Marine Sanctuary is due out in August. During the nine month public review of the draft plan we received over 6,400 oral and written comments on the plan. This includes comments from the Sanctuary Advisory Council and all of our interagency planning partners. And most of those comments came from you, the public, who cares so much not just about the coral reefs but all of the special marine resources of the Keys. We have attempted to balance everyone's concerns and interests to the best of our ability. Our sincere thanks go to all of you who have given us input throughout the planning process, regardless of which side of an issue you were on. It's because of your help, that your Marine Sanctuary Plan is the best ever produced.

Since this is the last Chapter we will be responding to in Mr. Swift's book, we would like to thank the Key West Citizen, its publisher, editors, and staff for giving us the opportunity to respond to each of Mr. Swift's chapters.

**THE NATURE CONSERVANCY:
FLORIDA KEYS INITIATIVE**

You Can Help

The Nature Conservancy can achieve its conservation goals in the Florida Keys only by forging partnerships with federal, state and local agencies, other organizations and concerned individuals throughout the region. Financial support from individuals, foundations and corporations is welcome. All gifts are tax-deductible.

To make a contribution, please contact

The Nature Conservancy
Florida Keys Initiative
201 Front Street, Suite 222
Key West, FL 33040
or call
(305) 296-3880



The Nature Conservancy is an international non-profit membership organization. Its mission is to preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

Since 1971, the Conservancy has protected more than 7,000 acres of critical habitat in the Florida Keys. An aggressive marine conservation program was begun in 1989 to address the challenges of the coral reef ecosystem and Florida Bay.

RECYCLED PAPER

ILLUSTRATIONS BY DIANE PIERLE





To protect the integrity of the only tropical ecosystem in the continental United States the Florida Chapter of The Nature Conservancy launched the Florida Keys Initiative in 1987. Designed to permanently safeguard threatened habitats and species throughout the fragile archipelago the program focuses on natural area protection and long-term management.

Goals of the Program

- To focus conservation efforts on the most ecologically significant sites
- To protect these sites through acquisition and effective stewardship
- To conserve Florida Bay and the coral reefs
- To guarantee long-term management and continued human use and enjoyment of protected areas

Protection Targets

Using scientific information the Florida Keys Initiative focuses on protecting areas of high ecological value. Its three priorities are the coral reef/Florida Bay ecosystem the pine rockland communities on Big Pine Key and tropical hardwood hammock communities found throughout the Keys.

The Coral Reef / Florida Bay

The coral reef — a delicate structure consisting of living corals — is the most diverse marine ecosystem. The 250-mile reef off the Florida Keys is the third largest in the world with more than 100 species of coral and 400 fish. However the reef is in decline. Water pollution heavy fishing and visitation — more than one million divers annually — are challenges that must be addressed.

Florida Bay was once a productive estuary that sheltered abundant plant and animal life. The seagrasses and sponges found there offer a critical nursery ground for many marine species including pink shrimp once the Keys most valuable fishery. But the Bay is now on the verge of ecological collapse. Fisheries and wading bird populations have declined dramatically. Scientific research shows that the conditions in Florida Bay are affecting the health of the coral reef as well. A critical need is to restore the historic freshwater flows to the Bay from the Everglades.

Thanks to efforts of The Nature Conservancy and others the waters of the Florida Keys were designated a National

Marine Sanctuary. Now an effective management plan must be developed to protect the fragile ecosystem and allow continued use and enjoyment of the coral reef and Florida Bay.

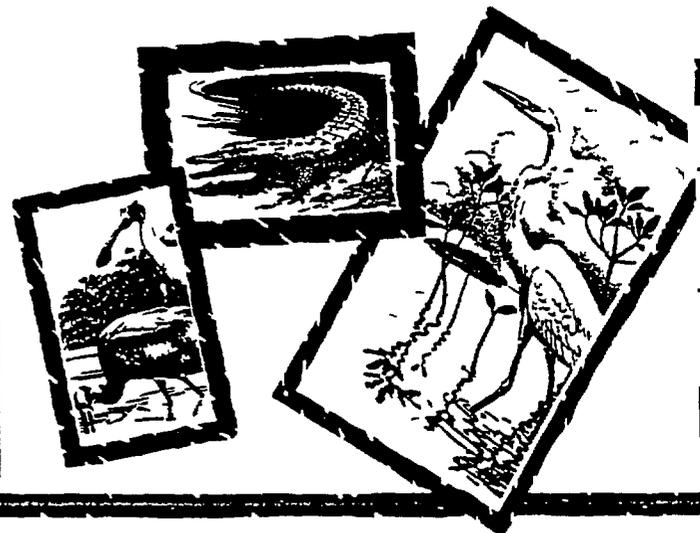
Pine Rocklands / Big Pine Key

The rare plant community known as pine rockland sustains dozens of rare and endemic species. In the Keys pine rocklands are found only in the lower Keys. On Big Pine Key the National Key Deer Refuge established in 1957 to preserve the natural habitat of the federally endangered Key deer shelters the majority of this community. To date The Nature Conservancy the U.S. Fish and Wildlife Service and the State of Florida have protected 7,500 acres but 1,300 acres of critical land still must be acquired to guarantee the viability of the pine rocklands and the Key deer. Intensive land management practices such as prescribed burning and exotics removal are crucial to protecting the ecological integrity of the area.

Tropical Hardwood Hammocks / North Key Largo

West Indian tropical hardwood hammocks are rare highly diverse communities found throughout the Keys. Sheltering nearly 200 plant and animal species they are also critical nesting and feeding areas for many migratory birds including the imperiled white-crowned pigeon.

The largest contiguous stand of hammock in the continental United States is found on North Key Largo. It provides habitat for a variety of endangered species including the American crocodile. In the past decade conservation efforts by The Nature Conservancy the U.S. Fish and Wildlife Service and the State of Florida have protected nearly 8,600 acres on North Key Largo but almost 2,000 acres remain at risk.



The Nature Conservancy®



FLORIDA K·E·Y·S INITIATIVE

Winter 1996

Florida Bay Watch Update

If you follow water quality issues in the Florida Keys, you've heard of Florida Bay Watch. The first rate force of volunteers who assist scientists by gathering water samples and data in Florida Bay and the waters of the Keys.

The program began in March of 1994 with seven volunteers responding to concerns about murky water and algae blooms in the Bay. Now over 140 fully trained volunteers supply scientists with information that meets approved quality assurance standards.

Fran Decker, the program's coordinator, does little recruiting. Committed volunteers enlist their friends and neighbors. Few leave the program — in fact, the original seven are still going strong.

Most Florida Bay Watch volunteers have lived in the Keys at least five years

and personally witnessed the deterioration of water quality. "Our volunteers are frightened, angry and deeply concerned about the Bay," says Decker. "In Bay Watch, they find a way to contribute."

Fred Tooker, a senior volunteer, has been fishing in the Bay since 1937. P. J. McMahon, the youngest volunteer, is a fifth grader who joined Bay Watch as part of a science fair project. Although the volunteers are a diverse group, concern about water quality is a common bond.

Florida Bay Watch remains committed to its original purposes: to assist research scientists and involve citizens in finding solutions to water quality problems. These goals have attracted widespread support.

Public partners include the South Florida Water Management District, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Florida Keys National Marine Sanctuary and Everglades National Park.

The Orvis Company has been the most important private supporter, matching substantial gifts from the Yamaha Miami Billfish Tournament, Cheeca Lodge and many individuals.

In the last year, Bay Watch has grown tremendously. Recently, the program added additional fixed stations so that near-shore water could be regularly sampled from Key Largo to Key West. The monthly aerial surveys and groundtruthing that cover Florida Bay will soon be extended to include the full length of the Keys.

Bay Watch is also focusing on sharing information. The Miami Herald prints maps of water conditions in Florida Bay updated monthly by the Florida Marine Institute and Bay Watch volunteers. The same maps are on display at the Key Largo public library.

Waterways, a weekly program on TCI Channel 5, often features Bay Watch volunteers.

The program's positive energy is epitomized by coordinator Fran Decker. She and her husband moved to the Keys seven years ago, after a three-year journey sailing around the Caribbean and Central America. Decker's background in biology propelled her toward The Nature Conservancy — where she began as a Conservancy volunteer.

When asked about the future of Florida Bay Watch, Decker says, "We will look to the scientists that we work with for direction. Our long-term goal is simply to remain useful."



Volunteers Fred Tooker and Paul Silverman help Bay Watch Coordinator Fran Decker test water clarity and color.

A Word from the Director



Dear Friends

Throughout the country significant achievements in conservation are happening at the community level. This is certainly true in the Florida Keys.

Opportunities are plentiful for residents to get involved in stewardship and decision-making. Residents of the Keys are taking the steps necessary to protect natural communities in order to ensure the health of human communities.

A remarkable increase in volunteerism is one example of local conservation efforts. Conservancy volunteers now contribute more than 15,000 hours per year, which represents an economic value of approximately \$200,000. Data collection, education, and hands-on protection are among the essential tasks that volunteers successfully undertake.

Citizens have also mobilized to shape public policy. Their testimony has influenced critical decisions regarding the Everglades, butterflylands, and Florida Bay. They have attended workshops, meetings, and public hearings regarding the Florida Keys National Marine Sanctuary's draft management plan. I fully expect to see the weight of community input reflected in the final plan.

Public involvement in conservation can be controversial. Difficult choices must often be made; many decisions have economic consequences and individual beliefs are deeply held. This potential for controversy creates a critical need for good information.

I see this as an essential role for the Conservancy's Florida Keys Initiative. Our job is to provide good scientific information so that citizen stewardship and public decision-making can produce the best possible conservation outcomes.

The Nature Conservancy's contribution to citizen involvement is only possible through the support of our members and donors. Thank you for helping.

Sincerely,

Mark L. Robertson

About the Conservancy

The mission of The Nature Conservancy is to preserve plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

To date, the Conservancy and its members have protected more than 9 million acres in 50 states and Canada. It has helped like-minded partner organizations preserve millions of acres in Latin America and the Caribbean.

In 1987, the Conservancy's Florida Chapter established the Florida Keys Initiative office to protect the environmentally significant waters and lands that constitute the only tropical ecosystem in the continental United States.

Mark L. Robertson *Director*
Marv M. Grusin *Editor*
Solares Hill Design Group *Logo*

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(305) 296-3880

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Florida Chapter
222 S. Westmonte Drive, Suite 300
Altamonte Springs, FL 32714
(407) 682-3664

Can We Call You a Friend?

Join the special group of individuals who give the Keys Initiative \$100 or more each year. As a member of Friends of the Florida Keys, you will receive newsletters, the Conservancy's national magazine, and invitations to field trips and special events throughout the year. Most important of all, you will know that your generous gift is helping the Conservancy protect the incredible beauty and biological diversity of the Florida Keys.

We'd be honored to call you a friend. Use the enclosed envelope to join today!

Where There's Pine Forest, There's Fire – Or Should Be

The pine rocklands of the Lower Keys are an ecological priority. This rare and shrinking habitat is found only in Florida's southeast peninsula, the Lower Keys, Cuba, and the Bahamas.

Extraordinary in many ways, the rocklands are defined by a rocky forest floor with small pockets of soil, a canopy of slash pines, five different native palms, many species of hardwood trees and shrubs of Caribbean origin, and a wealth of rare herbs, wildflowers, and grasses.

Key deer, the Lower Keys marsh rabbit, and the American alligator contribute to the rocklands' exceptional biological diversity.

This natural community depends on periodic fire to retain its beauty, health, and integrity. Years ago, natural fires controlled the hardwood understory that competes with the pines. Now, prescribed burning must be part of a sound management plan.

The Conservancy's first prescribed burn in the Keys took place in 1993 at Terrestrial Preserve on Big Pine Key. Since that time, the Florida Keys Initiative has signed a cooperative fire management agreement with the U.S. Fish and Wildlife Service. The Fish and Wildlife Service manages the National Key Deer Refuge, where the Keys' largest acreage of pine rocklands is found.

Efforts are under way to learn more about the effects of fire on the pine rocklands. Chris Bergh, the Conservancy's new stewardship intern, is accumulating pre- and post-burn monitoring data from the Terrestrial site.

His internship project will also involve interviewing fire and biological experts and reviewing records to help construct a fire history. When the study is completed, information will be compiled in a written report and illustrated through maps.

Input Given on Sanctuary Plan

Paul Dye the Conservancy's director of marine conservation in the Keys easily explains why protection of the coral reef is at the top of his agenda. It is home to thousands of species. It is the only barrier reef in the U.S. and the third largest reef in the world. Its value is aesthetic, economic, spiritual and ultimately immeasurable.

Throughout the world, coral reefs located near population centers are severely threatened. The U.S. may be best positioned to protect its coral reef system because of its environmental awareness, financial resources and scientific expertise.

In 1991, Congress designated all shallow waters surrounding the Keys as the Florida Keys National Marine Sanctuary (the Sanctuary). The comment period on the draft management plan for the Sanctuary ended December 31, 1995. It has been a period of unprecedented public input culminating in a series of strong recommendations for the final plan from the Sanctuary Advisory Committee (SAC).

Recommendations Are in

The SAC recommendations include two particularly significant conservation achievements: the water quality protection program and the zoning plan, says Mark Robertson, Keys Initiative director and member of SAC.

Water quality is the most serious threat to the diversity of the reef ecosystem. The recommended water quality program addresses threats to the reef from both inside and outside the boundaries of the Sanctuary. It has already sparked new initiatives to solve pollution problems.

The recommended zoning plan includes 19 preservation areas at the most heavily used reefs, 17 wildlife management zones, four research-only reef sites and two replenishment reserves.

The replenishment reserves will be located at the Western Sambos and Dry Tortugas. If the SAC recommendations are implemented, these reserves (totalling less than 5% of the Sanctuary) will become the first zones in Keys waters where all harvesting is prohibited. They will be fully protected

and invaluable sites for scientific study.

The draft management plan and accompanying recommendations represent four years of community effort. Government at all levels, commercial organizations, environmental groups and residents of the Keys were involved throughout the process. The final management plan is scheduled for release in Fall of 1996.

The process has at times been divisive and other times unifying. The Conservancy and the Sanctuary are close collaborators. As a result, the Conservancy has drawn some criticism from Sanctuary opponents.

Paul Dye places confidence in surveys that indicate wide support for protection among Keys residents. However, he is quick to acknowledge that the community faces difficult choices and controversy is inevitable.

The option of buying and privately managing the reef simply does not exist. Protection depends on the will of the citizens and consensus implemented through government action.

Conservancy Offers Scientific Expertise

Operating ecological reserves on water is pioneering work. The Nature Conservancy brings 45 years of experience in selecting, designing, managing and studying land reserves to the challenge. This experience plus an emerging expertise in marine conservation science prepares the Conservancy to provide what is most needed in the public process — good information.

This is not text book conservation. It requires persuasive articulation and calls for great patience and persistence. It brings personal visibility and invites critical comment.

Asked whether it's worth the price, Dye is again without ambivalence. Florida's coral reef is one of the world's great repositories of biological diversity, says Dye. There is no choice — The Nature Conservancy belongs here.

Rare Cacti Show Resilience

The Nature Conservancy owns and manages Torchwood Hammock Preserve, a 244-acre natural area on Little Torch Key. Among the rare flora found at the preserve, the semaphore cactus is the most fascinating. Each of the thirteen mature specimens remarkably individual in appearance is critical to the survival of this species.

The fact that their existence is threatened by cactoblastus moths, invaders from South America via the Caribbean, explains why some are housed in cages. Admirers find themselves like the moth peering in through wire mesh at the only known examples of the semaphore in North America.

Five years ago, the original semaphore cactus discovered at the preserve, Cactus #1, became ill and turned to mush. After several months of monitoring, caretakers reluctantly pronounced the cactus dead.

However, during a weekly monitoring visit this spring, Cactus #1 was rediscovered — uncaged and quite robust. Again there is a baker's dozen imperiled, but perhaps more resilient than was thought.

The Conservancy is seeking funding to conduct genetic analysis on the cacti and to expand the population through new plantings. Thirteen semaphore are still too few for comfort.



Semaphore cactus

Thanks to You

With support from individuals, foundations and corporations, the Conservancy is protecting the lands and waters of the Florida Keys. The following have made gifts of more than \$100 between July 1, 1995 and December 31, 1995. Although space does not allow us to list every gift, each is crucial to our efforts to preserve biodiversity.

(\$5,000+)

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Perkins Charitable Foundation

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Edward Gutierrez

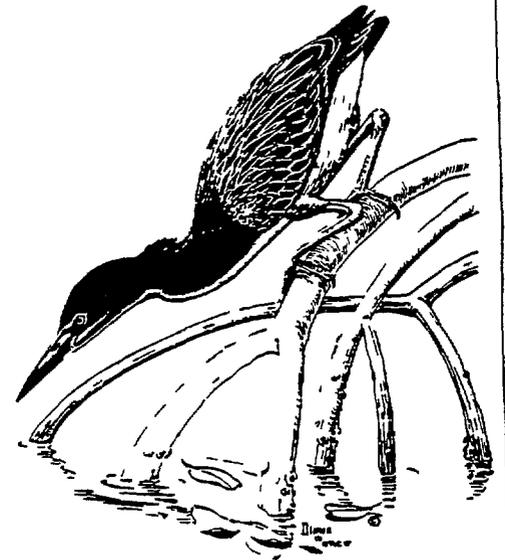
Wish List

Donations of equipment are very valuable to our program. If you can help, please call the Florida Keys Initiative at (305) 296-3880.

- light meter
- easel
- continuous feed slide projector
- elevated slide projector stand
- portable TV with built-in VCR

Wishes Granted

Special thanks to Lee Schmitt and Stevie Wheelchel for their donations to the Florida Keys Initiative.



The Nature Conservancy
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MARINE STEWARDSHIP VOLUNTEER NEWS, SPECIAL PROJECTS AND OTHER INTERESTING INFORMATION - January 1997 Happy New Year!! Lots of news!

NEW INTERNS - I would like to introduce you to Becky Vidra and Tiffany Williams, who will be working with Mary, Fran and Julie for the next six months. Becky is a graduate of Ohio State University, Tiffany graduated from Colby College in Vermont, and they are able to join us through the AmeriCorps program. Becky, as Marine Programs Assistant, will be picking up samples, administering training and quality control checks and working with Mary and Fran on all the volunteer programs. Tiffany, as Marine Science Technician, will assist Julie with data entry, quality control and other essential tasks. Welcome!

FLORIDA BAY DAY! - Volunteers are urgently needed now! Volunteers are needed to assist with this exciting new program, which is modeled after Coral Reef Classroom. Dr. Dan Gallagher of Pigeon Key is conducting a pilot program, which will run during February and March of 1997. Volunteers are needed for both classroom and boat trips. Classroom volunteers will spend a couple of hours at a school teaching the students about Florida Bay and water quality issues. Boat volunteers will accompany the students on a boat trip into Florida Bay to take water samples and see the Bay firsthand. All equipment and training will be provided. This is a great opportunity to become involved with a new educational program for the students of Monroe County! Call Mary or Fran to volunteer!

SPECIAL EVENTS - Mark down January 25 for the Slough Slog and February 22 for the annual volunteer party! There will be a separate invitation for the party, but not the Slough Slog. What special events would you like to attend? Any ideas for lectures or field trips? Call Fran!

THIRD ANNUAL SLOUGH SLOG - SWAMP TROMP - WETLANDS WALK!

Alan Scott, an interpreter with Everglades National Park, will be taking volunteers on a special tour of the Everglades on Saturday, January 25, 1996. We will visit Taylor Slough, go to an alligator hole, tour a cypress dome and see lots of birds. We will be up to our waists in water as we wade through the sawgrass. On our first year, we came across a baby alligator! The trip is a fun and different way to see what the Everglades is really like. Alan will tell us why we don't have to worry about snakes or alligators while walking around out there! (Seriously, it's safe!) We will leave from the ENP main visitors headquarters at 1:00 PM and return at 4:30 PM. There will be time to tour the new visitor's center and walk the Anhinga trail if desired. Admission to the park will be free for this special tour, but you must R S V P beforehand in order to get on the list. The trip is limited to the first 24 people who sign up! Wear long pants and closed-toed shoes that can get wet and muddy (like sneakers - not leather). Bring sunglasses, hat, binoculars, cameras, drinking water, a light snack and dry clothes for the ride home, if desired. Call Gina at (305)296-3880 to sign up, by Jan. 23.

TNC OFFICE VOLUNTEERS - Gina in the Key West office would love to have some help in the office with general administrative duties - answering the phone, reorganizing filing, clipping newspaper articles, updating rolodex files and more. People with computer and Internet skills are also needed! Call Gina at 296-3880. We do not have many Key West volunteers in general, so if you know of other people in the Key West area who might be interested in any of our volunteer programs, please let us know.

TNC LAND VOLUNTEERS - Laura Flynn, the Nature Conservancy Land Steward would like to have volunteer help on Little Torch and Big Pine. Volunteers would assist with exotic plant and trash removal, vegetation surveys and more. Call Laura at 296-3880 for more info.

FMRI Aerial Survey and Flyover dates for 1997. Call Fran to volunteer!

January Plane flies, FMRI meeting 4:00 pm on Tuesday, January 14

Volunteers are needed to sample on Wednesday, January 15

March Plane flies, FMRI meeting 4:00 pm on Tuesday, March 11

Volunteers are needed to sample on Wednesday, March 12

May Plane flies, FMRI meeting 4:00 pm on Tuesday, May 13

Volunteers are needed to sample on Wednesday, May 14

FMRI Aerial Survey - the movie! You can now see an animated sequence of the algae bloom maps on the Internet at <http://www.cdf.ufl.edu/cdf/library/tutorial/flabay/>. You will need Netscape Navigator 3.0 or Quick Time Movie Player (free from the Apple Software web site).

1997 is the International Year of the Reef. Scientists, students and environmentalists worldwide have pledged to work towards conservation and education about coral reefs. For information about worldwide events, see the Internet site at <http://www.coral.org/iyor/>.

BAY WATCH FIXED STATIONS - Lower-Upper Keys sample pick-up dates for 1997

January 7-8	April 1-2	July 1-2	September 30-October 1
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February 4-5	May 6-7	August 5-6	November 4-5
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March 4-5	June 3-4	September 3-4	December 2-3
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If anyone would like to volunteer to pick-up samples on these dates, please let me know.

ENVIRONMENTAL CALENDAR - Many of you ask me if I know of any special events or meetings that are going on and I want to spread the news when I do, so please find enclosed the new environmental calendar of events that I think will appeal to people involved in environmental education and stewardship. I hope you find this interesting and useful. If you have any ideas or items to be included on the next one, please give Fran a call.

FREE LECTURES - There are two series of wonderful free lectures going on during the next four months, in Key West, Marathon, Islamorada, Plantation and Key Largo. I have enclosed the lists, from Florida Keys Discovery and the Key Largo State Hammocks State Botanical Site, for your convenience and I urge you to attend these informative and fun events.

*** Call Fran Decker or Mary Enstrom 1-800-214-9BAY about any of the above***



Volunteer Program
Florida Keys National Marine Sanctuary

MARINE STEWARDSHIP VOLUNTEER NEWS, SPECIAL PROJECTS AND OTHER INTERESTING INFORMATION - November 1996

FMRI Aerial project change - This month's project has been moved from November 12-13 to November 16-21, to coincide with a special satellite pass over Florida Bay on November 16. The plane will fly on November 16, we will have our organizational meeting at FMRI at 4:00 PM on November 19, volunteers are needed to go out in boats on November 21. I also need one boat for Florida Bay on the 16th and one boat in the Marathon area for November 21. We will have some visitors from the press - Mark Caputo from the Key West Citizen and a Japanese journalist, who will be participating in various parts of the project. Call Fran to volunteer!

SPECIAL EVENT - Dr. Gene Shinn of the US Geological Survey will be giving a presentation on the geology of Florida Bay and the Keys. Dr. Shinn has ongoing research projects in South Florida and he will be bringing an interesting illustrative model on the geological history of the area. The event will be Thursday, November 21, 1996 at the Keys Marine Lab, MM 68 in Layton, next to the Little Italy Restaurant, 6:30 PM to 8:30 PM. Please come and bring a friend or neighbor if you like. R S V P to Gina at (305)296-3880 by Monday, November 18.

SURVEY - You will be receiving a survey about the volunteer programs of the Sanctuary and The Nature Conservancy in the mail shortly. We are collecting information on the volunteer programs in general and how to improve them. Later, you will be sent a more specific survey about the actual programs or projects that you volunteered for. Please send the surveys back in, as your input is very valuable!

BAY WATCH QUARTERLY AND ANNUAL REPORTS - Currently, the Bay Watch quarterly and annual reports contain tables and graphs of all the data from the fixed station nearshore monitoring project. These data comprise the bulk of the report, but not everyone on the mailing list is interested in receiving these data. We have decided to send out only the summary pages and not the actual data, as this will save on printing and postage costs. However, if you would like to receive the data, either for a particular station or all the stations, you may mail in the request form at the end of the report. Each report in the future will have this form, so you can request data as needed. You will need to send in a request for each report. If you are not receiving these reports and would like to, please let Fran know.

MANATEES - Many volunteers have expressed an interest in manatee monitoring programs. We do not have a program in the Keys presently, but there is an organization, the Sirenia Center in Hollywood FL, who needs volunteers in Dade and Broward County. For more information call or write to The Sirenia Center at (305)369-9005, or PO Box 840443, Hollywood FL 33084.

STAFF NEWS - Julie Overing, our new marine ecologist began work in October. Julie has moved up here from the British Virgin Islands, where she worked for the government and an environmental consulting firm. She will be responsible for all the data from our monitoring programs including Bay Watch, and will help us design new programs. Julie will be writing the Bay Watch topic reports as well as the quarterly and annual reports. She will be visiting the fixed stations during the December pick-up and will be going out on volunteer boats during the aerial surveys. Julie is really looking forward to meeting all of you. FMRI has generously given her office space at the state building at 2796 Overseas Hwy, Suite 119, Marathon, phone 289-2330.

Our intern, Shawn Richardson is leaving on November 6 to return to his home state of Michigan and graduate school. Many thanks for a job well done! A new intern, Becky Vidra will begin in January as the Marine Programs Assistant for six months. Becky graduated from Ohio State University this spring, and we are looking forward to her assistance with the marine programs!

Holiday schedules: Mary Enstrom will be gone December 4-16, Fran Decker will be on vacation November 27-30 and December 22-26 and Julie Overing will be gone November 25-27 and December 19-27.

INTERNSHIPS - We are seeking funding for three more AmeriCorps internship positions: Marine Science Technician in Marathon, Science Information Specialist in Marathon and another Science Information Specialist in Key West. These are 6 month full time positions with a cost of living reimbursement of \$4.65/hr and a continuing education/loan reimbursement of \$2363. These positions are a great opportunity to gain experience in the marine conservation/environmental field. If you would like more information, give us a call.

INTERN HOUSING - Finding a place for our interns to live is a problem! The AmeriCorps cost of living reimbursement does not come close to covering the typical cost of renting a place in the Keys. If anyone out there has an apartment or a room to rent for a six month period, please let us know!

BAY WATCH FIXED STATIONS - Volunteers are needed for the fixed station nearshore water quality monitoring project. Volunteers take samples once a week at any low tide at their home or other convenient location for one year. Back-ups can be arranged for vacations. All sites in the Keys are of interest, particularly near cuts in the Keys, such as Vaca Cut or Niles Channel. All equipment and training will be provided. Please call Fran if you would like to volunteer. *All present fixed station volunteers will receive new tide tables and the schedule of pick-ups in late December!

HAPPY HOLIDAYS TO ALL!

***** Call Fran Decker or Mary Enstrom 1-800-214-9BAY about any of the above*****



Florida Keys Initiative

MARINE STEWARDSHIP VOLUNTEER NEWS, SPECIAL PROJECTS AND OTHER INTERESTING INFORMATION - September 1996

Note the new title - this letter is going out to all Bay Watch and FKNMS volunteers. As some of you are aware, we now have a fully operational Marine Stewardship Team that addresses marine conservation issues in the Keys. The team consists of Paul Dye, the Director of Marine Conservation, Mary Enstrom as the Marine Programs Manager, Fran Decker as the Marine Stewardship Coordinator and Julie Overing as the Marine Ecologist. Betsy Marlowe and Shawn Richardson are our interns. We plan to add a Science Outreach Specialist and a Volunteer Programs assistant when finances allow.

We envision a network of volunteers from various sources and backgrounds who share a common interest in marine conservation. We have been trying to think up a new name for all the volunteers, like "Sea Stewards" or "Sea Corps". What do you think? Any ideas? We will give a special award to whoever thinks up the final name that we decide to use.

I want to introduce you to all the marine stewardship volunteer programs currently in operation. I think that some Bay Watch volunteers will be interested in the Sanctuary programs and vice versa since I know you all care about good water quality and the health of the coral reef and Florida Bay. If you are interested in any of the programs, just ask Fran, Shawn, Betsy or Mary for details!

We are also updating our mailing list, files and forms. I have enclosed a new marine stewardship volunteer form. This will allow us to better assess your volunteer program desires. We are also planning a survey of all the volunteers to see what you really think!

Please complete this new form if

- 1) you have had any changes to address or other information,
 - 2) you wish to volunteer for additional programs, or
 - 3) if you haven't volunteered in the last year but wish to remain on the mailing list
- **All currently active volunteers with no changes do not need to complete this new form**

I know you won't want to miss out on these exciting new opportunities to help out, as well as all the fun things like the volunteer party, the science lectures and the Slough Slog. We also have some great plans for new programs, to be introduced in the near future!

We are developing a new orientation program that would be given in the evening or on a Saturday, once a month in different locations. This will be designed to introduce all the different volunteer opportunities available and to give you a better idea of what you might like to sign up for, as well as meet other volunteers in the program.

FLORIDA BAY WATCH VOLUNTEER OPPORTUNITIES

Fixed Station Nearshore Water Monitoring Volunteers take samples once a week at their homes. Samples are analyzed for total nutrients and chlorophyll by Dr. Ron Jones of FIU.

FMRI Aerial Survey Volunteers go out in their boats to take samples in and around Florida Bay. Samples are analyzed for types and abundance of algae, sediments, and are used to groundtruth the aerial survey of the different water colors in the Bay, and for productivity studies.

Anecdotal Sampling Volunteers collect physical water quality data, such as salinity, temperature, and turbidity whenever they see an unusual situation, such as red tide or a fish kill.

USGS study Volunteers take a sample in addition to the anecdotal information. Samples are analyzed for sediment content and are used to groundtruth satellite data.

Science support Volunteers are needed to take visiting scientists out in their boats, to conduct a variety of projects, such as tracking algal blooms after a heavy rain, or studying the effect of herbivores on the reef.

Fish deformity study Volunteers record information about unusual fish caught anywhere in the Keys or Bay. Information is used to track pollution and disease.

FLORIDA KEYS NATIONAL MARINE SANCTUARY VOLUNTEER OPPORTUNITIES

Queen Conch Project Volunteers assist FMRI staff at the conch hatchery. Volunteer divers and boat operators monitor conch placed in the field.

Adopt-A-Reef Dive operators "adopt a reef" and schedule special clean-up dives. Volunteers who dive go out and clean the reefs. Spring and Fall special dives with reduced rates are scheduled. See below for the Fall schedule!

Coral Reef Classroom Volunteers assist staff in teaching students how to take water samples and snorkel.

R.E.E.F. Fish surveys Volunteers census fish while diving.

Submerged cultural resources inventory Volunteers locate and catalog SCR's.

Team O C E A N Volunteers provide information and brochures on-the-water at popular reefs on weekends.

Boat operators Volunteers with Power Squadron or Coast Guard Auxiliary certificates or captains licenses operate Sanctuary vessels for researchers. Volunteers with their own boats are also needed to take our visiting researchers. Fuel reimbursement is available.

Maintenance Volunteers assist staff with boat, dock, vehicle and office maintenance and repair

Booth staffing Volunteers assist staff with manning booths at fairs, festivals and shows

Brochure Routes Volunteers deliver brochures and posters to dive shops, marinas, stores and doctor/dentist offices

Spanish translation Cuban volunteers are needed to translate brochures and other materials into Spanish

General education program support Volunteers are needed to speak at schools about their volunteer and life experiences Volunteers also assist staff with organizing and editing materials, videos and slides

Research database Volunteers assist with compiling a research database

Office help Volunteers answer phones and assist with clerical duties

Assist other agencies Volunteers help out our partners on special projects

Special projects Do you have a special skill? Would you like to be a volunteer leader? There's a good chance someone needs your help and we can make a match! Some possibilities Would you like to be a volunteer trainer? Administer quality control checks? Host or hostess for a science lecture? Help plan the annual volunteer party? Coordinate sample pick-up? Be a new volunteer mentor - call up new volunteers and share your experiences? Be in charge of a display? Help compile survey results? Data entry? Help with mailings? Give presentations to community groups and schools?

MAILINGS

The Bay Watch volunteers have been receiving the Bay Watch Topic reports and I will now be sending them out to all the volunteers These are the ones that have been sent in the past, and if you have not received them and would like a copy, just let me know

Effects of Waterbirds on Water Quality in Florida Bay

Nutrients and Florida Keys Canals

Florida Bay Geology

Circulation in Florida Bay

Bay Watch also has quarterly reports with data from the various projects that are given to participating volunteers If you would like to receive these, let me know

NEWS

Advance notice for a fun event - the Yamaha Miami Billfish Tournament, who has generously donated \$10,000 to Bay Watch for the past two years, is having a Marine Conservation Night on Thursday, October 17, 1996 from 7 00-9 30 at the Rosenstiel School for Marine and Atmospheric Sciences in Miami. The evening will feature exhibits by The Billfish Foundation, The Keys Marine Lab, Florida Sea Grant, the International Game Fish Association and of course, Bay Watch. The highlight of the evening is a video presentation and a tour of the fish hatchery and labs. Please come, and bring your friends!

I am putting together plans for speakers and special events for the next year. Is there any special person you would like to hear or any particular topic? Call me with your ideas!

The Florida Keys National Marine Sanctuary has compiled a database of research papers and educational materials on local marine resources, which can be accessed on the Internet at URL www.fknms.nos.noaa.gov. This database was put together by some of our AmeriCorps volunteers!

BAY WATCH VOLUNTEERS It's quality control time again! Shawn Richardson will be calling each of you with an equipment bucket in the next few months to set up an appointment for your quality control check. Shawn will come to your sample spot or out on your boat and watch while you take a sample and fill out the data sheet. He will be checking to see if you are taking the samples correctly. Shawn will also check your equipment and remark your faded secchi disk lines if needed. Ideally, we would like to come to your station or boat when you are taking an actual sample. Shawn will be giving you some helpful hints on how to improve your collection. Don't worry, no one will "flunk". You all are doing a great job, but I must document this for my EPA grant.

*** Call Fran Decker 1-800-214-9BAY about any of the above***

You are invited to attend these FREE Interesting Programs

January 1997

Friday, January 10, Marathon
"FORTUNES Made & Lost in Florida Keys Industries"
Slide Lecture by Irving Evster 7:30 pm

Sunday, January 12, Key West
"Hurricanes & Lessons Learned for the Florida Keys"
Slide Lecture by Richard Pasch Public Library 4 pm

Sunday, January 19, Plantation Key
Recollections of COMMERCIAL FISHING
in the UPPER KEYS Past to Present
Oral History Session with Jimmy Williams, Gary & Beth Williams 4 pm

Saturday, January 25, Marathon
"THE ROLE OF THE FLORIDA KEYS IN RECENT FICTION"
Slide Lecture by Drs. Harold & Susan Monroe Nugent 7:30 pm

Friday, January 31, Marathon
"The FOSSIL REEF: A Keys' Time Capsule"
Slide Lecture by Alison Fahrner 7:30 pm

February

Sunday, February 2, Key West
"The HISTORY of Key West & the Florida Keys to 1919"
Slide Lecture by Tom Harrington Pier House 4 pm

Sunday, February 8, Marathon
"A Photographic Natural History Tour of the Keys"
Slide Lecture by Bill Keogh 7:30 pm

Sunday, February 9, Islamorada
"Dolphins of the Florida Keys"
Slide Lecture by Barbara Losch & Peggy Sloan 6 pm

Saturday, February 15, Marathon
Recollections of EARLY DAYS in MARATHON
Oral History Session with Joe Whalton 7:30 pm

Sunday, February 16, Key West
"Snorkeling & Diving Recognizing What You See"
Slide Lecture by Dr. Steve Davidson Pier House 4 pm

Friday, February 21, Marathon
"Florida CORAL REEFS Past, Present & Future"
Slide Lecture by Walter Jaap 7:30 pm

Sunday, February 23, Islamorada
"The MARITIME HISTORY of the Florida Keys"
and "The SHIPWRECK TRAIL"
Slide Lecture by John Viele & David McCampbell 6 pm

March

Saturday, March 1, Marathon
"Recollections of EARLY DAYS in MARATHON
and STANLEY SWITLIK'S Pivotal Role"
Oral History Session with Richard Switlik, 7:30 pm

Sunday, March 2, Key West
"Manatees in the Florida Keys & Beyond"
Slide Lecture by Shelly Samm Pier House 4 pm

Friday, March 7, Marathon
"Restoration of the 1891 Custom House
Florida Key Museum Emerges"
Slide Lecture by Jim O'Brien 7:30 pm

Sunday, March 9, Islamorada
"Building of the Old Seven-Mile Bridge"
Slide Lecture by Dr. Dan Gallagher 6 pm

Friday, March 14, Marathon
"The Mysterious Lives of SHARKS Revealed"
Slide Lecture by Dr. Robert Hueter 7:30 pm

Sunday, March 16, Key West
"KEY WEST'S HOUSES: HISTORIC & RESTORED"
Slide Lecture by Michael Miller Public Library 4 pm

Saturday, March 22, Marathon
"THE HISTORY OF THE FLORIDA KEYS
THROUGH POSTCARDS: 1906-1960"
Slide Lecture by Tom Wilkinson 7:30 pm

Sunday, March 23, Islamorada
"Buds of the Florida Keys"
Slide Lecture by Alexander Sandh Sprunt 6 pm

April

Friday, April 4, Marathon
"Why Coral Reefs Look the Way They Do in Florida
The REAL Story" Slide Lecture by Dr. Steven Miller 7:30 pm

Sunday, April 6, Islamorada
"Sea Soup Why WATER QUALITY is Not So Sure
in the Florida Keys" Slide Lecture by Paul Dye 6 pm

Sunday, April 13, Key West
"Recollections of EARLY DAYS in KEY WEST"
Oral History Session with Arthur Valladares Old City Hall 4 pm

Friday, April 18, Marathon
"Native Plants of the Florida Keys"
Slide Lecture by Susan Sprunt 7:30 pm

MARATHON lectures are held at the Marathon Government Center, MM 47.5

ISLAMORADA lectures are held at the Islamorada Library MM 81.5

For INFORMATION call (305) 872-3725, or write P.O. Box 430137 Big Pine Key Florida 33043-0137

Florida Keys Discovery

Exploring Everything Unique & Wonderful about the Florida Keys A Nonprofit Community Education Project

Major funding from The George B. Storer and Elizabeth Ordway Dunn Foundations
with generous annual support of Florida Keys Discovery Members & Sponsors

THE FLORIDA KEYS & KEY WEST
Come as you are

Solares Hill Design

JANUARY, FEBRUARY, MARCH 1997 ENVIRONMENTAL CALENDAR

Saturday, January 25

*Center for Marine Conservation's Citizen Scientists Stormwater Training Program 9-5 PM
Southernmost Hotel, Key West Call Susan White 743-5199

*Florida Bay Watch Slough Slog 1-4 PM Everglades National Park Call Fran Decker
1-800-214-9BAY

*The Nature Conservancy's Torchwood Preserve Workday, 9-5 PM Little Torch Call Laura
Flynn 296-3880

Tuesday, February 4

*US Power Squadron Boating Classes
7 30 PM Marathon High School Call Alice Kulecki 743-2676
7 00 PM Homestead Call William Alexander 248-4246

Saturday, February 15 - Sunday, February 16

*International Year of the Reef Awareness Weekend - educational booths, entertainment and
interpretation, Miami Seaquarium Contact Laura Urian 451-1644

Saturday, February 22

*The Nature Conservancy's Florida Bay Watch and Florida Keys National Marine Sanctuary
Volunteers Annual Recognition Party Call Fran Decker 1-800-214-9BAY

Thursday, March 13

*Regional Envirothon, Everglades National Park Contact Ivy Kelley 451-1644

*LEEF - League of Environmental Educators of Florida Conference "Widening the Circle
Partnerships to Friendships" Deland, FL Thursday, March 13 - Sunday, March 16 Contact
Richard Mohr 407-952-7652



Florida Keys Initiative

Marine Stewardship Programs
PO Box 500368
Marathon FL 33050
(305) 743-2437
1-800-214-9BAY

MARINE STEWARDSHIP VOLUNTEER APPLICATION

NAME _____

IF UNDER 18, NAME OF PARENT OR GUARDIAN _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

HOME PHONE _____ WORK PHONE _____ FAX _____

MAY WE CONTACT YOU AT WORK? YES _____ NO _____

IN CASE OF EMERGENCY, CONTACT _____

ADDRESS _____ PHONE _____ RELATIONSHIP TO YOU _____

DATE OF LAST MEDICAL PHYSICAL _____

ANY PHYSICAL LIMITATIONS THAT WOULD RESTRICT YOUR ACTIVITIES? _____

DATE OF BIRTH MONTH _____ DAY _____ YEAR _____ SOCIAL SECURITY # _____

WHAT ARE YOUR OBJECTIVES? _____

SPECIAL TRAINING SKILLS AND INTERESTS _____

EDUCATION _____ OCCUPATION _____

PLEASE DESCRIBE ANY SCIENCE BACKGROUND OR EDUCATION?(not necessary for most projects)

PLEASE DESCRIBE ANY INVOLVEMENT IN MONITORING OR FIELD RESEARCH PROJECTS?

HAVE BOAT? _____ SIZE & TYPE? _____

RANGE _____ GPS OR LORAN? _____

CG AUX CERT OR PS ? _____ CAPTAINS LIC ? _____ CERT DIVER? _____

Key Largo Hammocks State Botanical Site

Presents the Sixth Annual Lecture Series **THE DELICATE BALANCE OF NATURE**

Wednesday Evenings from 7 30pm - 8 30pm

at

John Pennkamp Coral Reef State Park Visitor Center

MM 102 5 Overseas Highway

Gates to Pennkamp will be open from 7 00pm - 7 30pm

For additional information contact the Ranger Station at

(305)451 1202

Free Admission - Limited Seating Available



January 3, 1997

JOE-FISH

Biologist Jim Duquesnel, from the Key Largo Hammocks State Botanical Site will teach us that there's a lot more to FISH IDENTIFICATION than knowing names. Learn to use nature's clues to really get to know our reef fishes.

January 15, 1997

THE CROCODILES ARE COMING.....BACK!

Once again we are seeing these endangered reptiles around the island. Veteran croc expert Paul Moler from the Florida Game & Freshwater Fish Commission will tell us about their behavior and why we are starting to see them more.

January 22, 1997

HAPPY BIRTHDAY EVERGLADES NATIONAL PARK

As our backyard neighbor turns 50, explore with Alan Scott, ENP Florida Bay Naturalist, the past, present, and future of the River of Grass.

January 29, 1997

FLORIDA BAYWATCH - HERE'S LOOKING AT YOU

Nancy Diersing, Florida Bay researcher from the Marathon office of the Florida Marine Research Institute, has the latest data concerning the health of this body of water that is so important to our Keys lifestyle and economy.

February 5, 1997

ECOLOGICAL LANDSCAPING - A HOLISTIC APPROACH

Learn how to turn your yard into a native Keys habitat with Ron Mossman, Director of Environmental Horticulture at Miami Dade Community College.

February 12, 1997

HER MAJESTY THE QUEEN OF CONCH

Are the conch coming back? Conch researcher Bob Glazer will be here from the Florida Marine Research Institute's Conch Lab on Long Key. Bob's just the person to answer that question.

February 19, 1997

WHAT'S HAPPENING TO OUR FRAGILE CORAL REEF?

Walter Jaap is the coral research and restoration expert from the Florida Marine Research Institute in St. Petersburg. He is very involved in crucial research projects on Keys reefs, and will be telling us what the research is revealing.

February 26, 1997

KEY LARGO HAMMOCKS STATE BOTANICAL SITE

Join Park Manager Robert Wilhelm and Park Biologist Jim Duquesnel for a look at who we are, where we come from, and where we are going in our efforts to preserve, protect, and restore the environmentally sensitive ecosystems of North Key Largo.

Florida state parks are in various stages of accessibility, and are working to improve access to services and facilities. Should you need assistance to enable your full participation, please contact John Pennkamp, Coral Reef State Park, (305)451 1202, P.O. Box 487, Key Largo, Florida 33037, as soon as possible.

TYPE OF POSITION DESIRED (Circle as many as you wish)

WATER QUALITY MONITORING
Fixed Station Nearshore Water Monitoring
FMRI Aerial Survey /algal bloom sampling
Anecdotal/USGS Sampling

EDUCATION
Coral Reef Classroom
Booth staffing
Brochure Routes
Spanish translation
School presentations
Staff assistance
Research database
Displays(design& creation/maintain)
Training/quality control of volunteers

DIVING
Queen Conch Project
Adopt-A-Reef
REEF Fish surveys
Submerged cultural resources inventory

BOATING
Team OCEAN
Science support (own boat)
Boat operator(Sanctuary vessels)
Boat/Dock Maintenance

OTHER
Report fish deformities
Assist other agencies
Office help(mailings phones computer)
Lab help(data entry conch hatchery)
Sample pick-up coordinator
Special projects(leader party lectures surveys)

SPECIAL INTERESTS? _____

WHAT DATES ARE YOU AVAILABLE? FROM _____ TO _____

WHAT DAYS AND HOURS (CIRCLE AND INDICATE HOURS)

SUN _____ MON _____ TUES _____ WED _____ THURS _____ FRI _____ SAT _____

WHAT AREAS ARE YOU AVAILABLE TO WORK? (CIRCLE ALL THAT APPLY)

LOWER KEYS MIDDLE KEYS UPPER KEYS OCEAN FLORIDA BAY FLAMINGO

HOW MANY HOURS PER WEEK/MONTH ARE YOU WILLING TO WORK? _____

WHEN AND WHERE WOULD AN ORIENTATION SESSION INTERVIEW AND TRAINING BE CONVENIENT?

WOULD YOU LIKE TO BE CONTACTED ON MATTERS NOT DIRECTLY RELATED TO THIS VOLUNTEER PROGRAM BUT THAT INVOLVE NATURAL RESOURCE ISSUES OF THE KEYS?

YES _____ NO _____ TELL ME MORE _____ I AM INTERESTED IN _____

MAY WE SHARE YOUR NAME WITH ANY PRESS PERSON WHO IS INTERESTED IN DOING A STORY ON THE VOLUNTEER PROGRAMS? YES _____ NO _____

DO YOU WANT YOUR NAME AND ADDRESS GIVEN OUT FOR OTHER MAILINGS? YES _____ NO _____

SIGNATURE OF APPLICANT _____ DATE _____

SIGNATURE OF PARENT/GUARDIAN IF UNDER 18 _____ DATE _____

**JOHN PENNEKAMP
CORAL REEF STATE PARK**

John Pennekamp Coral Reef State Park

Key Largo



The first underwater state park in the United States, John Pennekamp Coral Reef State Park covers approximately 70 nautical square miles of coral reefs, seagrass beds and mangrove swamps. These park areas were designated to protect and preserve a portion of the only living coral reef in the continental United States.

Coral reefs are made up of skeletal remains of corals, other animals and plants which have been cemented together by limestone secretions and calcareous algae.

The park has 53,661 acres of submerged land and 2,350 acres of uplands. The park's uplands are home to many rare and endangered plants.

The park offers swimming, snorkeling, picnicking, camping, fishing and boat ramp access. Concessions within the park offer glassbottom boat tours, a snorkeling tour, scuba lessons and tours, canoeing, motorboat and sailboat rentals.

John Pennekamp Coral Reef State Park is located at Mile Marker 102.5, north of Key Largo.

Contact

John Pennekamp Coral Reef State Park
P O Box 487
Key Largo, FL 33037
(305) 451-1202



[Back to Florida Parks Main Page](#)



[Return to DEP Home Page](#)



[Back to South Parks Index](#)

Jason Prieto, prieto_j@dep.state.fl.us



Legendary
KEY LARGO

PARKS AND BEACHES

Return to [Key Largo ~ Parks and Beaches](#)

PENNEKAMP: A VISIT TO A SMALL PLANET

Wildlife abounds here in the Florida Keys, but one must get on or under the water to observe most of it

The State of Florida has provided the place and commercial enterprise the means to make these wildlife observations whether one is man, woman or child, avid scuba diver or someone who hates to get his or her feet wet

The place is called John Pennekamp Coral Reef State Park, the first underwater park in the United States. The park and the Key Largo National Marine Sanctuary are 20 miles long and contain about 103 square nautical miles altogether. It's about a one hour drive from Miami but a world totally apart from any man-made metropolis.

The residents at Pennekamp are more than 500 species of fish and 55 varieties of coral, along with 27 species of "Gorgonians," which are marine life forms related to anemones. The coral forms a kind of underwater condominium which also is home to crabs, sea urchins, snails, lobsters, shrimps, worms, chitons (mollusks), starfishes, sea cucumbers, sand dollars, barnacles and sponges.

These are the life forms of another world. And a visit to this alien place is very much like traveling through space to another planet. For close observation, one needs a "spacesuit" - in this case, a tank - filled with compressed air, and regulator, a face mask, fins and snorkel. A glass-bottomed boat acts as a kind of spaceship for those who don't want to take an actual plunge.

There are four basic ways to visit Pennekamp's residents: Glass-Bottomed Boats, Scuba Dive, Snorkeling, and Sailing. There are more than 30 independently owned dive shops in the Key Largo area which offer similar diving and snorkeling trips.

Divers and snorkelers who want to see something man-made in this underwater world besides wrecks can go to Key Largo Dry Rocks, where there is a nine-foot bronze statue of Jesus Christ in about 20 feet of water. There also are large brain, stag and elkhorn coral formations and a four foot barracuda who like to be photographed.

Inevitably, there are one or more people in most family groups who couldn't care less about the park's underwater inhabitants. For them, there are two manmade beaches, as well as canoe, kayak, and sail boat rentals and nature trails. The park has 47 campsites, all with electrical hookups and water.

Return to [Key Largo ~ Parks and Beaches](#)

WELCOME TO... THE PENNEKAMP PAGE!



The Internet's most popular Key Largo Connection!



Welcome to the Pennekamp page! *THE* web site in Key Largo for diving, snorkeling, fishing, and other attractions! This page is locally produced, so you'll find it's information focuses specifically on Key Largo, Pennekamp Park and the Key Largo National Marine Sanctuary We're here to help you, so if you don't see what you need, just ask!

You can reach the Pennekamp Webmaster by e-mail at keystech@pennekamp.com



Special Event! **Win a boat... Sink a Ship!**

Click here to learn about the future sinking of the *Spiegel Grove*, destined to become the LARGEST INTENTIONALLY SUNK ARTIFICIAL REEF IN THE WORLD!

General Information...

□ **What is Pennekamp Park?**

John Pennekamp Coral Reef State Park is the nation's first UNDERWATER park! Formed in the 1960's, Pennekamp Park represents over 100 square miles of mangrove shoreline, grass flats, and of course our famous coral reef. Adjacent to Pennekamp (and extending it's boundaries out to international waters) is the Key Largo National Marine Sanctuary. Both these pristine coral reef areas are protected by law against environmental abuse, guaranteeing this beautiful resource will last for many generations.

□ **How do I get there?**

By boat! Bring your own, or hop on a local charter adventure. Specialized charters (diving, snorkeling, fishing, sightseeing, you name it!) are a major industry here in Key Largo, and nobody does it better than we do! Pennekamp is an underwater park, and you'll find dozens of professional

John Pennekamp Coral Reef State Park

Organization

John Pennekamp Coral Reef State Park

Mailing Address

P O Box 487

City

Key Largo

State

FL

Zip

33037

Phone

305-451-1202

Fax

FAX 305-451-1410

E-Mail

Contact Person

Park Manager

Contact phone

General Mission

John Pennekamp Coral Reef State Park, managed by the state's DENR-Division of Recreation and Parks, was the first underwater park in the U S In 1960, a 75-mile offshore area was set aside for the preservation of this unique resource

Organization Type

Government

Keywords

Recreation, Endangered/Threatened Species, Parks/Trails, Tourism, Water Quality

Activities

Education, Recreational Activities

Services



Holiday RV of Key Largo...

Holiday RV features both new and used, state-of-the-art recreational vehicles of all types. Visit our Upper Keys lot and showroom at mile-marker 100 in beautiful Key Largo

Other Area information...

- Learn what's new in Key Largo by reading the monthly publication The Florida Keys News!
- Concerned about the Environment? We're blessed with an active, healthy reef - Let's keep it that way! Click here for the latest news from the South Florida Environmental Reader
- Rain? Well, we do we have occasional tropical showers here in the fabulous Florida Keys, but they never last long! For the local high-resolution Doppler Radar image, click here (And remember wherever it's not raining, it's probably sunny!)
- Reef Conditions? Sure! Our reef reports are updated hourly - directly from the automatic station at Molasses Reef!
- Hurricanes? Hurricanes rarely affect the Florida Keys, but we do keep a close eye on the weather - just in case. During the summer and fall seasons, the Pennekamp Page pledges to keep it readers informed with detailed information. Check out the plot of any current storms, the predictions, or visit FEMA's page to be prepared!
- Let's not forget our pals, the Manatees! Read further about their habits and habitat here in the Florida Keys



New to the area and looking for a local Internet connection?
Try ReefNet - Key Largo's *only* Internet Provider!



Dolphins Plus...

Key Largo is home to "Dolphins Plus" a marine mammal research and educational facility offering tours, classes, and in-water swim sessions with these marvelous marine mammals!

charter trips available to take you there 1 rips to the coral reef are available mornings, afternoons, and evenings

❑ **Can't I just swim out from the beach?**

Our coastline in Key Largo is comprised of mangroves, and shallow grass flats teeming with life. There are very few natural beaches in the Keys, and the coral reef begins about 3 miles off-shore. This fantastic coral reef provides such a complete barrier against wave action that "normal" coastal erosion (which provides sand to northern beaches) just doesn't apply. There are several lovely man-made swimming areas here in Key Largo, in both private and public locations, but don't expect to swim to the reef!

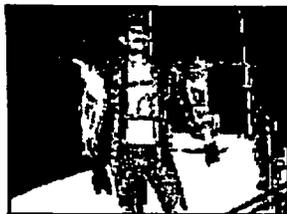
❑ **What else do I need to know?**

Everything you'll need to plan a vacation here in Key Largo can be found (or linked to) from this page! We hope you'll enjoy your visit with us



Diving & Snorkeling...

Key Largo boasts some of the finest tropical diving in the world! Surrounded by protected waters, our coral reef is a site to behold. Click here for information on diving in Key Largo, along with maps, pictures, site descriptions, reef fish, charter trips, specials, and much much more!



Fishing and Boating in the Keys...

The Florida Keys are known worldwide for their great fishing, both in the quiet, still waters of the "backcountry" (Florida Bay) and our exciting off-shore waters! Check out this link for more information on charters, boat rentals fishing advice, and special local events



Dining in Key Largo...

From "conch-casual" to elegant cuisine, Key Largo is a great place to tempt your tastes! Choose from outdoor waterfront dining, to out-of-the-way, intimate eateries



Accommodations...

Relax and enjoy the relaxed tropical ambiance of intimate, family owned motels, outdoor camping, or the amenities and services of larger resorts! Key Largo offers a broad range of accommodations to fit within *your* family's budget



Everglades National Park...

Key Largo also borders the *Everglades National Park* - an area of mysterious and abundant wildlife
Click here for more information on this fascinating natural resource

Florida Keys Wild Bird Rehabilitation Center

Located at MM94 Bayside in Tavernier Take a free tour of our facilities See the birds of Florida up close We have Ospreys, Rosetta Spoonbills, Brown Pelicans and many other wild birds in our recovery areas Come by during lunch or dinner and you can feed the birds yourself!

Call (305)852-2286 for more information.

Keys Technologies (who bring you The Pennekamp Page) is a proud member of the Legendary Key Largo Chamber of Commerce



For more information on visiting Key Largo, Check out
The Key Largo Chamber of Commerce's home page!

Finally, no page on Key Largo would be complete without one of our famous sunsets over Florida Bay!



Watch for more links, updates, and info, as we expand our facilities!

Are you a local (Key Largo) business? Drop us a line and we'll include your services too!

Comments? Come-on, you must have *something* to say about our efforts! We appreciate hearing from our readers - drop us a line at the link below with your feedback

Tell them you saw it on the "Pennekamp Page!"

**BISCAYNE
NATIONAL PARK**

Mangrove Shoreline

THE MANGROVE SHORELINE

In Biscayne, the mainland mangrove shoreline has been preserved almost unbroken. For many years these trees of tropical and subtropical coasts were considered almost worthless. Some were cut for timber or used to make charcoal. As recently as the 1960's the mangrove wilderness was referred to as "a form of wasteland". Like thousands of other wetlands, it was cleared or filled to make way for harbors and expanding cities.

Now we understand that the mangroves are vital to the well-being of the bay and surrounding areas. Without them, there would be fewer fish for fishermen and fewer birds for birders. Biscayne Bay would become murky and areas inland would be exposed to the full force of hurricanes.

BEYOND THE DARKNESS

It is hard to see what lives in the brackish waters of the mangrove swamps, this water is stained brown by tannin from the trees. Hidden among the maze of roots is a productive nursery for all sorts of commercial, sport, and reef fish. Here the young find not only shelter but also food. Fallen mangrove leaves feed bacteria and other microorganisms, and so begins a food chain that supports not only the marine animals of the mangroves but also visitors like barracudas and birds that roost and nest in the treetops.

DEFENDING THE COAST

The mangrove forest appears as a nearly impenetrable fortress. Perhaps a snake or a mosquito can move through easily, but little else can. It makes an effective protective buffer between the mainland and Biscayne Bay. It guards the bay from being dirtied by eroded soil and pollutants washing from the land by trapping them in its tangle of roots. The mangroves also stand as a natural line of defense against the strong wind and waves of hurricanes.

Biscayne National Park protects over 17 miles of mangrove shoreline along the mainland and many more miles of mangroves on the islands of the park.

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Living Coral Reefs

THE LIVING CORAL REEFS

Dive into the undersea realm of the coral reefs and you will discover a feast for the eyes. It is a living kaleidoscope of gaudy colors, bold patterns, intricate designs, and peculiar shapes. Alien, yet inviting, the life of the reef excites and mystifies snorkelers and scientists alike.

FISHES OF THE REEF

"In variety, in brilliance of color, in elegance of movement, the fishes may well compare with the most beautiful assemblage of birds in tropical climates." Louis Agassiz, 19th century French naturalist, wrote after visiting the Florida reefs.

Reefs are in fact host to the ocean's most spectacular galaxies of fish. Along Biscayne's reefs more than 200 types of fish can be spotted. Each holds its own fascination for us. Some are impressive in size, others in color. Some are grotesque, others dangerous. Many behave in bizarre, unexplainable ways, at least to humans. Few places on earth can match the diversity of life that inhabits the reef's underwater wilderness.

A SEA OF COLOR

Imagine the most colorful scene you have ever seen--a field of wildflowers, the glittering lights of a city at night, a desert sunset. Whatever it may be, the dazzling spectrum displayed by the reef fish will equal or surpass it. The range extends from the most flamboyant--the angelfish, the wrasses, the parrotfish, the neon gobies--to ones that are quite drab and ordinary. And they all await you.

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Biscayne Bay

BISCAYNE BAY

"The water of Biscayne Bay is exceedingly clear. In no part can one fail to clearly distinguish objects on the bottom ." biologist Hugh Smith wrote in 1895 Today the shallow waters of this tropical lagoon are still remarkably transparent. They serve as a blue-green tinted window to a world of starfish, sponges, crabs, sea urchins, fish of all sizes and kinds, and hundreds of other marine plants and animals.

The bay is a huge reservoir of natural riches, teeming with unusual, valuable, and rare wildlife It is home for many; temporary refuge and feeding grounds for others, birthplace and nursery for still others It is a benign powerhouse, designed to draw energy from the sun and use it to support a complex and far-reaching web of life.

One unusual animal that depends on this web is the manatee. This gentle blubbery giant visits the bay throughout the year on its journeys north and south to graze on turtle and manatee grasses. It is the waters warmth and ample food supply that attracts this marine mammal. It is these same wonderful waters that attract people and their boats--the manatee's greatest threat. Most adult manatees have scars that testify to their encounters with boats and many have been killed. Today, boaters in Biscayne Bay are required to slow down in designated "No Wake Zones" and "Manatee Zones" to protect this endangered animal.

A SANCTUARY FOR BIRDS

Birds are drawn to the bay year-round. Each follows its own instincts for survival Brown pelicans patrol the surface of the bay, diving to catch their prey. White ibis meander across exposed mud flats, probing for small fish and crustaceans.

Large colonies of little blue herons, snowy egrets, and other wading birds nest seasonally in the protected refuge of the Arsenicker Keys The extremely shallow waters surrounding these mangrove islands in the south bay are especially well suited for foraging

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The Keys

THE KEYS

One hundred thousand years ago the Florida Keys were "under construction." The builders were billions of coral animals, each not much larger than a period on this page. Together these animals constructed a 150-mile-long chain of underwater coral reefs. When these reefs later emerged from the sea, they became the many islands of the Florida Keys. If you look closely, you can see fossil coral rock on the islands of Biscayne.

A TROPICAL PARADISE

Gumbo limbo Jamaican dogwood. Strangler fig Devil's-potato. Satin-leaf. Torchwood. Mahogany. In this country only tiny pockets in south Florida contain this mixture of tropical trees and shrubs common in the West Indies. North-flowing air and ocean currents, birds, and storms delivered the pioneer seeds and plants that eventually grew into the islands' lush, dark, jungle-like forests.

NATIVE AMERICANS TO MILLIONAIRES

The islands abound with legends of pirates and buried treasure. Many shipwrecks, victims of high seas and the treacherous reefs, lie offshore. Fortune hunters, bootleggers, alien smugglers, artists, gamblers, millionaires, and four United States Presidents have spent time on the keys of Biscayne.

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Biscayne's Environmental Education Program

BISCAYNE NATIONAL PARK'S ENVIRONMENTAL EDUCATION PROGRAM

INTRODUCTION

School camping visits to Biscayne National Park began in 1976 as an extension of the Everglades National Park education program. The program originated on Elliott Key but was moved to Adams Key during the 1980-1981 school year. It was at that time that Biscayne National Park began to operate the program on its own. Since then, the program has continued to grow and gain interest with counties throughout South Florida.

The camping program at Adams Key is a 3-day, 2-night field trip for 5th and 6th grade classes (some 4-day, 3-night trips maybe available). This program provides an opportunity for teachers to reinforce and to enhance their school curriculum by bringing students to see and experience the natural environment first hand. It provides an opportunity for the park to introduce future users to principles of safe and minimum impact enjoyment of the resources. It also provides the park with an opportunity to instill concern for fragile ecosystems and a concern for the ecosystems' problems in these future voters and community leaders.

Study habitats include the mangrove shoreline, coastal transitional forest, hardwood hammock, intertidal zone, and marine meadows. Activities in these habitats may include shoreline "wet" walks, hammock explorations, night walks and light acclimatization activities.

ADAMS KEY

Once part of the living coral reef, Adams Key is now a 70 acre barrier island. It is located 7 miles across Biscayne Bay, southeast of Convoy Point (Biscayne National Park's headquarters).

CAMP LOGISTICS

Dates: January to April

Time: Monday to Wednesday or Wednesday to Friday (some 4-day, 3-night camps may be available)

Grades: 5 & 6

Max Group Size: 25 students plus teachers and chaperons. (1 chaperon for every 5 students).

TRANSPORTATION

Transportation to and from Adams Key is provided by Biscayne National Park at no cost to the school. (The school is responsible for arranging transportation from the school to Biscayne National Park and back.)

FACILITIES AND EQUIPMENT

Facilities on Adams Key include a picnic shelter, barbecue grills, restrooms, and a campfire circle. Tents, food storage boxes, trash cans, dishwashing buckets, and water coolers filled with fresh water are provided. (There is no fresh water available on Adams other than what is provided.)

TEACHERS WORKSHOPS

Prior to participating in the Adams Key camping program, teachers must attend a weekend workshop. Teacher in service credit is available. Two workshops may be offered each year.

1) Beginning level -- includes logistics, camp rules, ranger's role, site orientation, and familiarization. ALL FIRST-TIME TEACHERS ARE REQUIRED TO ATTEND THIS WORKSHOP. Chaperons are also invited. (Conducted in December.)

2) Advanced level -- incorporates more resource education for teachers, creative program ideas, pre and post visit studies, and a review of camp logistics. Anyone is invited to attend this workshop. (Conducted December-April.)

For more information contact the Park's Environmental Education Coordinator at (305) 230-1144, ext. 3036.

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Who We Are

WELCOME TO BISCAYNE NATIONAL PARK

Biscayne National Park
P O Box 1369
Homestead, FL 33090-1369
(305) 230-PARK (305-230-7275)

Biscayne National Park has the simple beauty of a child's drawing: clear blue water, bright yellow sun, big sky, dark green woodlands. And here and there a boat or a bird. It is a subtropical place where a mainland mangrove shoreline, a warm shallow bay, many small islands or keys, and living coral reefs intermingle. Together they comprise a vast, almost pristine wilderness and recreational area along the southeast edge of the Florida peninsula. The park was established as a national monument in 1968. In 1980 it was enlarged to 180,000 acres and designated as a national park to protect a rare combination of terrestrial and undersea life, to preserve a scenic subtropical setting, and to provide an outstanding spot for recreation and relaxation. Today, it is one of only 54 National Parks in the entire United States.

In most parks land dominates the picture. But Biscayne is not like most parks. Here water and sky overwhelm the scene in every direction, leaving the bits of low-lying land looking remote and insignificant. This is paradise for marine life, water birds, boaters, fishermen, snorkelers, and divers alike. The water is refreshingly clean, extraordinarily clear. Only the maintenance of the natural interplay between the mainland, Biscayne Bay, keys and reefs, and the Atlantic Ocean keeps it that way. The region's Caribbean-like climate saturates the park with year-round warmth, generous sunshine, and abundant rainfall. Tropical life thrives. The land is filled to overflowing with an unusual collection of trees, ferns, vines, flowers, and shrubs. Forests are lush, dark, humid, ever-green, many birds, butterflies, and other animals live in these woods.

No less odd or diverse is Biscayne's underwater world. At its center are the coral reefs. Unlike the ocean depths, which are cold and nearly lifeless, the shallow water reefs are inundated with light and burgeoning with life. Brilliantly colored tropical fish and other curious creatures populate the reefs. Their appearances and behavior are as exotic as their names--stoplight parrotfish, finger garlic sponge, goosehead scorpionfish, princess venus, peppermint goby. A reef explorer can spend hours drifting lazily in the waters above the reefs and watch a passing procession of some of the sea's most fascinating inhabitants.

Whether on the reefs, the keys, the bay, or the mainland you leave behind what is familiar and become acquainted with another world that is strange and wild. Biscayne is a different sort of national park. Expect the unexpected.

COME SEE US

Recreational opportunities abound in Biscayne National Park. It is known as a wonderful place to boat, sail, fish, snorkel, dive, and camp. The resources protected within the park are beautiful, diverse, and very productive, they are also fragile. Fish and animals can be injured and killed by trash in the water. Sea grasses can be torn up by boats run aground. Touching coral may open the way for disease. Carelessness can cause great damage to the resources of Biscayne National Park--but your forethought and care can preserve and protect these unique resources for the future.

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BELIZE

WELCOME

to the

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TOURS SITE



A Brief Overview of the country of Belize

Following is a brief introduction to the country of Belize. This will provide a very basic understanding of where Belize is located, the geography, biology, history and political structure of the country. Following this introduction, you can continue on with the full tour of Belize (approximately 50 different stops), or return to the Guided Tour Home Page where you can take a specialized tour of the towns, Mayan ruins or parks.

LOCATION



The country of Belize, lying between latitudes 15 degrees 53 minutes and 18 degrees 30 minutes North and longitudes 87 degrees 15 minutes and 89 degrees 15 minutes West. It is bounded to the north by Mexico, to the west and south by Guatemala, and to the east by the beautiful Caribbean Sea.

In form, the country is roughly rectangular, measuring 280 km from north to south and 109 km from east to west, extending to 180 km through the inclusion of the territorial sea. Total land area including the over 1,000 offshore islands, is about 8,860 square miles, for a total national territory including the territorial sea of 18,000 square miles.

**GEOGRAPHY
and
CLIMATE**

Belize is an extremely varied country for its size Inland, the Maya Mountain range is the dominant landscape feature and rises to 3,688 feet at its highest point



The mountains are surrounded by rugged karst limestone hills Beyond that, most of the north of the country and the entire coastal area consists of lowlying plains Major rivers erode the Maya Mountains, spreading sediment onto the coastal plains and continually extending out the coastline

Rainfall varies from less than 50 inches per year with a four month dry season in the north, to over 180 inches per year and a much shorter dry season in the south The natural vegetation of the country reflects the varied soils and climate with over 49 distinct types of forests identified to date

THE SEA



The pattern of diversity and high environmental quality of the land also applies to the coastal zone and marine waters The Belize Barrier Reef is the second largest in the world and the largest in the western hemisphere It is, however, only part of a complex and largely intact coastal ecosystem of exceptional value

The diversity of the marine zone is exceptional Three large coral atolls lie outside the barrier reef The continental shelf off Belize ends abruptly in a drop off that sinks to over 10,000 feet The barrier reef runs the entire length of the country and supports a tremendous number of patch reefs, shoals and over 1,000 islands called "cayes" Most of these cayes, and the entire coastline of the country outside of settlements are protected by huge forests of mangrove

ANCIENT HISTORY



The Mayan Civilization is among the elite of all archaic civilizations The ancient Mayan sites of Belize cover the full spectrum of time and diversity Belize boasts the oldest known Mayan site, the longest occupied site, and the largest carved jade object in all Mayandom

Over 600 hundred sites have been discovered to date in Belize New artifacts and even major sites seem to be discovered on a regular basis And excavation projects are taking place all over Belize today While only a fraction of the known sites are open to the public, those that are accessible will provide more than a glimpse of how spectacular this civilization was and how much a part of Belize history it is

POLITICS and PEOPLE



In terms of government and stability, Belize is unique in Central America It is a true democracy which operates under the British parliamentary system As a member of the British commonwealth, it has an excellent human rights record and freedom of the press is practiced without any censorship

Belize has six districts. Each one has elected officials responsible for representing the people of the district Each district has a main town which acts as the center of government for that portion of Belize Each town has elected officials responsible for local services Even village councils and village leaders are elected Every citizen over the age of 18 can vote

The population of Belize is very young and over 50 percent is less than 18 years old Belize is truly a melting pot of Central America Some of the major cultures represented in Belize include Creole, Mayan, Garifuna, Spanish, East Indian, Mennonite, Chinese and European/North American

If you wish to continue on with a FULL TOUR of Belize, which contains over 50 different stops covering subjects from the towns, the Mayan ruins and the National Parks of Belize, use the NEXT button below, this will take you to the first stop - the Corozal District Otherwise, you can return to the [Virtual Tour Home Page](#) and choose a specialized tour If you would like more information on this site, go to the [HELP](#) section to learn more about these guided tours

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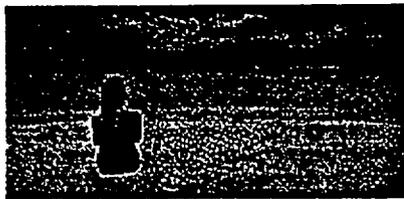
WELCOME

to the

BELIZE NATIONAL PARKS

TOUR

Belize is a country of incredible natural wealth. The descriptions one hears from visitors to Belize

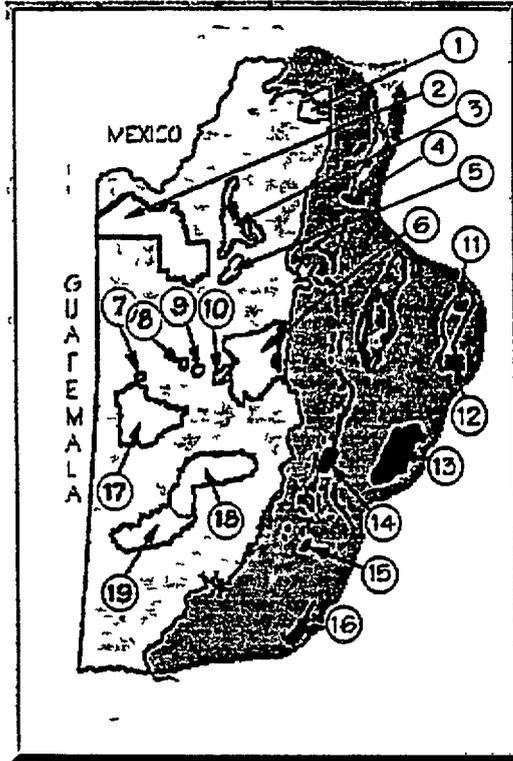


**crystal clear waters,
white sandy beaches**

attest to a nation endowed with a great diversity and abundance of natural beauty. Well aware of these precious natural gifts, Belize has embarked on a course of preserving these natural wonders. From the second largest barrier reef in the world to an untouched expanse of tropical forest, Belize has a great variety of National Parks and protected areas.

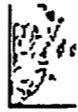
Belize uses a number of different designations for protected areas. National Parks is only one. There are also national monuments, wildlife sanctuaries, wildlife preserves, marine parks, community sanctuaries and forest reserves to name but a few. For these pages we chose to refer to these areas as 'national parks' because that is what most people are used to hearing when it comes to the protection of natural places. So be aware that while Belize has a number of National Parks, this tour will provide a small sampling of many different types of protected areas.

For those familiar with Belize, it is possible to explore the protected areas on your own by using the map and legend. For those just learning about Belize, we recommend that you follow the tour by using the NEXT button at the bottom of each page



- 1 Shipstern
- 2 Rio Bravo
- 3 Crooked Tree WS
- 4 Hol Chan
- 5 Baboon Sanctuary
- 6 Manatee Lagoon
- 7 Slate Creek
- 8 Guanacaste
- 9 Blue Hole
- 10 5 Blues lake
- 11 Blue Hole
- 12 Halfmoon Caye
- 13 Glover's Reef
- 14 Southwater Caye
- 15 Laughing Bird Caye
- 16 Sapodilla Caves
- 17 Pine Ridge
- 18 Cockscomb Basin WS
- 19 Bladen Nature Reserve

This is a location map of the protected areas covered in this guide. You can click on the circled numbers on the map, or on the names in the list to go to information on any of the protected areas. Please note that the numbers on the map do not correspond to the stops on the tour or the order that the areas are presented on the tour.



This National Parks Tour guides you first through some of the land protected areas, then through some of the marine protected areas. Each stop will provide a map of the area, a brief history of the area, and highlight some of the wildlife or sites that make the protected areas so special. Should you ever get disoriented as to where you are in the tour, you can click on the small map (as shown to the left) in the upper left corner of each page of this tour and return to this page. From here you can click on the map or the legend to start where you left off.

Please note that each page of this tour will also have buttons for a Full Tour of Belize. If you have time, you can go through a complete tour of Belize's protected areas, mayan ruins and districts by following the Full Tour. Click the **NEXT** button to continue the National Parks Tour.

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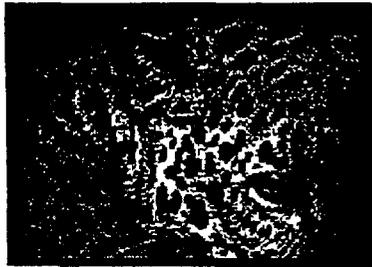
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Parks Map

BELIZE'S TERRESTRIAL PARKS

(Stop 01 of 21)

Belize is one of the smallest Central American countries, but is one of the most diverse geologically, topographically and climatically. This is reflected in the diversity of vegetation types with extensive tropical forests, wetlands, savannas and coastal systems.



Closeup of a Jaguar

Historical circumstances and low population pressure has allowed the greater part of the country to remain in natural vegetation. Many endangered animals under pressure in other countries of Central America occur in Belize in healthy populations.

The landscapes of Belize have been divided up into three broad areas so as to better understand the physical characteristics of the country. These areas include the Maya Mountains, hilly upland terrain, and the coastal plains.

The Maya Mountains are the dominant topographical feature of the country, with the highest peak at just over 3000 feet. The geologic history of this region is one of mountain uplifting, followed by rising sea level and the deposition of limestone by ancient coral reefs. Granite intrusions formed the Cockscomb Basin. Volcanic activity left behind a huge lava dike in the Bladen Valley. The oldest rocks in the country sit atop the Mountain Pine Ridge area.

The hilly upland terrain is what surrounds the Maya Mountains. These are thick beds of limestone deposited by ancient corals. These limestone hills have been eroded into extremely rugged scenery known as "karst". This region includes the areas around Five Blues Lake and the Blue Hole on the Hummingbird Highway, and the Rio Bravo hills of the northwest portion of the country.

A result of this eroding limestone is rich soils and also intricate cave systems. Belize is dotted by caves wherever limestone is found. The ancient Maya utilized these caves as storage chambers, living quarters, and for religious ceremonies. It is still possible to find pottery and other artifacts within many of the caves of Belize.

The remaining land area of Belize includes the coastal plains, divided up into northern, central and southern plains. These are extensive areas of alluvial deposits, laid down through hundreds of thousands of years of erosion of the Maya Mountains and hilly upland. This area has the richest soils in the entire country and is where most of the agriculture is concentrated in Belize.



**Limestone cave in
Hilly Upland
Terrain**



Coastal Savanna

The coastal plains support a wide variety of habitats. Many protected areas lie within the coastal plains region, including Shipstern Nature Reserve, Crooked Tree Wildlife Sanctuary, and the Community Baboon Sanctuary.

All told, Belize displays as much low altitude habitat diversity as any Central American country. Along with this habitat diversity comes a great diversity of plants and animals. It is estimated that the flora of Belize is comprised of over 4000 species. Over 150 species of mammals have been recorded for Belize.

Belize is a bird watchers paradise. Over 540 bird species have been found. While about 20% are migrants from North America, there are over 80 species which have special conservation value. These include colony-nesting sea and shore birds which use the rich wetland habitats for feeding and nesting. One of these rich waterbird areas is Shipstern Nature Reserve.

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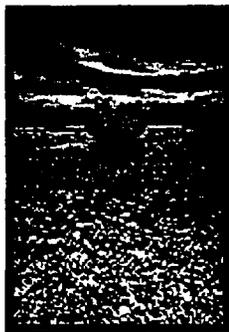
Go To

Parks Map

BELIZE'S MARINE PARKS

(Stop 13 of 21)

As **beautiful and pristine** that the terrestrial parks are in Belize, it's in the marine realm that Belize is truly unique in the world. With over 1,000 cays and 180 miles of barrier reef (longest in the northern hemisphere), Belize is extremely rich in coastal habitats and marine creatures.



Coral, Seagrass, Mangrove

The Belize continental shelf is approximately 257km long and 15-40km wide. This underwater platform is a realm of caves, coral pinnacles and grass meadows. The platform ends abruptly on the east by an escarpment which falls more than 3000m into the Caribbean Sea. An extensive fringing and barrier reef system has developed upon the rim of the escarpment. The platform flat is peppered with sand cays and coral reefs among vast seagrass beds and sand flats. Between the platform flat and the mainland lies a gently sloping underwater valley, wide and shallow north of Belize City but falling to depths of 64m east of Punta Gorda.

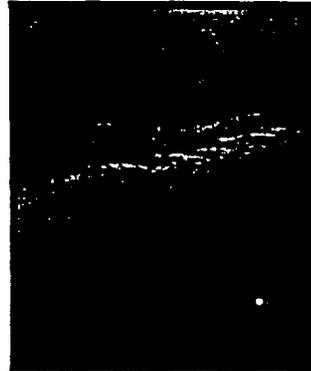
Our coastal habitats are essential breeding, rearing and feeding grounds for all aquatic and marine organisms. These habitats also perform important storm protection functions and provide a link between the runoff of terrestrial ecosystems and the marine food chain. Increasing pressure to develop economic and recreational entities within the coastal zone, as well as more efficient harvesting of marine products has intensified the need for reliable information on the extent and status of marine resources. Only with this information will proper management of these marine resources be possible.

The great diversity of marine habitats can be divided into three major groups - coral reefs, seagrass beds, and mangroves. Each of these three habitat groups work together to create a healthy marine environment. The Belize marine protection system, while lagging far behind the terrestrial park system, is quickly gaining strength. Each of the main habitats is now afforded some protection throughout the coastal zone of Belize.

The most stunning feature of the entire coastal zone is its diversity of reefs. The conditions for coral growth are ideal in Belize - clear water, sunlight, warm water temperatures, perfect salinity, and constant circulation of well oxygenated water. The variety of reef types that these conditions create is unparalleled in the Caribbean.

The Belize Barrier Reef is a nearly continuous strip of coral running all along the continental shelf, forming a wall from the Spodilla Cayes in the south all the way to the Mexican border on the north. Within this coral barrier lie many different types of reefs including patch reefs, fringing reefs, faroes and ribbon reefs. Most if not all the approximately 40 corals found in the Caribbean are represented in Belize.

The largest habitat type in Belize are the seagrass beds. Seagrasses are a small closely related group of plants. Seagrasses are true flowering plants that have adapted to living submerged in marine environments. They are the most successful shallow water marine community in Belize for the following reasons: they grow best in a salt environment, they do not need exposure to the atmosphere to grow, they have a well developed anchoring system to the bottom of the sea, they can reproduce while underwater, they compete well against other marine organisms for space and resources.



Belize Barrier Reef



Turtle Grass

There are six species of seagrass found in Belize. The most dominant is turtle grass. This plant is extremely important to the marine environment. Besides helping to consolidate bottom sediments, thereby preventing erosion or shifting of marine sediments, turtle grass also provides a home for numerous other marine organisms. For example, scientists have found over 40 different species of algae growing on the turtle grass blades alone.

Mangroves are highly productive and ecologically important ecosystems. Mangroves are trees which are adapted to grow in the intertidal zone. The major environmental factors influencing mangrove growth are climate, salinity, tidal fluctuation, sedimentation and wave energy. Variations in the physical, biological and chemical characteristics of coastal environments interact to form a variety of mangrove communities.

Belize is caretaker of a real global treasure - the magnificent Belize Barrier Reef ecosystem. Belize is one of the few places left on earth where resources are predominantly undeveloped and undisturbed. And the people and government want to be sure to do the right thing and not follow the lead of many other developing nations. They would like to forego the hyperdevelopment that has destroyed so much.



Mangrove Habitat

The following marine protected areas are only a sampling of what Belize has to offer. Eighteen marine locations have been nominated for protection status, and the entire coastal zone is being nominated for Biosphere Reserve status.

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**HOL CHAN
MARINE RESERVE**



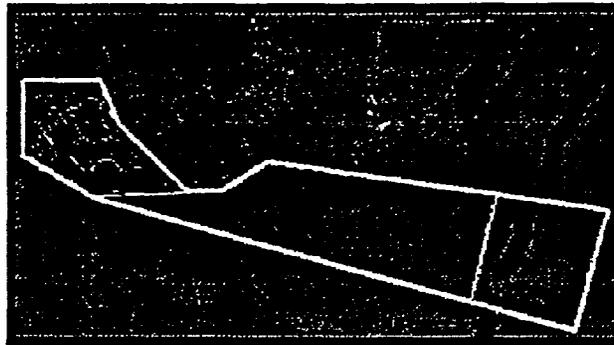
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HOL CHAN MARINE RESERVE

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The Hol Chan Marine Reserve, established in 1987, is Belize's first marine park. The reserve focuses on the Hol Chan (which means "little channel" in Mayan) cut which is a break or quebrada in the reef. The reserve is located approximately 4 miles southeast of San Pedro.



Hol Chan Site Map

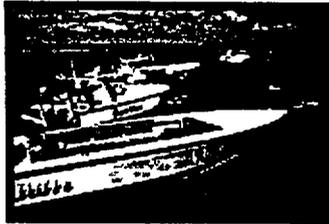
The reserve was formed primarily as a community-based initiative due to concern over the high level of uncontrolled fishing and diving activities in the area. But the reserve is also protecting a unique formation of the channel, the abundant fishery resource, and the feasibility of interlinking the three major habitats in Belize - mangrove, seagrass, and coral reefs

The walls of Hol Chan channel are lined with corals such as elkhorn coral, staghorn coral, and brain coral. The channel is well known by local fishermen as one of the richest areas on the reef for large fish school. The channel is also well known for the large green morays which live in the small caves and crevices along the walls of the channel



Jack School in Channel

The reserve which covers about five square miles, has been divided into three zones, allowing the maximum use of the area while emphasizing its preservation. The zones are clearly marked by bouys at the site. These zones are laid out according to the three main habitats - mangroves, seagrass, and coral reef



Boats at Marine Reserve

Hol Chan's one square mile coral reef zone is the most highly protected as well as the most heavily visited by tourists. No fishing or collecting is permitted within this outer Zone A. Boats are required to use the mooring bouys and an entrance fee is required to snorkel or dive here

Large schools of snapper and jacks continually cruise through this zone. Big groupers sit on the bottom completely at ease with the human presence. Lobster populate the caves and crevices of the channel's heavily pockmarked walls. Currents here can be strong at times and special attention has to be paid to the tides

The seagrass beds in Zone B cover the largest portion of the park, physically linking the mangrove and coral reef habitats into one continuous ecosystem. The dominant plant is turtle grass. Large populations of conch feed in these seagrass fields. Many of the fish species which spend the day in the channel, will migrate to the seagrass beds at night for feeding.



Patch Reefs

The mangrove habitat in Zone C contains seven mangrove cayes and several navigable channels. The primary mangrove species is the Red Mangrove, a tree that grows very well in salt water. The red mangrove lines many of the channels and cayes of this zone.

Located very close to the reserve boundaries in Zone C is the Mayan archaeological site of "Marco Gonzalez". Although a small ruin, studies have shown it was a very important trading center and had close links to the Mayan ruin of Lamanai.

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**FIVE BLUES LAKE
NATIONAL PARK**

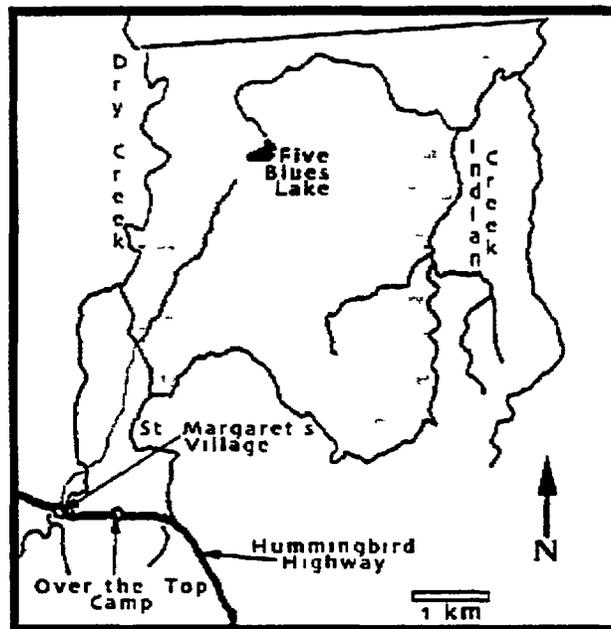


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FIVE BLUES LAKE NATIONAL PARK

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Five Blues Lake National Park was established on Earth Day 1991 as the only National Park in Belize to be managed by a community-based organization. The many cultures of nearby St. Margaret - Spanish, Creole, English, Garifuna, Mayan and Mennonite - came together and committed themselves to protect the beautiful lakes called Five Blue Lakes.



5 Blues Lake National Park Site Map

The park is 4292 acres of rugged karst (limestone) terrain and lush broadleaf forest. The lake spreads over 10 acres and is an estimated 200 feet deep in one spot. The limestone hills surrounding the lake contain numerous sinkholes, caverns and underground streams. Basically, Five Blues Lake is an exceptionally large "blue hole" or sinkhole filled with water.



Five Blues Lake

A unique forested island sits in the middle of the lake. Access to the island is possible across a shallow ledge protruding from the bank on the eastern side of the lake. This island is called "Orchid Island" for the profusion of orchids which grow throughout the small forest covering the island.

Two hundred seventeen species of birds have been identified in the park and all five of Belize's wildcats make their home within the park's boundaries. Other mammals include howler monkeys, tapir, gibbon, peccary and armadillo. The forest surrounding the lake is a tangle of broadleaf trees, lianas, and lots of orchids and bromeliads.

Access to the park is from a road off the Hummingbird Highway near "Over-the-Top". The park is completely managed by the locals of St. Margaret Village. The local population has set up camping sites, and numerous small beds & breakfasts have sprung up to accommodate visitors to the park.



5 Blues Lake Guide

Activities at the park include swimming in the lake. Many nature trails criss cross the park and guides are available at the village. Nearby flows Indian Creek, a drainage that leads into the Sibun River. Along the course of Indian Creek lie a series of seven caves.

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**RIO BRAVO CONSERVATION
AND MANAGEMENT AREA:
PROGRAMME FOR BELIZE**



The primary aim of the Programme for Belize staff is to protect this valuable area of forest. The lands were bought through an international fund-raising programme, assisted by donations from companies working in Belize. Money raised has also been used to establish a field research station, train and employ local people as forest rangers and develop an Outreach programme. This has worked to strengthen relationships with the local Mennonite agricultural community and people in the nearby villages in Orange Walk District.

The Programme's attention is now turned towards methods for creating revenue from the careful use of the forest's resources to provide the funds for its perpetual care. Preliminary research into appropriate management methods is considering limited harvesting of non-timber forest products (such as chicle, honey and thatch), the potential for developing income from participation in the global carbon sequestration programme, from low density tourist facilities and careful timber production, citrus growing and other agricultural activities on disturbed land.

The need for surveys of the RBCMA lands

It is crucial that these activities are developed in a way that takes full account of the biodiversity within the area, so that particularly sensitive sites and habitats can be distinguished and given special protection.

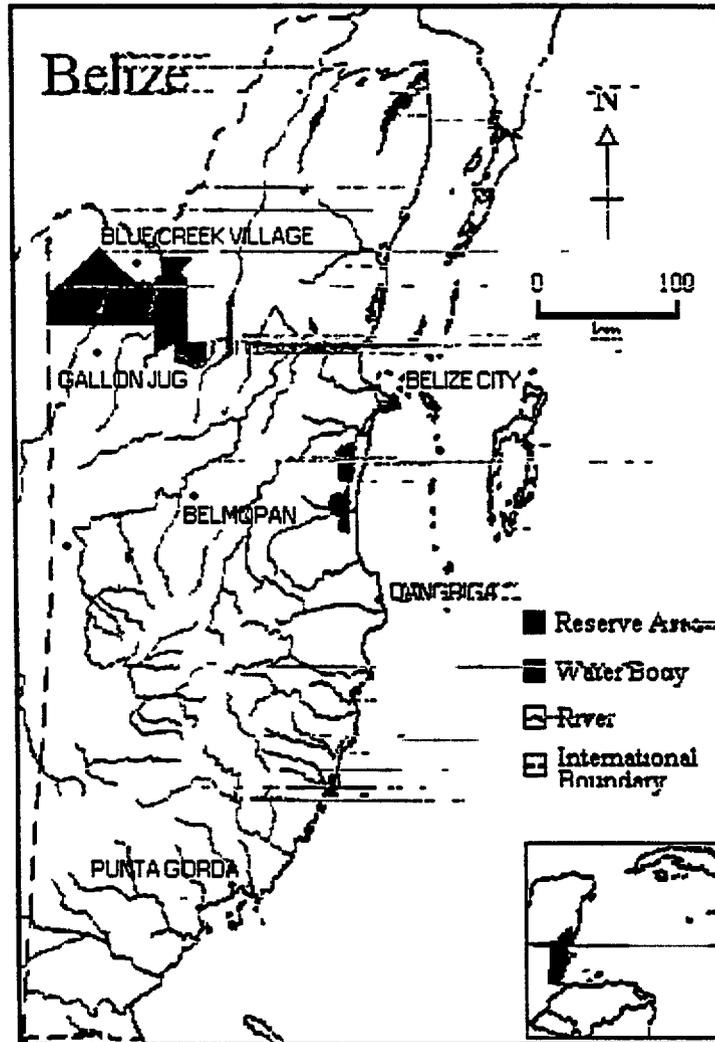
Programme for Belize also recognises that as a major landowner, (the charity owns approximately 4% of the land area of Belize) it has a responsibility to assist in the country's economic development. If it can identify areas within its care which have little conservation value it hopes to use these to develop model sensitive land-use schemes which would be suitable for adoption by local people on the adjoining lands.

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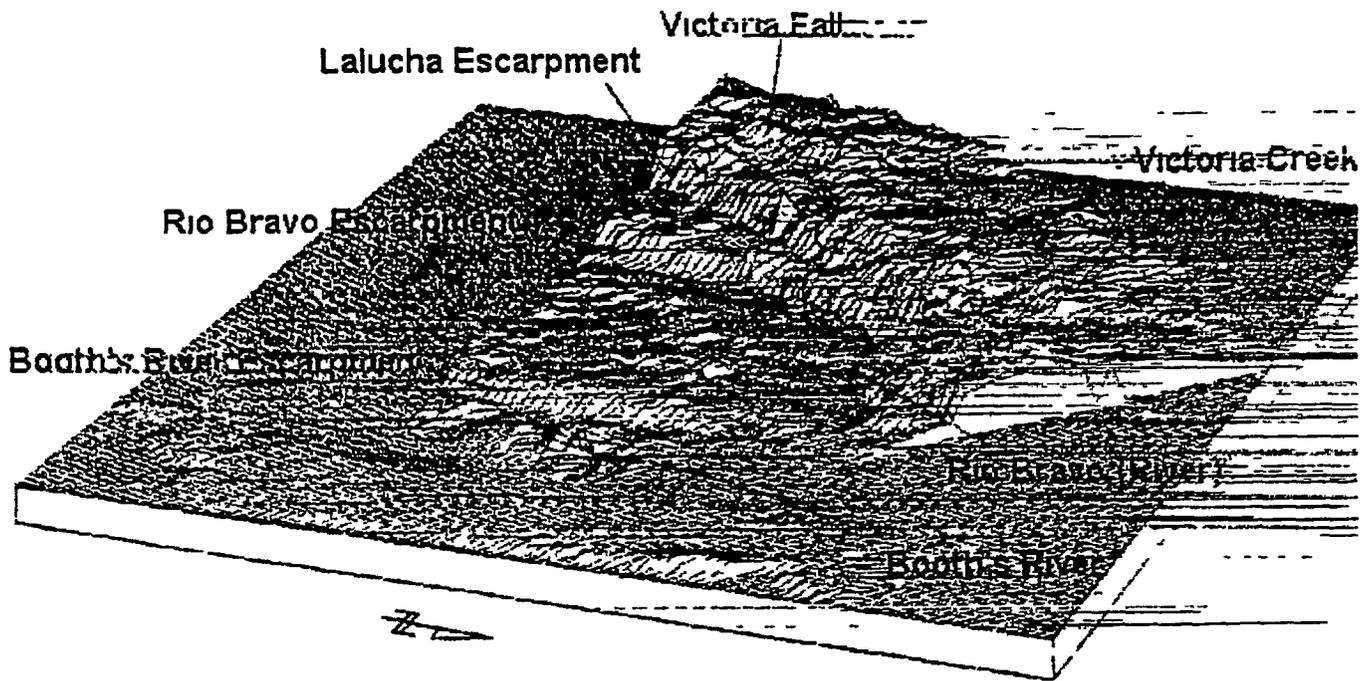
STUDY AREA

This project focuses on wetland and savanna areas within land owned by the Programme for Belize the Rio Bravo Conservation and Management Area (RBCMA) This is located in the north west of Belize



Based on a map produced using ARC/INFO in the Department of Geography

Biogeographically, the RBCMA constitutes an extension of the Peten, forming part of the Yucatan Peninsula. As such it has features representative of the lowland and emergent Atlantic coastline of Central America. It has been recognised as a priority area for biodiversity conservation.



Based on an image taken from W C Yee's MSc dissertation, © W C Yee/The University of Edinburgh 1991

This digital terrain model shows part of the RBCMA as if looking towards the north-west. Three conspicuous escarpments (between 30 and 60 m high) form the dominant physiographic features. The highest of these three escarpments is the Lalucha Escarpment, seen at the back of the model. The present work concerns itself with the lands to the east of the Booth's River Escarpment - seen in the foreground of the model - mostly flat or gently undulating terrain.

Preliminary reconnaissance work in 1994 reveals the vegetation to vary considerably across the RBCMA. Faulting has created a range of habitats at different altitudes. Variations in the underlying geology and sedimentary deposition result in alternating zones of poor and good drainage. Semi-deciduous forest occupies the highest, well-drained land, pine-savanna can be found on the lenses of pliocene sediments, mangrove forest and wetland grasses grow on the lowest areas, some of which are composed of calcareous clays.

☉ Diagram showing vegetation changes along a west-east transect (10KB GIF file).

Biodiversity

Originally thought to be largely Maya lowland forest, recent surveys have found the RBCMA to have the most diverse array of any vegetation types of any protected area in Belize (*WWLCT News Issue 2*). Of the twelve vegetation types found in Belize, two occur only in the RBCMA and five others are only adequately represented in Belize because they occur in protected regions of the RBCMA.

A particularly important vegetation type is the *bajo* - a seasonal swamp habitat which supports a very distinctive range of flora and fauna. The RBCMA is therefore an important refuge for biodiversity, not only within Belize, but part of the larger Peten ecosystem. Together with the Maya and Calakmul Biosphere Reserves they form the largest remaining forest block in Central America. The area supports many endangered species - 15 mammal and 21 bird species and is a vital wintering and passage area for many North American migrants. Its importance is given greater importance by the accelerating deforestation of adjacent lands in the region.



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RIO BRAVO CONSERVATION AREA

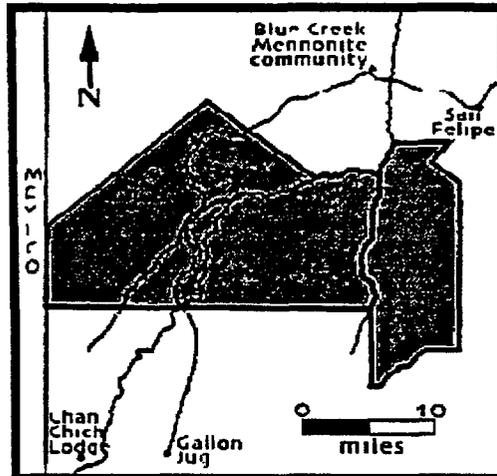
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The Rio Bravo Conservation and Management Area is an innovative forest conservation project. Three hundred thousand acres of subtropical moist forest are being managed to maintain the healthy forests and its abundant wildlife. Other goals include the production of commercial scale hardwood lumber, chicle, and other forest products on a sustainable basis. Forest and archaeological research as well as tourism are other uses of the area.

Rio Bravo is private land being held in trust for the people of Belize. It is managed by the Programme for Belize, a non-governmental organization. Today, the area remains covered in dense forest, primarily mahogany, cedar and other valuable hardwoods.

These rich hardwood forests support an abundance of wildlife. The population of jaguars at Rio Bravo is thought to be the most dense in Belize, and perhaps all of Central America.

The Rio Bravo lands are generally flat or rolling lands. A series of terraces have developed over geologic time resulting in several distinct escarpments which run through these lands. The Rio Bravo is the only major river in the area.



Rio Bravo Site map



**Large Mahogany
Tree**

The forests of Rio Bravo are interesting for the great diversity in tree species and types of forest. Two-thirds of the forests are classified as upland broadleaf forest. This type of forest has been an important source of mahogany, cedar and many other hardwood species. In fact, most of Rio Bravo was once cleared or selectively logged during the presence of the Maya or during logging earlier this century.

Other types of forest include cohune palm forest which grows on very rich, well drained soils, swamp and marsh vegetation, and savanna.

Wildlife is abundant in Rio Bravo, due in part to the remoteness of the region. Hunting has been actively discouraged or completely eliminated in the last few years. All five cat species found in Belize live here: jaguar, puma, ocelot, margay, and the jaguarundi. Other mammals frequently sighted include the tapir, tayra, anteaters and grey fox.



White Tailed Deer

In the relatively short period of time that studies have been conducted, more than 200 species of birds have been recorded, with some habitat types still to be studied. Many big game birds are very abundant, including ocellated turkey, great curassow, and the guan. Hawks and other raptors are abundant along the forest edges and escarpments.



Research Center

The major activities undertaken by the Programme for Belize have concentrated on scientific research, archaeology, forestry and tourism. The Rio Bravo research center supports many different types of studies ranging from taxonomy to ecology. There is a major, multi-year project underway, excavating the major Maya ruins of Las Milpas. Research continues into exploring new ways of sustainably exploiting forest products, including harvesting of chicle, selective logging and manufacture of charcoal.

Finally, tourism has become a major focus of the Rio Bravo area. Dormitories as well as cabanas are available with prior reservations. New ecotourism lodges are in the planning stages on both the northern and southern sections of the protected area.

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Bravo New World

The ruins of La Milpa don't have to remain obscure to protect them and the surrounding 229,000-acre Rio Bravo Conservation and Management Area, local conservationists say. Nor should they be exploited for economic gain. The solution is to manage the area's natural and historical resources sustainably, according to Jov Grant, director of Programme for Belize, a private group that manages Rio Bravo.

For instance, plans by U.S. universities to research and excavate La Milpa tie in with Programme's strategy to launch an ecotourism venture. Rio Bravo "Demand for secluded, nature-based vacations is growing," says Grant, and La Milpa is an ideal side trip for people who want to explore the Belizean forest. We must simply do it right—encouraging visitors without harming the land and wildlife or debasing the ruins."

For several decades, this remote corner of Belize was the object of illegal logging of prized tropical hardwoods, hunting of jaguars and other endangered species, and looting of Mayan ruins. Since 1988, however, when Programme for Belize (with the support of The Nature Conservancy) began acquiring land in the Rio Bravo area, many of these activities have been curtailed—this despite only four full-time rangers.

Yet the threats have not disappeared in this lush subtropical moist forest, which harbors endangered cat species in greater numbers than anywhere else in Central America. Instances of timber smuggling and animal poaching still occur. Perhaps more ominous are the clear-cutting and runoff on adjacent tracts of land, which raise questions about the ecosystem's future.

To counter these problems, Programme and partner groups such as the Conservancy have had to think about how best to protect the land while generating income for neighboring residents. In one pilot project, local tree tappers, or "chicleros," have been hired to harvest chicle tree sap—the traditional raw material of chewing gum. Programme is finding new markets for this substance in the natural chewing-gum business. After the first year, revenues have more than doubled the income of the chicleros.

Programme is also examining ways to harvest valuable hardwood mahoganies and cedars over the long term without impoverishing the forest, and



▲ Sustainable development in action at Rio Bravo (Lower left) A "chiclero" taps a tree to extract chicle—an ingredient of chewing gum. The raw sap flows into a collection bag. (Top) Processed chicle.

seeking markets for timber traditionally considered less valuable. Both forestry projects would eventually employ local workers.

A successful education program brings American students to Belize for two weeks of intensive training in rain forest and marine ecology, as well as a cultural exchange with Belizean students. Beyond garnering nearly \$80,000 a year for Programme, the student visitors provide crucial income to area villagers, who serve lunches and sell handicrafts. Says Grant, "It's amazing how this program has created interest among villagers in Rio Bravo's ecology, and has revived cultural practices that were falling by the wayside."

All of these projects contribute to Programme's long-term vision for Rio Bravo: protecting a significant forest reserve while generating revenue sustainably. According to Brad Northrup, director of the Conservancy's Caribbean program, this thinking places Programme on the cutting edge of the environmental movement in Latin America. "Better yet," Northrup says, "their actions are keeping pace with their thinking." □

—MARTHA HODGKINS GREEN

BELIZE AUDUBON SOCIETY

What it is!!

Mission Statement

The Belize Audubon Society is a non-profit, non-government organization dedicated to the promotion of the sustainable use and preservation of our natural resources in order to maintain a balance between people and the environment

The Society was formed in 1969 as a foreign chapter of the Florida Audubon Society and affiliated with the National Audubon Society of the United States. In 1973 it became a completely independent organization. The Society takes its name from the great 19th century American naturalist, John James Audubon, who is famous for his paintings of the Birds of America.

Aims and Objectives

While the name "Audubon" suggests birdwatchers, the Society is interested in all aspects of our natural heritage and is dedicated to working with local communities to conserve the wildlife and natural resources of our country. It aims, through education, to promote the appreciation of the beauty and diversity of nature. Public opinion is of great importance in this endeavor, and making people aware of the value of conservation is one of the Society's prime aims and objectives.

Affiliations

In 1986 the Belize Audubon Society became the first Belizean member of the International Union for the Conservation of Nature and Natural Resources (IUCN), the world's largest environmental organization based in Switzerland. The Society is also a member of the Flora and Fauna Preservation Society in the United Kingdom.

On the local front, the Belize Audubon Society is a member of the Belize Tourism Industry Association and the Belize Alliance of Conservation Non-Government Organizations (BACONGO).



The Belize Audubon Society
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The society was instrumental in having the rare Jabiru Stork (known lovingly as "turk") added to the list of fauna protected by law and continues to monitor its nesting activity. BAS fully supports the Wildlife Protection Act which controls the management of protected animals and the hunting of game animals and has worked closely with the Belize government in determining the bird and animal species that need protection.

Christmas Bird Count

Since its formation, BAS has conducted Christmas Bird Counts which are reported to the journal AMERICAN BIRDS to be processed along with other counts from Middle America.



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What It Does!!

To achieve its aims and objectives, the Belize Audubon Society (BAS) undertakes a variety of activities within its three main programs: advocacy, environmental education and protected areas management.

Advocacy

Public opinion is of great importance and BAS endeavors to make people aware of the value of conservation. BAS works with other nongovernmental organizations and relevant bodies to make Government aware of the problems experienced in Natural Resource Management.

Environmental Education

The environmental program, which has been in operation since the formation of the society, has been expanded with support from the World Wildlife Fund. The education objective includes supporting the community development component of the Protected Areas Management plans through increased education, planning and outreach in communities around the protected areas. Lectures and films are periodically offered to BAS members and the public free of charge. Members and staff readily respond to requests for talks from schools and other bodies. Flyers, leaflets, posters, along with a small library with information on Belize's abundant wildlife, are available to teachers, students and other interested individuals through the BAS office in Belize City.

Several educational slide programs have been developed throughout the years. Conservation booklets have been published for the school children in Belize. Publications on Belizean flora and fauna are also available through the society.

A BAS staff member is responsible for the environmental education component of the Coastal Zone Management Program, a multifaceted project involving many government agencies and nongovernment organizations. School groups regularly organize field trips to visit the sanctuaries at several of which these are visitors' centres with educational displays.

Protected Areas Management

Since 1984 a major thrust of the BAS has been the management of several protected areas established under the National Parks System Act of 1981. At the request of the Government of Belize, BAS has been instrumental in the financing, development and operation of these areas. The reserves provide a variety of recreational and educational opportunities. Brochures with general information on the reserves, including maps and listing visitor facilities, are available at the BAS office.

Other Activities

Bird Sanctuaries

Also, at the request of the BAS, seven small mangrove cays were declared bird sanctuaries. These cays are nesting rookeries for Wood Storks, Great and Cattle Egrets, Boat-billed and Tricolored Herons, Reddish Egrets and White Ibis, as well as Magnificent Frigate birds, Anhingas and other birds.

Chapters

BAS has been expanding its activities by establishing chapters. Cayo Audubon was inaugurated in 1990 and Placencia and Belmopan Audubon in 1994.

Conservation

Protected Areas in Belize

Protected Areas Management

Since 1984 a major thrust of the BAS has been the management of several protected areas established under the National Parks System Act of 1981. At the request of the Government of Belize BAS has been instrumental in the financing, development and operation of these areas. The reserves provide a variety of recreational and educational opportunities. Brochures with general information on the reserves, including maps and listing visitor facilities, are available at the BAS office.

Half Moon Caye

The Half Moon Caye Natural Monument was designated in March 1982, the first area in Belize to be protected under the National Parks System Act. The marine reserve consists of about four miles of Lighthouse Reef, part of its inner reef lagoon, some much deeper water beyond the reef and the entire Half Moon Caye. This island is important because it supports the only nesting colony of the Red-footed Booby in white phase adult plumage in the Western Caribbean. Over 4 000 birds nest in the colony.

The Society, with the assistance of the lighthouse keepers living on the island, conducts a rat control exercise. An observation platform in the booby rookery is provided to accommodate the growing number of visitors. There is great concern about damage to the reef by the anchors of large vessels visiting the reserve, so please be careful. A Half Moon Caye Natural Monument slide program is available for presentation to school children and others.

Crooked Tree

The Crooked Tree Wildlife Sanctuary was established in November 1984 for the protection of resident and migrant birds which, during the dry season, gather there by the thousands. The sanctuary centers around several inland lagoons connected by waterways. Other landforms in the sanctuary include swamps, savannah and lowland pine ridge. This is prime habitat for Jabiru Storks which congregate around Crooked Tree at the end of the nesting season. Facilities provided with the funding from the Wild Wings Foundation of New York include a furnished visitor centre. Park wardens have been engaged and equipped. The sanctuary is a regular stop for many organized nature-based tours that visit Belize.

Cockscomb

The Cockscomb Basin Forest Reserve was established in 1984 and declared a no hunting area to protect the natural prey of its resident jaguars. Part of the Forest Reserve was established as the Cockscomb Basin Wildlife Sanctuary (CBWS) in 1986. The Sanctuary was expanded in 1990 to include the entire forest reserve, a total area of over 100 000 acres. The CBWS is without doubt Belize's most famous reserve. In February 1988 HRH The Duke of Edinburgh, as President of the World Wide Fund for Nature, visited Cockscomb. Newspapers and magazines throughout the world have carried stories on Cockscomb and its jaguars. Since 1985 BAS has received funding support from the World Wildlife Fund - U.S. to develop Cockscomb. Facilities include a visitor center, three guest houses, campground, signs, hiking trails and a trail guide. Visitation has soared with the visitors' register recording nationals of many foreign countries. A CBWS slide program is presented throughout the Stann Creek District.

Guanacaste National Park

Guanacaste Park, a parcel of some 50 acres near Belmopan, was established as a Crown Reserve in 1973 and given National Park status in 1990. Located on the Western Highway at the confluence of the Belize River and Roaring creek, the park is named for its very large guanacaste (tubroos) tree which supports a great variety of epiphytes. The area also has numerous other species of plants, all of which are preserved.

great variety of epiphytes. The area also has numerous other species of plants, all of which are preserved in their natural state. Facilities include a visitor center with educational displays, bird watching and hiking trails. The wardens conduct an active educational program.

Blue Hole

The Blue Hole National Park was the fifth area to be protected under the National Parks System Act. Designated in December 1986, BHNP includes an area of 575 acres, covered mostly with relatively undisturbed forest and features two principal attractions: St. Herman's Cave and the Blue Hole. Wildlife is quite plentiful in the park and four of Belize's National Symbols are known to occur there.

Community Baboon Sanctuary

The Community Baboon Sanctuary was established in 1985 to protect one of the few healthy black howler monkey populations in Central America. The sanctuary is a completely voluntary grass roots conservation program and is managed by a committee composed of land owners from the eight villages included in the project. BAS is responsible for administering funds the sanctuary receives from sponsors.

Areas Reserved for Scientific Research Only

Bladen

Bladen Nature reserve in the Maya Mountains has been set aside to preserve its watershed, pristine forest and large population of endangered species. Bladen was declared in 1990 a reserve to be held for research only. Our goal at Bladen, which covers some 97,000 acres, is to leave an area of wild habitat for perpetuating natural and biological diversity. By leaving Bladen relatively undisturbed, neighbouring parks, such as Cockscomb, will undoubtedly benefit by being near a peaceful breeding habitat for many species that are vulnerable to human disturbance.

Tapir Mountain

Formerly named Society Hill, Tapir Mountain Nature reserve was officially established in November 1986 for tropical research and preservation of genetic diversity. The area is approximately 360 feet above sea level and covers 6741 acres. Located at the northern edge of the Mountain Pine Ridge, the terrain is rugged limestone karst, categorized as subtropical wet forest. A Rapid Ecological Assessment was carried out in 1994 to record the biological diversity of the area.



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**CROOKED TREE
WILDLIFE SANCTUARY**



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CROOKED TREE WILDLIFE SANCTUARY

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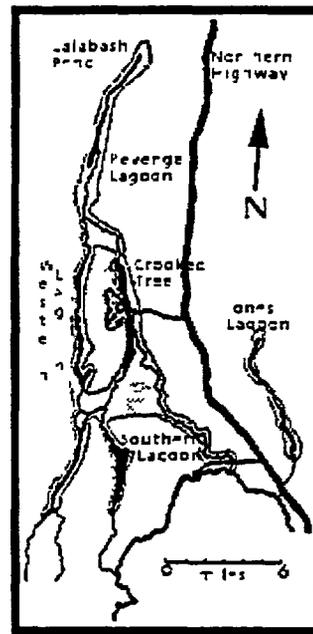
Located 33 miles northwest of Belize City and just 2 miles off the Northern Highway, Crooked Tree Wildlife Sanctuary provides an opportunity to view some of Belize's magnificent waterbird populations

Established in 1984 for the protection of resident and migrant birds, the sanctuary consists of a network of inland lagoons, swamps and waterways. During the dry season, thousands of birds congregate here, taking advantage of the food resources, and migrants find a safe resting spot on their spring migration back to the north.

The variety of habitats in the Crooked Tree area provide food and homes for a wide diversity of animals. Within the logwood swamps roost many Boat-billed Herons as well as the rare Chestnut-bellied Herons and Bare-throated Tiger Herons.

The two species of ducks in Belize, the Black-bellied Whistling Duck and the Muscovy, nest in the trees along the edges of the lagoons. Over the open water you will find many birds feeding on the abundant food resources the lagoon habitat provides.

Some other species found in abundance at Crooked Tree include the Snail Kite, which feeds exclusively on the apple snails found along the shoreline. The graceful Snowy and Great Egrets stalk frogs and small fish along the shoreline. All five species of Kingfishers, as well as the Osprey and Black-collared Hawks feed on fish near the surface of the lagoon. Many diving birds such as cormorants feed on fish deep in the lagoon.



Crooked Tree Site map



Jabiru Stork Nest

Jabiru Storks, the largest flying bird in the New World with a wing span of 10-12 feet, feed throughout the sanctuary Belize supports the largest nesting population of these great birds in all of Central America A small population of these birds nest within or close to the sanctuary's borders

The storks arrive in November to nest in the lowland pine savannas After the young fledge and during the months of April and May, the birds from the northern and central parts of Belize flock to the Crooked Tree and Mexico lagoons

Within the sanctuary is the village of Crooked Tree, established during the logwood harvesting era Because of its relatively easy accessibility by boat, Crooked Tree was one of the first inland villages in Belize Until recently, Crooked Tree was still only accessible by boat which travelled up the Belize River and Black Creek But a 3.5 mile causeway now connects the village with the Northern Highway



Crooked Tree Lagoon

Today, the village of Crooked Tree remains much as it has been throughout its existence The economy is basically based on agriculture During the dry season (January thru May), the lagoons of the sanctuary are used for a small scale fishery by netting Also, cashews provide a source of income During the months of May, June and July the cashew seeds are parched, cracked open and roasted Other sources of income include the selling of cattle pigs and goats



Roseate Spoonbill

The village of Crooked Tree is fast becoming a tourist destination. Infact, tourism is the fastest growing industry in the area. The village is known for its beauty. The village maintains an open air sort of feeling with the sprawling lagoon providing a wide open back drop to the east. A cool breeze normally blows from the east and large trees dotted throughout the village provide cool shade.

The Crooked Tree Wildlife Sanctuary is managed by the Belize Audubon Society. There is a visitor center at the immediate end of the causeway as you enter the village. Boats and guides are available at visitor center or within the village.

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**UNIVERSITY COLLEGE OF BELIZE:
MARINE RESEARCH CENTER**

MARINE RESEARCH CENTRE

**Calabash Caye Field Station, Turneffe Islands Atoll
BELIZE**

[General Information](#) | [Location](#) | [Facilities](#) | [Coral Cay Conservation](#) | [Outputs and Benefits](#)
[Academic Activities](#) | [Training](#) | [Research Activities](#) | [More Information](#)

GENERAL INFORMATION

(March 1996)

The University College of Belize (UCB) has been working to develop a Marine Studies Programme and an associated research station since 1989. On August 1994, UCB signed a Memorandum of Understanding with the Government of Belize and Coral Cay Conservation (CCC), (a UK-based, non-profit marine conservation organization) to establish a Marine Research Center (MRC) on the Turneffe Islands atoll.

The MRC's Calabash Caye station was officially opened on September 27, 1995, but there is still much infrastructure development work to be done. When completed, the station will become Belize's first nationally owned and managed marine research facility.

This Calabash Caye station will complement scientific field work presently being carried by the Smithsonian Institution at Carrie Bow Cay and the newly established research station at Glovers Reef set up by the New York Zoological Society and the Fisheries Department.

LOCATION

The Belize Barrier Reef is over 170 miles long and is the second longest reef in the world. There are three atolls along the reef: Glovers Reef, Lighthouse Reef and the Turneffe Islands.

The Turneffe Islands atoll is the largest of the three covering approximately 850 sq km. The MRC field station is located on a 5 acre plot on the east coast of Calabash Caye on the south-eastern side of Turneffe. The facility is easily reached by crossing the atoll through the lagoon and mangrove channels. The approximate distance from Belize City is 32 miles and may take anywhere from 1-3 hours depending on the vessel and weather conditions.

Calabash Caye has a dense cover of coconut trees, mature palm forest, other low-vegetation and is fringed on the lagoon side with mangroves. On the eastern exposed side, there is a well developed fringing reef separated from the shore by a shallow area of seagrass beds. A cut in the reef allows access to the reef drop-off which runs the length of the atoll.

The mangrove and reef habitats within the atoll are productive in a number of ways. They provide a home to numbers of species that are declining elsewhere in the world, such as crocodiles, turtles, manatees, dolphins and seabirds. Also, the Turneffe Islands atoll is of great value to the Belizean economy. The mangroves provide nursery and feeding areas for several commercially valuable species of fishes and it is believed that grouper and snapper may spawn in this area. A large proportion of the lobster catches for the major fishing cooperatives occur around Turneffe and conch are abundant in parts of the lagoon. Turneffe is the nearest of the three atolls to Belize City and has already become a tourist destination as it provides a relatively pristine atoll environment. A number of divers and sport fishermen from surrounding resorts, visit the reefs.

FACILITIES

Construction of the two main buildings has been completed and accommodations for up to 50 people will begin in 1996. The pier, dive locker, generator shed, compressor shed and composting toilet facility have been completed. The roofs of the main buildings provide a large rainwater catchment area and there are plans to install solar and wind power.

The principal aims of the MRC is to provide facilities for scientific monitoring, research and environmental awareness programs with an immediate focus on shallow water tropical marine ecosystems. It is planned that the Calabash Caye field station will support UCB's developing degree programs in Natural Resources Management and Coastal/Marine Studies. It will also provide a facility for short training courses and workshops on a wide range of marine related topics for students, teachers and others, from both Belize and overseas. It is also anticipated that the station will be the headquarters for current national efforts to maintain the unique biodiversity of the Turneffe Islands atoll.

Elevated walkways and nature trails are to be established through the mangroves and coral forest providing access for research and making these habitats easily available for educational purposes, whilst minimizing the impact on the environment. Facilities will be available for a range of marine science courses, as well as for training in basic technical skills such as boat handling and navigation. Environmental impacts at the facility will be minimized through mandatory orientation programs for visitors, including training in environmentally safe snorkeling practices and restricted access to potentially sensitive habitats. Impacts from essential services will be minimized through adoption of appropriate technologies. It is hoped that electricity will eventually be provided through wind and solar generators, a composting toilet is already in use, most water will be collected into large cisterns, a grey water processor is currently being installed which will process kitchen and shower effluent, combustible wastes will be incinerated, and non-combustible products returned to the mainland for appropriate disposal.

1 Development Of The Facilities

- Living Quarters - the funds have been located which will enable UCB to construct a dormitory block to accommodate 28 persons, and two cabanas to serve as living quarters for the MRC staff and visiting scientists. Construction is expected to be completed by August.
- Equipment and teaching materials - some equipment and teaching materials will be procured through the Smithsonian Mangrove Workshop, but additional funding is necessary to fully equip the station's planned wet lab and teaching infrastructure.
- Vessels - UCB is acquiring two 25' skiffs and one 18' skiff (all present boats are owned by CCC), future plans envision the acquisition of a larger 35' vessel for resupply and transport. It is hoped that the larger boat could be used for deep sea research as well in the short term until a proper vessel is secured.
- Nature Trail - an elevated walkway to minimize the human impact on the terrestrial habitat needs to be constructed and identification stakes of flora need to be placed.
- Wind and solar power - to become even more environmentally friendly, the acquisition of wind and/or solar power is being fully investigated. This is initially, a very expensive venture, but may be a necessity.
- Staff appointment - currently, there are two full time MRC staff members, by May 1996, a Science

Officer/Station Manager and a full-time certified Coxswain (Boat Captain) will be appointed
Accounting and secretarial support staff needs will be met by 1997

CORAL CAY CONSERVATION

Coral Cay Conservation, which is a U K based limited company, under its 1993 Working Agreement with UCB, has been very active in assisting with the establishment of the MRC CCC has solicited donations of most of the construction materials and provided additional support to the MRC by providing an architect, builder, solicitor, and a variety of researchers In return, CCC has been provided a site to conduct its volunteer program

The CCC volunteers pay to conduct survey work on the reefs of Turneffe Atoll They gather information on substrate cover, coral and fish diversity and abundance using recognized quantitative and semi-quantitative methods All information they gather will be entered into a database that will be used to establish a management plan for the Atoll

OUTPUTS & BENEFITS

It is anticipated that the main outputs and benefits of the MRC will be

- 1 the establishment of a financially self-sustaining field facility which will compliment UCB's programs,
- 2 the development of UCB's technical capacity to independently provide training, research and education on coastal issues to students, teachers, Government of Belize and NGO staff,
- 3 the provision of training in coastal/marine science oriented field work in Belize and improvement in environmental awareness amongst Belizeans and visitors,
- 4 support of the CZMP's activities to ensure the conservation and sustainable integrated management of the biodiversity and natural resources of the entire Turneffe Islands atoll including the designation and implementation of a protected areas strategy
- 5 the establishment of collaborative links (including educational & data exchange agreements) with Regional and International research and educational agencies

ACADEMIC ACTIVITIES

The aim at the present is to develop strong Natural Resource Management based field studies programs in the Coastal/Marine Studies area which will be offered to Belizean, Regional and International educational institutions (particularly those who are able to offer course credit for these programs)

- The Natural Resources Management curriculum has been developed and approved by the UCB council for acceptance into the University's curricula. Initially, an associates degree program will become effective in August 1996 with three areas of concentration Coastal/Marine Resource Management, Tourism (Recreation) Resource Management, and Terrestrial Resource Management The development of B Sc and M Sc programs will be pursued in the immediate future
- Several meetings with regional universities that offer degree courses in Natural Resource Management (NRM) have been held to discuss the possibility of forming a Western Caribbean

consortium The interest has been positive and as a result of this UCB organized the first workshop to bring together the interested parties in October 1995 Representatives from the following universities attended UWI-Jamaica, Cuba, Campeche & Quintana Roo, Mexico, San Carlos, Guatemala, & the National University of Honduras The preliminary aims of the consortium were to provide a network for information sharing on coastal/marine environmental and educational concerns, collaboration on regional research and scientific projects, faculty and student exchanges, and fund raising efforts to support consortium activities UCB is following up on this through communication with the various groups

- The Mangrove Education Workshop, a joint proposal between the MRC and the Smithsonian Environmental Research Center is being funded (US\$50,000) by the MacArthur Foundation The workshop will be held at the Calabash Caye station in July- August 1996 for teachers, GOB & NGO representatives
- Publicity and public relations campaigns need to be implemented to make the public, schools, and even the fishermen aware of the MRC and its goals and objectives The identification of media and personnel for these purposes is underway
- 1996 has been declared the Year of the Coral Reefs and there will be a very large conference in Panama in 1996 Funding (for travel and subsistence costs) is being sought support MRC representation and participation at this important conference
- Library Materials are currently being acquired for a newly designated Natural Resource Management area of the UCB main library Equipment, to be acquired from the Mangrove Workshop, included will enable the production from CD-ROM and printed copies of all published research conducted by the Smithsonian Institution in Belize for the last 20 years (about 400 published documents)
- In 1996, the MRC will also further develop the field studies program which is presently being offered to Belizean students (in 1995, with little publicity, eight weekend field trips were provided for groups from Belize City, Corozal and Dangriga) This program will also be offered to visiting University students and faculty and will provide a major contribution to the financial support of the MRC Already, since January 1996, three such trips have been made to the Calabash Caye station and between March and July 1996, there are five more scheduled

TRAINING

For the past few years training scholarships for Belizeans wishing to learn to SCUBA dive and participate with the survey has been offered, first at South Water Caye and currently at Calabash Caye The aims of this program are to (a) develop a work force of trained Belizeans capable of undertaking coastal resource assessment projects, and (b) heighten environmental awareness within Belize, and (c) strengthen UCB's human resources by using these scholars as recruits for the UCB Sub-Aqua Club

Last year, over 30 scholarships were awarded to Belizeans from a wide variety of backgrounds, including students, teachers, government employees from several districts The scholarship program includes a 5 day SCUBA training course (to PADI Open Water level) followed by an intensive 7 day training course in marine life identification and survey techniques, based at the MRC's Calabash Caye station The program is administered jointly by the Fisheries Department, UCB and CCC

Other educational activities planned for the MRC are Coastal/Marine studies workshops, such as the Mangrove Education Workshop in collaboration with Smithsonian, for Belizean teachers, GOB staff,

NGO staff and others involved in environmental education

UCB Sub-Aqua Club will continue to receive scuba training by CCC and, through the MRC, will participate in environmental monitoring dive weekends for club members and other field research activities. In return, the Sub-Aqua club will continue to support the MRC by assisting with the programs run for Belizean schools and school visits for educational presentations on the reef ecosystem.

Primarily at UCB's Belize City campus. Training in Medical First Aid, Small Boat Handling, Outboard Motor Repair, Coastal/Marine Survey Techniques, Advanced scuba diving certification will be offered to the general public including UCB faculty & staff and GOB employees.

It is also anticipated that, with the acquisition of the three small boats, the MRC will now begin to provide training in navigation, maritime safety and general seamanship.

RESEARCH ACTIVITIES

Research activities at the Calabash Caye field station have already begun, even though the lab facilities have not been developed as yet. Some of the activities that have taken place to date are:

- 1994 & 1995 Survey of the crocodile population at Turneffe by Steve Platt, Clemson University
- 1995 Terrestrial Habitat Survey of Turneffe by Simon Zisman and a team of researchers from Edinburgh University
- 1995 Preliminary assessment of the biodiversity of the Turneffe lagoon habitat by a team of scientists from the Natural History Museum of London

Activities planned for the immediate future are:

- 1996 the MRC will be implementing the Caribbean Coastal Marine Productivity (CARICOMP) monitoring program for mangroves, seagrasses, and coral reef at the Calabash Caye station site and will train a national workforce for monitoring through the Belizean dive scholars, CCC volunteers and science staff, and UCB student internships
- 1996, monitoring of the coastal/marine reef habitats is being done in conjunction with the Fisheries Department
- 1996, the MRC is collaborating with the Department of the Environment to carry out water quality monitoring of the Belize River in conjunction with a Ph D student from the College of Marine Studies of the University of Delaware

UCB is also becoming quite active in the national UNDP/GEF Coastal Zone Management Project (CZMP) initiative in Belize. The MRC represents UCB on many of the authoritative committees which coordinates activities affecting the coastal environments of Belize. At present, the MRC Officer is also collaborating with the CZM Technical Committee on his M Sc thesis research. The thesis, "Information Needs for Development and Implementation of a Turneffe Islands Management Plan", aims to investigate the information requirements for the establishment of an integrated ecosystems management plan for Turneffe's biologically diverse terrestrial and marine resources. Besides fulfilling part of the academic requirements for a masters degree in Coastal Zone Management from the University of the West Indies, the results may also be used as a model for the development of integrated management plans for the entire Belize coastal area by the CZMP.

There are several other collaborative research efforts planned for 1996 and beyond. If they materialize these are:

- Smithsonian Environmental Research Center - a look at the recovery of the reef flora & fauna at Calabash Caye 30 years after Hurricane Hattie
- Natural History Museum, London - the finalization of on- going discussions on ways and means of collaboration, including joint research projects, is expected to be determined in the medium term
- University of Maryland research at the Pelican Cayes, an impressive Pleistocene reef that abuts mangrove forest with a very deep hole in the center
- crocodile research with Clemson University for the entire coastal area of Belize Two years of research has already been conducted at Turneffe

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DEVELOPMENT OF ENVIRONMENTAL
MANAGEMENT ORGANIZATIONS (DEMO) PROJECT
(USAID CONTRACT NO 532-0173-C-00-4188)

**LESSONS LEARNED THROUGH
A STUDY TOUR OF PARKS AND PROTECTED AREAS
IN FLORIDA AND BELIZE**



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02

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Funding Support Provided Through the GOJ and USAID/Kingston
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Funding Support Provided Through the GOJ and USAID/Kingston
Development of Environmental Management Organizations (DEMO) Project

INTRODUCTION

The Government of Jamaica places high priority on the establishment of a national system of parks and protected areas. In support of this effort, USAID, through the Development of Environmental Management Organizations (DEMO) Project, sponsored a study tour of Parks and Protected Areas (PPAs) in Florida and Belize. The primary objective of this study tour was to expose Jamaican government and non-government environmental management and planning organization personnel to projects and programs in other countries that display successful examples of

- revenue generation/financial sustainability,
- establishment of protected areas,
- PPA management (including co-management) practices,
- enforcement practices,
- conservation partnerships,
- public outreach/public consultation (participatory planning),
- alternative income-generating activities for local communities,
- nature tourism,
- interpretation/environmental education

PPAs in Florida and Belize were selected based on the degree to which their programs displayed a commitment to the above-mentioned topics. The Florida Keys area was chosen because several PPAs and related programs would provide exposure to PPA and general environmental management strategies in a developed country context. The area also has ecological characteristics similar to Jamaica's. Sites in Belize were selected because Belize shares many ecological and socio-cultural characteristics with Jamaica and provides excellent examples of PPA establishment and management in a developing country context.

Sixteen environmental managers from governmental, non-governmental, and community organizations participated in the tour, which took place from March 16 – 27, 1997.

This report contains three main sections. The first, "Site Summaries", provides brief summaries of the specific sites visited. The second, "Thematic Site Analysis", draws on group discussions held during the trip. This section provides an in-depth analysis of points that the group felt were of particular interest. The third section, "Lessons Learned and Recommendations" also draws on group discussions, but focuses on points that the group felt had specific and critical relevance to Jamaica. This section examines examples of projects and programs that the group felt should be implemented in Jamaica. The Annex, "Summary of Evaluations", is a compilation of evaluation forms completed by participants on their return.

SITE SUMMARIES

SITE SUMMARIES

The following are short descriptions of the sites visited during the study tour

FLORIDA

John Pennekamp Coral Reef State Park

The first park in the U S to encompass both terrestrial and marine resources, it is heavily used by both national and international visitors. Established in the 1950s in response to degradation due to widespread coral collecting, the park originally covered only the reef areas off Key Largo. During the 1960s, as land-based development increased, scientists began to note that impacts on the land, particularly the cutting and filling of mangrove wetland, were negatively impacting the health of the reef system. In response, the State extended the park boundaries to the foreshore. During the 1970s and 80s, however, development of Key Largo increased substantially, and the environment of the area surrounding the park was substantially degraded. To deal with the increasing pressure on the area's natural resources, in the late 1980s the State began to develop what they call a "whole ecosystem" management approach. The park, which in the past had been looked at as an island-like unit, began to be considered as an area that was key to maintaining both the ecological and economic integrity of Key Largo.

By this time park visitation had increased dramatically, and state and local government began to recognize that the health of the resources that were attracting those visitors was critical to the long-term economic well-being of the greater Key Largo area. To protect and secure this resource, the state developed more stringent guidelines for prospective developers, a comprehensive enforcement program, and a land acquisition program. The park's economic importance has been a key factor in raising local awareness of the necessity of conservation.

John Pennekamp Coral Reef State Park places heavy emphasis on revenue generation. The most lucrative park in the Florida state system, it makes several million dollars a year. Most income is derived from entrance fees (average of US\$5 per/vehicle), campsite rental (US\$25/night) and a percentage of the John Pennekamp Concessionaire's revenue. The concessionaire, which runs all snorkeling, diving, canoe/kayaking, and gift shop activities, has an agreement with the park by which it pays the park, on a monthly basis, 12.5% of gross revenues or \$25,000, whichever is greater. That John Pennekamp Coral Reef State Park's ability to generate revenue far exceeds its budget is important because the excess revenue is used to subsidize other, less lucrative parks in the state system.

The group met with Roger Wilhelm, Park Superintendent.

Florida Keys National Marine Sanctuary (FKNMS)

Encompassing 2800 square nautical miles of marine ecosystems surrounding the Keys, it is the second largest marine sanctuary in the U S. The Florida Keys National Marine Sanctuary and Protection Act, signed by the President in 1990, established the sanctuary in response to rapidly deteriorating ecological conditions due to poor water quality and increased human activity in the area. The Act called for the National Oceanic and Atmospheric Administration (NOAA) to prepare a comprehensive management plan for the sanctuary in consultation with the public and with federal, state, and local government authorities. In order to facilitate the process, an Advisory Council that is representative of all public and private stakeholder interests was formed to assist in the drafting of the management plan.

Over the past six years, planners, marine resources management experts and the public have been involved in the drafting of a comprehensive management plan that addresses critical issues through ten separate action plans Channel/Reef Marking, Education/Outreach, Enforcement, Mooring Buoys, Regulatory, Research and Monitoring, Submerged Cultural Resources, Water Quality, Volunteer, and Zoning Since the Sanctuary is a national protected area, the federal government retains management responsibility for the area Management, education, and enforcement are accomplished through a cooperative agreement with the State of Florida Department of Environmental Protection and partnerships with local, regional, and national NGOs

The sanctuary provides an excellent example of what can be accomplished when government agencies, non-governmental conservation organizations, and private sector groups work together Over 15 agencies and organizations have been major players in the establishment and implementation of the protected area These partnerships have enabled the sanctuary to cultivate broad-based local, regional, and national support for the protected area

The group met with Mary Enstrom, Director of Marine Conservation, Dave Holtz of the Center for Marine Conservation, and Alysson Simmons and Kelly Jones of the State of Florida Department of Environmental Protection

The Florida Marine Research Institute

The South Florida Department of Environmental Protection's Marine Research Institute is involved in the study and conservation of commercially important marine species such as conch, lobster, and finfish The Institute monitors populations and conducts species rehabilitation programs Using groups of volunteers, the Institute has increased its ability to monitor populations, work with commercial fishermen, and conduct public awareness campaigns

The group met with Bob Glazer and Tom Mathews, Biologists

Crane Point Hammock

Crane Point Hammock is a small protected area managed by the Florida Audubon Society primarily for educational purposes Consisting of a museum and interpretation center, a series of hiking trails, and a small shop, it is visited by tourists and locals alike It also hosts a large number of school field trips

The group met with Captain Ed Davidson, Chairman of the Florida Audubon Society

Biscayne National Park

Biscayne is a 180,000 acre national park that consists of mangrove wetlands, shallow bay habitat, 42 small islands, and the northernmost living coral reefs in the hemisphere The park's budget is maintained through federal government allocations and, at present, it charges no user fees Federal funds, however, are dwindling Recognizing that the park must become more sustainable, Biscayne personnel are developing programs such as charging mooring fees at two of the more popular island destinations within park boundaries It is hoped that these steps will help create sustainability over the long-term Biscayne National Park is a good example of a federal protected area that is changing in the face budget cuts

The group met with Richard Curry, Chief Science Officer and Rob Shanks, Chief Interpreter

BELIZE

The Forestry Department

A department under the Belize Ministry of Natural Resources, the Forestry Department is responsible for ensuring the conservation and wise use of Belize's natural resources. The department controls and manages the utilization of timber throughout the country. In 1992, the Department established a Conservation Division to oversee all parks and protected areas (PPAs) that fall under the Forestry Department's jurisdiction. The Conservation Division is presently responsible for the sound management of nearly all of Belize's terrestrial parks and protected areas. The division delegates PPA management authority to NGOs when it sees fit, and has done so in several cases, but is ultimately responsible for any and all successes or failures.

The Forestry Department's primary mandate at present is to establish new protected areas. This is due to the Government of Belize's (GOB) commitment to protect over 1/3 of Belize's terrestrial surface in formal parks and other protected areas. To date, over 35 PPAs have been formally established, and the Forestry Department is working to quickly provide legal protected status to the remaining areas that are slated for protection. This focus on protected area establishment reflects the GOB's standing that the country's natural resources are a key cornerstone of its long-term economic development plan.

The group met with Richard Belisle, Chief Forestry Officer, and Rafael Manzanero, Head of the Conservation Division.

Protected Areas Conservation Trust (PACT)

PACT is a national trust fund that was established as a "trust for the protection, conservation and enhancement of the natural and cultural resources of Belize for the benefit of all Belizeans and visitors." The Trust generates revenue through an exit tax of US\$3.75 which is levied on all visitors to the country. It receives additional funding through a mechanism that distributes 20% of all protected area entrance fees to the fund. In addition, through the affiliated PACT Foundation, the Trust is able to receive grant funding from donor organizations. It is Belize's hope that the PACT will be able to support its national protected areas system. The Trust, however, is still in its initial stages of development. PACT, in order to gain further support, distributes pamphlets to every person leaving the country so they understand that a portion of the exit tax that they pay will contribute to the conservation of Belize's natural resources.

The PACT is seen by many as a symbol of Belize's commitment to protecting its natural heritage. Dedicating a portion of a national exit tax to conservation of natural resources is a highly unusual step that demonstrates a deep national dedication to developing a viable system of protected areas.

The Coastal Zone Management Programme (Fisheries Department)

This project, funded by the UNDP's Global Environment Fund (GEF), serves within the structure of the Fisheries Department to assist in the coordination of conservation and development activities in Belize's coastal areas, arguably the richest and most diverse in the hemisphere. The Programme's objective is to ensure the sustainable management of Belize's coastal resources by supporting the institutionalization of integrated coastal zone management practices.

The Fisheries Department, with support from the Coastal Zone Management Programme, is presently working to strengthen and expand Belize's system of marine protected areas through a variety of means. Much like the Forestry Department, the Fisheries Department is charged with establishing the far-reaching marine component of the national system of protected areas. To this end, the department has established comprehensive research, education, training, and participatory planning programs that support the establishment and sustainable management of marine protected areas.

The group met with Janet Gibson, Program Coordinator

Programme for Belize (PFB)

PFB, a nongovernmental organization that manages the 300,000 acre *Rio Bravo Conservation and Management Area (RBCMA)*, raised the major part of the funding necessary to purchase the land and is responsible for all expenses associated with its management. The NGO has instituted many programs whose objective is to generate revenue for park maintenance and development as well as for the economic well-being of neighboring communities while ensuring the integrity of local ecosystems. Specific programs include sustainable production of hardwood lumber and the sustainable harvest of chicle and other forest products. In addition, PFB hosts groups of scientists, archaeologists, and tourists in order to both increase knowledge of the area and raise funds for operating and maintenance costs. PFB is constantly exploring new ways to raise revenues.

Since PFB purchased the land that comprises the protected area with private funds, it is not formally part of the national system of protected areas. However, PFB has an agreement with the Government of Belize that the land is being held in trust for the people of Belize. If PFB ever fails to manage Rio Bravo properly, the Government of Belize can appoint another organization as steward.

Crooked Tree Wildlife Sanctuary

Crooked Tree Wildlife Sanctuary is a terrestrial protected area that encompasses a large lake with an extensive island. It is managed by the Belize Audubon Society (BAS). However, BAS has allowed the local community (the town of Crooked Tree is situated on the island) to play a primary role in the management process. Crooked Tree is known as one of the premier bird watching sites in Central America. Its wetlands and dry tropical forests are host to hundreds of bird species, both migratory and year-round, including the Jabiru Stork. Other wildlife found in the area includes paca, howler monkeys, crocodiles and jaguars and other cat species.

Crooked Tree is unique among the protected areas that we visited because it was truly run by the community. The Sanctuary was established in 1984. In 1985, a ranger/visitor station was built. Facilities are limited to the ranger station, but the local community provides lodging and guided tours which generate substantial income for residents.

The group met with Donald Tillet, Sanctuary Manager, and several members of the Village Council.

Hol Chan Marine Reserve

Hol Chan was Belize's first marine park. It was established in 1987 as a community-based initiative arising out of concern over unregulated exploitation of this area's fisheries resources and uncontrolled visitation of its coral reefs. The park is remarkable in that it has been divided into

several special use zones that denote specific types of protection. Local fishermen, crafts vendors, and hotel/restaurant operators benefit substantially from the protected area by providing tours and services to visitors.

University College of Belize (UCB), Marine Research Center (MRC)

UCB has been working to establish a Marine Studies Programme and an associated research station since 1989. In 1990, through a grant from USAID and in partnership with the University of Montana, it started a natural resource management program. In 1994, UCB signed a Memorandum of Understanding with the Government of Belize and Coral Cay Conservation (a UK-based, non-profit marine conservation organization) to establish a Marine Research Center on the Turneffe Islands atoll. This Center, which was opened in 1995, is called the Calabash Cay Field Station and is the only marine research center owned and operated by Belize.

The MRC's field station provides facilities for scientific monitoring, research and environmental awareness programs with an immediate focus on shallow-water tropical marine ecosystems. The MRC's main objectives include: 1) the establishment of a financially self-sustaining field facility which will compliment UCB's programs, 2) the development of UCB's technical capacity to independently provide training, research and education on coastal issues to students, teachers, Government of Belize and NGO staff, 3) the provision of training in coastal/marine science-oriented field work in Belize and improvement in environmental awareness amongst Belizeans and visitors, 4) support of the Coastal Zone Management Programme's (UNDP/GEF-funded project) activities to ensure the conservation and sustainable integrated management of the biodiversity and natural resources of the entire Turneffe Islands atoll including the designation and implementation of a protected areas strategy, 5) the establishment of collaborative links (including educational and data exchange agreements) with regional and international research and educational agencies.

THEMATIC SITE ANALYSIS

THEMATIC SITE ANALYSIS

Over the course of the tour, the group held periodic discussions to examine what had been seen and learned. During these discussions, the group singled out the aspects of each site that it felt were most significant and examined them in-depth. This section, which is organized by subject area, summarizes the group's observations regarding examples of successful programs relevant to Jamaica.

REVENUE GENERATION/FINANCIAL SUSTAINABILITY

Revenue generation is a major focus for many of the protected areas visited on the tour. In the face of increasingly difficult economic times, many of the PPAs visited have developed creative means of raising the funds necessary for sound operations and maintenance and development.

In Florida, John Pennekamp Coral Reef State Park displayed the most developed revenue generation strategy encountered by the group. In this park, the state of Florida has seemingly exploited every possible avenue for generating funds. The park's revenues far exceed its budget, which enables the state to use the excess funds to subsidize other, less lucrative protected areas.

In Belize, the group noted that the Government of Belize is highly committed to establishing a viable national system of protected areas. To that end, it has provided the agencies charged with managing protected areas and their NGO partners with the authority to charge entrance fees to protected areas and to market goods and services such as t-shirts, posters, and ecotours. The agencies and organizations are empowered to retain the majority of these funds for management purposes and are encouraged to exploit any and all revenue-generation strategies as long as they do not compromise the ecological integrity of the protected areas. In addition, the GOB has recently established the PACT, a protected areas trust fund whose major source of funding is derived from a portion of the national airport exit tax.

John Pennekamp Coral Reef State Park

John Pennekamp is managed as an efficient business. Profit margins are high and revenue generation goals are set and achieved. This management strategy, which exploits every possible revenue generation angle, has developed over a number of years due to the need to operate in an increasingly difficult economic climate. The state of Florida, faced with issues such as crime and poverty, has been forced to decrease support to PPAs. In response, the state park system has developed management strategies that help the system to support itself to the greatest extent possible.

Under this regimen, certain parks, such as John Pennekamp, which are heavily visited, have been developed into "cash cows", whose capacity to earn revenue has been exploited to the fullest extent. These "cash cow" parks are critical to the park system because the revenue earned in excess of their budgets supports other, less lucrative parks. This strategy has drawn criticism from many sectors, primarily because there is a perception that John Pennekamp and similar "cash cow" parks are not being managed to conserve resources, but rather to make money. It seems, though our host did not admit it, that the state of Florida has made a conscious decision to allow and even promote this in order to support the park system.

This strategy of compromise or sacrifice seems to be effective, because it allows Florida to maintain an extensive system that includes many PPAs that are managed strictly for conservation purposes and do not generate revenue. However, if the "cash cow" parks deteriorate from overuse to the point that they no longer attract a high volume of visitors, the system will not be sustainable over the long-term.

The remarkable thing about the revenue generation methods employed at John Pennekamp is their comprehensiveness. Every possible angle has seemingly been exploited. *Entrance fees, gift shops, snack bars, snorkeling/diving training and tours, and canoe/kayak rentals* generate huge sums of money for the park system. Even the visitor center, though it is free (covered by entrance fee), has a donation box by the door that collects several thousand dollars a year which is used to upgrade office computer equipment.

The most lucrative arrangement for the park is a concession that it leases to a private company that runs all activities in the park (snorkel/dive training and tours, canoe/kayak rental, glass-bottom boat tours). Under this arrangement, the concessionaire must pay the park, on a monthly basis, 12.5% of its gross receipts or \$25,000, whichever is greater.

John Pennekamp's creative, business-like approach to park management has paid dividends. Its instrumental, "cash cow", role in supporting the whole park system is a concept that is being replicated in other states. The issue of management for long-term *environmental* sustainability of John Pennekamp, however, does not seem to have been addressed sufficiently.

The Government of Belize and the Forestry and Fisheries Departments

These departments, which are responsible for the management of all terrestrial and marine PPAs in Belize, recently began to collect (and allow their NGO agents to collect) entrance fees in its PPAs. This step was taken because the Government of Belize (GOB) recognized that although it was committed to establishing and managing protected areas to conserve biodiversity and attract tourists, it could not subsidize their establishment and management. Allowing entrance fees to be charged was a logical step in helping PPAs to become self-sufficient. Other key steps taken by the GOB to promote PPA sustainability include allowing and encouraging its NGO agents to produce and market merchandise (T-shirts, posters, jewelry) and develop tourism programs that generate revenue in support their efforts, and the establishment of the PACT.

The GOB's support for PPA self-sufficiency is critical. By giving the agencies and organizations that manage PPAs the tools they need to strive toward financial sustainability, the government is creating a win-win situation that is crucial to Belize's economic development. If protected area management organizations can generate sufficient revenue to sustain, develop and market their PPAs as interesting nature tourism destinations, visitation increases and so, in turn, does economic opportunity and foreign exchange.

Richard Belisle, Chief Forestry Officer, perhaps expressed this win-win situation best by saying "*The GOB sees tourists as golden eggs and protected areas as golden geese. By giving the caretakers of the geese the tools they need to care for them, it ensures a steady supply of eggs.*"

Protected Areas Conservation Trust (PACT)

The PACT's support to Belize's national system of protected areas has not yet begun, but it is hoped that the PACT's funding level will be significant. The Government of Belize, by establishing the PACT, has demonstrated its serious commitment to PPAs. The commitment of a

portion of the airport exit tax to the PACT, in particular, shows deep national support for the system

A key aspect of the PACT is the manner in which its success (which translates into success of PPAs) is directly tied to the tourism industry. The tourism industry, though it initially resisted the use of exit tax to support the PACT, finally recognized, after a lengthy public consultations process, that the success of the industry is indelibly tied to the success of protected areas (and Belize's natural resources in general) and gave its approval and support.

The PACT's reliance on tourists entering and exiting the country provides an extra incentive for all PPA management organizations to promote tourism as a means to generate revenue for the PACT. In addition, because 20% of all entrance fees from PPAs are transferred to the PACT, this may provide an incentive for PPAs to increase visitation so they can in turn receive those funds in the form of project grants.

The PACT may be considered a symbol of the GOB's commitment to a viable system of protected areas. A step as bold as dedicating a portion of exit tax to the establishment and management of PPAs indicates that the GOB truly considers them to be a legitimate and even integral part of the country's economic development strategy.

Programme for Belize (PFB)

PFB is an aggressive, innovative organization. It is critical to note that PFB considers itself a business. In that spirit, PFB is constantly looking for new ways to market itself, generate revenue, and access international funding. Revenue generation and financial sustainability is its first priority. In its early stages, PFB has relied heavily on international donor support. Recognizing that competition for donor funding is rapidly increasing, PFB is developing programs that it hopes will eventually result in 100% financial sustainability.

One of PFB's primary management objectives is to "produce sufficient cash return from sensible utilization of the [protected] area to pay for its perpetual care." Examples of revenue generation projects that PFB has instituted to support this objective include:

- PFB has an innovative arrangement with Wisconsin Electric, a large US utilities company. The US government has established a program called the Carbon Sequestration project. Under this project, US firms can acquire pollution credits by setting aside tracts of forest. Wisconsin Electric donated US\$2 million to PFB to assist in the purchase of additional lands for the protected area.
- Tourism accounts for a high percentage of PFB's income. At La Milpa field station, the group has rustic but impeccably-run accommodations for groups and individuals. Nature tourism is the main draw.
- Student groups provide a mainstay for PFB. PFB hosts groups of students throughout the year that attend a basic course in tropical ecology. Course fees and room and board charges provide PFB with a steady stream of income.
- Researchers not only contribute to the body of knowledge on the ecology of the area, but also pay for room and board.
- PFB is beginning a micropropagation project. The EU has funded establishment of a lab in which orchids and other native and non-native ornamental plants will be produced for export. If successful, this project could generate substantial revenue for the NGO.
- PFB is experimenting with the sustainable use of non-timber forest products. Chicle, or natural latex, is harvested and sold for the manufacture of organic chewing gum. The sabal

palm, which is used extensively for thatch-roof houses, is sustainably harvested from the protected area and sold on the coast. An effort to establish a program of sustainable mahogany harvest is underway. All of the profits from these activities accrue to PFB and/or neighboring communities.

Initiatives such as these will eventually allow PFB to operate in a self-sufficient manner. In the meantime, PFB is continuously writing grant proposals to support the development of more revenue generation initiatives. Donor agencies have provided PFB with support that has enabled it to develop into an effective environmental management organization. By using donor funds to build programs that increase its self-sufficiency, PFB has built a reputation for effectiveness, accountability and creativity, which in turn has enabled it to cultivate even wider national and international support.

It is important to note that PFB does not, and has not ever, depended on the government for funding. Since its inception, it has tenaciously pursued funding opportunities and used a majority of funding received to develop programs that support its goal of self-sufficiency. This heavy management emphasis on revenue generation, however, is complemented by a total commitment (unlike the scenario in John Pennekamp) to the preservation of the RBCMA's environmental integrity. This comprehensive management focus on sustainability, both financial and ecological, has formed the cornerstone of PFB's success.

PFB is not without its detractors, however. Individuals from other NGOs express that PFB is almost ruthless in its drive for success and is out-competing other NGOs for funding. Many in the group felt, however, that this aggressive, competitive attitude was positive. It was stated that if this business-like attitude has contributed to PFB's obvious success, then more NGOs should emulate PFB's attitude. A telling statement by Joy Grant, an economics and finance specialist and Executive Director of PFB, may explain the reputation that it has earned: "This is a business, and I am its CEO. Our business is conservation and we do it better than anyone else."

Hol Chan Marine Reserve

Hol Chan Marine Reserve's method of collecting user fees is unusual and effective. By only allowing diving and snorkeling activities in a small area of the reserve, park rangers can simply moor their boats in a central location and collect fees as tour boats come in. This innovative practice allows rangers to collect fees and oversee use simultaneously. All revenue (less the percentage that goes to the PACT), is placed in the reserve's trust fund and subsequently used for O&M and facilities development.

PROTECTED AREA ESTABLISHMENT

In both Florida and Belize, tour participants were exposed to strategies employed in the establishment of protected areas. Interestingly, in both Florida and Belize, the major thrust of the protected area establishment process is to elicit stakeholder input in the planning of areas as well as in the subsequent drafting of the management plans. This "people-centered" focus of protected area planning has paid dividends in both Florida and Belize in that the protected areas that encouraged stakeholder participation at the planning stage now enjoy popular support.

Although PPA personnel promoted the participatory planning paradigm, several individuals warned that it is important to define process objectives beforehand in order to avoid stakeholder domination of the process to the detriment of conservation objectives.

Florida Keys National Marine Sanctuary (FKNMS)

The recently established FKNMS employed an immense range of strategies in an unprecedented effort to involve stakeholders in the establishment of the sanctuary and the drafting of its management plan. The public outreach/participatory planning process targeted all sectors of society. The process used was remarkable for its comprehensiveness (see the *Public Outreach* section). Sanctuary employees, their NGO and private sector partners, and volunteers all worked together using the media, workshops, and a host of other methods to build support and awareness of the need for the sanctuary. The process, which took six years, culminated in the drafting of a comprehensive management plan for the sanctuary.

The efforts of sanctuary staff and their partners paid dividends in that community awareness and acceptance of the sanctuary is much higher than when they began. Although there are still some detractors, it seemed that local residents recognize that the sanctuary, if successful, will contribute to the conservation of the area's natural resources and thus yield long-term economic benefits for local communities.

Sanctuary staff members credit the sanctuary's success to the level of community involvement that their public outreach efforts have inspired. They expressed that six years of intensive effort to involve people in the process has been difficult and even harrowing at times. They feel, however, that since community support for the sanctuary is so critical to its long-term success, the effort to conduct a truly *participatory* protected area planning process has been worth it.

Crane Point Hammock

Captain Ed Davidson, Chairman of the Florida Audubon Society, criticized the participatory process employed by sanctuary staff in establishing the FKNMS. He felt that the six-year participatory process employed to establish the sanctuary was overly long. He also felt that the final result of the process, the management plan, was not as restrictive as it should have been because the process resulted in a number of compromises. He stated that participatory planning is important to a point, but that goals and objectives should be clearly stated *before* embarking on the process. His main point was that if an organization is going to establish a protected area, it must have a reasonably clear idea of what kind of results are wanted and how the public will contribute. If not, the stakeholder community can begin to *run* the process rather than just contributing to it. He warned that it is easy to "fall in love with the process" and lose sight of critical goals and objectives.

Belize Forestry and Fisheries Departments

Recognizing that the environment is a critical economic resource, Belize has made the establishment of a national system of protected areas a top priority. Since the Forestry and Fisheries Departments are responsible for establishing and managing protected areas, the Ministry of Natural Resources has mandated that the two departments establish as many protected areas as they possibly can. They have taken the mandate seriously, and to date over 35 protected areas have been established and many more are proposed for establishment.

In many instances, due to lack of resources, a management plan cannot be drafted for these PPAs. The GOB feels, however, that the simple act of declaring a protected area gives a certain level of legislative control and secures the lands from development interests, even though resources may not be available to manage it.

That the GOB is setting aside lands in protected areas so quickly, even though, at present, they do not have the funds or manpower to manage them, is significant. They feel strongly that protected areas are playing a critical enough role in the country's development to warrant setting aside vast tracts of land as quickly as possible. Even if they cannot manage them, the lands are safeguarded from development to a certain extent.

Richard Belisle (Chief Forestry Officer) stated that although "paper parks" are not ideal, they are much better than no parks at all.

Marine Parks

The planning and establishment of marine PPAs has proven to be more difficult than terrestrial PPAs. Terrestrial parks in Belize have, for the most part, been established on GOB lands in unpopulated or sparsely populated areas. For this reason, the GOB has not had to consult with user groups or other interests that might oppose PPAs when establishing terrestrial parks.

Efforts to establish marine PPAs, on the other hand, have encountered some resistance from traditional users, primarily fishermen. Although many Belizeans are cognizant of the need for and benefits of protected areas, the Fisheries Department has found it necessary to involve resource users, through workshops and other means, in the planning of marine protected areas. As evidenced by the success of Hol Chan and other marine PPAs, involving resource users, particularly fishermen, at the planning stage has paid off.

At Hol Chan, for example, many of the fishermen, who before the reserve was established felt that the area was *theirs* to exploit and resisted the idea, now feel even more ownership toward the resources. The same fishermen who initially resisted the idea of restricting certain uses in certain areas (most of whom are now tour guides) now actually help to enforce the regulations because they recognize that the resources are key to their livelihoods. This sense of protective ownership may not have developed if these resource users had not been involved in the protected area planning process.

PROTECTED AREAS MANAGEMENT

The tour provided participants with the opportunity to examine several distinct PPA management styles. In Florida, the John Pennekamp Coral Reef State Park provided the group with an excellent example of a protected area that is managed primarily as a money-making venture, to the purported detriment of its natural resources but also to the gain of the protected areas that are subsidized by its excess revenue. In contrast, Programme for Belize places major management focus on revenue generation, but all revenue generating activities must support the organization's overarching goal of maintaining the ecological integrity of the Rio Bravo Conservation and Management Area.

Belize also provided examples of functional co-management arrangements. The Government of Belize, through the Forest Department, has a formal agreement with the Belize Audubon Society that delegates management authority to the NGO. A critical component of this co-management partnership has been the GOB's willingness to allow BAS to generate and retain revenue from entrance fees and the marketing of PPA-related products and services. This has in turn allowed BAS to develop management partnerships with local communities such as Crooked Tree, who can benefit from marketing products and services to visitors.

John Pennekamp Coral Reef State Park

As discussed in the *revenue generation* section above, Pennekamp's management focus is heavily slanted toward revenue generation rather than conservation. When asked how the park establishes carrying capacity thresholds, the park manager simply stated that the number of parking spaces available was the main limiting factor for the park. When asked if the carrying capacity of the natural resources was taken into account, he evaded the question.

Pennekamp is managed for maximum economic gain. Although it is clear that economic, not ecological considerations are the guiding management principles, it seemed to be a conscious trade-off between conservation and revenue generation. By generating high revenues at Pennekamp, the Florida State Park System is able to subsidize other, less lucrative parks around the state. This "cash cow" management strategy has helped the park system increase self-sufficiency in the face of decreasing economic support. The long-term sustainability of this strategy, however, is questionable because the reefs, which draw visitors, are being degraded by overuse.

The Forestry Department

The Forest Department has delegated management authority for seven protected areas to the Belize Audubon Society (BAS). Through this agreement, the Forest Department has been able to ensure their effective management. "Terms of Agreement", signed by the Forestry Department and BAS, outline the roles and responsibilities of each organization and gives the Forestry Department the authority to revoke BAS's management authority if it does not fulfill its responsibilities.

Key aspects of the Terms of Agreement stipulate that

- the GOB and BAS will jointly develop management plans for protected areas,
- the government will provide assistance to BAS such as tax exemptions on equipment,

- the government authorizes BAS to collect entrance fees and market products and services in order to raise the revenue necessary to manage and develop the areas,
- BAS and the Forest Department shall jointly manage the areas for a period of twenty-five years, with an option for renewal after expiration of the period

The GOB's co-management arrangements with the Belize Audubon Society (BAS) have been successful. Richard Belisle stated that without help from BAS, the level of management that has been attained in the jointly-managed PPAs would not have been possible. BAS has fulfilled its duties with very little support from the government. Through grants from international donors, entrance fees, and merchandising, BAS has been able to generate a level of revenue sufficient to manage the PPAs that it has been delegated.

Critical to the success of this co-management arrangement has been the mutual support between the GOB and BAS. The GOB, recognizing that if BAS is to manage PPAs effectively, it must have the tools to generate the necessary resources. As discussed in the *revenue generation* section above, the GOB's commitment to sharing management authority with NGOs is evidenced by the support and encouragement it has provided to its NGO partners in their development of revenue generation programs.

Programme for Belize (PFB)

PFB's management regime is predicated on the "need to balance the interests of conservation of a site of substantial environmental importance with those of local and national socio-economic development." This has resulted in the development of management strategies that strive to develop programs that are "sustainable in the long term and deliver economic return, but are compatible with conservation of the cultural heritage, biodiversity and environmental values of the area."¹ PFB has developed guidelines for economic development in the RBCMA. These guidelines allow for what PFB calls an "adaptive management" regime which promotes development of economic activities that are "based on retention of natural habitat, so conserving its environmental values while allowing for economic return." PFB initiates new activities on a "pilot phase" basis, and projects are monitored carefully to ensure that they do not adversely affect the environment.

The RBCMA's management objectives are

- Preservation of the natural heritage and biological diversity of Belize,
- Production of sufficient cash return from sensible utilization of the area to pay for its perpetual care,
- Participation in the proper economic development of the Greater Rio Bravo Area, including surrounding population centers, to further the national economic interest

PFB's outlook on protected areas management is important because the organization has taken lessons from other PPAs in developing countries that are not financially sustainable. From the outset, PFB has made financial sustainability its highest priority. In striving for that goal, PFB is developing programs that can be replicated by other PPA management organizations.

However, it is important to note that revenue generation is only one component of PFB's comprehensive, integrated management regimen for the RBCMA. Although the RBCMA's management plan has many components (revenue generation, community outreach, etc.), it is

¹ * Rio Bravo Conservation and Management Area Management Plan

highly integrated in that each component complements and supports the others. Hence, though each component of the plan proposes specific objectives to be achieved over the life of the plan, all of those objectives ultimately support the overarching objectives listed above.

Crooked Tree Wildlife Sanctuary

Crooked Tree was the only protected area visited that was managed by the local community. In this protected area the community of Crooked Tree works in partnership with the Belize Audubon Society (BAS has been delegated management authority for the sanctuary by the GOB) to preserve the rich wetland habitat that is host to a great number of bird, reptile and mammal species. Since its establishment in 1984, the community has managed the sanctuary to its economic benefit.

Management of the sanctuary is not intensive. In fact, aside from the ranger station where a ranger collects entrance fees, there seemed to be no formal management structure at all and regulations are not strictly enforced. Representatives of the Village Council explained that the natural resources, which attract ever-increasing numbers of visitors, are not threatened by the current level of use. They are, however, acutely aware that many other areas in the region with comparable natural resources have been ruined by over-exploitation. They expressed that although present management practices seemed to be low-input, the guiding principle is that any present and future development of the resources must provide long-term benefits to the community.

They stated that present uses, such as conducting bird-watching tours, have been good for the local economy and have supported a small hotel/restaurant trade. They stressed that the reason that these uses have been good for the community is that they are low-input, community-based ventures. The future management of the area, they felt, must promote locally-based ventures, and strive to avoid the proliferation of foreign-owned hotels and businesses. BAS supports this plan. It is particularly significant that the Crooked Tree Village Council has real political power. Although the Council is the lowest rung of government, it is the authority that ultimately controls local development has the authority to approve or deny any application for development and can thus guide development to suit local needs.

Management practices in Crooked Tree focus on ensuring the well-being, economic and otherwise, of the community. The Village Council understands how uncontrolled development can have negative social and economic impacts on local communities and is committed to avoiding it. Regarding the management of natural resources, Crooked Tree/BAS understands that continued sustainable economic development depends on their health and therefore will ensure their sustainable use.

ENFORCEMENT

In Florida, the group was exposed to strict environmental enforcement practices that provided stiff penalties for infractions. It was noted that the threat of heavy fines and/or imprisonment for breaches acted as a powerful deterrent to unlawful conduct. This was in direct contrast to common enforcement practices in Jamaica, where violators of environmental legislation are often given a fine or other punishment that is of little consequence in comparison to the potential economic benefit of the unlawful behavior.

In Belize, at both Crooked Tree and Hol Chan, participants noted that the local resource users play an important role in the enforcement process. Local resource users, recognizing that their economic well-being is dependent on the health of the resource base, tend to self-enforce regulations in order to maintain its quality.

John Pennekamp Coral Reef State Park

The State of Florida's environmental legislation gives it broad powers to address breaches in a strict manner. The State levies substantial fines for breaches and has the power (which it uses) to condemn and confiscate structures that are not in compliance with wetlands and other environmental regulations. This real threat of legal action in response to environmental breaches serves as an effective deterrent to illegal activity.

Environmental legislation governing the use of natural resources can only be effective if the consequences for violating the law outweigh the benefit from the violation. Several individuals cited cases in Jamaica that provided examples of enforcement rendered ineffective by weak fines. One case, in Montego Bay, involved a fisherman who speared and killed two hawksbill turtles. The value of the turtle's shells was estimated at J\$20,000. When the fisherman was arrested and brought before the court, he was fined J\$500 and released. In addition, the judge ordered that his spearfishing equipment be returned. If the penalty for a violation such as this is a fraction of the benefit the violator will receive if he is not caught, the threat of punishment is not a deterrent.

The Forestry Department

The Forestry Department, along with other agencies with environmental enforcement responsibilities, has recently initiated an effort to adopt an integrated national approach to enforcement. The goal, to coordinate activities with Department of the Environment, the Fisheries Department, and other agencies, should increase efficiency and eliminate duplication of effort.

Countries such as Belize and Jamaica, whose enforcement budgets are minimal, must look for more efficient ways to enforce environmental regulations. Integrated enforcement strategies can help stretch enforcement dollars.

Crooked Tree Wildlife Sanctuary

As mentioned above, the Crooked Tree community (with BAS) does not enforce sanctuary regulations. However, a sort of unwritten "code of conduct" seems to be in operation (wherein community members are cognizant of the link between local environmental and economic health) that ensures that the natural resources (and hence the economic benefits) are not degraded. This

kind of mutual recognition of the link between natural resources and economic opportunity has, to date, formed a balance between exploitation and conservation

Hol Chan Marine Reserve

Enforcement in Hol Chan is carried out by a ranger in a boat that is stationed at the reserve's dive site 24 hours a day. Enforcement duties are virtually non-existent, however. This is due mainly to two factors. One, Hol Chan, although it covers a five square mile area, limits dive/snorkel activities to a very small area that can be easily patrolled from a stationary boat using binoculars. From their vantage point, rangers can also detect vessels throughout the reserve boundaries. The full-time presence of rangers in this area also acts as a deterrent to any illegal activities. Two, the tour operators help to self-enforce reserve regulations. The tour operators that bring their clients to Hol Chan do so because the coral reefs are healthy and teeming with fish. Since a majority of the operators were once fishermen, they understand the delicate nature of reefs and are well aware that their livelihood depends on the health of the reef ecosystem. Hence, if tour operators notice activities that could negatively impact the reefs, they are quick to report it or confront the offender. They are also careful to impress upon their clients the importance of proper dive/snorkel techniques.

At Hol Chan, as in Crooked Tree, local resource users contribute to the sound management of natural resources. This ideal situation is primarily due to the direct (recognized) link between environmental health and economic opportunity. Recognizing that this scenario is critical to the long-term success of protected areas, local environmental management personnel strive to strengthen awareness of the economic importance of natural resources as well as create opportunities to sustainably exploit those resources. Awareness-raising activities also target peripheral beneficiaries such as hotel and restaurant operators and craft vendors. Although awareness-raising activities such as this would not be considered "enforcement" in the traditional sense, in Belize it seems that enforcement personnel believe that if they can provide economic incentives to conserve resources, resource users will view regulations as protective not only of the resource, but also of their livelihoods.

PARTNERSHIPS

In Florida, conservation partnerships between government agencies and NGOs have proven to be an effective way of leveraging resources and increasing overall protected area management capacity. NOAA, the federal agency charged with the management of the Florida Keys National Marine Sanctuary, has formal and informal partnership agreements with state government agencies and many local, regional, and national environmental NGOs. Under these partnerships, the state agencies and NGOs perform duties ranging from public outreach and education to water quality monitoring.

Florida Keys National Marine Sanctuary (FKNMS)

To successfully implement the sanctuary, partnerships have been formed between federal, state, and local government agencies, non-governmental organizations, research institutes, and private sector groups. By promoting the concept of "stewardship", this coalition of public and private sector organizations has built wide public support for the sanctuary. The partnerships have focused on coordinating activities to maximize effectiveness and minimize duplication of effort. All of the following organizations and agencies coordinate activities and cooperate to some degree. Some of the key players and their roles include:

- ***National Oceanic and Atmospheric Administration (NOAA)*** is the federal agency with management responsibility for National Marine Sanctuaries throughout the US. In the FKNMS, NOAA has full-time staff at regional offices in the upper and lower Keys, and at the sanctuary headquarters in Marathon, FL. NOAA has established partnerships and cooperative agreements with State of Florida Department of Environmental Protection and several NGOs to accomplish management, education, and enforcement objectives.
- ***The Nature Conservancy (TNC)*** is working with federal and state agencies to promote public understanding and involvement in the sanctuary. TNC's Marine Stewardship Program, which is managed jointly by the National Marine Sanctuary and The Nature Conservancy, is supported by over 400 local and regional volunteers and sponsors a variety of activities including a conch restoration project, coral reef monitoring projects, coral reef education, and water quality monitoring projects. Volunteers also participate in environmental education programs with local schools. This program, as it capitalizes on the goodwill of volunteers, has been cost-effective, has enjoyed a high degree of success and is an excellent example of government-NGO partnerships working to accomplish ambitious objectives on restricted budgets.
- ***The Center for Marine Conservation (CMC)*** focuses on science-based advocacy. The group's efforts include lobbying the government at the local, state and federal levels to promote the conservation of coastal and marine ecosystems as well as grass-roots organizing of activities such as the International Coastal Clean up. Although they work in partnership with government agencies on such efforts as establishing educational visitor centers, the CMC prefers to limit government partnerships that might compromise their ability to effectively lobby the government. Grass-roots activities conducted by CMC include working with local populations to reduce stormwater run-off as well as addressing issues such as inadequate housing and sewage disposal.
- ***Team Ocean*** is a volunteer-based organization which promotes responsible use of marine resources by visiting popular reef areas, by boat, to distribute educational materials on issues such as water quality, coral reef ecology, and ecologically sound boating practices. Volunteers range from local junior and high school students to retirees. They also work with local dive

shops to promote programs such as "Adopt a Reef" as well as support scientific research in the area

- *Florida Bay Watch* is a volunteer-based organization similar to Team Ocean. The group, which was formed by local fishermen and other resource-users to address the increasing problems caused by algae blooms, monitors water quality and promotes the reduction of land-based pollution from sewage and other run-off. Over 200 volunteers take water samples, distribute educational information, and disseminate the results of their research to the public.
- *Coral Watch* is an NGO that uses volunteers to monitor coral health around the Keys. The group works with federal, state and private scientists to support coral reef research.
- *Reef Relief* is an NGO that promotes the sound use of coral reef ecosystems. One of Reef Relief's main activities has been the installation of mooring buoys in heavily visited reef areas. Other activities include monitoring reef health and the production and dissemination of educational information.
- *The Florida Marine Research Institute* conducts research on the effects of pollution and fishing on populations of commercially important species of finfish, conch and lobster. They operate a pilot conch reproduction facility. The Institute supports Sanctuary efforts to monitor species populations and other indicators.

This example of a federal government agency (NOAA) working towards one goal in collaboration with a host of both governmental and non-governmental organizations was inspirational. When broken down into numbers, one finds that within this coalition of partner organizations there are thousands of people working to achieve one goal: a successful protected area. This type of collaborative dedication is unfortunately rare in the world, but it has proven to be an effective strategy for the FKNMS and shows what can be accomplished when people and organizations work together toward a common goal.

Crooked Tree Wildlife Sanctuary

The Belize Audubon Society's partnership with the community of Crooked Tree seems to be a successful one. Although the Forestry Department delegated management authority to BAS, the community has basically taken over management duties. Rangers and managers are hired from the community, and the Village Council has the final word on all development activities taking place in the area. Since, for economic reasons, it is important for the community to maintain the quality of the area's natural resources, BAS does not have to expend much effort in ensuring that the resources are managed properly. This is a natural partnership that has proven effective over a number of years with few problems.

PUBLIC OUTREACH/PUBLIC CONSULTATION

"Public outreach" is a broad topic area that includes education, protected area promotion, and participatory planning. In Florida, conservation organizations have taken outreach to a level of sophistication that can almost be considered scientific. Organizations working with the Florida Keys National Marine Sanctuary, in their effort to involve the general public in the establishment and management of the protected area, have employed a diverse array of media and outreach methodologies, from simple newsletters, to complex internet webpages, to public meetings. These activities, which have promoted the sanctuary as key to the long-term environmental and economic health of the Florida Keys region, have been critical in the development of broad-based, multi-sector support for the protected area. Similar outreach programs have been undertaken in Belize, where it has also been important to draw links between environmental and economic health.

Critical to the success of these outreach programs (in both Florida and Belize) have been the personnel employed to implement them. In both Florida and Belize, natural resources management organizations have recognized that one of the keys to protected area success is to develop "people centered" programs that involve communities in the planning and management of these areas that are so important to their long-term well-being. To this end, these organizations have sought employees who have excellent "people skills" such as sociologists and public relations specialists.

John Pennekamp Coral Reef State Park

The Park has used several effective methods to promote itself and to accomplish conservation objectives:

- It has mutually beneficial arrangements with private sector entities. One such arrangement, with a major soft drink manufacturer, gives the company exclusive rights to market their product in the Park. In exchange, the company has painted a John Pennekamp Coral Reef State Park scene on the side of several trucks that distribute soft drinks in Florida.
- The concessionaire markets the Park as a unique recreational destination. Although this is a strictly self-serving activity, the park itself does not have to spend time and money on advertising but they still benefit financially from increased visitation.
- The media is used to sensitize the general public on conservation issues and happenings at the Park.
- The Director of the state park system spends considerable time on promotional and lobbying activities in order to build support and awareness in all levels of government as well as the private sector.
- John Pennekamp has undertaken studies showing that many visitors to Key Largo come specifically to visit the park. Many of the 12 million people that pass through the park's gates also patronize local restaurants, stay in local hotels, and generally contribute to the health of the local economy.

By promoting itself as an important part of both the local economy and environment, Pennekamp has drawn support from all sectors of society. This is a critical strategy given today's economic climate. In most countries, conservation of lands and waters for conservation's sake cannot be justified when economic need is creating pressure on the natural resource base. To gain multi-sector support for protected areas, their economic worth must be demonstrated. The studies

Pennekamp has undertaken, which demonstrate yearly park visitor contribution of millions of dollars to the local economy, have convinced many people of the park's value and fostered wide-reaching support. By using the media, promotional and lobbying activities, and other strategies to raise public awareness of the benefits that accrue from the park's presence (directly linking economic benefits to the protected area), Pennekamp has built a strong constituency throughout the state of Florida.

Florida Keys National Marine Sanctuary (FKNMS)

The FKNMS has employed an innovative outreach process to build public support for the sanctuary and garner stakeholder input in the drafting of the sanctuary management plan. An advisory council, comprised of representatives of all sectors of local society, played a key role in ensuring that all stakeholder interests were considered in the process of establishing the sanctuary and drafting of the protected area management plan. The participation of the advisory board, coupled with a long series of public meetings, helped to resolve many major issues and promote community ownership and support of the protected area. A public consultation process of this scope was unprecedented in the history of marine sanctuaries in the U.S. Over the course of the process, thousands of individuals and organizations contributed and commented on the plan, and although some issues were debated intensely, many solutions and compromises were reached that shaped the management plan into its present form.

The State of Florida Department of Environmental Protection (DEP), has been instrumental in building public debate and support for the Sanctuary through a comprehensive public outreach campaign. Specific activities have included:

- a weekly newspaper column and articles,
- radio PSAs, talk shows, and news,
- television programs, commercials, PSAs, talk shows, and news,
- advertisement and articles in fishing, diving and tourism magazines,
- active involvement in the local chamber of commerce,
- networking and marketing,
- brochures and posters,
- educational signs strategically placed at boat ramps and other heavily used areas,
- sponsorship of Team Ocean, a group that distributes educational information on the water,
- sponsorship of environmental education grants for teachers,
- internet homepage,
- utilization of volunteers to disseminate information,
- participation in community events,
- information expos

These strategies have proven successful. Particularly effective have been the working relationships that DEP staff has established with members of all sectors of the media including local, regional and national newspapers, television and radio stations and magazines. When an issue arises, new developments need dissemination, or there is a need to reinforce public awareness, DEP staff simply call their media contacts and ask them for a favor. DEP staff also stressed that their involvement in community activities outside of work helped to raise their visibility and level of support considerably.

The FKNMS staff were unusual in that they had obviously been hired for their "people skills" rather than science or management. Their skills, a combination between social work and public relations, seemed ideal for the type of public consultation work that they were doing.

FKNMS staff and partner organizations are absolutely dedicated to ensuring that the general public is aware and involved in the planning and management of the sanctuary. Through the exhaustive implementation of the methods and strategies outlined above, they have involved thousands of individuals and groups and built strong multi-sector support for the protected area.

Programme for Belize (PFB)

One of PFB's primary management objectives is to participate in the sustainable economic development of the Rio Bravo area. This has translated into several programs aimed at raising environmental awareness and creating economic opportunity for local communities. Programs include²

- facilitating the establishment of community groups including August Pine Ridge Crafts Group, Yocoxtic Dance Group, San Lazaro Women's Group, Trinidad Crafts Group, St Paul's Craft Group, LEMONAL Community Group, LEMONAL Beekeepers, Country-Can Producers of Isabella Bank and Ranch Dolores Women's Group,
- group training and development covering a range of skills and topics from organizational skills (e.g. micro-entrepreneurship, community banking) to technical skills relating to a particular community initiative (pottery making, handicrafts and sewing, cultural dances, sustainable agriculture and livestock, beekeeping, community-based ecotourism, and production of preserves),
- infrastructure to support small industry and ecotourism including the construction of a handicrafts center in August Pine Ridge, ceramic sheds in August Pine Ridge, road signage and a facility for making preserves by the County-Can Producers of Isabella Bank,
- educational visits, ecology field trips, and teachers workshops with schools in the target villages and to a lesser extent throughout the nation,
- acquisition of educational materials and equipment for use in presentations and as reference materials,
- production and dissemination of documentary and public relations materials such as short video stories, public service announcements, press releases, brochures and information packets

PFB's community outreach/education programs have helped to promote better relations and channels of communication with neighboring communities. This type of "people centered" outreach strategy is seen as critical to the long-term viability of the RBCMA. Much like in other protected areas visited, PFB is dedicated to linking conservation with economic gain. PFB's community outreach programs are designed not only to help local communities understand that protected areas can provide economic benefits, but also to help create economic opportunities for them.

ALTERNATIVE INCOME GENERATION

In both Florida and Belize, it was noted that the protected areas that enjoy the highest degree of popular support are those that provide economic benefit to local communities. Belize, in particular, as its economy is relatively undeveloped, must clearly demonstrate the economic value of protected areas if they are to be accepted by the rural poor who sometimes see protected areas as a waste of good farmland.

In Belize, environmental management organizations such as Programme for Belize and the Belize Audubon Society realize that the *only* way that a protected area will have success in a developing country such as Belize is if local communities enjoy obvious economic benefits from it. As a result, these organizations see the development of alternative income generating opportunities as a critical component of their public outreach programs (see "Public Outreach" section).

Programme for Belize (PFB)

As discussed above, one of PFB's primary management objectives is to contribute to the economic development of the Rio Bravo area. Indeed, the main thrust of its community outreach program is to help promote sustainable economic opportunities for local communities while raising awareness of the importance of conservation. This strategy is effective because it builds support for the protected area while it helps local communities raise their standard of living.

Crooked Tree Wildlife Sanctuary

The community of Crooked Tree has received significant economic benefit by developing and offering services to visitors. This has been critical to the success of the protected area because many local residents now value the natural resources, particularly the wildlife, as central to their economic well-being. As was noted in other protected areas, when direct and obvious links between natural resources and economic benefits are developed, local communities generally respond by supporting conservation activities.

In 1984, the year it was established, the sanctuary had no hotels, had only one boat adequate for giving tours, and only received 26 visitors. Today, there are five community-run hotels, several bed & breakfasts and many boats that cater to the 4000+ tourists who visit each year. The number of tourists is steadily increasing.

The Village Council is also interested in developing other sustainable economic activities such as the production and sale of crafts and cashew products. They have established an annual "cashew festival" to celebrate and market the area's number one agricultural product. There are also plans to build a boardwalk through the wetlands to a nearby Mayan archaeological site.

The Council, though it is actively promoting the development of sustainable, natural resource-based income-generating activities, cited a Peace Corps-supported craft project that failed as having been an important learning experience for the community. A group of women had received training in craft production but not in marketing. The project failed. They now recognize that the lack of marketing training was the root of the failure. They stressed that, particularly at the community level, it is not enough to know how to make a product, one must also know how to sell it.

Crooked Tree provided yet another example of the benefits that accrue from forging a direct link between the integrity of the natural resource base and economic development

Hol Chan Marine Reserve

Hol Chan provided yet another example of a protected area whose success was tied to the economic benefits that accrued to local user groups. Although local fishermen initially resisted the idea of a protected area, the Fisheries Department, through education and training programs, offered fishermen the tools they needed to exploit the expanding dive/snorkeling market. As demand for dive/snorkel tours increased, many fishermen abandoned fishing and learned how to conduct safe, responsible tours. They are now earning many times what they earned as fishermen. As in Crooked Tree, Hol Chan's users now see the reserve as central to their livelihood and strive to preserve it.

Tourists that come to visit Hol Chan also support a thriving hotel, restaurant and craft shop industry. This has broadened support for the reserve among these indirect beneficiaries. As a result of the obvious economic benefits that have accrued from the reserve, the neighboring village of Cay Caulker is trying to establish its own marine protected area.

NATURE TOURISM

John Pennekamp Coral Reef State Park is one of the most popular "nature tourism" destinations on the East Coast of the US, attracting over one million visitors a year. In the US, visits to public natural areas is increasing. Protected areas such as Pennekamp are under great pressure to accommodate the increased demand. Parks such as Pennekamp, however, which have revenue generation programs in place, are making millions of dollars catering to this trend.

In Belize, many organizations and individuals, both public and private sector, see environmentally responsible nature tourism as central to the economic development of the country. Many Belizeans feel the tourism development strategies that have been implemented in other Caribbean nations, with their emphasis on sun and sand, are not appropriate for Belize. It was noted that tourist attitudes are changing, and many of the "high end" tourists are looking for an high-quality tourism experience that is an "adventure", or out of the ordinary. Belize is committed to attracting the "active tourist" who would rather hike through the jungle or snorkel a coral reef than sit on the beach. Judging by the success of many of Belize's nature tourism programs (tourism is the fastest-growing sector in Belize), there is a great potential for growth in this area. By preserving its prime natural resources in protected areas, Belize feels that it is investing in its economic future.

Programme For Belize (PFB)

PFB defines nature tourism, or "ecotourism", as "low-impact tourism, based on appreciation of the environment and where a conscious effort is made to re-invest an adequate portion of revenues in conservation of the resource on which it is based". PFB staff emphasized this definition because many other so-called ecotourism programs use natural settings such as protected areas for their tours without contributing substantially to the conservation of those resources.

PFB has made nature tourism a central pillar of its economic development program. PFB sees nature tourism as having the potential to generate a substantial amount of income while providing opportunities for natural history and cultural education and interpretation.

PFB presently operates La Milpa Field Station which consists of cabanas, a dormitory, a food service facility, a maintenance shelter, two staff residences, and a gazebo. All structures and facilities incorporate the most environmentally sensitive and resource efficient materials, techniques, technologies and operating standards possible.³

Specific examples of environmentally sound facilities include

- structures are built using lesser-known construction timbers,
- solar power - currently supported by a diesel generator, PFB plans to build a windmill to decrease dependency on diesel,
- dormitory facilities use composting toilets,

While at La Milpa, visitors can choose from a variety of educational nature walks and tours of a nearby Mayan archaeological site.

³ * Rio Bravo Conservation and Management Area Management Plan

PFB sees nature tourism as a critical component in the overall management of the RBCMA for several reasons

- It can provide a significant source of income for the protected area and so is a key component of their revenue generation strategy
- It can provide a substantial source of alternative income for surrounding communities
- The educational focus of the tours supports PFB's environmental education objectives

This holistic approach to nature tourism is manifested in PFB's dedication to truly integrated, sustainable development. Each component of PFB's management strategy, in this case nature tourism, complements and supports other components such as education and outreach and revenue generation.

The traditional view of ecotourism, at best, is that it should not adversely impact the resources it uses. It is noteworthy that PFB's definition of nature tourism differs from the norm in that it necessitates a financial commitment to the long-term conservation of the resources used.

INTERPRETATION

Many of Florida's PPAs have developed environmental interpretation programs that are designed to help visitors better understand the natural environment. Two of the protected areas that the group visited in Florida had visitor centers that had well-developed interpretation programs. These programs serve to both promote the protected areas and educate visitors on the importance of healthy ecosystems.

John Pennekamp Coral Reef State Park

John Pennekamp's interpretive displays were simple yet effective. By using a combination of aquariums and informational posters, park staff has created displays that are both attractive and informative. The aquariums, which housed typical reef communities, were complemented by the informational posters which, by explaining individual species and their role in the greater ecosystem, gave the visitor a comprehensive lesson in the dynamics of coastal ecosystems. In addition, the park offered hourly talks and/or video presentations on the park's purpose and the importance of coral reef ecosystems. This program seemed to be an effective way of orienting visitors and preparing them for subsequent activities at the park. This combination of aquariums, simple information, and informational presentations as an educational tool is effective because it captures and holds a visitor's interest.

Crane Point Hammock

Crane Point Hammock provided two extraordinary examples of highly effective environmental interpretation. One, the museum/zoo, was fascinating and educational. Although the displays representing local natural and cultural history were excellent, it was their interactive nature that attracted and held one's attention. Many of the displays, by inviting visitors to touch and smell, gave a participatory feel to the museum. It seemed that when people are invited to experience something that employs more than just the intellect, their interest levels rise. This was especially apparent at the "touch tank." People are initially afraid to handle the odd-looking sea creatures, but when they begin to handle them and realize they are harmless, they begin to ask questions about their diet, habits, etc. This focus on tactile learning seemed to spur visitor inquisitiveness and imagination.

The second example of interpretation was provided by Captain Ed Davidson. Captain Ed, who has led nature walks and boat tours for many years, emphasized and re-emphasized the need to involve people's imagination when talking about the environment. He stated that people in general, and children especially, need to get excited about something before they can really learn about it. He explained that most people's interest is sparked by sex, violence, and bodily functions. He said that by focusing on these topics as they occur in natural systems, one can spark a person's morbid curiosity. His favorite topics include spiders, poisonous plants, and distribution of seeds by birds. Spiders, as they tend to incite fear in humans, attract interest immediately. The fact that many female spiders eat the males after mating adds an extra level of interest because it brings sex and violence into the picture. Birds, which spread plant seeds through their feces, interest people who are fascinated by bodily functions. Captain Ed explained that while this methodology may seem immature, when dealing with people who are not knowledgeable about natural systems, focusing on this type of topic serves to draw them in to a tour by getting them to laugh and ask questions. Once this is accomplished, he said, the guide can focus on other aspects of the environment.

VOLUNTEERISM

Florida's parks and protected areas benefit substantially from volunteer support. Both government agencies and NGOs sponsor volunteer programs that support their missions. Volunteers donate time and expertise worth tens of thousands of dollars a year. This allows protected areas to accomplish objectives on smaller budgets.

John Pennekamp Coral Reef State Park

The park leverages funds and bolsters its public awareness programs through the use of volunteers. These volunteers maintain park landscaping, paint buildings, remove exotic vegetation, and perform a variety of other important tasks.

Florida Keys National Marine Sanctuary (FKNMS)

It is estimated that since 1992, the hours worked by Florida Keys National Marine Sanctuary (FKNMS) volunteers have been worth over US\$850,000. Volunteers help with everything from education to water quality monitoring. This resource has been critical to the success of the sanctuary. The following groups have organized major volunteer programs:

- ***The Nature Conservancy (TNC)*** is working with federal and state agencies to promote public understanding and involvement in the sanctuary. TNC's Marine Stewardship Program, which is managed jointly by the National Marine Sanctuary and The Nature Conservancy, is supported by over 400 local and regional volunteers and sponsors a variety of activities including a conch restoration project, coral reef monitoring projects, coral reef education, and water quality monitoring projects. Volunteers also participate in environmental education programs with local schools. This program, as it capitalizes on the goodwill of volunteers, has been cost-effective, has enjoyed a high degree of success and is an excellent example of government-NGO partnerships working to accomplish ambitious objectives on restricted budgets.
- ***Team Ocean*** is a volunteer-based organization which promotes responsible use of marine resources by visiting popular reef areas, by boat, to distribute educational materials on issues such as water quality, coral reef ecology, and ecologically-friendly boating practices. Volunteers range from local junior and high school students to retirees. They also work with local dive shops to promote programs such as "Adopt a Reef" as well as support scientific research in the area.
- ***Florida Bay Watch*** is a volunteer-based organization similar to Team Ocean. The group, which was formed by local fishermen and other resource-users to address the increasing problems caused by algae blooms, monitors water quality and promotes the reduction of land-based pollution from sewage and other run-off. Over 200 volunteers take water samples, distribute educational information, and disseminate the results of their research to the public.
- ***The Florida Marine Research Institute***. The Institute is supported by two volunteer programs. One, run by TNC, provides volunteer divers who assist in the assessment of offshore populations. The other, Americorps, provides one to three full-time volunteers for up to two years at a time. In exchange for their volunteerism, Americorps volunteers receive government assistance with higher education.

**LESSONS LEARNED AND
RECOMMENDATIONS**

KEY LESSONS LEARNED AND RECOMMENDATIONS FOR JAMAICA

The group, during discussions of the site visits, examined the relevance of specific aspects of those sites to the Jamaican experience. These discussions produced many recommendations for increasing environmental management effectiveness in Jamaica. The following section outlines the key lessons learned and recommends actions that could be taken in Jamaica.

REVENUE GENERATION/FINANCIAL SUSTAINABILITY

- 1 It was apparent to the group that the Government of Belize is highly committed to establishing a viable national system of protected areas as a component of the nation's economic development plan. This commitment was particularly manifested in the steps it has taken to promote revenue generation in its PPAs. By giving protected area management organizations license to collect and retain revenue from entrance fees and sales of products and services, it has provided the Forestry and Fisheries Departments and their NGO partners with the tools they need to effectively manage their PPAs. In addition, the GOB's initiative in establishing the PACT shows a further commitment to raising the funds necessary to finance a system of protected areas.

The group felt that the Government of Jamaica should take immediate steps to establish and facilitate means by which PPAs can become financially sustainable. If the GOJ truly hopes that NGOs will manage protected areas, it must follow Belize's example and allow the NRCA and its NGO partners the freedom to charge user fees and otherwise create revenue generation opportunities for themselves. If the tools that the rest of the world is using to establish and manage financially sustainable PPAs are not made available to interested groups in Jamaica, it is highly unlikely that a viable PPA system will become a reality.

- 2 The group was particularly interested in Belize's PACT fund. Belize, by developing the PACT, is attempting to create an effective protected area financing mechanism that will complement the revenue generation initiatives of individual agencies and organizations. It was felt that this model could be replicated in Jamaica to support the expansion of the national system of protected areas. It was suggested that the DEMO project assist in the process by distributing PACT literature to members of the "Trust Fund Group" formed at February's DEMO-sponsored Financial Sustainability Workshop. The group felt that Jamaica's present trust fund is not fulfilling its mandate and that it must either be restructured or a new trust fund created.
- 3 John Pennekamp Coral Reef State Park and Programme for Belize's Rio Bravo Conservation and Management Area both provided excellent examples of parks that have made revenue generation a top priority. They both view park management as a business venture. There is a fundamental difference, however, in their management philosophy. John Pennekamp's management focus is almost purely revenue generation oriented. The impact of visitor use on the park's ecological integrity is not considered. Programme for Belize, although its management plan places major emphasis on revenue generation and financial sustainability, it places higher priority on environmentally sustainable development. This commitment to maintaining the integrity of the ecosystems that it manages in trust for the people of Belize cannot be compromised.

The group agreed that the Jamaica's System Plan for Protected Areas should emphasize the need to run PPAs using good business practices and that Jamaica should make an effort to replicate the revenue generation strategies employed by John Pennekamp and PFB, but that Jamaica should follow Programme for Belize's example by setting guidelines and establishing monitoring programmes that ensure environmental sustainability. Although revenue generation

is necessary, environmental integrity should not be compromised in pursuit of financial sustainability

- 4 The "cash cow" protected area strategy that Florida employs to subsidize other, less-lucrative protected areas has proven effective. John Pennekamp and other "recreational" parks, through the creative use of multiple revenue generation tools raise enormous sums of money for the park system. The group agreed that this strategy should be adopted, where possible, as opportunities arise in Jamaica. If Jamaica could establish several high revenue "recreational" protected areas, the revenue generated could support the management of other less-accessible and/or environmentally sensitive protected areas. The long-term feasibility of this strategy, however, must be examined carefully. As the group noted at John Pennekamp, if high levels of visitation degrade the park to the point that it no longer attracts visitors, revenue will drop and other PPAs will suffer.
- 5 Programme for Belize, with its tropical ecology course, provided a good example of how protected areas can develop educational programmes which not only inform but are also a source of revenue. This type of program could be replicated in protected areas such as Blue and John Crow Mountains National Park.
- 6 If revenue generation is to be a goal for organizations involved in the management of protected areas, it is critical that those organizations learn business skills. As evidenced by the success of PFB, management, marketing and proposal writing skills, complemented by tenacious, energetic development of innovative programs, are key to organizational (and protected area) success.

Jamaican NGOs could benefit greatly by emulating or adapting many of PFB's revenue generation strategies. PFB has made a distinct effort to integrate all components of its management plan in order to create overlap of discreet program objectives. For example, as noted in section two, PFB programs such as nature tourism and the tropical ecology course allow the organization to generate revenue while fulfilling educational objectives. PFB's dedication to achieving financial sustainability while fulfilling complementary objectives provides an example of sound NGO and protected area management. PFB is an ideal candidate for a more comprehensive study by a Jamaican group. Relevant organizations would benefit greatly from an extended visit to this organization.

PROTECTED AREA ESTABLISHMENT

- 1 The group noted that in Florida and Belize, the agencies and organizations responsible for establishing protected areas have instituted strategies that promote public participation. These strategies have proven successful in both countries. Since Jamaica is instituting a participatory process for the planning and establishment of protected areas, it was encouraging to learn that this strategy is being implemented with success in other areas. The group learned, particularly in Florida, that there are many public outreach methods that Jamaica could adapt and employ to increase the effectiveness of participatory protected area planning efforts.

Participatory planning is rapidly becoming accepted as the most effective way to establish protected areas that enjoy public support. There are, however, many different methods that are employed around the world to varying degrees of success. To increase the effectiveness of participatory planning initiatives in Jamaica, the NRCA and environmental NGOs should develop a "best practices" document that outlines the methodologies that have proven successful and presents new practices that could be adapted to the Jamaican context.

- 2 The group felt that the GOJ should emulate Belize's level of commitment to the establishment of a national system of protected areas. After seeing how PPAs are contributing to both local and national economies in Belize, it was obvious that Jamaica is missing out on a variety of economic opportunities. Given that Jamaica is committed to tourism as a major foreign exchange earner, it would seem that the country should strive to preserve examples of its natural beauty that could broaden its base of attractions.

Like the Government of Belize, the Government of Jamaica should adopt the view that the simple act of declaring a protected area provides a certain level of legislative control and secures lands from development interests, even though, at present, resources to manage it may not be available. The group agreed that this strategy could pay off for Jamaica. At the present rate of PPA establishment, it will take decades to establish the PPAs that are proposed. It was agreed that if Jamaica is serious about establishing a national system of PPAs, it should move ahead as quickly as possible before the proposed areas are developed and/or degraded.

As discussed in the *revenue generation* section above, a commitment to establishing and managing viable protected areas must include the creation of means by which PPA management organizations can raise the revenue they need to do the job. The NRCA is committed to establishing protected areas in Jamaica. However, the Authority does not have the resources to manage these areas once they are declared. Although there might be no shortage of NGOs who would wish to manage protected areas, the Authority realizes that the NGO community, which it hopes will be capable of managing these areas once they are established, is in an even worse-off position in terms of financial resources. The challenge is therefore that the NRCA work with NGOs to develop revenue generation strategies which are realistic and implementable in support of establishment and management of protected areas.

- 3 Both Belize and Florida have spent considerable energy on the promotion of protected areas as necessary and beneficial. Through a variety of public outreach methodologies, including the media and school curriculums, they have built support for their respective protected area systems. Jamaica, as its system of PPAs is very young and unknown, should make every effort to disseminate information on the system to the public, using all available public outreach methodologies in an effort to garner public support for the continued establishment of new protected areas.

PROTECTED AREA MANAGEMENT

- 1 The group felt that the GOB's co-management arrangement with the Belize Audubon Society was a successful one and that the GOJ should strive to develop similar relationships with Jamaican NGOs. Of particular importance was the GOB's commitment to giving BAS and other NGOs the tools they need to raise the funds necessary to effectively manage protected areas. The group strongly agreed that if the GOJ is committed to co-management as a means of managing PPAs, it must follow Belize's example.
- 2 The group noted that the Biscayne National Park was adopting a more proactive management stance. Whereas in the past, park managers did not work with potential pollution problems and other issues until the impact on the park was apparent, now park management is taking steps to identify and stop possible problems before they become problems.

Proactivity should be the principle on which protected areas management in Jamaica is based. The stated policy of the NRCA is to delegate management authority for protected areas to non-governmental organizations. The NGOs in Jamaica need to become better watchdogs for the

environment and NRCA should assist them in developing the skills to detect potential risks to the environment

- 3 Programme for Belize's (PFB) management strategy for the Rio Bravo Conservation and Management Area is an excellent example of comprehensive, integrated protected area management. Each of the components of PFB's management plan is complementary and supportive of the others. The management plan is carefully designed to set out goals and objectives that are mutually supportive. Both the NRCA and Jamaican NGOs could benefit from a review of the RBCMA management plan, if not an extended visit to PFB.

The group saw Programme for Belize as an efficient, aggressive, innovative NGO that has taken its mission seriously. Its accomplishments provided an ideal example of how much a small NGO can do when it is well-managed. Many Jamaican NGOs could learn from PFB's business-like approach to environmental management.

- 4 As mentioned in the "revenue generation" section above, the group learned important lessons from the two divergent management strategies demonstrated by Pennekamp and PFB. Though both areas have management plans whose major focus is on revenue generation and financial sustainability, PFB differs from Pennekamp in that environmental sustainability, not financial, is the driving force behind the management plan. The group felt that PFB's strategy was more sound and would be more successful over the long-term than Pennekamp's.
- 5 In Crooked Tree, the group was exposed to a local community that played an important role in the management of a major protected area. It was apparent that the community valued the natural resources for both their ecological and economic benefits. The important lesson imparted by the community was that if a community possesses political power as well as knowledge of the importance of healthy ecosystems, it can ensure that sound natural resource management practices are employed that benefit both the environment and local residents.

ENFORCEMENT

- 1 The group learned that the State of Florida has the ability to levy substantial fines for breaches and this acts as a strong deterrent to illegal activities. If the potential consequences of unlawful conduct do not outweigh the possible benefit if the violator is not caught, environmental legislation is rendered inconsequential. In Jamaica, fines and other punishments for breaches need to be increased significantly if they are to act as a deterrent.
- 2 The Hol Chan Marine Reserve provided an excellent example of resource user participation in protected area management and enforcement of regulations. The group was impressed that almost all local fishermen had forsaken fishing for the more lucrative and sustainable dive/snorkel trade. The critical lesson learned in Hol Chan was that when resource users value the health of those resources as the source of their livelihood, they sometimes begin to police themselves.

The NRCA and its NGO partners should make the development of more programs that allow resource users to derive income from *sustainable* use of protected areas a high priority. If resource users could be incorporated in the management of protected areas (for their economic benefit) this sort of self-enforcement might develop in Jamaica.

Though the resource users in Hol Chan seem to be practicing a high level of self-enforcement, it is important to note that the reserve is a *managed* common area. As has been seen around the world, fishermen that fish relatively unmanaged common areas, though they are entirely cognizant of the link between the health of the resource and their livelihoods, still deplete fish

stocks In Hol Chan, the profitable, sustainable use of the reefs by local communities has been accomplished only through intensive education and training, and vigilance by rangers So, although establishing a link between economic development and healthy natural resources is critical, it is equally important to provide a management structure that guides resource use and ensures its long-term health

- 3 In both Florida and Belize, government agencies are making an effort to integrate the enforcement of environmental regulations This entails close coordination between all agencies with enforcement responsibilities, environmental organizations, and private individuals representatives from both countries stressed that this integration is coming very slowly, but is seen as necessary to prevent duplication of effort and increase efficiency The group agreed that Jamaica, too, should move more quickly in this direction

PARTNERSHIPS

- 1 Florida Keys National Marine Sanctuary provided an excellent example of what can be accomplished when government agencies and NGOs team up The NRCA, particularly given its present lack of sufficient human and financial resources to fulfill its mandate, should try to develop more effective partnerships with other government agencies and NGOs around the Island The group learned that the partnership strategy can result in more effective education, enforcement, and research programs
- 2 The Center for Marine Conservation (CMC), although it works in partnership with government agencies on such efforts as establishing educational visitor centers, it prefers to limit government partnerships that might compromise their ability to effectively lobby the government

This is a key point for Jamaican NGOs because so many of them are dependent on government for financing NGOs need to recognize that dependency on government financial support can compromise the effectiveness of their lobbying efforts The group suggested that the National Environmental Societies Trust assist in developing an NGO policy document to address this issue

- 3 The community of Crooked Tree provided the group with an excellent example of a local community that has become a strong partner in the management of a protected area. The group recognized, however, that Crooked Tree has been an effective partner because 1) the Village Council holds real political power, and 2) the community leaders have been educated on environmental issues and appreciate the link between the health of local natural resources and the local economy This type of effective partnership, if it could be replicated in Jamaica, could contribute to both successful protected area management and local economic development.

PUBLIC OUTREACH/PUBLIC CONSULTATION

- 1 The group learned several important lessons from the innovative outreach process employed by the Florida Keys National Marine Sanctuary The NRCA and NGOs could benefit greatly by emulating some of the FKNMS's public outreach/consultation strategies Of particular note was the FKNMS staff's ability to use the media as a channel through which they disseminated their message The NRCA and NGOs alike could use the media more effectively as an outreach tool By establishing relationships with members in all different media (newspaper, TV, radio, magazines) FKNMS staff can reach tens of thousands of people whenever necessary Environmental organizations in Jamaica could greatly increase their effectiveness by developing similar relationships with the media.

The NRCA and environmental NGOs could benefit from the development of a "Best Practices in Public Outreach" document that outlines the methodologies that have proven successful in Jamaica. In this manner, environmental management organizations could move toward the institutionalization of public outreach programs that support their activities.

- 2 Many of FKNMS staff who conducted the public consultations leading to the development of the management plan were public relations experts. The FKNMS showed the group that establishing protected areas requires much more than technical expertise. It was apparent to the group that the FKNMS believes that multi-disciplinary teams which include technical personnel, sociologists, and public relations specialists are necessary to effectively implement public consultations processes. The NRCA, through the Public Education/Information Branch, is moving in this direction. However, much greater emphasis should be placed on changing public opinions and attitudes. By involving sociology and public relations experts, the NRCA could develop more effective awareness and education campaigns.
- 3 Although the group was impressed by the exhaustive public consultation process undertaken by the FKNMS, we were cautioned by Captain Ed Davidson, Chairman of the Florida Audubon Society, that it is easy to "fall in love with the process" and lose sight of goals and objectives. He felt that the FKNMS had allowed user groups to bully it into making concessions on critical environmental issues and that this had resulted in a management plan that is not as stringent as it should be. The group felt that Captain Ed had raised a key point, and that the NRCA, since it is only just starting to conduct public consultations, must be careful. However, it was clear that participatory planning methods are being adopted world-wide as the most effective means of cultivating long-term support for environmental initiatives.

To increase its effectiveness in public consultation, the NRCA should develop a charter for public consultation. This charter should clearly outline steps which the organization will take in its consultative process, the different indicators of when milestones have been achieved and also the indicators of when the objectives of the consultative process have been achieved. Relevant NRCA staff should receive ongoing training in consultation techniques such as rapid rural appraisal, participatory rural appraisal and consensus building.

- 4 In Belize, the group noted that the most effective public outreach programs were those that combined environmental awareness initiatives with economic development programs. Local communities were much more likely to respond to environmental initiatives that provided the promise of economic benefit. The group felt that this strategy would also be effective in Jamaica and that environmental management organizations, particularly NGOs, should strive to incorporate a local economic development component whenever possible.
- 5 Like the Executive Director of the Florida State Parks System, high level personnel involved in environmental management should focus a great deal of energy on public relations. The ED of the Florida parks system spends at least 40% of her time lobbying state and federal officials and local, state, and regional chambers of commerce to drum up support for her system. This investment of time and energy has paid off in that the park system has warded off budget cuts and increased private sector and public support. Top-level personnel from the NRCA, PIOJ, and NGOs could increase public support of PPAs through similar activities.

ALTERNATIVE INCOME GENERATION

- 1 In both Florida and Belize, the group noted that the protected areas that enjoyed the most public support were those that provided direct or indirect economic benefits to local communities. John Pennekamp, in Florida, went so far as to commission studies to assess the park's impact.

on the local economy. Once park management could prove that the park was bringing millions of dollars into the local economy, support for the park increased. Similarly, in Belize, when local communities receive direct economic benefits from protected areas, they support them. This is a critical point. The group noted that when local communities are beneficiaries, the need for intensive management and enforcement strategies is reduced. The communities themselves begin to care for the resources and even assist in enforcement.

The group felt that, particularly in a developing country such as Jamaica, the development of programs that help local communities derive economic benefits from protected areas is critical to their long-term success. By striving to create direct economic links between protected areas and local communities, the NRCA and its NGO partners can greatly increase protected area success while reducing the need for intensive management and enforcement.

- 2 The group learned an important lesson about developing local income-generating capacity in Crooked Tree. The Village Council, citing the example of the failed craft cooperative, emphasized that it is not enough to know how to produce a product, one must also have the marketing skills to sell it. This is an important lesson because although environmental organizations make great efforts to give training in craft production, aquaculture, etc., all of these good intentions can be scuttled if local communities do not have the skills to identify and develop markets for their commodities.

NATURE TOURISM

- 1 The group was surprised at the importance that Belize's government (environmental and tourism agencies) NGO, and private sector has placed on the development of a high quality nature tourism product. Belize has responded to the rapidly expanding market for active, educational, nature-based tourism by marketing its natural beauty and variety of pristine natural resources. The most important aspect of this strategy was that protected areas play a key role in the development of the tourism product.

It was apparent that Belize is ahead of Jamaica in developing a nature tourism product. The group agreed, however, that Jamaica's natural areas are equally or more impressive than Belize's, and that Jamaica should tap the expanding nature tourism market. All agreed that the nature tourism product, if developed in an environmentally sustainable manner, has the potential to generate substantial foreign exchange while supporting the conservation of key natural resources.

The group suggested that the NRCA and tourism agencies such as the Tourism Product Development Company (TPDCo) work closely to develop a nature tourism product based on and supportive of protected areas. It is critical to link tourism, both foreign and national, to protected areas to the greatest extent possible. It is important to note that although the GOB is committed to the establishment of protected areas, conservation for the sake of conservation is not the main motivating factor. Belize is establishing protected areas because it sees them as playing a key part of the country's economic growth. The group felt that Jamaica, with its incredible natural beauty, must not only protect its natural areas, but also market them.

- 2 Programme for Belize's approach to nature tourism provided the group with a critical lesson on the importance of approaching this rapidly expanding area in a sensible, resource-focused manner. Although PFB has made nature tourism a central pillar of its economic development program, the NGO has adopted the environmentally responsible definition of nature tourism as "low-impact tourism, based on appreciation of the environment and where a conscious effort is made to re-invest an adequate portion of revenues in conservation of the resource on which it is

based ” Many persons in the group expressed that Jamaica must attempt to regularize nature tourism enterprises to ensure that they adhere to the same definition

- It was noted that many so-called "nature tourism" or "ecotourism" organizations in Jamaica do not, in fact, invest in the conservation of the natural areas which they frequent It was suggested that TPDco develop a nature tourism certification program that ensures responsible, sustainable use of Jamaica's natural areas

INTERPRETATION

- 1 The group learned that the manner in which information is presented is very important This was particularly reinforced by Captain Ed Davidson, of Crane Point Hammock, who took the group on a tour of this facility His talk focused on methods of presenting historical and ecological information to the public in a way that captures not only their attention, but their imagination as well Captain Ed emphasized the importance of getting people to think and be creative when learning about the environment The group agreed that his methodology, to focus on examples of sexual reproduction, violence, and bodily functions that occur in nature, helps to get people to laugh and relax, which in turn makes them more receptive to learning

Training in environmental interpretation should be provided to all protected area personnel across Jamaica Nature walks and visitor centers can be an effective environmental education tools, but they are most effective when the guide or designer is skilled in interpretation

- 2 Lessons on how to make use of simple indigenous materials to create a low-cost and interesting displays were demonstrated by John Pennekamp Coral Reef State Park, Biscayne National Park and Crane Point Hammock The group agreed that environmental visitors centers in protected areas are excellent teaching tools for all age groups and should be further developed in Jamaica.
- 3 Jamaica's environmental management organizations need to become innovative in their use of indigenous material as teaching tools and also ways of packaging information to interest their target audience Some work has been done already Some use is being made of "plays" and "skits" on the environment Members of the group have plans to build displays similar those seen and the NRCA has since implemented the "environmental expo" model

VOLUNTEERISM

One important lesson learned is the pivotal role that volunteers can play in the establishment and management of protected areas This topic is a challenge In a developing country such as Jamaica, in which most people are busy trying to earn a living, it is difficult to find volunteers In light of this, innovative strategies for volunteerism will have to be developed locally One method could be to target students and teachers Many teachers would like to become skilled in environmental education, but they do not have the tools A programme could be put in place in which teachers and students learn about the environment while actually doing valuable work for environmental management organizations It was also suggested that the Jamaica Youth Service program could incorporate an environmental component

CONCLUSION

The group agreed that the study tour was a valuable experience. Participant's overall individual and organizational learning needs were in all cases met or surpassed. The group expressed that they had learned a great deal about the majority of the target topics and many participants indicated that they will be able to immediately apply lessons learned on the tour in their present work.

The sites chosen in Florida and Belize provided participants with an opportunity to compare and contrast protected area management styles and strategies in both developed and developing country contexts. The group unanimously agreed that this contributed invaluable lessons and insights that would benefit them in their respective environmental management positions.

Site visits in Belize, in particular, provided the group with important lessons on all of the tour's target topics. These lessons were valuable because the similarities between Jamaica and Belize will allow for transfer of protected areas management methodologies. The group agreed that Belize's commitment to protected areas as a key component of an overall conservation strategy sets an important example for the rest of the Caribbean and that Jamaica should strive to emulate many of Belize's successes.

The study tour brought together 17 natural resources management professionals from different backgrounds and geographic areas, many of whom had not previously known each other and whose only known common denominator was a personal and professional interest in environmental management. Over the course of the tour, the 17 people learned not only about what is happening in Florida and Belize, but also about what each is doing in Jamaica. Friendships were formed and many of the group plan to remain in contact both professionally and personally.

Perhaps most importantly, many of the group, particularly those that had not traveled abroad, expressed that one of the key lessons learned was that environmental management, whether in the US, Belize, or Jamaica, is an extremely difficult field. Several persons stated that exposure to the enormous problems that face environmental managers in both developed and developing countries alike helped to make them aware that these problems are not unique to Jamaica, but in fact are ubiquitous. The understanding that Jamaica and the rest of the world are struggling with many of the same issues was, although sobering, encouraging.

The group felt that the study tour, by providing them with the opportunity to meet individuals and visit projects in other countries that are facing challenges similar to those experienced in Jamaica, served as an excellent training tool.

FOLLOW-ON ACTIVITIES

As a follow-on to the study tour, the DEMO PMU will maintain contact with study tour participants to evaluate the impact of the study tour over the medium term. Over a period of one year, DEMO PMU personnel will contact participants periodically to assess progress of implementation of any projects or programs developed based on lessons learned from the tour, and any other impacts that the training activity may have had on their work. In March, 1998, the DEMO PMU will compile a report based on the findings of the follow-up activities.

ANNEX

**SUMMARY OF
PARTICIPANT EVALUATIONS**

DEVELOPMENT OF ENVIRONMENTAL MANAGEMENT ORGANIZATIONS
(DEMO) PROJECT

STUDY TOUR TO FLORIDA AND BELIZE PROTECTED AREAS
MARCH 16 - 26, 1997

GROUP COORDINATOR

J Gordon Arbuckle

PARTICIPANT DATA

Breakdown of Participants

Fisheries Division	}	
Monistry of Agriculture	}	1
Montego Bay Marine Park Trust		2
Negril Environmental Protection Trust (NEPT)		1
Negril/Green Island Planning Authority		1
NRCA		6
Environmental Unit	}	
Planning Institute of Jamaica	}	1
Port Royal Citizens' Assn		1
PREMT/Port Royal Citizens' Assn		1
St Ann Environment Protection Assn		1
Tourism Product Development Co Ltd		1
Total No of Participants		16

Note One participant visited Belize only
One NRCA staff member was sponsored exclusively by the Authority

EVALUATION SUMMARY.

Thirteen (13) evaluation forms were completed

1. OBJECTIVE:

The main objective of the Study Tour was for participants to learn from examples of programmes in Florida and Belize in the areas of Revenue Generation/Financial Sustainability, Alternative Income Generating Activities for Local Communities, Co-Management/NGO-government Partnerships, Environmental Awareness/Public Outreach and Participatory Planning

1.1 FROM YOUR PERSPECTIVE, EVALUATE THE EXTENT TO WHICH THIS WAS ACHIEVED

Ratings 1 = not at all, 2 = only slightly, 3 = fair, 4 = to a great extent, 5 = to a very great extent

<u>AREAS EVALUATED</u>	1	2	3	4	5	No response
a Revenue Generation/Financial Sustainability			4	8	1	
b Alternative Income Generating Activities for Local Communities			6	6	1	
c Co-Management/ NGO-government Partnerships		2	7	3	1	
d Environmental Awareness/Public Outreach			2	8	3	
e Participatory Planning		1	5	6	1	

1.2 LIST YOUR PERSONAL/ORGANIZATIONAL LEARNING OBJECTIVES OF THE STUDY TOUR (IF THEY ARE DIFFERENT FROM ABOVE) AND INDICATE THE EXTENT TO WHICH THEY HAVE BEEN ACHIEVED

<u>ADDITIONAL AREAS EVALUATED</u>	1	2	3	4	5	No response
a Co-Management/NGO-government Partnership			2			
b Environmental Awareness/ Public Awareness(Outreach)			1	1		
c Participatory Planning			1			
d Revenue Generation/Financial Sustainability			1	1		
e Alternative Income Generating Activities			1			
f Research and Monitoring		1				
g Physical Planning			1			
h Enforcement of Planning and Environmental Laws			1			
i Marketing Strategies					1	
j Site Maintenance re standards adhered to			1			

<u>ADDITIONAL AREAS EVALUATED</u>	1	2	3	4	5	No res- ponse
k Quality Control				1		
l Making plans reality "implementable"			1			
m Community Involvement/Participation			1			
n Communication within and between organizations		1				
o The Establishment of a National Park through Community Initiative				1		
p Good Conservation Practices - Rio Bravo				1		
q The implementation of the Hol Chan Reserve and the manner in which it was managed by both Park Rangers and fishermen/ I was also impressed with the zoning of the area					1	
r Management system for total operation				1		

2 GENERAL STUDY TOUR ADMINISTRATION

<u>AREAS EVALUATED</u>	1	2	3	4	5	No res- ponse
2 1 Orientation before departure		2	3	4	6	
2 2 Orientation on arrival				6	7	1
2 3 Logistical Arrangements		1*	1	8	3	
2 4 Accommodation			1	7	5	
2 5 Meals			5	3	5	

* Specific reference to the return flight arrangements Montego Bay/Kingston

3. QUALITY OF EXPERIENCE

Ratings 1 = poor, 2 = fair, 3 = good, 4 = very good,
5 = excellent

FLORIDA

<u>AREAS EVALUATED</u>	1	2	3	4	5	No res- ponse
3 1 Site Visits/Tours			1	6	4	
3 2 Presentations			2	5	4	
3 3 Networking Opportunities		2	2	7	1	
3 4 The overall programme met your expectations		1	2	5	4	
3 5 Appropriateness of study tour for your current work or career development		1	1	4	6	
3 6 Appropriateness of study tour for your organization		1		4	7	

Note No comments on Florida from the participant who did not visit the area

BELIZE

<u>AREAS EVALUATED</u>	1	2	3	4	5	No res- ponse
3 1 Site Visits/Tours				3	9	1
3 2 Presentations			2	7	4	
3 3 Networking Opportunities		1	2	7	2	1
3 4 The overall programme met your expectations		1	2	7	3	
3 5 Appropriateness of study tour for your current work or career development		1	1	3	7	
3 6 Appropriateness of study tour for your organization		1		3	9	

4 ELEMENTS OF SPECIAL INTEREST

What elements of the study tour did you particularly like or were important to you/your organization?

a **FLORIDA**

Particularly enjoyed the study tour in terms of the information on public awareness and co-management

Of interest too was the conch and lobster hatchery facility in Florida

The aquarium display at John Pennekamp

Merchandising Much emphasis was placed here Everything saleable was on sale

The visitor centres, revenue generation programmes and the general layout of the park facilities

All aspects of the study tour were important to me

- Experiencing their roads and the free flow of traffic,
- The sanitation of the various sites,
- Their style of presentation and management,
- Income generation

The sustainable running of attractions such as John Pennekamp Park, e.g. the placement of signs along water routes

The environmental protection techniques such as the placement of signposts along seashores was of particular importance. Also of importance were the diverse methods used to educate the public, especially youths on the importance of marine life (Florida Keys National Marine Sanctuary)

Visiting John Pennekamp - seeing the display areas and seeing the reefs. Ideas about setting up similar (smaller scale) displays, so that schools can arrange tours which give children the opportunity to learn in a visually-stimulating way. Interacting with vibrant nature conservancy employees - idea of informal expo - very applicable. Liked the interactive displays - touch, listen, and colour.

The "visitor friendly" services such as a visitor information centre, eating, bathroom and conference facilities, the presence of extinguishers in building, etc.

Environmental Awareness, Public Outreach Methods, Revenue Generation and Financial Outreach Methods

All elements were relevant to my work and that of the organization. It was refreshing to note that some of the problems being experienced in Jamaica (e.g. lack of coordination among the different environmental agencies) are not unique.

The understanding of the centralized operations of a Protected Area system.

Understanding the effects of being profit-driven.

Financial sustainability and income generation.

b **BELIZE**

Enjoyed the tour of the La Milpa field station. It demonstrated that it is possible to manage the environment sustainably.

The reef at Hol Chan.

Of particular interest to me was the way in which Belize was kept clean, particularly their downtown area.

The fact that fishermen earn a decent salary from boat tours (alternative income programmes).

Community-based management.

Criteria for delegation of management of a protected area

The protection of trees and birds
Planning of rural townships
Protection of the reefs and income generation

The Programme for Belize was one of the most interesting tours. Their facilities in the jungle and the wealth of information they had

I was rather impressed with Belize, especially their approach/the manner in which they went about establishing their national parks/protected areas. The good thing about Belize is that they are in a position to learn from other countries' mistakes. They are planning ahead in the right direction with the right infrastructure and mechanisms in place. This will enable them to decide on the types of future developments they would like.

At La Milpa, it was evident that people from the community are used as tour guides, kitchen staff and property personnel - on a whole making them feel a part of an establishment and thus dedicated to sustaining and maintaining it.

Co-management NGO-government Partnership, Environmental Awareness, Public Outreach and Participatory Planning

Could relate more to this country's economic status and climate. Especially appreciated the Hol Chan Marine Reserve no fishing allowed zone. Appreciated the community involvement at Crooked Tree Wildlife Sanctuary (area) and the undisturbed natural environment. Liked the Programme for Belize's natural holistic approach and foresight, e.g. chicle production for gum.

All elements were relevant to my work and that of the organization. There were so many examples of initiatives which the organization in Jamaica could adopt.

The government of Belize seems to have the view that there is some merit in declaring a protected area even when all the resources to manage are not yet in place.

The establishment of zones around the Hol Chan Marine Reserves, which allows fishermen to fish in designated areas at various times of the year. Also of interest, was witnessing the placement of patrol boats to ensure that people were adhering to the rules of the reserve.

The observance of community run tourism

The opportunity to observe Protected Areas in operation and to question the

operators

Financial sustainability, income generation and community participation

5 USE OF INFORMATION/KNOWLEDGE GAINED

5.1 WITH REGARD TO THE INFORMATION AND TECHNIQUES ACQUIRED ON THIS STUDY TOUR, YOU.

9 Will be able to use them immediately

5 Will soon be able to use them after some practice

Will not use them soon

Will never use them

Note One person selected the first two options

5.2 IF YOUR ORGANIZATION WILL USE THIS INFORMATION/KNOWLEDGE, PLEASE DESCRIBE YOUR IMPLEMENTATION PLAN OVER THE NEXT SIX MONTHS.

The Fisheries Division is in the process of developing a public awareness programme as well as a process of participatory planning involving fisher-folk. This programme will run over two years. One priority of the programme is to establish a Fisheries Advisory Council comprised of the stakeholders. This will facilitate the planning process as it relates to Fisheries Management.

Protected areas are not yet established, so we are currently working on environmental awareness and community outreach. This will be implemented by distributing flyers in the community, putting up posters, going into the schools and talking to the children and having a number of public meetings. (Port Royal representative)

The PIOJ will not use the information in a routine manner. However, the information and exposure gained from the trip will strengthen the institution's capacity to participate and contribute to the analysis of a wide range of issues related to Parks and Protected Areas Systems Planning and Management. In particular, information related to financial sustainability/income generation was useful.

My main area of work is in monitoring and enforcement and the knowledge I have gained will be used in this area. I will assist in the community outreach programme by dealing with the people on a one-to-one basis. I am also willing to work with the various organizations to educate the public and protect the environment.

NEPT will be initiating a Merchandising Plan and will be investigating how other income generating ideas gathered can be implemented within our watershed area and in Jamaica as a whole

Conservation and sanitation ideas gathered in Belize will also be targeted for implementation in our E P A

The informational expo is to be implemented for the Palisadoes-Port Royal Protected Area and could also prove useful for the Black River area. Workshops in Port Royal are scheduled for the end of May Specific "no use" (protected) zones within areas (maybe in Black River) should be established, so that a "stock area" exists (like Hol Chan), may be for Black River This could be done during the boundary setting exercises Community involvement and innovative income-generation activities look feasible and "implementable"

Draft proposals for small grants

Selected information will be incorporated into our Management Plan

Methods for conducting public forums will be utilized

Public education techniques

Special emphasis should be placed on community development, sensitizing the communities about the do's and don'ts Implement projects that are environmentally friendly with the right sort of infrastructure in place in order to maintain a complete balance between mankind and nature, which will enable both parties to grow and flourish in harmony The result - to erase bad cultural practices and appreciate and protect our natural resources in order to maintain a healthy lifestyle today and in the future

As a Standards Officer who goes out to inspect accommodation and attractions across the island, I will be able to make valuable suggestions to various owners and operators With respect to the organization, knowledge gained can be used to draw up guideline booklets, which are regularly distributed by the company to various accommodation and attraction owners/operators in a bid to help them function in a more sustainable way

Review the strategic plan

Clarify goals and objectives

Review of plans and proposals

Integrate what was learnt on the study tour with the continuing discussions initiated at the Blue Mountain workshop on Financing and Protected Areas System Documents obtained will be used to stimulate discussions in the follow-up meetings to the above-mentioned workshop

The talk at the Florida Marine Sanctuary highlighted the value of fishermen to the whole business of marine and environmental protection As experienced seamen, the fishermen can

double as tour guides as a means of earning more money for themselves. While giving these tours, we can further public education by imparting our knowledge of the marine life and also safe and preventative practices to preserve the environment.

The experiences and ideas will be incorporated into the material produced in the Parks and Protected Areas Unit at the NRCA.

6 RECOMMENDATIONS

6.1 WHAT ELEMENTS OF THE STUDY TOUR WOULD YOU CHANGE?

The compactness, the closeness of the meetings

The daily sessions were long and tightly packed and so the participants got very tired towards the end of the tour. I would have put more space between sessions.

The schedule for exchanging ideas after each day's activities should be kept tighter. The duration of the trip should be longer.

None

Increase the amount of time spent at each site in order for us to actually see and feel the whole operation of the Park or Protected Area. Also the study of a more developed area (city).

Group meetings should be held in the mornings, regularly and more importantly, short (less than an hour).

I would schedule no more than two talks per day, so as to enable the group to meet on a daily basis for discussion. Participants were exhausted towards the end of the tour.

Plans for air travel for those not residing in Kingston.

The tour was a very compact one and we were introduced to a smorgasbord of cases. The introduction was "tantalizing", meaning that there was so much more that one wanted to know. Maybe more time to get into more depth with discussions.

More time could have been spent looking at the day-to-day operations of some of the organizations in both Florida and Belize, but especially in Belize.

6 2 WHAT FOLLOW-UP WOULD YOU RECOMMEND FOR THIS STUDY TOUR?

I think another study tour, somewhat extended, would be very important, because the first one was so compact, I think we missed some important sights that would have been beneficial to us

The participants should be called upon to assist in the development of environmental plans and their implementation

A tour of a more developed country (e g Canada), where there is more proactive planning in regard to environmental issues

Participants should meet after at least 3 - 6 months to do an evaluation on whether or not we have been able to put in place anything learned from the tour and to report on any progress made since

Establish a working group of Parks and Protected Areas for discussing and exchanging ideas on related issues

The next tour should be another geographic region of the world

I think the entire group should meet at least once every two months to see how what was learnt was being implemented in the different organizations

I will be in touch with individuals I met to discuss issues I did not get an opportunity to bring up I will also endeavour to keep in touch with study tour participants

I strongly believe that courses should be available for students, teachers, community leaders and staff from various organizations so that they can upgrade their knowledge in issues which relate to the environment This will make them more capable of sensitizing the public at large about the importance of the environment.

Continued interaction among participants to implement some of what was learnt on the trip - fostering communication among agencies Other study tours would be most welcome, as participants should be exposed to other success cases

The group should meet at least once monthly to see how and if lessons learned are being implemented in the various organizations

A gathering of the group later this year to review and discuss implementation ideas used

Continuous consultation with those not employed by the NRCA

4 or 5 individuals should be placed in a work experience programme for about one month in 1 or 2 organizations in Florida or Belize

6 3 WOULD YOU RECOMMEND THIS STUDY TOUR TO SOMEONE ELSE?

12 Yes

- No

7 ADDITIONAL COMMENTS YOU WISH TO MAKE

I think the tour is a necessary requirement and they should be organized more frequently I certainly learnt a whole lot and picked up some very important facts and am now more environmentally aware I would recommend a tour of this nature to anyone and would be willing to go again, because I think the tour was successful

I wish to see the Minister responsible for environmental matters become more visible, in terms of more educational outreach programmes on TV, radio and at the community level (grass root) etc

Take the stumbling blocks out of the way of the Local Planning Authority, so that cases taken to court will be dealt with expeditiously and that plans passed in Kingston will not be approved without the Authority's knowledge

Take back control of the verges on the Norman Manley Blvd in Negril, so that the pedestrians and the bicycle riders will have access to them

It was a brilliant idea to invite PIOJ, TPDCo and Town Planning UDC should have been there

The experience and awareness gained will certainly be utilized

It is time for us as a nation to become very serious about the implementation of a proper park system with adequate infrastructure throughout the island in order to minimize the current degradation and destruction of our natural resources In addition, we need to put idle land to use through tree planting campaigns (especially hard wood) Direct community involvement is also an important goal if good environmental habits are to be strengthened within the communities In order to accomplish this, we need to change our approach and start at the community level and work our way up the ladder

The trip provided the opportunity to meet with colleagues from different organizations This allowed for the airing of a number of issues (planning and environmental) which needs to be addressed Maybe this indicates the need for ongoing situations to be created for dialogue among the agencies

Generally enjoyed the exposure and found the trip to be educational

The study tour was very educational I learnt a great deal and wish to thank USAID and the NRCA for this worthwhile opportunity

The tour was a very good experience for me It has opened up my eyes to a number of environmental issues especially Coastal Management and Monitoring and Protecting Wetlands The experience is one that will last a lifetime and will contribute to my career development The knowledge that I have gained will contribute to the betterment of my country particularly in the area of environmental protection

Let me take this opportunity to thank the staff of NRCA/DEMO for inviting me to participate in this study tour It was very enlightening in more ways than one Thanks in particular to J Gordon Arbuckle, who, I believe, displayed a great deal of patience in trying to move the group along

I would like to extend my gratitude to the organizers and planners of the tour as well as to USAID for financing this venture The experience has made me more aware of environmental issues and ways and means of establishing attractions in a sustainable way