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Reef Relief

Final Report: St. Kitts Peninsula Marine Ecosystem Survey Week **April 24-29, 2007**

Summary

Reef Relief is a global nonprofit membership organization dedicated to the protection of coral reef ecosystems. We were honored to participate in the Peninsula Marine Ecosystem Survey Week held the week of April 22, 2007, on the island of St. Kitts, sponsored by The Ocean Foundation and administered by the St. Kitts Foundation.

Reef Relief was able to establish a baseline-monitoring program to assess the health of the coastal waters, establish a continuing monitoring effort by the local Clarence Fitzroy Bryant College, launch community-based environmental education efforts at the elementary school level and through local media on the island of St. Kitts, and to a limited degree, review plans to develop the peninsula.

This report will be presented in two parts:

- (1) This final report with an overview of the activities undertaken and the objectives achieved, along with a CD of 66 images taken by DeeVon Quirolo of the peninsula tour and activities during the week.
- 2) A separate notebook with the work product of the baseline survey obtained by Director of Marine Projects Craig Quirolo and volunteer divers. The notebook contains Craig Quirolo's original report, DVD's and CD's of the video transects, and one set of color proofs of the still images taken. An additional three copies of this report are provided to share with the St. Kitts Foundation, the Clarence Fitzroy Bryant College, and the St. Christopher and Nevis Ministry of the Environment.

Much was accomplished during a short period of time—just five days in the field. We thank the St. Kitts Foundation for the opportunity to be a part of its Peninsula Marine Ecosystem Survey Week. Reef Relief is available to offer our expertise to support continued efforts on St. Kitts to achieve a sustainable future for the island.

Establishing a baseline-monitoring program of coastal waters of St. Kitts

Founder and Director of Marine Projects Craig Quirolo directed the effort to establish a baseline-monitoring program to document the conditions of the coastal waters. He presented an overview of monitoring coral reef health during the first day's training symposium and produced a hard cover full color report entitled "Monitoring Coral Reef Stress and Disease" that was reviewed during the presentation and distributed to key individuals at the event. The report features images of common coral diseases and other stress-related anomalies to assist in their identification in the field.

During the diving that followed throughout the rest of the week on the peninsula, Quirolo employed a rapid assessment technique using video and still images. A total of 19 video transects and over one-hundred still images were obtained at Ballast Bay, Shitten Bay, and Green Point.

One component of the Peninsula Marine Ecosystem Survey Week was underwater video survey training. Basic camera techniques and the Video Random Point Intersect method were taught to local volunteers including dive operators, college

instructors and students. Random point transects are used to determine percentage of bottom coverage.

The quality of the video from the 5 dives is excellent. Included in this report are 6 DVD disks. Disks 1—4 are from dives 1—4. DVD 5 was recorded at the wreck dive. DVD 6 is *Coral 2000 Volume 2*, a Reef Relief presentation on photo monitoring with still photography, coral reef restoration and the technique used to score video Random Point Intersect transects.

Video Methodology

The video camera was turned on at the beginning of each dive and was never turned off. One diver would lay down a 100' transect tape across the bottom. The videographer would follow the transect tape at a slow but steady pace pointing the camera straight down with a 90 degree look-down about a meter off of the bottom. After video recording the 100' transect line, a second recording was made with a 45 degree look down. Because the camera was never turned off, the diver's course in the surrounding habitat between each transect was recorded as well, providing a good overview of the general area.

A basic overview for viewing and scoring the Video Random Point Intersect transects

1. Mark 10 random spots on the TV screen using a felt tip marker that can be erased.
2. Stop the transect 10 times at intervals that are evenly spaced along the transect.
3. At each of the ten stops, identify what is under each spot on the screen. This is called a "hit." Record it on a sheet with all of the selected fields listed. Select which field best characterizes each hit and record it in that field.
4. The descriptive fields for hits can be broad or specific. **Coral** for a broad field. **Hard Coral** for a more specific field or **Star Coral** to be even more specific. The parameters are open and can be determined to fit your purpose. It is always best to start with basic fields such as Hard Coral, Soft Coral, Algae, Sponge, Hard Bottom, Sand or Seagrass.

5. At the end of the transect 100 hits will have been recorded. Add them up for each field. 25 hits on coral = 25% coral coverage. 35 hits on sponges = 35% sponge coverage. When you tally them up the percentages are reflected for each field.
6. In a classroom setting, the transects can be scored many times over. Starting and stopping at different points along a transect will produce varied results for each transect scored. These percentages can be averaged to produce more accurate results.

Tips for Scoring DVD's

To begin, view the entire DVD at one setting. Make sure the DVD starts at the beginning and set the counter on the DVD player to 00000. Write down the counter numbers for the beginning and end of each transect. These numbers will help you locate the transects on the DVD and will give you each transects' elapsed time. The viewing will also give you a better idea about which fields to choose. There are a total of 19 transects on the DVDs included in this report. Dive 1. Ballast Bay—6 transects. Dive 2. Ballast -Whitehouse Bay—4 transects. Dive 3. Shitten Bay—4 transects. Dive 4. Green Point—5 transects.

Through the continued efforts of Dr. Leighton Naraine, Laughton Pemberton, Ellsworth Diamond and others at the Clarence Fitzroy Bryant College, in cooperation with the St. Kitts Foundation, we anticipate that the monitoring survey of coastal waters will be continued locally. Reef Relief provided the college with an underwater camera, housing, GPS, battery charger, batteries and other equipment so that they could begin additional monitoring immediately. Educational materials and a VHF version of *Coral 2000-- Volume I and II*, produced by Quirolo for Reef Relief, were also donated to the college.

Students from the college, working in cooperation with the St. Kitts Foundation, can and should "score" the video transects obtained to produce a report on reef health with percentages of living coral, algae, seagrass, or other parameters.

Educational Activities, Media

Reef Relief's visit to St. Kitts to participate in the Peninsula Marine Ecosystem Survey Week included a community-based educational component. During the Opening Training Symposium held on Wednesday, April 28th, Executive Director DeeVon Quirolo presented a brief introduction to coral reefs, the coral reef ecosystem, why they are important, what threatens them, and how to protect them to the full room of attendees. This was followed by a presentation by Craig Quirolo on reef health monitoring. The video *Seascapes III* aired during the presentation, giving participants a brief introduction to the names of common corals, fish and other marine life on a typical Caribbean coral reef. A table was set up with printed educational materials from Reef Relief that were provided to symposium participants.

The next day, both Craig and DeeVon were first exposed to local reef conditions during a snorkel at White House Bay, where there were some small corals and fish and an abundance of nuisance algae covered in sediment. The first two video transects and still images of the reef were taken here. A hawksbill turtle was sighted by a volunteer participant.

Thanks to the excellent planning efforts of Kaya Freeman of the St. Kitts Foundation, on Thursday morning, April 26th, DeeVon Quirolo participated in a Department of Agricultural Fair. She staffed a table in the tent with the Fisheries Department and provided coral reef educational materials to hundreds of local students. In anticipation of these activities, she produced and brought several hundred copies of the "St. Kitts—Nevis Coral Reef Guide for Kids of All Ages" and other materials such as the "Don't Teach Your Trash to Swim" mini-poster. Five other activity sheets were provided and each student was asked to choose one. They covered topics such as marine debris, endangered sea turtles, threats to the reef, the coral reef ecosystem, and reef coral identification. Teachers were given a full set to reproduce for their classes as was the St. Kitts Foundation to reproduce for future use. DeeVon met with Kenji Saotome, a United Nations UNV Heritage Conservation Specialist, and the local Peace Corps volunteer and she shared materials with them. They

were staffing a booth in cooperation with the local sea turtle monitoring organization.

DeeVon met with Fisheries Ministry's Joe Simmonds to discuss fisheries issues over lunch. The Ministry is generally agreeable to exploring the establishment of marine protected areas around St. Kitts and is pleased with the progress made in protecting sea turtles. Funding remains an obstacle to many projects.

DeeVon scheduled class time at two private and one public elementary school where the students watched the *Seascapes III* instructional video and participated in a talk on coral reefs and their protection. The first class presentation was at the St. Theresa Convent School on Thursday afternoon, April 26th. Phillippe Cousteau of Earth Echo International—another member of the team brought in by the St. Kitts Foundation--recorded the event and participated in teaching the children. On Friday, DeeVon visited a combined group of two classes of students at the Montessori Academy directed by Dale Amory, and two separate classes at Irish Towne Primary School. All students were in the 9-11 year old range, an ideal age as they are just beginning to think critically. Instilling conservation concepts such as biodiversity, extinction, conservation, and practical solutions to marine threats is ideal at this age.

In addition, radio and television interviews were given to discuss and explain the project and how to protect coral reefs that will be aired on St. Kitts. The local public television producer taped interviews of both Craig and DeeVon regarding their activities, coral reefs, and how to save them during luncheon on Friday. They also taped a half hour radio talk show with Unoma and local radio personality Sugar Bowl on Saturday. He also has a television show. We encouraged both media to follow up with Kaya Freeman for future opportunities to present marine conservation to the island.

On Thursday, DeeVon met with Patrick Freeman, Director of Sustainable Development for Auberger Resorts and Vice President of Development for KHT

Landholdings Ltd., to learn more about their plans to develop a sustainable luxury resort community on the southern peninsula of St. Kitts. She visited his office to review maps and artistic renderings and joined him for a tour of the peninsula on Saturday.

Recommendations for the KHT Landholdings & St. Kitts Foundation

We provide the following concepts and ideas that may or may not be considered for the development of the Peninsula, based on our brief time there and the tour of the island, and our past experience in protecting coral reef ecosystems on tropical islands. Our intent is to raise potential opportunities to provide a sustainable development that will inure to the benefit of the residents of St. Kitts and future generations by enhancing the biodiversity and health of the surrounding marine environment.

1. Develop Principles of Guiding Development that incorporate a conservation approach as a priority in all planning.
2. Bring onto your planning staff a local qualified advisor who is familiar with the area to be developed. E.g. Dr. Leighton Naraine has access to studies of the salt ponds on St. Kitts and is a professor of geography at the Clarence Fitzroy Bryant College and would be a good candidate.
3. Organize several local workshops to present your plans to the local community—ideally including a local well know advisor—and give the public an opportunity to comment.
4. Produce and publish a rigorous Environmental Impact Study on the project for public comment, and host a community workshop to discuss it.
5. Insure that all waste generated by the various projects is treated to advanced, nutrient stripping tertiary treatment levels. A central plant will achieve economies of scale and a greater potential for higher nutrient removal.
6. Insure that any boat slips and marinas have a vessel pump out facility. Establish a rule that as a condition of picking up guests or using the docks or marina, all vessels 10' or longer with enclosed cabins must have a holding tank and use the pump-out facility regularly.
7. Provide a disposal site for used motor oil and other hazardous wastes at any marinas and encourage everyone to bring their trash back to shore, especially monofilament line and plastics. Sell hydrocarbon pillows, aka "bilge buddies", to absorb routine oil spills and biodegradable bilge cleaner in the marina shop.
8. Consider installing reef mooring buoys at area coral reefs and anchorages that are currently experiencing anchor damage. Mark shallow areas adjacent to marina entrances so that boats don't accidentally run aground.
9. Promote the creation of a deed-restricted upland park for areas of the peninsula that are not identified as development nodes. Promote the park as an eco-tourist destination and support creation of infrastructure through a nonprofit entity that can manage the park, remove invasive plants and promote healthy rainforest growth. This will add immense value to the peninsula, increase biodiversity, and become an attraction to those who would stay at the resorts being planned as well as local residents. It could become an outdoor classroom for local students.
10. Promote creation of a marine park adjacent to the upland park with zoned areas for fishing, no fishing, diving and establish a no discharge zone for boater sewage, with prohibitions and fines for the discharge of sewage into park waters.
11. Create a fish-attracting device for use by fishermen. Dismember the boat

hull at the beach and sink parts of it in deep waters in an area selected by the local fishermen to create an area where fish will gather and they can fish. In exchange, strike an agreement with the local fishermen that they will support setting aside another area as a no take zone for fishing. This will increase fish habitat and attract a larger diversity of fin fish that will spill over from the no take zone to other areas.

12. Move the proposed golf course away from any low lying areas, salt ponds and shorelines such as the area proposed on the southeast peninsula. Groundwater seepage from low areas would transport nutrients from the golf course into coastal waters and promote algal blooms in coastal areas that are part of the coral reef ecosystem.
13. Any beach nourishment plans should be considered very carefully and avoided if at all possible. If not, they should be accompanied by an adjacent stretches of mangroves, which could be planted in cooperation with the St. Kitts Foundation and local students. The mangroves will create an eco-tourist kayaking and photography destination, as well as a nursery and breeding ground for fish. Most importantly, it will trap and reduce the sedimentation running from the uplands into the ocean and will help reduce beach sand runoff that will be deposited after each storm into the adjacent coastal areas. A highly qualified consultant should be retained to assess the currents and groundwater transport in the area to predict runoff patterns from routine weather events and how to avoid loss of beach sand.
14. Any dredging should be approached with a careful eye toward avoiding the transport of degraded water into coastal areas both during the dredging activities and as a result of it from inland salt ponds. Sludge from the dredging should be contained, de-

liquefied and if at all possible, re-used to create berms and swales to help capture stormwater runoff from developed areas.

15. The potential to utilize solar energy is obvious as it will reduce the use of fossil fuels and can be integrated into the design component of all new structures to provide for energy needs on the peninsula.
16. Recycling of trash can be integrated into the solid waste plan for the developed areas, including appropriate disposal of batteries, used oil, and other hazardous waste. A commitment to using biodegradable and non-toxic cleaning products and building materials by the developer and all contractors would reduce the amount of such waste generated in the building process.
17. If an off-island delivery site for recycled items is located and a system for delivery is established for the development, it would be of tremendous benefit to the local community to provide transport of their recyclables; this would greatly strengthen the capacity to launch a recycling program on St. Kitts.
18. Native landscaping can be used in the developed areas to reduce fresh water needs for watering green areas.
19. Launch a public relations campaign in association with the St. Kitts Foundation that targets:
 - School students—utilize the Reef Relief *St. Kitts-Nevis Coral Reef Guide for Kids of All Ages* brochure, the video *Seascapes* and other educational materials to make presentations to local school students. Participate in school fairs and events and distribute the materials. Host poster contests on ecological themes.
 - College Students—collaborate and support additional baseline

- monitoring by students from the Clarence Fitzroy Bryant College in cooperation with Dr. Leighton Naraine, Laughton Pemberton and others. Score the video transects and publish the results, possibly in a workshop presentation and in the press.
- Support creation of a marine library for the CFB College and help build its capacity for marine research and learning.
 - Residents--Produce radio public service announcements on “reduce and reuse and don’t teach your trash to swim.” Distribute copies of Reef Relief’s mini-poster “Don’t Teach Your Trash to Swim.” Organize gutter clean-ups in town.
 - Media—launch a radio and television campaign to promote coral reef awareness and reef friendly actions on the part of local residents and visitors.
 - Produce and distribute cotton shopping bags with the St. Kitts Foundation logo on it to reduce the use of plastics as part of an educational program to “reduce, reuse.”
 - Fishermen—sit down with local fishermen and develop an understanding that no take zones and the creation of marine protected areas are beneficial to their continued success
 - Policy makers—initiate an effort to provide advanced tertiary sewage treatment for Basseterre, possibly identifying funding from the Interdevelopment Bank or other foreign funding sources in cooperation with national policy makers and the Ministries of the Environment and Tourism and phase out the direct discharges into coastal waters that are destroying the coral reefs.
 - NGO/Educational Community-- Research the potential for launching a recycling program on the island of Nevis, possibly in cooperation with the local schools,

the UNESCO program, Peace Corps, local government and others, beginning with perhaps aluminum or plastics only and then expand it. Partner with the development to take the recyclables off island to a recycling center.

Recommendations of Books for the library at the Clarence Fitzroy Bryant College

It was suggested that the St. Kitts Foundation help bolster the local marine science library at the college and that Reef Relief submit a list of recommended volumes for inclusion. The web has made it possible to obtain the most current studies easily and subscribing to various journals such as *Coral Reefs* and the NOAA Cora List list-serve will keep educators and students abreast of current developments in the world of marine ecology. So perhaps a publicly-accessible computer with subscriptions to these would achieve increased accessibility to current ecological data.

In addition, attending the International Coral Reef Symposium every five years is an incredible learning experience. But if you don’t, ordering the **Symposium Proceedings** is next best as it gives abstracts for all the papers that are presented in several volumes. The conference is organized and the proceedings published by the International Society for Reef Studies in cooperation with the IUCN.

What follows is a list of some of the books that we have relied upon in the past and which were part of our bookstore, in no particular order.

Paul Humann, Ned DeLoach, **Reef Set: Reef Fish, Coral, and Creature Identification**

Mark and Diane Littler, **Marine Plants of the Caribbean.** Henry Holt

Susan Wells, editor, **Coral Reefs of the World Vol. 1 and 11** 1988 (or a later version if available from the IUCN)

Joseph Seneca, **Economic Losses from Marine Pollution.** 2001 Island Press

Marea Hatzios, Anthony Hooten, Martin Fodor, editors, **Coral Reefs: Challenges and Opportunities for Sustainable**

Management: Proceedings of the 5th Annual World Bank Conference on Environmentally and Socially Sustainable Development. 1998 World Bank

Mark D. Spalding, Corinna Ravilious and Edmund P. Green, **World Atlas of Coral Reefs**, 2001 University of California Press.

Judith Lang, editor, **Status of Coral Reefs in the Western Atlantic: Results of Initial Surveys, Atlantic and Gulf Rapid Reef Assessment (AGRAA) Program.** 2003 National Museum of Natural History. Smithsonian Press

Edwin O. Wilson, *The Diversity of Life*. 1992. W.W. Norton & Co.

Lester R. Brown, **Eco-Economy: Building an Economy for the Earth.** 2001. W.W.

Norton & Co.

Alan White, Lynne Zeitlin Hale, Yves Renard, Lafcadio Cortesi, editors, **Collaborative and Community-based Management of Coral Reefs: Lessons from Experience.** 1994. Kumarian Press

Linda Glover, Sylvia A. Earle, editors, **Defying Oceans End.** 2004 Island Press.

Carl Safina, **Song for the Blue Ocean.** Henry Holt

David Helvarg, **Blue Frontier**

Osha Davidson, **The Enchanted Braid of Life.** John Wiley & Sons

Osha Davidson, **Fire in the Turtle House.** Public Affairs Books. 2001