

## Department of Defense Legacy Resource Management Program

# Natural Selections

Volume 4, Issue 10 October 2008

## **Legacy Program Update**

#### The Legacy Program moves forward 136 proposals:

The Legacy Program received 230 pre-proposals submitted through the Legacy Tracker in response to the RFP solicitation announced in May 2008. A total of 90 natural resources pre-proposals, 37 cultural resources pre-proposals, and 9 integrated (natural and cultural) resources pre-proposals are being invited to submit a full proposal. Full proposals are due to the Legacy program on November 3, 2008. All full proposals must be submitted by using the Legacy Tracker at <a href="https://www.boblegacy.org">www.boblegacy.org</a>.

## **Legacy Project Highlight of the Month**

#### <u>Legacy Project 06-306 Coral Ecosystem & Marine</u> Resource Initiative (T/E & Sensitive Species)

DoD promotes sustainable use of all its ranges and operational areas, including in-water areas in the south Atlantic, Caribbean, Gulf of Mexico, and Pacific Ocean. Protected marine species and associated benthic/marine habitat, known collectively as coral reef ecosystems, occur within locations used by DoD. Range managers must comply with an array of federal resource protection laws and regulations as well a DoD and Service-specific resource conservation measures. Development of programmatic DoD-wide management recommendations and strategic planning objectives to protect sensitive coral reef ecosystems will improve consistency in applying DoD policy and resource protection measures while reducing resource management costs. This project supports a DoD-wide programmatic approach to sustainable management of marine ranges and operating areas, as well as promotes participation in international conservation efforts.

The objective of this project is to develop tools for consistent management and conservation of DoD protected marine species and associated

See Legacy, page 6



#### In The News

## Department of the Navy Supports International Year of the Reef

2008 is a year for the world to focus on understanding the value of coral reefs and learning what it takes to protect them

By Tom Egeland

Office of the Assistant Secretary of the Navy for Installations and Environment, Washington, DC

The International Coral Reef Initiative, a voluntary governments, partnership amona international organizations, and non-government organizations, has declared 2008 to be the International Year of the Reef. In 2008, agencies and organizations around the world will focus on the importance of coral reefs to sustainability, local environmental and global economies, and global peace and security. During the International Year of the Reef, Department of the Navy (DON) will lead Department of Defense (DoD) in highlighting the success of existing measures to conserve valuable reef resources and developing innovative and proactive new measures.

International Year of the Reef, page 8

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## **Naturally Speaking**

From the Desk of L. Peter Boice, DoD Conservation Team Leader and Director, Legacy Program



I can count my 'real world' snorkeling experiences on two hands. Like many, I've seen far more of our world's coral reefs through the lenses of IMAX, the aquaria of three different continents, and the magic of Disney. But as beautiful and informative as those experiences have been, they've failed to convey the frailty and vulnerability of these remarkable ecosystems -- and the hope for the future that remains – as well as the sensation of floating a few feet above these reefs.

I've viewed the corals of the Florida Keys' John Pennekamp Coral Reef State Park from both a glass-bottomed boat, and in the water. And although I saw more of the reef's beauty from the boat, the closer experience more dramatically illustrated both physical damage and decline and one small reason for that decline --- the inadvertent contacts some of us were having with parts of the reef. The patches of bleached coral we saw were another sad reminder of their vulnerability.

The coral heads of Cozumel's Chankanaab Park offered a different and more accessible experience, but again replete with fantastic fish and other reef life. Sadly, the park's proximity to island runoff clearly was having adverse effects. Cozumel's off-shore reefs face other vulnerabilities -- apparently damages from Hurricane Wilma in 2006 were severe.

Perhaps my recent visits to Hawaii have provided the starkest contrast between hope and despair. Visit Oahu's Hanauma Bay and one will be struck by both the beauty of the coral that remains and the difficulties of managing such a popular and easily accessible site. Take a tourist submarine dive from Waikiki and you'll see both large barren patches of near shore ocean as well as the promise and allure of large artificial reefs. And if you're fortunate, you may be able to visit the Navy's wharf area on MCB Hawaii. There, if you're not too shy to lie directly on the wharf and peer over the edge, you'll see a totally unexpected and vibrant coral community growing on the sides of the active wharf.

The challenges of coral reef management and protection are daunting, and DoD's direct role is admittedly modest. But we can all learn more about these precious resources from the outreach and management actions spearheaded by the Navy, including why we should do all in our power to protect these treasures for future generations.



Peter Boice, DoD, and Lorri Schwartz, NAVFACHQ, at Hanauma Bay, Oahu, Hawaii

## **SMR Conference Update**

Call for papers hit the streets



#### SMR 2009: Call for Papers

Thank you for your suggestions for natural resources track sessions at the Sustaining Military Readiness (SMR) Conference, set for 9-14 August 2009 in Phoenix, Arizona. The natural resources track lead has taken heed of your suggestions and is calling for papers! Broad conference themes include: energy, partnerships, sustainability, emerging issues, and the future. Papers may pertain to one of the above themes, or another subject relevant to the DoD natural resources community such as: ecosystem management; bird conservation; invasive species; endangered species; conservation strategies; readiness and range sustainment, and others. Abstracts should be approximately 500 words and submitted no later than 15 November. Please send your abstracts by email to Pedro Morales, Pedro.Morales.ctr@osd.mil. Note: A call for posters will be issued in late winter.

## **Picture of the Month**

Capturing the beauty of our natural resources





Venus Sea Fan (*Gorgonia flabellum*), a gorgonian at U.S. Naval Base Guantanamo Bay, Cuba, c. 2003 Photo by Ken Deslarzes

Send your pictures to <u>Pedro.Morales.ctr@osd.mil</u> for a chance to have your picture highlighted on Natural Selections.

## **Training**

Workshops, Interagency Training Announcements and More



**NEW!** <u>Natural Resources Compliance:</u> January 13 -16, 2009, Port Hueneme, CA. This course offers instruction in specific natural resource laws, regulations, policies, Executive Orders, DoD Instructions, and other guidance, noting Service-specific requirements. Course addresses stewardship, preservation, and process; fish, game, and wildlife management laws; protection of wetlands, waterways, and other protected ecological areas; forest and land use management laws; and interservice cooperation. Practical exercises and guest speakers are included. This course is approved by the Interservice Environmental Education Review Board (ISEERB). Click <u>here</u> for course description or visit <a href="https://www.netc.navy.mil/centers/csfe/cecos/">https://www.netc.navy.mil/centers/csfe/cecos/</a>.

**NEW!** Environmental Negotiation Workshop: December 9 – 11, 2008, San Diego, CA. This three-day ISEERB approved course provides instruction on the negotiation and communication skills necessary to achieve productive agreements with regulatory and public stakeholders. The class aims to make attendees more knowledgeable and comfortable in the negotiation process in order to have confidence in a negotiation. It stresses the human, organizational and public aspects of building constructive relationships with stakeholders and installation management. Case studies and role playing provide an opportunity for every student to apply the information presented in class. Click here for course description or visit <a href="https://www.netc.navy.mil/centers/csfe/cecos/">https://www.netc.navy.mil/centers/csfe/cecos/</a>.

<u>USEPA Online EMS Training Course:</u> (Online) This online course provides an overview of how environmental management systems (EMS) can support facility programs. The course takes about one hour to complete and may be found at: <a href="http://www.epa.gov/epaoswer/ems/ems-101/ems101.htm">http://www.epa.gov/epaoswer/ems/ems-101/ems101.htm</a>.

WORKSHOP RESULTS! Guidance for the Establishment, Use, and Operation of Conservation Banks: TNC worked with the Environmental Law Institute, the EPA, and USACE, with financial support from some private foundations, in developing a two-day training course designed to familiarize TNC staff with the legal and administrative requirements for implementing mitigation projects under Section 404 of the Clean Water Act and the new regulations, while providing tools (including model banking agreements) for planning and implementing wetland and stream mitigation projects. The workshop materials that were given to attendees of this course, including a training binder and additional resources, are now available online at no charge. You can download them at <a href="http://conserveonline.org/workspaces/mitigationtraining">http://conserveonline.org/workspaces/mitigationtraining</a>.

## Announcements and Events of Interest

A Short List of Future Events of Interest to the Conservation Community



NEW! ACES 2008: Using Science for Decision Making in Dynamic Systems: December 8-11, 2008 in Naples, Florida. ACES (A Conference on Ecosystem Services) is holding their annual meeting in Naples Florida. As the issue of ecosystem services and their valuation and location becomes an increasingly important factor in resource management and conservation; decisions relating to prioritizing conservation and development locations, managing public lands, and evaluating the impacts of change are posing new challenges for policy makers. These important decisions require an understanding of the services provided by ecosystems and ways that they can be valued and used in decision making. The purpose of ACES 2008 is to provide a needed forum for sharing information on state-of-the-art methods, tools, and processes related to ecosystem services and their effective use in decisions. The interdisciplinary nature of ACES 2008 will facilitate interactive discussions and networking to create and build partnerships while sharing lessons learned from the field. Visit <a href="http://conference.ifas.ufl.edu/aces/index.html">http://conference.ifas.ufl.edu/aces/index.html</a> for more information.

NEW! 9th National Conference on Science, Policy, and the Environment: Biodiversity in a Rapidly Changing World: Dec 8-10, 2008, in Washington, DC. The National Council for Science and the Environment (NCSE) invites you to participate in the 9th National Conference on Science, Policy, and the Environment: Biodiversity in a Rapidly Changing World, to address the challenge the changing world poses to biodiversity (and to humanity). The conference will provide an opportunity to look at what is happening to biodiversity in the context of radical climate disruption, human population rise, land use changes, globalization and other economic forces. We will collectively develop a 21st century biodiversity science and conservation strategy. For more information and to register visit http://ncseonline.org/Conference/Biodiversity/

The Wildlife Society 15th Annual Conference: November 8-12, 2008 in Miami, FL. The conference is an excellent opportunity to learn and debate cutting-edge research, management practices, and policy issues. A variety of workshops will provide hands-on training in new management techniques. It's also a great place to network among 1,500 wildlife biologists from across the U.S., Canada, the Caribbean, and worldwide. You're sure to come away with ideas and inspiration for tackling the challenges in your daily work environment. During this conference, DoD is sponsoring a 1/2 day symposium on "Biodiversity Management in the Department of Defense". To register or for more details visit http://joomla.wildlife.org/miami08/.

8th Annual NAPPC International Conference: October 22-24, 2008, in Washington, DC. The work of the NAPPC partnership has brought significant attention to the plight of the continent's pollinators. From the NAS NRCS Study on the Status of Pollinators to the US Postal Service Pollination Stamps to the IABIN Western Hemisphere Pollinator Data Portal to National Pollinator Week, this collaboration needs your help to keep our momentum moving forward for pollinators. Wednesday, October 22, 2008 will include an optional pollinator field trip to Plummers Island and the National Museum of Natural History Coevolution Hall, followed by an opening evening reception at the Organization of American States where invitations will be extended to the Ministers of the Environment, the Ministers of Agriculture, and numerous Ambassadors from across the Western Hemisphere. For details visit <a href="https://www.nappc.org">www.nappc.org</a> or to register go to <a href="https://www.nappc.org">www.regonline.com/NAPPC2008</a>.

35th Annual Conference on Ecosystems Restoration and Creation: November 6 - 8, 2008 at the John R. Trinkle Building located on the Plant City Campus of the Hillsborough Community College (Plant City, Florida). Kiran C. Patel Center for Global Solutions at University of South Florida is joining the Institute of Florida Studies in co-hosting this year's Conference. The Conference provides a broad forum for exchange of results of the latest research and experience with restoration, creation, and management of ecosystems. The theme of this year's conference is "Assessment of Wetland Mitigation and Mitigation Banks". Visit <a href="http://www.hccfl.edu/ifs/conference/index.html">http://www.hccfl.edu/ifs/conference/index.html</a> for details.

#### Legacy, continued from page 1

benthic/marine habitat (coral reef ecosystems), including endangered, threatened and sensitive resources/habitat. The goals of this project are to: coordinate a comprehensive program to assess protected marine resources; develop a strategy and objectives for DoD coral reef conservation research; and, foster international cooperation for marine resource conservation and sustainable use of in-water operational and training areas

To achieve the goals and objectives, several individual tasks were developed using combinations of five elements. These elements each leverage with the others for efficiencies in meeting budget requirements and integrating the products.

Element 1 is expanded development of in-house resources in the knowledge needed to locate underwater resources and identify potential impacts related to mission needs, operations and facilities development projects, especially coral reef ecosystems. With this training, in-house resources will be able to record and evaluate coral reef monitoring data, and plan both on-shore and at-sea activities so as to minimize the potential to adversely impact coral reefs.



Elkhorn Coral, *Acropora palmata*, and it is now listed as an threatened species. It is only in the Caribbean; see <a href="http://www.nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral.htm">http://www.nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral.htm</a> recoral.htm

Element 2 involves gathering available coral reef maps/data for DoD installations from internal and external sources, and disseminating the data to DoD resource managers and installation commanders. DoD will also encourage cooperative efforts by making the non-secure, non-sensitive information about marine resources accessible to other users with an accredited interest in coral reef ecology.

Element 3 addresses developing a DoD Research & Management Strategy Plan to guide future decision making regarding programmatic and DoD-wide coral reef conservation efforts. The DoD Research & Management Strategy Plan will be based on the National Strategic Plan.

Element 4 involves identifying a technical expert to support Pacific region DoD resource managers with the best available information regarding coral reef ecology; provide input to the development of DoD strategies and procedures; and, keep DoD resource managers up-to-date with academic research. Element 5 includes modeling the applicability of cooperative conservation to DoD facilities through development of a cooperative plan for protection of marine resources at Johnston Atoll. The model application will establish processes and lines of communication necessary for this type of action, as well as identify benefits and costs associated with this type of action.

As a result of this project, DoD planners and managers will have access to better marine resource information to use in decision-making for both on-shore and near-shore activities. This will enable them to manage their assets so as to maintain military readiness with minimal adverse impact to the marine environment. By increasing the inhouse resources available for locating marine resources and identifying potential impacts related to mission needs, operations and facilities development projects, DoD will reduce the costs for planning efforts. The increased awareness among DoD personnel will lead to improved long-term conservation of resources under DoD management.

The status of the resource management tools being developed under this project is summarized below. All of the tools are being made available by way of the Coral Reef Assessment Team (CRAT) website located at <a href="https://clients.emainc.com/dcs/coralreef/default.asp">https://clients.emainc.com/dcs/coralreef/default.asp</a>.

1. Improve the utility of the CRAT website: The CRAT website has been streamlined and made more user friendly based on input from users. New features include a matrix of "data sources vs. coral reef locations" to provide web site users with a cross reference of all the data available on the website, and a document sharing utility allows users to post large documents from their personal computers to an area of the CRAT website for review and comment without the limitations of the e-mail system. It is anticipated that RSS feeds from journal publishers will be added to the web site to provide summaries of academic research related to coral reefs. A

login ID and password are required for use of the website.

- 2. Collect available external data for coral reefs in proximity to DoD facilities: Geospatial data was acquired from NOAA, the World Resource Institute, and The Nature Conservancy. This data was used to create ten new regional maps in JPEG and Adobe PDF electronic file format depicting coral reefs in the vicinity of military installations. These maps are currently available for use on the CRAT website. In addition, a working draft library of scientific literature related to coral reefs and searchable by DoD facility location was prepared. This database is presented in stand-alone web-based format and is available on the Navy system EIMS. A list of references along with links to the actual document is given for each specific site. This program does not require internet access or special software to run. It provides stand-alone and immediate access to the important scientific and other coral reef related publications. This data is available on both CRAT and Navy EIMS website.
- 3. Collect available internal data for coral reefs in proximity to DoD facilities: All available marine resource assessments of coral reef ecosystems in proximity to DoD facilities were collected and made available through the CRAT website. In the future, the specific data from these assessments will be linked to geospatial data as practical to provide enhanced resource mapping. The applicability of specific oceanographic electronic equipment, scuba diving tools and underwater mapping technologies for coral reef studies was also evaluated. The focus was on the assembly and operation of oceanographic survey tools for coral reef mapping with data integration into GIS and other databases. The ongoing testing and integration of new diving and underwater equipment for the purpose of conducting coral reef monitoring and assessment studies at DoD coral reef locations continue throughout 2008.
- 4. Develop guidance for consistent collection of coral reef data in the future: Guidance for conducting future marine resources assessments and monitoring in a uniform manner, titled "U.S. Department of Navy Standard Marine Resources Assessment and Monitoring Protocol," was developed to assist all in-house resources conducting or contracting for marine resources assessments. This document is currently available for use on the CRAT website.
- 5. Develop a strategic plan to guide future decision making: A draft "Department of Defense Strategic Plan for Coral Reef Protection" was developed in conjunction with core members of CRAT, and has been endorsed for wider circulation. Geospatial maps and references have been finalized and included on the CRAT website for wider review and comment. The final draft will be posted for commenting on DENIX in the near future.
- 6. Cooperative Conservation Model: Due to war-time commitments, the field training program was not presented to military dive teams. However, the program was adapted for use by Belizean scientific divers in cooperation with Conservation International, the University of Belize, the Belize Department of Fisheries and Friends of Nature (Belize). In 2007, this collaboration will conduct a coral reef mapping project in the Meso-American Barrier Reef System of Belize. The resulting information will be used to define the impacts of marine area management practices and potential adverse ecological effects of coastal developments. DoD will use the opportunity to field test the new diving and mapping technologies to map marine habitats, oceanographic currents and biotic complexity of complex coral reef areas.

#### **Contact Information:**

Ms. Lorri Schwartz Naval Facilities Engineering Command HQ 1322 Patterson Ave SE, Suite 1000 Washington Navy Yard, DC USA 20374

Phone: 202-685-9332

Email: lorri.schwartz@navy.mil

#### International Year of the Reef, continued from page 1

DON has a long and distinguished tradition of being a good "Steward of the Sea" and is dedicated to preserving and enhancing the natural resources of our world's oceans. Navy and Marine Corps integrate coral reef protection into the every day work that is performed including: proper natural resources management on the land, completing marine ecosystem surveys and applying the data to protect benthic habitat; considering offshore resources when planning facility and operational actions; supporting research and development efforts; improving coral reef assessment and monitoring; and, many other coastal and aquatic resource protection measures. DON continues to focus on every day efforts to:



Control land-based sources of sediment or other pollution



Assess coral reefs in proximity to installations



Conduct near-shore natural resources surveys for incorporation in Integrated Natural Resources Management Plans



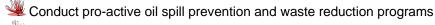
Plan for coral reef protection in operational and facility planning



Utilize Geographic Information Systems to identify sensitive resources



Carry-out ongoing shipboard practices to protect aquatic resources



Offer training to personnel addressing coral reef protection within DoD



Navy divers geared up to engage in underwater reefs assessment.



The Flamingo Tongue Snail, Cyphoma gibbosum, is a marine gastropod, lives sub-tidally on shallow reefs in the Caribbean and southern Atlantic Ocean, ranging from North Carolina to Brazil.

"The Department of the Navy's dedication to protecting coral reefs is part of a larger effort to make environmental considerations part of everything we do. Through effective natural resource management, as well as investments in assessments, monitoring and research, we can improve and protect valuable natural resources and maintain National Security through continued access to the high seas. By integrating protection measures where we train and operate in the coastal environment, we can uphold the long tradition of the Navy as "Stewards of the Sea"."

BJ Penn Assistant Secretary of the Navy (Installations and Environment)

The Navy and Marine Corps Team will use International Year of the Reef to reemphasize the importance of these day-to-day work achievements while pursuing new efforts to preserve the ocean environment through:



Increasing individual and Commander awareness of the issues, threats, and opportunities for coral reef conservation through various media



Developing a Coral Reef Strategic Plan for DoD-wide use



Continuing to coordinate research and develop projects for coral reef assessment in the Strategic Environmental Research and Development Program (SERDP)



Coordinating Ocean & Meteorological information for coral reef conservation requirements

Conducting underwater reef surveys and coral reef protection measures, as needed, for planned joint exercises in 2008

Highlighting development and SERDP/R&D projects that incorporate sustainable technologies

Increasing and broadening participation, partnerships, and collaborative action related to coral reef conservation

Providing reef awareness tools to DoD schools (K-12)

Distributing products at Earth Day, Coastal America, and aquarium sponsored events

Partnering with agencies to foster coral reef conservation cooperation and information exchange

Developing a DENIX portal to DoD coral and near-shore ecosystem information, and to collect and disseminate reef conservation information and success stories throughout the year

Participating in 11th International Coral Reef Symposium, Ft. Lauderdale, Florida, July 7, 2008 - July 11, 2008



A christmas tree worm, *Spirobranchus giganteus* has burrowed into one of the brain coral species, *Diplora strigosa*.

"International Year of the Reef is an opportunity for the Department of Defense and Department of the Navy to highlight our efforts to preserve and protect the coastal environment. Effective and responsible protection and management of these resources will allow us to carry out our mission of defending the United States now and into the future. It is the duty of all – the public, the marine ecologist, the natural resources manager, the environmental planner, and our Sailors and Marines, to protect coastal resources through whatever measures are available to us, knowing that every act, small or large, counts. The Navy's stewardship efforts and conservation achievements continue to demonstrate our commitment to coral reef protection. I challenge our team to enhance those efforts in 2008 with innovative and proactive measures to conserve valuable coral reef resources."

> Donald R. Schregardus Deputy Assistant Secretary of the Navy (Environment)

Coral reef and coastal resource protection are important not only to the mission readiness and sustainability of the Navy and Marine Corps, but also to the global economy and security of nations abroad. Through effective natural resource management and investment in assessments, monitoring and research, DON can improve and protect these valuable resources while maintaining national security through continued access to the high seas. Fulfilling these efforts in the maritime environment also contributes to the Cooperative Strategy for the 21st Century Seapower, achieving national security objectives by contributing to the sustainable use of reef resources and averting economic crises and conflict.

DON is coordinating DoD involvement in International Year of the Reef activities and will disseminate information on specific events. Future information about the International Year of the Reef will be posted at DENIX website: <a href="https://www.denix.osd.mil/portal/page/portall/denix/environment/NR">https://www.denix.osd.mil/portal/page/portall/denix/environment/NR</a> or you can visit the official International Year of the Reef site directly at <a href="https://www.iyor.gov">www.iyor.gov</a>.

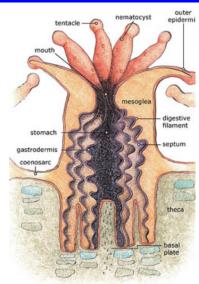
## **Did You Know?**

Little Did You Know Conservation Could Be So Much Fun!



Corals! – Corals are invertebrate animals belonging to a large group of colorful and fascinating animals called *Cnidaria*. Other animals in this group that you may have seen in rock pools or on the beach include jellyfish and sea anemones. Although Cnidarians exhibit a wide variety of colors, shapes and sizes, they all share the same distinguishing characteristics; a simple stomach with a single mouth opening surrounded by stinging tentacles. Each individual coral animal is called a polyp, and most live in groups of hundreds to thousands of genetically identical polyps that form a 'colony'. The colony is formed by a process called budding, which is where the original polyp literally grows copies of itself.

Coral are generally classified as either "hard coral" or "soft coral". There are around 800 known species of hard coral, also known as the 'reef building' corals. Soft corals, which include seas fans, sea feathers and sea whips, don't have the rock-like calcareous skeleton like the others, instead they grow wood-like cores for support and fleshy rinds for protection.



Anatomy of a polyp (image source http://www.iyor.org).

Soft corals also live in colonies, which often resemble brightly colored plants or trees, and are easy to tell apart from hard corals as their polyps have tentacles that occur in numerals of 8, and have a distinctive feathery appearance. Soft corals are found in oceans from the equator to the north and south poles, generally in caves or ledges. Here, they hang down in order to capture food floating by in the currents that are usually typical of these places.



Coral reefs are found throughout the oceans, from deep, cold waters to shallow, tropical waters. Temperate and tropical reefs however are formed only in a zone extending at most from 30°N to 30°S of the equator; the reef-building corals prefering to grow at depths shallower than 30 m (100 ft), or where the temperature range is between 16-32oc, and light levels are high.

\*\*Image Source: NOAA.\*\*

Hard corals extract abundant calcium from surrounding seawater and use this to create a hardened structure for protection and growth. Coral reefs are therefore created by millions of tiny polyps forming large carbonate structures, and are the basis of a framework and home for hundreds of thousands, if not millions, of other species. Coral reefs are the largest living structure on the planet, and the only living structure to be visible from space.

As we currently know them, coral reefs have evolved on earth over the past 200 to 300 million years, and over this evolutionary history, perhaps the most unique feature of corals is the highly evolved form of symbiosis. Coral polyps have developed this relationship with tiny single-celled plants, known as zooxanthellae. Inside the tissues of each coral polyp live these microscopic, single-celled algae, sharing space, gas exchange and nutrients to survive.

This symbiosis between plant and animal also contributes to the brilliant colors of coral that can be seen while diving on a reef. It is the importance of light that drives corals to compete for space on the sea floor, and so constantly pushes the limits of their physiological tolerances in a competitive environment among so many different species. However, it also makes corals highly susceptible to environmental stress.

Coral reefs are part of a larger ecosystem that also includes mangroves and seagrass beds. Mangroves are salt tolerant trees with submerged roots that provide nursery and breeding grounds for marine life, that then migrate to the reef. Mangroves also trap and produce nutrients for food, stabilize the shoreline, protect the coastal zone from storms, and help filter land based pollutants from run off.

Content for this month's Did You Know? section are excerpts from the International Year of the Reef Website!

## **Contact Us**

Who we are and where to find us!



For further information about the Legacy Resource Management Program please contact:

.. Peter Boice Conservation Team Leader

Jane Mallory Natural Resource Management Specialist 703-604-1774

Pedro Morales Natural Resource Management Specialist 703-604-1933 Hillori Schenker **Cultural Resource Management Specialist** 703-604-1724

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