

SANCTUARY

WATOH

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NATIONAL MARINE
SANCTUARIES



Science in the Sanctuaries



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Photo: University of Miami, RSMAAS



Letter from the Director

As ocean expert Dr. Ellen Prager points out in her guest editorial (see page 10), “ignorance isn’t bliss” when it comes to the marine environment. We couldn’t agree more, which is why the NOAA National Marine Sanctuary Program has developed strong capabilities to conduct and coordinate world-class scientific research, working in partnership with local universities and marine science institutes. In any given year, more than \$10 million in partnership-based science takes place in national marine sanctuaries. We highlight some of these efforts in this issue of *Sanctuary Watch*.

For example, in an effort to understand vessel-whale collisions in Stellwagen Bank National Marine Sanctuary, our scientists worked with other research institutions in New England to study the behavior and distribution of whales in the sanctuary. Their analysis revealed that a minor lane shift of commercial vessel traffic could dramatically reduce whale strikes there.

Sanctuary scientists at Flower Garden Banks National Marine Sanctuary, meanwhile, have been using the latest technology to study and map the habitats within Flower Garden Banks National Marine Sanctuary and surrounding areas in the northern Gulf of Mexico. The data they have collected has helped marine resource managers identify areas that may be important to the health of sanctuary marine life.

We have found time and again that when research results are shared with stakeholders, managers, decision-makers and local communities in a timely way, problems often give way to solutions.

We therefore are committed to sharing the results of research conducting in national marine sanctuaries through our marine conservation report series, symposia, the sanctuary management plan review process, and other forums.

Please visit our innovative Web site, sanctuaries.noaa.gov, to learn even more about the important scientific work being carried out in your national marine sanctuaries—America’s ocean and Great Lakes treasures.

Sincerely,

Daniel J. Basta, Director
NOAA National Marine Sanctuary Program

Learn more about your national marine sanctuaries at sanctuaries.noaa.gov

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Cover: NOAA National Marine Sanctuary Program Marine Archaeologist Tane Casserley deploys a special sled for documenting shipwrecks. Photo: Russ Green/NOAA

New Report Highlights 2005 Sanctuary Program Activities

National marine sanctuaries played a key role last year in whale rescues, the discovery of new marine species, and the exploration of historic shipwrecks in 2005. These and other efforts by the NOAA National Marine Sanctuary Program, partner organizations and communities to protect, manage and explore these special areas are detailed in the *2005 State of the Sanctuaries report*. The report is available at sanctuaries.noaa.gov/sos05/

Stellwagen Bank Sanctuary Shipwrecks Added to Historic Register

The wrecks of the coal schooners *Frank A. Palmer* and *Louise B. Crary*, which rest on the Stellwagen Bank National Marine Sanctuary seafloor, have been listed on the National Register of Historic Places, the nation's official list of cultural resources worthy of preservation. "The *Frank A. Palmer* and *Louise B. Crary*'s historical, architectural and archaeological significance makes the vessels the best examples of the great New England coal schooners," said Craig MacDonald, Stellwagen Bank National Marine Sanctuary superintendent. NOAA and University of Connecticut researchers have visited the wrecks annually since 2002 to monitor, study and document their condition.



Conference on Ocean Literacy

Special Conference Highlights Ocean Literacy

On June 7-8, 2006, the National Marine Sanctuary Foundation hosted a two-day forum in Washington, D.C. that brought together leaders

in formal and informal education to explore opportunities to increase public knowledge and understanding of the ocean. Participants in the Conference on Ocean Literacy included Members of Congress and the Administration, aquaria, media, federal agencies, academia, non-profits and other stakeholders with an interest in ocean literacy. Aquaria around the country will also host regional ocean literacy workshops to discuss opportunities at the local and regional level. For more information on the conference, visit www.nmsfocean.org/chow2006/cool.html

Leaders Gather for Capitol Hill Ocean Week 2006

On June 13 and 14, Capitol Hill Ocean Week (CHOW) 2006 brought together a wide-range of stakeholders to discuss ocean and coastal issues. The symposium, hosted by the National Marine Sanctuary Foundation, included panel discussions on ocean resource use, marine debris, invasive species, ocean

observation systems, ecosystem-based management in the Gulf of Maine, and the Census of Marine Life. Each session featured a panel of experts, including Members of Congress and representatives from federal and state government, industry, academia and nonprofit organizations. On June 13, the National Marine Sanctuary Foundation also hosted its fourth annual Leadership Awards Dinner. This special evening honored Senator Judd Gregg and Congressman Norm Dicks for their commitment to protecting and preserving ocean and coastal resources, and creating a strong congressional ocean agenda. A special lifetime achievement award was presented to Joint Ocean Commission Initiative co-chairs Admiral James D. Watkins and the Honorable Leon E. Panetta. The NOAA National Marine Sanctuary Program Volunteer of the Year Award was presented to Linda Paul, vice-chair of the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve Advisory Council. For CHOW and awards dinner details, visit www.nmsfocean.org/chow2006



The new vessel Peter Gladding will greatly enhance the protection of Florida Keys National Marine Sanctuary. Photo: FKNMS

New Vessel Patrols Florida Keys Sanctuary

A new high-speed law enforcement vessel that NOAA and the State of Florida dedicated in April 2006 is now patrolling the Florida Keys National Marine Sanctuary, focusing on the Tortugas Ecological Reserve. The vessel was named the

Peter Gladding in honor of a longtime Key West, Fla., commercial fisherman and conservationist who helped establish the reserve. Florida Fish and Wildlife Conservation Commission officers with the Sanctuary Enforcement Team requested that the vessel be named in Gladding's honor based on their working relationship with him in the Tortugas.

Marine Conservation Series Reports Available

The NOAA National Marine Sanctuary Program is pleased to announce the release of two new Marine Conservation Series Reports, *Developing Alternatives for Optimal Representation of Seafloor Habitats and Associated Communities in Stellwagen Bank National Marine Sanctuary* (Cook, R. and P. Auster) and *Normalization and Characterization of Multibeam Backscatter: Koitlah Point to Point of the Arches, Olympic Coast National Marine Sanctuary* (Intelmann, S.S. and J. Beaudoin). The reports are available at sanctuaries.noaa.gov/science

(Cont'd on pg. 6)

Protecting A Special Place

Through Ecosystem-Based Science

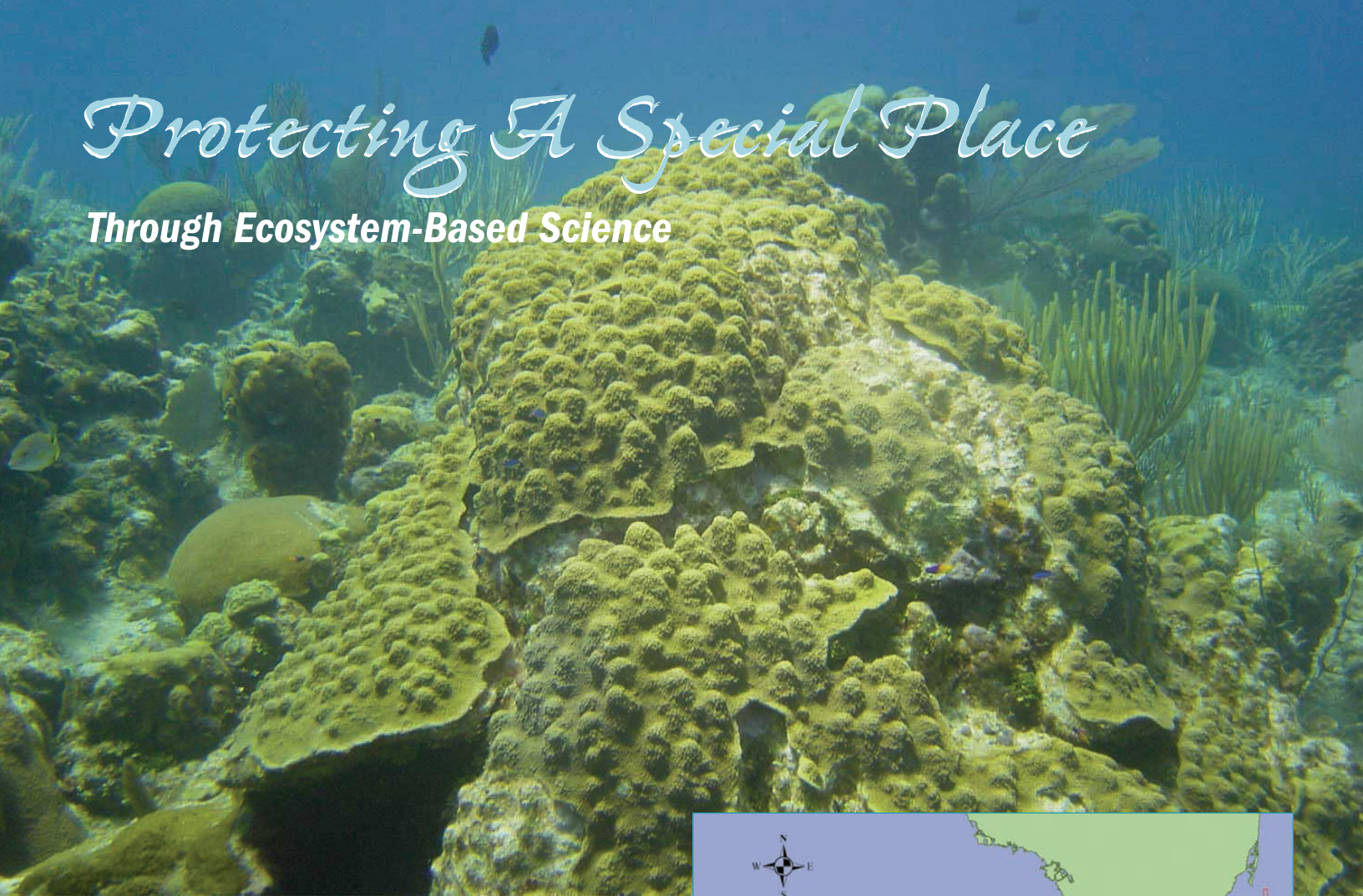


Photo: CCFHR

Whether on land or sea, many people form a connection with their environment, but rarely in this day and age does one get the opportunity to protect a relatively undisturbed and unique coral reef ecosystem. The Tortugas Ecological Reserve is that kind of place.

Established by NOAA in 2001, the reserve is located at the western end of the Florida Keys National Marine Sanctuary and is one of the largest fully protected marine reserves in the United States. Within the reserve, the taking of all marine life or historical artifacts is not allowed except as necessary for monitoring or research.

While the millions of people who visit the Florida Keys each year are familiar with the region's unique characteristics, not many people know about the innovative effort undertaken by scientists, resource managers and local citizens to create the Tortugas reserve.

Beginning in 1998, Florida Keys National Marine Sanctuary Superintendent Billy Causey convened a 25-member advisory group to provide recommendations on establishing an ecological reserve in the Dry Tortugas region. The group, made up of fishermen, scientists, divers, business and government agency



The Tortugas Ecological Reserve is shown in blue. Map: NOAA NMSP

representatives, was tasked with reviewing available scientific information.

The group was informed by up-to-date investigations on oceanography, fish and fisheries, the relationship between natural resources and cultural uses, and connectivity of the Tortugas area to the broader region. Having fishermen and scientists sitting at the table together talking about observations and data helped engender trust and respect that ultimately led to a proposal that decision-makers could support.

According to Causey, one research study in particular, affirmed what commercial fishermen already knew. In that study, scientists used drifter buoys to show that larvae from grouper and snapper spawning at a deep-water reef known as Riley's Hump would drift in the prevailing current to the reefs off the Florida Keys and Florida's east coast. "This study provided conclusive scientific evidence to what commercial fishermen had known for years," says Causey. The final outcome was Riley's Hump, which was not initially proposed for protection, was included in the final reserve recommendation by the group.

"Creating the Tortugas Ecological Reserve is a good example of how people can work together to establish a special place," says Brian Keller, science coordinator for the Florida Keys National Marine Sanctuary. "We are already seeing positive results for the relatively short amount of time it has been set aside as a reserve."

Florida Keys National Marine Sanctuary Superintendent Billy Causey highlighted some of those results during a March 2006 science symposium on Capitol Hill. "Large numbers of black grouper have been documented. And they are bigger. We're also seeing increased numbers in some species of snapper," says Causey.

Over the years, the Florida Keys coral reef ecosystem has maintained a relatively undisturbed quality of water and marine resources. By establishing the reserve, these resources get further protection so that not only the ecosystem remains healthy, but local economies thrive.

To learn more, visit floridakeys.noaa.gov/tortugas



Science Leads to Whale-saving Shipping Lane Change Proposal

Cutting-edge whale research conducted by Stellwagen Bank National Marine Sanctuary and NOAA Fisheries Service scientists indicates that a minor northward shift in the Boston shipping lanes could significantly reduce the threat of whale-ship collisions in the sanctuary. The lanes cross the southern half of the sanctuary in an area where endangered humpback, finback and right whales are often observed.

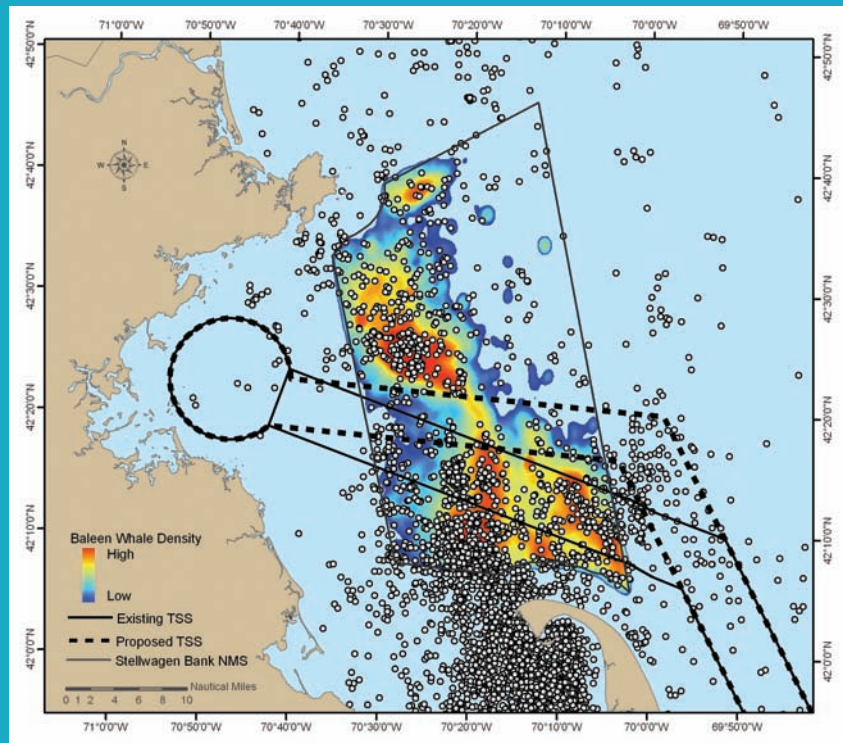
NOAA, through the U.S. Coast Guard, has asked the International Maritime Organization to make the shift a permanent reality. Local shipping companies support the proposal, which scientists say could reduce whale strikes by a whopping 81 percent.

The proposal stemmed from a study to identify where and when whales spend time in the sanctuary. After analyzing more than 20 years of whale sighting reports and data gathered through

high-tech sensors and first-hand observations, scientists found that humpback and finback whales congregated in sandy areas preferred by sand lance fish, the prey of choice for many whales. A 12-degree northward adjustment, the scientists concluded, would place the lanes over a more muddy and gravelly seafloor. The shift would also move the lanes away from right whale feeding areas.

According to David Wiley, research coordinator for the Stellwagen Bank sanctuary and lead scientist for the study, "This step will significantly contribute to the safety of endangered and protected whales in the sanctuary and can be a model for similar actions in other areas."

To learn more about the whale research and lane change proposal, visit sanctuaries.noaa.gov



A proposed vessel traffic separation scheme showing whale concentrations and proposed lane shifts in Stellwagen Bank National Marine Sanctuary and proposed lane shifts. Graphic created by David Wiley and Michael Thompson, SBNMS

Researchers
Shed New Light on a Hidden
'Flower Garden'

Most of the reefs and banks scattered throughout the northwestern Gulf of Mexico have some degree of protection from human impacts, such as oil and gas production and over fishing. None of them, however, enjoy the level of protection that national marine sanctuary status confers on the Flower Garden and Stetson Banks, located approximately 100 miles off the Texas-Louisiana coast. Sanctuary status helps protect these banks from additional human impacts such as habitat destruction caused by vessel anchoring, treasure salvage and destructive fishing techniques.

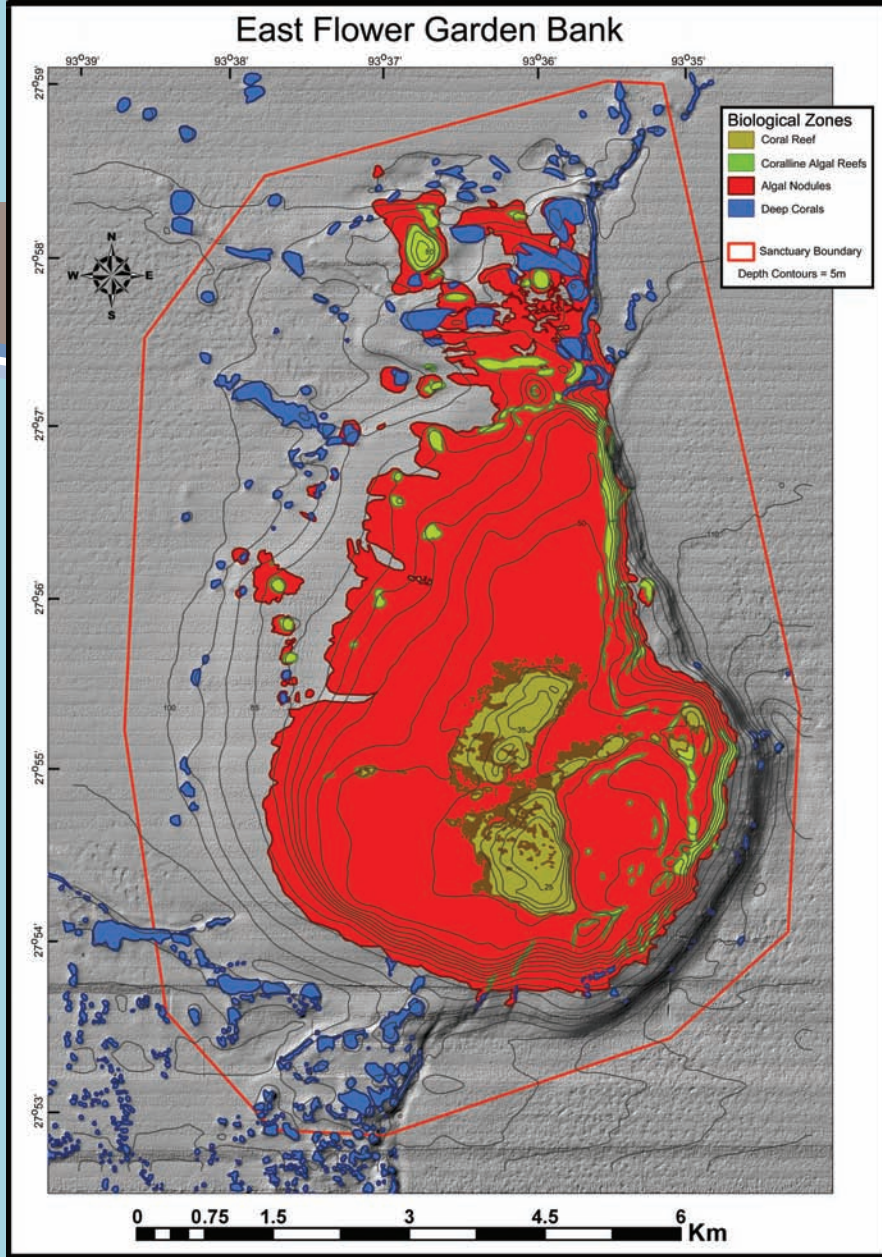
A lot goes into selecting areas for protection, including years of scientific research, observation and discussions with numerous partners and citizen groups. But what then? How do you manage a place that not only is 100 miles off shore, but underwater?

“To know how to make meaningful management decisions, we have to know what the area and its surroundings look like,” says Steve Gittings, science coordinator for the NOAA National Marine Sanctuary Program. “We cannot protect and manage sanctuaries in a vacuum. We have to see and understand what lies beneath the waves.”

Uncovering the secrets of the deep is no easy task. It takes years of careful, deliberate exploration with ships, sonar, remotely operated vehicles and scuba gear to paint a detailed picture of the landscape, habitats and marine life of the undersea world. But, researchers say, this “characterization” work pays off.

Expeditions to Flower Garden Banks National Marine Sanctuary, for example, have revealed that some reefs may be connected to other banks in the northern Gulf of Mexico through low reef ridges previously unknown. These “habitat highways” likely provide protection and foraging grounds for animals traveling between the various banks.

Detailed habitat maps produced by sanctuary staff recently helped the NOAA Fisheries Service and the Gulf of Mexico Fishery Management Council determine the boundaries for “marine managed areas” known as Essential Fish Habitat and Habitat Areas of Particular Concern. These designations raised the protection level for these sensitive and unique habitats,



Graphic of four major types of habitat within the boundaries (the red line) of the East Flower Garden Bank. Each habitat is shown in a different color. Coral reef areas are colored olive green, coralline algae areas are in lime green, algal nodules are in red and deep corals are in blue. Image produced by Doug Weaver.

which are used by fish sought by commercial and recreational fishermen.

“Increasing protection of areas outside the sanctuary may ultimately help protect resources within the sanctuary,” says Gittings. “They are all connected in some manner.”

To learn more about habitat characterization mapping at Flower Garden Banks National Marine Sanctuary, visit sanctuaries.noaa.gov/sos05/mapping.html



Volunteer Opportunities with Your National Marine Sanctuaries

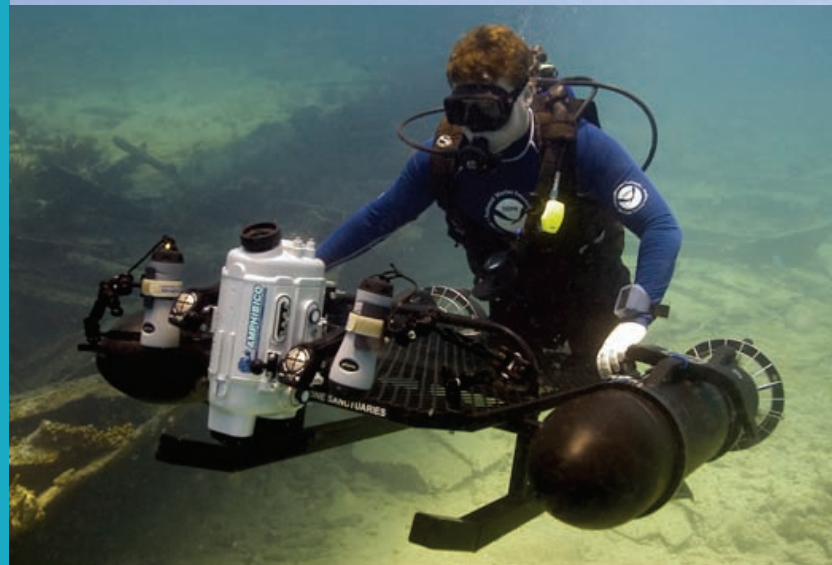
Volunteers provide enormous support to the NOAA National Marine Sanctuary Program. Every year, citizens contribute hundreds of thousands of hours to support sanctuary education, outreach, research, management and law enforcement activities.

For example, Beach Watch volunteers at Gulf of the Farallones National Marine Sanctuary help managers monitor the sanctuary's health by conducting monthly beach surveys. In communities surrounding Channel Islands National Marine Sanctuary, Naturalist Corps volunteers raise public awareness of the sanctuary at public events, whale watching tours and free lectures. Members of Team O.C.E.A.N in Florida Keys National Marine Sanctuary patrol sanctuary waters and provide boaters with valuable navigational information to avoid running aground on seagrass beds and coral reefs. These same volunteers also act as the eyes and ears for law enforcement by reporting prohibited activities. Volunteers also play a valuable role in representing their community on management issues by filling seats on sanctuary advisory councils, which provide management recommendations to sanctuary superintendents. In 2005, all 14 sites in the National Marine Sanctuary System had established these councils.

To learn more about volunteer opportunities with your national marine sanctuaries, visit sanctuaries.noaa.gov/involved



Beach Watch volunteers document the live and dead animals of the Sanctuary. Photo: GFNMS



NOAA National Marine Sanctuary Program Marine Archaeologist Tane Casserley deploys an innovative camera sled for producing photomosaics of shipwrecks. Photo: Russ Green/TBNMS

Florida Keys Shipwrecks Focus of New Photo Technology

Archaeologists from the NOAA National Marine Sanctuary Program deployed a newly developed propulsion sled in April 2006 to create high-resolution photo-mosaics of shipwrecks on the Florida Keys National Marine Sanctuary Shipwreck Trail. Archaeologists "flew" over the shipwrecks while high-resolution cameras on the sled captured multiple images of the shipwrecks below. These images will be pieced together with computer software to create highly detailed images of the sunken *City of Washington*, *Benwood*, *Adelaide Baker*, *North America* and *San Pedro*, a ship from the 1733 Spanish treasure fleet. The images will aid researchers in monitoring the wrecks' condition over time. For photos and dive logs, visit sanctuaries.noaa.gov/maritime



Congratulations to Florida Keys National Marine Sanctuary Superintendent Billy D. Causey, who received an honorary Doctorate of Science from the University of South Florida on May 6.



Monitoring the *Monitor*: Artifact Conservation Goes High-tech

On the morning of March 9, 1862, the USS *Monitor* and the Confederate Navy's CSS *Virginia* (the former USS *Merrimack*) fought the first battle between ironclad warships. The battle was a draw, but would forever change how naval warfare would be waged.

Although the *Monitor* sank in a storm off Cape Hatteras in December 1862, the story of this American icon is far from over. Since her discovery in 1973 and designation two years later of the *Monitor* National Marine Sanctuary, NOAA, the U.S. Navy and The Mariners' Museum have been working to ensure that this 19th century engineering marvel lives on

through the recovery, conservation and interpretation of her artifacts.

"The artifacts are a critical benchmark in American history—a specific era that in a very real sense defined us as a nation and as a culture," says David Alberg,

Before: The *Monitor*'s anchor, on display in the "Ironclad Evidence" gallery at The Mariners' Museum, is prepared for laser scanning. Photo: The Mariners' Museum

manager of the *Monitor* National Marine Sanctuary.

Thanks to new laser scanning technology that produces highly accurate three-dimensional images of objects large and small, NOAA marine archaeologists and conservators from The Mariners' Museum in Newport News, Va., have gotten a fresh new look at artifacts recovered from the ironclad by NOAA and the Navy, including her anchor, cannon and gun turret.

"Laser scanning...can reproduce a 3-D model of an artifact with unparalleled accuracy," says David Krop, assistant conservator with The Mariners' Museum, which houses most *Monitor* artifacts.

Laser scanning is a process by which a machine sends laser beams to a specific point on a surface repeatedly. These images are bounced back to a machine that reads the signal and a computer creates a 3-D image or model of the item.

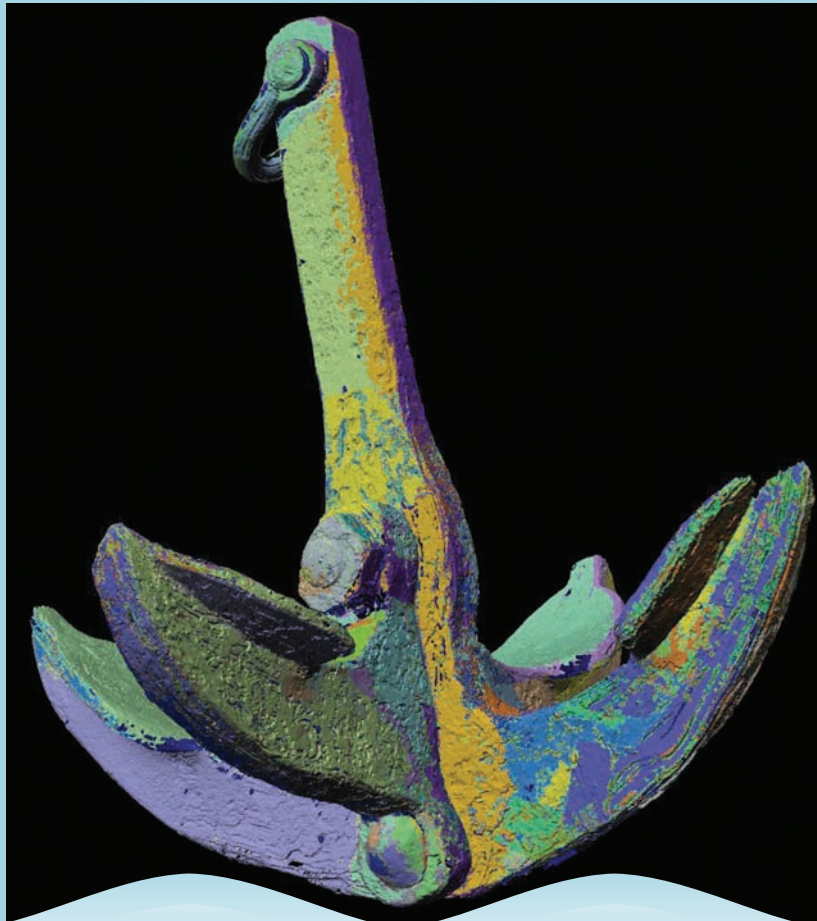
"Conserving metal is a race against time," says Alberg. "Already heavily corroded from 140 years submerged in sea water, the ship's fragile, salt-contaminated iron can split apart if exposed too long to air. By using 3-D scanning, the computer, in effect, creates an incredibly accurate drawing in a relatively short amount of time, making life a bit easier for the conservators. Without scanning, conservators must painstakingly measure and document an item manually. The scanning process, however, requires no handling of the artifact, is virtually error-free, and is much quicker than traditional techniques.

"Manually measuring a large artifact like the *Monitor*'s anchor can take weeks vs. a day using laser scanning," says Krop.

To learn more about the ongoing work to preserve and protect the *Monitor*, visit monitor.noaa.gov and www.monitorcenter.org



After: The *Monitor*'s anchor after undergoing the laser scanning process. Photo: The Mariners' Museum



Critter Files: Caribbean Spiny Lobster

During your next dive in the Florida Keys National Marine Sanctuary, you just might spot what looks like a prickly, clawless version of the lobster you had for dinner during your last trip to New England. Meet the Caribbean spiny lobster.

Spiny lobsters get their name from the forward-pointing spines that cover their bodies to help protect them from predators. They vary in color from almost

Researcher's Notebook

Common name: Caribbean spiny lobster

Scientific name: *Panulirus argus*

Max length: 2 feet

Max lifespan: Unknown

Distribution: Tropical and subtropical waters of the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico.

Diet: Small snails and crabs

Status: Stable in sanctuary waters

white to dark red-orange. Two large, cream-colored spots on the top of the second segment of the tail make spiny lobsters easy to identify. They have long antennae over their eyes that they wave to scare off predators and smaller antennae-like structures called antennules that sense movement and detect chemicals in the water. The animal typically grows to 6-10 inches, but can grow up to two feet. Adults often hide in crevices during the day, but feed in the open at night. If disturbed, the spiny lobster can swim backwards rapidly using its powerful tail.

Caribbean spiny lobsters have found a haven in the Florida Keys Western Sambo Ecological Reserve, a no-take zone established in 1997. Here, the lobsters thrive and are getting bigger. The greater number of large males and females found inside the reserve is likely increasing the success of lobster reproduction. The number of eggs produced by a lobster increases with its size, so the larger ones are producing significantly more eggs than their counterparts outside the reserve. To learn more, visit sanctuaries.noaa.gov/sos05/floridakeys

Photo: FKNMMS





Star of the Sea

John Calambokidis

It takes a special man to protect a special creature. One such man is John Calambokidis, a research biologist and expert on blue

whales in the eastern North Pacific who, in 1979, co-founded Cascadia Research in Olympia, Wash. The nonprofit scientific and education organization does research needed to manage and protect threatened marine mammals.

What drew Calambokidis to the largest animal on the planet—one that is endangered—was an accidental sighting of a blue whale on a humpback whale research cruise in the Gulf of the Farallones 20 years ago.

“I had considered blue whales one of those rare species that I likely would never see,” says Calambokidis. “After seeing my first one, I was amazed to encounter hundreds more on subsequent trips off the California coast and discovered there were far more blues feeding there than anyone had suspected. What excited me about studying them was their mystery. Here was a chance to learn something about these animals that nobody else new.”

So began his journey to study blue whales in earnest, including a 20-year close partnership with the NOAA National Marine Sanctuary Program. In 1986, the Gulf of the Farallones sanctuary office funded the first three years of what would become a decades-long study of the whales in the sanctuary.

Calambokidis later expanded his research to southern California and Central America, finding other concentrations in Monterey Bay, Santa Barbara Channel, Baja and Costa Rica. Calambokidis puts the total number of blue whales off California and Mexico at about 2,000.

“The whales feeding off those waters represent the largest concentration of this magnificent animal anywhere on earth since before whaling decimated worldwide populations,” says Calambokidis.

In recent years, his research has involved attaching cameras and instruments on suction cups to blue whales to examine their underwater behavior and vocalizations. His tagging efforts have for the first time given researchers insight into the underwater lives of these animals.

“John has effectively combined leading-edge technology such as Crittercam© with time-honored low-tech methods like photo-identification and boat surveys to fine-tune our knowledge

of whale populations,” says Mary Jane Schramm of the Farallones sanctuary. “This approach has yielded some of the most valuable data we could hope for in terms of detecting changes and impacts such as from ocean sound, with immediate implications for species conservation.”

A 1979 graduate of Evergreen State College in Olympia, Calambokidis worked briefly for the federal government upon graduation, but soon after embarked on his journey that led him to the magnificent blues.

“Despite having seen thousands of different blue whales, it is still a thrill to encounter one,” he says. “Getting close enough to actually attach a tag has also given me a unique chance to appreciate their true size which can be deceiving at a distance.”



Blue Whale Facts

Blues whales, the largest mammal and possibly the largest animal ever to have roamed the earth, are thriving in the waters off California and Mexico. Worldwide, estimates put their numbers between 5,000-10,000, compared to pre-whaling populations of more than 350,000.

Females are usually larger than males, and the longest ever recorded was a 108-foot adult female caught during whaling efforts in Antarctica!

The largest of the blue whales (150 tons) has a heart that weighs about 1,000 pounds and is about the size of a Volkswagen beetle.

A full-grown human can crawl through an adult blue whale's aorta.

Blue whales are very fast swimmers; they normally cruise at 12 mph but exceed 30 mph when in danger.

Blue whales feed on tons of tiny shrimp-like krill. An average-sized blue whale will consume 2,000-9,000 pounds of krill each day during summer feeding season.

Sanctuary Voices

Ignorance Is Not Bliss!

Dr. Ellen J. Prager
President
Earth2Ocean, Inc.



On land, it's obvious when forests are cleared by logging or fewer birds flock to a pond. In essence, we can see when our actions dramatically alter the landscape or affect terrestrial wildlife. But in the ocean it is an entirely different story. The sea's dark depths hide what is going on beneath the waves, and its creatures remain mostly hidden from our view. How do we know what is going on in the ocean? How do we understand what human activities are or aren't doing to the landscapes under the sea or to the animals and plants that live there? And how can we manage and protect the marine world without this knowledge?

The answer? Research.

The National Marine Sanctuary Program works to preserve some of our nation's most precious and fragile ocean ecosystems. With the ocean equivalent of our land-based national parks, we hope to protect these environments and to replenish the marine populations that live both within and outside of their bounds. However, to determine how best to do this we need to understand what is there and how ocean ecosystems work. Also, how biology, geology, chemistry, and physical flow interact and are influenced by human activities. And we need to examine what is happening over time to determine if protective measures are effective and if not, what more or else needs to be done.

In Washington, D.C. and elsewhere, ecosystem-based management is the buzz. One big problem: We don't have all the information or understanding we need to manage on the basis of ecosystems. Major questions remain unanswered, such as how do climate variability, habitat change, patterns of flow, and human exploitation interact to control populations in the sea? How does change in one population of marine organisms influence the others in an ecosystem and where are critical spawning areas? What geologic features or organisms remain to be seen, let alone understood, in the deeper waters of our sanctuaries and the ocean?

From research, we are just beginning to answer some of these questions. And it must be noted that research alone is

not enough. Hand in hand must come the translation of information and data into usable products for policy-making, management and education. Research must also be made relevant and important to everyday people, thus helping to build a constituency for the oceans, for science and for our marine sanctuaries.

But of course we cannot wait for all of the answers. Time is of the essence. Research is revealing that human activities are changing our seas. From coral reefs to fisheries, harmful algal blooms to hurricanes, the news is not good and seems to be getting worse. Many of us worry that soon these changes will be irreversible. So we need to make policies, manage based on the information we have, and continue to seek new understanding and adapt as we gain more knowledge.

The national marine sanctuaries encompass ocean ecosystems we have identified as valuable, needing protection and as places where research can be fostered, but we cannot protect, preserve, understand—or even restore—these ocean areas if we don't invest sufficiently. And we certainly cannot build support for the marine sanctuary concept or ocean in general if we don't make the information we have publicly relevant, useful and known.

Seems pretty simple to me: Earth—nearly three-quarters covered by the ocean. Ocean—provides food, jobs, trade, tourism and recreation, energy, security and health. The benefits of people protecting the ocean and investing in its future through research, effective management and education? Priceless.

Dr. Prager is an adjunct associate professor and formerly the Assistant Dean at the University of Miami's Rosenstiel School of Marine and Atmospheric Research. She has participated in research expeditions to the Galapagos Islands, Papua New Guinea, Caribbean, Bahamas and the deep waters of the Florida Reef tract. She holds a Ph.D. from Louisiana State University. She may be reached at eprager@earth2ocean.net.



The opinions expressed by columnists in "Sanctuary Voices" do not imply endorsement by NOAA's National Marine Sanctuary Program of any particular product, service, organization, company or policy.



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The National Marine Sanctuary
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vision

People value marine
sanctuaries as
treasured places
protected for future
generations.

mission

To serve as the trustee
for the nation's system
of marine protected
areas to conserve,
protect and enhance
their biodiversity,
ecological integrity, and
cultural legacy.

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National Marine Sanctuary System



The National Marine Sanctuary Program serves as the trustee for a system of 14 marine protected areas, encompassing more than 150,000 square miles of ocean and Great Lakes waters. The system includes 13 national marine sanctuaries and the Northwestern Hawaiian Islands Marine National Monument. The sanctuary program is part of the National Oceanic and Atmospheric Administration (NOAA), which manages sanctuaries by working cooperatively with the public to protect sanctuaries while maintaining compatible recreational and commercial activities. The program works to enhance public awareness of our marine resources and maritime heritage through scientific research, monitoring, exploration, educational programs and outreach.