

## **Creating an Ocean Ethic Through Informal Education and Outreach Programs**

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### **Need for Action**

Ten percent of the world's coral reefs are considered to be lost beyond recovery and the remaining coral reefs, especially those near population centers, are in a state of decline. However, coral reefs are not the only marine ecosystem or marine resource that are in a state of alarming decline. Pollution, over fishing, habitat destruction, introduction of marine exotics, ocean dumping, coastal development, and global climate change are all affecting the health of the world's oceans. As a result, the economies that are dependent on a healthy ocean environment are being affected on local, regional, and global scales.

For decades we have taken our bounties from the oceans; tapped into their vast reservoir of resources; used their surfaces to move our commerce from port to port, coast to coast and continent and continent; and replaced vital coastal and marine habitats with facilities and development designed to attract ocean loving people to our shores. Now we are witnessing the results of past actions by way of polluted waters, collapsing fisheries, loss of critical coastal and marine habitats, harmful algal blooms, hazardous storm water runoff, and introduction of exotic marine species.

Among our mistakes has been to not treat our oceans as a finite resource. For generations we have honestly assumed our oceans would always be capable of supplying our personal and commercial needs, whether they are economic or spiritual in nature. We have always taken the quality of life given to us by our oceans for granted. However, in a few brief decades we have witnessed advancing technology collide with the ability of marine life to sustain itself.

We have witnessed a huge increase in the migration of our population to our shoreline. Today more than 50% of the US population lives within 50 miles of a coast and 3600 people join them daily as coastal residents. On a global scale two-thirds of the world's 5.5 billion people live within 50 miles of the coast. Could anyone have ever predicted the volume of shipping traffic, or the size of ships that would be navigating our oceans; or the number and types of watercraft that we see along our shores today? Whoever thought that we could tap into our ocean seabed miles below the surface or slant oil and gas wells from miles away?

The economic importance of our oceans is only starting to be realized as we lose critical commercial fisheries, witness the decline of water quality, puzzle over mysterious fish die-offs, cope with coral diseases, monitor toxic algal blooms, and assess the impacts of exotic marine species. Today, one out of every six U.S. jobs is related to the oceans. In 1995, the U.S. fishing industry added more than \$20 billion to the economy while coastal

tourism generated more than \$54 billion. For example, 3 million tourists visit the Florida Keys on an annual basis and stay an average of 13.3 million visitor days. While in the Keys the tourists spend \$1.2 billion each year and their favorite activities are snorkeling and diving on the living coral reefs, fishing and simply enjoying the environment.

The U.S. coastal tourism and recreation industries are the largest and fastest growing economic segments of the U.S. service industry and travel and tourism contribute tax revenues in excess of \$58 billion a year, with \$7.5 billion of that generated by foreign visitors. Beaches are the leading tourism destination in the country followed by national parks and historic sites. In 1997, the EPA reported that coastal and marine waters support 28.3 million jobs, generate \$54 billion in goods and services, contribute \$30 billion to the U.S. economy through recreational fishing and provide a destination for 180 million Americans to recreate each year. Miami Beach is an excellent example of just how much good beaches mean. There was no beach left by the mid-1970's as a result of erosion. Beginning in the late 1970's a beach renourishment program was initiated, and beach attendance increased from 8 million in 1978 to 21 million visitors just five years later.

Success in stemming the trend we are witnessing in the decline of our oceans depends on our collective understanding of the concept of sustainability. We must remind ourselves that we cannot use up the resources in our generation that are important to support the economy and environment that will be inherited by future generations.

### **An Ocean Literate Society**

The theme of this symposium, “Connecting the WOW!: Wonders of the Ocean World Creating an Ocean Literate Society,” creatively captures what we, as residents of planet ocean, must accomplish if our ocean and its resources are to survive present day assaults. I recall the first time I heard the challenge for an ocean literate society from my good friend, Jean-Michel Cousteau, during a presentation in the Florida Keys. Recently, I read his testimony to the President’s Commission on Ocean Policy, where he again emphasized the need to develop a society who understands the ocean and its needs and limitations ...an ocean literate society.

Another good friend, Dr. Jim Bohnsack, uses the term “ocean ethic.” He has frequently pointed out the need to develop an “ocean ethic,” much like the “land ethic” that so many naturalists have subscribed to over the decades. Just imagine, a world or a nation where the literacy of the people about the ocean and ocean issues is such that it affects their ethical understanding and behavior and is passed along, generation to generation. Where a set of moral principals or values regarding the ocean and its inhabitants are instilled in people. As I write this, I am reminded of all of the coastal communities that I have visited over the decades where this kind of knowledge was passed along between generations of peoples who were somewhat successful at sustainable practices until the 21<sup>st</sup> Century caught up with them. Today, even the most remote regions of the Pacific, Atlantic or Indian Oceans have witnessed declines in tropical marine environments unlike anything ever witnessed by mankind.

In order to be successful at conserving and protecting our ocean for present and future generations, we have many challenges ahead of us. We must first establish the goal of attaining an ocean literate society as advocated by Jean Michele Cousteau. Then and only then will society understand or recognize the need to embrace an ocean ethic. In order to meet these challenges, we need education and outreach programs that target every aspect of society. Programs that not only reach coastal communities, but reach far inland where some of the problems that affect the health of the ocean begin.

### **Education and Outreach: Management Tools in National Marine Sanctuaries**

The primary management tool used in the thirteen National Marine Sanctuaries, managed by the National Oceanic and Atmospheric Administration in the United States Department of Commerce, is education and outreach. Public awareness and understanding through education are critical ways to achieve resource protection and to stem many of the ocean problems described above. National Marine Sanctuaries provide excellent settings in some of this nation's most significant and fascinating marine and coastal environments where the public can be exposed to the WOW! (Wonders of the Ocean World). While each of the National Marine Sanctuaries have excellent education and outreach programs, coordinated from the National level, I have limited my presentation to only one site.

### **Education and Outreach in the Florida Keys National Marine Sanctuary**

This presentation is focused on some of the education and outreach programs currently being used in the Florida Keys National Marine Sanctuary. By reaching the recreational visitors to the coastal or marine environments with educational and outreach messages we are able to spread our messages across the nation, and indeed the world. However, it is also important that we reach our coastal residents with the same educational and outreach messages. For that purpose, we have developed an informal education program that comprehensively targets visitors and residents alike.

The Florida Keys National Marine Sanctuary was the first congressionally designated Sanctuary. It was designated and signed into law in November 1990. At the time it was the largest NMS in the system, at 2800 square nautical miles in size. Today, due to a boundary change in July 2001, it is 2900 square nautical miles in size. The Sanctuary is at the tip of the South Florida ecosystem and encompasses the coral reef communities that comprise a critical component of the diverse ecosystem. There are over 1600 islands in the Sanctuary that have over 1800 miles of shoreline.

Education and outreach are major tools for managing the marine resources of the Sanctuary, as well as reaching people who impact those resources. Our audience is the more than 80,000 year-round residents in the Keys, which increases to 130,000 residents

in the winter, and the 3 million visitors who spend 13.3 million visitor-days snorkeling, scuba diving, fishing, or relaxing in the tropical environment of the Florida Keys.

Impacts to the resources of the Florida Keys are numerous, including: water quality degradation; habitat destruction; overfishing; and increasing pressures on a finite, fragile ecosystem whose balance began to topple in the 1950's. Each one of these threats to the marine ecosystem of the Florida Keys requires education and outreach programs that target specific audiences. For example, many of the impacts to the shallow water resources of the Keys come from boating activities. Whether it is prop-scuting in the seagrass beds or running aground on fragile coral reefs, much of the habitat destruction we are witnessing is the result of poor or inexperienced boat operation. In the last ten years alone, boater registration has increased 60% in the Florida Keys. There is one boat for every two households in the Keys. This does not include the tens of thousands of boats that are trailered into the Keys by visitors each year.

### **A Place to Start**

Our education programs are targeted at various audiences and begin with our more than 10,000 school aged children in the Florida Keys. We also reach many of the students in the Miami-Dade and Broward County areas in South Florida. In addition, we target our three million annual visitors with education and outreach materials. Some of the challenges we face are:

- There is no single point of entry to the Sanctuary,
- There are large numbers of users,
- There are diverse, multilingual residents and tourists, and
- Resource damage occurs from both direct and indirect impacts.

These challenges are not unlike many of those facing other National Marine Sanctuaries or other marine protected areas around the nation or the world, for that matter. The goal of our education and outreach program is to meet and overcome these challenges with innovative and creative educational tools that increase the public's understanding of the marine environment. This will develop a more-informed public who appreciate and use the marine environment for recreational, commercial or aesthetic purposes, recognizing their full impact on those resources.

### **How We Rise to these Challenges**

The management plan for the Sanctuary contains an Education and Outreach Action Plan that utilizes a variety of tools to convey critical information to the various audiences. These tools are:

- Community Based
- School Based

- Involve Partnerships
- Technology Based
- Product Development
- Media Based

**Community Based.** The Sanctuary Education and Outreach staff organizes and participates in a wide variety of programs that reach out to the community of Sanctuary users, including visitors and residents. Some of those programs include:

- The Sanctuary is a founding and active member in the Monroe County Environmental Education Advisory Council (MCEEAC).
- A Sanctuary Advisory Council Education Working Group.
- Sanctuary staff holds yearly Maritime Community Meetings throughout the Keys to engage the local community in Sanctuary-based issues.
- Staff attends local, regional, and national trade shows (dive and boat shows) and events (seafood festivals) to provide public information about Sanctuary resources.
- The Sanctuary education staff has established an Education Advisory Board representing a broad spectrum of interests throughout the state to advise them on education related projects.
- Sanctuary initiated Team OCEAN (Ocean Conservation Education Action Network).
- Sanctuary staff developed the Sea Smart - Dive Smart program for employees of the dive/snorkel industry. The accompanying *Florida Keys Dive and Snorkel User's Guide* is available to the businesses for use with their customers.
- Sanctuary staff participates in the Great American Fish Count, an annual nationwide event aimed at increasing public awareness about marine resources while providing valuable information to Sanctuary managers and researchers.

Team OCEAN. In this brief presentation, I only have time to highlight some of our education and outreach programs. One of our more successful Community Based programs is Team OCEAN.

Team OCEAN is an on-the-water education and information program aimed at protecting the natural marine resources of the Florida Keys, while enriching the experiences of visitors to the Florida Keys National Marine Sanctuary. Team OCEAN volunteers have donated over 6000 hours in the promotion of safe and enjoyable public use of the marine environments of the Sanctuary, while advocating the protection of our natural resources over the past 6 years. Staff regularly visits over 400 businesses, distributing educational materials and serving as liaisons with the community. It involves the stationing of trained volunteer teams at heavily visited reef sites throughout the Keys during peak recreational boating seasons in order to educate and inform other boaters about the unique nature of the coral reef habitat, share their knowledge of the best approach to certain areas, demonstrate the use of a mooring buoy, and give out various safety information. Originally set up with the use of a few government owned boats, the program has been expanded to include the private boating sector, allowing trained volunteers to go out to a

greater number of target reef areas using their own boats. All program supplies, as well as fuel reimbursement for private boaters, are provided to program participants by the Sanctuary. Individuals are trained for one or more of the following positions:

- Operators for government boats
- Private boat owners/operators (boats must be between 15 - 25 feet in length)
- Interpreters/educators

Another aspect of Team OCEAN is the Business Community Program. This includes a comprehensive, Keys-wide database of over 450 waterfront and visitor related businesses such as dive shops, hotels, and marine supply stores. Team OCEAN staff regularly visits each of these businesses to distribute Sanctuary educational materials and serve as liaisons between the businesses and the Sanctuary program. These visits allow the business owners to ask questions, air their views, and discuss any needs or issues. Team OCEAN staff also distributes information packets to rental boat facilities throughout the Keys, the same packets that Team OCEAN volunteers are distributing on the water. The disbursal of these packets to rental boat businesses helps to enhance the numbers of boaters having access to Sanctuary information. One of the objectives of this program is to intercept visitors before they get on the water, and to provide them with outreach materials that can affect their behavior and increase their understanding of Sanctuary resources and the issues affecting those resources.

**School Based Programs.** The Sanctuary Education staff has developed a number of environmental education programs that are focused on the schools in the region. Those programs include:

- The Teacher Grants Program, where \$26,000 has been awarded to Monroe County teachers to implement environmental education programs.
- Over nine years, 3314 students have participated in the Coral Reef Classroom (CRC) program. CRC offers Monroe County students an opportunity to learn about the coral reef ecosystem and collect water quality data through on-water sampling.
- Developed the Build an Ocean program that focuses on students from grades 1-4.
- Sanctuary staff conducts and support teacher workshops and other school programs. They frequently visit schools and give presentations.
- Sanctuary staff has participate in the Sustainable Seas Expedition including development of web site materials, conducting a Student Summit, Open House, and Student/Teacher at Sea days.
- Adult Environmental Education: Sanctuary staff has routinely given presentations to local, regional and national organizations. In addition, frequent

on-site interpretive tours are provided to adult audiences to further their understanding of the threats to Sanctuary resources and the potential solutions.

Coral Reef Classroom. In the School Based programs I want to focus on one of our more successful and long-lasting education programs. Coral Reef Classroom has provided free educational excursions to the reef for over 3,000 local students and teachers since 1991. Environmental stewardship is highlighted as students develop their own hypotheses about the condition of essential habitats, record and compare field observations, and discuss ecosystem management strategies.

The objectives of Coral Reef Classroom are to familiarize students with basic coral reef biology and concepts of habitat interdependence by engaging them in activities such as water quality sampling, data collection, and evaluation. These exercises encourage analytical thinking, demonstrate the role management plays in protecting natural resources, and inform students about careers in environmental science.

Each Coral Reef Classroom program includes a shoreside presentation and a boat trip to the coral reef. During the classroom session, students experience their first hands-on practice with the Niskin bottle, Secchi disc, refractometer, dissolved oxygen kit, wind meter, and compass. The Coral Reef Classroom instructor, using examples illustrated with colorful slides, guides discussion about coral reef ecology.

During the field trip, the instructor and trained volunteers assist students with sampling methods at each of three stations on the boat. Students learn how to collect and record oceanographic data and the importance of monitoring the condition of the coral reef ecosystem. A plankton tow near the reef site explores marine biology; students collect, observe, and identify plankton and explain its importance in the food web. The remainder of the field trip is spent snorkeling at a Florida Keys reef, where the instructor and volunteers offer guidance and ensure safety in the water.

The enthusiastic support of community volunteers and boat charter businesses in the Florida Keys makes this program possible and provides a vital link in students' exploration of career possibilities. The Sanctuary also offers Coral Reef Classroom to out-of-county groups who charter their own boat.

**Sanctuary Partnerships.** Sanctuary education staff has developed many partnerships with local, state, and federal agencies and non-governmental organizations to undertake a wide-range of environmental issues and educational challenges in the Keys. Some of those include:

- The Sanctuary is a founding member and lead agency in the Seagrass Outreach Partnership (SOP). On a statewide level the SOP raises awareness of the importance of seagrass and the impacts of improper boating. Practice of proper boating skills is encouraged to reduce negative impacts on the environment.

- The Sanctuary and The Nature Conservancy partnered in 1992 to develop a volunteer and stewardship program for the Sanctuary. This successful program has generated over 120,000 volunteer hours that have been donated to the FKNMS. This is equal to \$1.8 million dollars in contributions based on a national figure from the independent sector.
- The Sanctuary developed the Shipwreck Trail through a partnership with the State of Florida, several universities, the Pigeon Key Foundation, and volunteers.
- The Sanctuary has partnered with various non-governmental groups to design and develop a variety of education and outreach programs and materials.

**Technology Based.** The Florida Keys National Marine Sanctuary website (<http://www.fknms.nos.noa.gov>) was developed and is continually updated with timely information. The Web Site contains over 429 pages of content. The total number of Unique Visitors increased from 26,794 in 1999 to 42,821 in 2000, which represents an increase of roughly 62%. Visitors to the Web Site are from North America, Europe, Oceania (including Australia, New Zealand, and the South Pacific islands), Asia, South America, and Africa.

Sanctuary education staff routinely participates in Web Broadcasts, Web Chats and have developed Web Based Curriculum. Clearly, this technology has given the Education and Outreach Program an amazing geographical reach in a very short time frame.

**Product Development.** Sanctuary education staff has developed a variety of materials to disseminate to the general public. Some of that material includes:

- A variety of educational products have been developed including posters, brochures, fact sheets, rack cards, videos, CDs, charts, and boat ramp signs. When appropriate, the products have been bilingual.
- Sanctuary staff writes, edits, and prints quarterly editions of the *Sounding Line* newsletter.
- Sanctuary staff provides information, articles, and images to periodicals and publications.
- Sanctuary staff produced two editions of the *Florida Keys Environmental Education Resource Directory (FKEERD)*. The FKEERD is a comprehensive listing of agencies and organizations that offer environmental education programs and products in the Florida Keys.
- The Sanctuary offices have audio and video libraries that have been expanded and catalogued for easy accessibility.

**Media Based.** One of the early “lessons learned” in the Sanctuary was that the majority of the general public, especially the locals, are not reached by many of the education and outreach programs described above. For that reason, a public affairs specialist was hired to focus on getting information and messages out to the public by radio, newspapers, publications, video news clips and television. While all of these methods have their advantages, one of the Sanctuary’s unique programs is our own television series called *Waterways*.

*Waterways* is a television series that the Sanctuary produces in partnership with the Environmental Protection Agency and the National Park Service. The 30-minute show is aired weekly over 17 public access channels. There have been over 130 episodes produced. This show has become very popular and uses an interview and narrative format that focuses on the natural and historical resources of the Florida Keys and South Florida.

## **Conclusion**

If we are going to be successful in developing an ocean literate society with an ocean ethic, then we are going to have to seriously commit to education and outreach programs that not only reach into the classrooms, but also reach into living rooms across the nation. In order to reach the classrooms we must engage the education professionals, such as those who write the textbooks that comply with various state standards and those who use the textbooks and their associated electronic materials in the classrooms. The education materials have to be useable, in that they help the teacher achieve specific goals or standards established in their state and the materials must be relevant to both the needs of the teachers as well as the messages resource managers want to convey. This can be accomplished.

In order to reach into the living rooms across the nation with messages that improve the public’s understanding about the issues that face our oceans, or in order to develop an ocean literate society, the education messages must be based on sound science with everyday, social applications. I sense there is a lack of confidence in both the messages and the messengers in much of the general public across the nation when it comes to ocean issues. For generations we heard the sea was an endless bounty waiting to be explored, discovered and profited from by mankind. Yet, in the lifetime of those who have witnessed the invention of scuba that mental impression has changed to one of alarm and despair. We must gain the public’s confidence and appreciation that the ocean is a finite resource that is being enormously impacted by mankind.

