

NATIONAL MARINE SANCTUARIES

2010 ACCOMPLISHMENTS



THE NATIONAL MARINE SANCTUARY SYSTEM is the trustee for the nation's special marine places, working to conserve, protect and enhance their biodiversity, ecological integrity and cultural legacy.





SUPPORTING JOBS, COMMUNITIES AND CULTURE

Have you ever wondered how many businesses and jobs depend on national marine sanctuaries? As it turns out, the answer is more than any of us realized.

Visitors to the sanctuaries are often struck by their extraordinary natural beauty, but the worth of these underwater treasures is greater than just their aesthetic wonder. People rely on the continued conservation of these special places for their livelihoods, both directly and indirectly. Generation after generation of Americans has grown up, worked jobs and supported families on the waters of your national marine sanctuaries.

Nationwide, nearly 400 local communities border national marine sanctuaries. These communities depend on us to ensure these waters stay productive, healthy and available for everyone that comes to enjoy them.

National marine sanctuaries have economic value reaching far beyond the water. Sanctuaries are sites of great natural beauty and historical significance — not just tourist destinations, but also centers for strong local economies.

National marine sanctuaries have economic value reaching far beyond the water.

When companies and other enterprises locate themselves near these special places, they do this in part to enjoy the quality of life and economic benefits sanctuary communities provide.

While it is easy to get lost in the bureaucratic details of sanctuary management plans, budget reviews and other competing demands for our attention, it's important to take stock in how jobs are sustained through NOAA's work in protecting critical ecosystems. Managing special places like national marine sanctuaries enables us to encourage recreation, create jobs and build stronger coastal communities.

The Office of National Marine Sanctuaries will continue this work in 2011 and beyond, building stronger communities, supporting local economies and maintaining the coastal cultures that are a true American treasure. Our greatest accomplishment remains investing in America's future. With so many jobs and business depending on national marine sanctuaries, it's an investment worth making.



COMMUNITY INVOLVEMENT

ABOVE: A New Year's Eve beach cleanup organized by Florida Keys National Marine Sanctuary's Team OCEAN program netted more than 800 pounds of marine debris.

BELOW: Intergovernmental Policy Council meeting attendees paddle ocean-going canoe; Olympic Coast ocean science teacher training; Volunteers educate students about whales.



Sanctuaries are supported by a network of dedicated and diverse individuals and organizations working to protect our ocean treasures. Throughout the National Marine Sanctuary System, thousands of volunteers make wide-ranging science and education programs possible, community-based advisory groups provide expertise and input on critical issues, and non-profit partners help build support for effective ocean management.

Volunteers Contribute to Sanctuary Science, Resource Protection

Volunteers support the Office of National Marine Sanctuaries mission in countless ways, donating tens of thousands of hours to the sanctuary system every year. Citizen science is a critical and growing component of these efforts, with more than 15,000 volunteer hours contributed in support of sanctuary science programs in 2010. Programs like the Channel Islands Naturalist Corps empower community members and engage the public in ocean science, in addition to providing valuable data that help marine scientists and managers better understand sanctuary resources. Volunteers also help protect those resources through efforts like shoreline cleanups. In Florida Keys National Marine Sanctuary, volunteers with the Team OCEAN program collected more than 10,000 pounds of debris last year. Team OCEAN members also reached out to the local community, educating ocean users about responsible recreation and coral reefs through classroom trainings, outreach to dive shops and marinas, and on-the-water interaction with boaters.

More than 33,000 jobs in the Florida Keys are supported by ocean recreation and tourism, accounting for 58 percent of the local economy.

Film Festivals and Sanctuary Films Bring the Ocean to All

In 2010, national marine sanctuaries sponsored and supported a range of film festivals and sanctuary-themed films to bring the ocean to a national audience. Nearly 9,000 people attended the BLUE Ocean Film Festival's debut in Monterey, Calif., which featured more than 120 ocean films in addition to live online broadcasts. At the Gray's Reef Ocean Film Festival in Savannah, Ga., more than 40 free films were screened to over 4,000 attendees, while the Seventh Annual San Francisco Ocean Film Festival featured short films made by an international group of students who participated in the sanctuaries' 2009 Ocean For Life program. Last year also saw the release of three new films highlighting Hawaiian Islands Humpback Whale and Channel Islands national marine sanctuaries and the Papahānaumokuākea Marine National Monument.

Sanctuaries and Citizen Councils: Dynamic Partnerships

Sanctuary advisory councils are community-based advisory groups that provide advice and recommendations to the 14 sites managed by the Office of National Marine Sanctuaries. In 2010, 731 people with a wide range of perspectives and experience were actively engaged in sanctuary advisory councils and council working groups, collectively volunteering more than 13,000 hours as liaisons between their communities and the sanctuaries. Councils are dynamic — continually evolving to respond to the critical issues of the time. The recent addition of youth seats and youth working groups is just one example of their adaptability. Councils are results-oriented — holding ocean acidification workshops and studying vessel traffic and climate change impacts on sanctuary ecosystems. Councils are collaborative — strengthening connections between the sanctuaries and the public and helping build increased stewardship for sanctuary resources. Their hard work and passion is invaluable in driving effective, community-based management throughout the National Marine Sanctuary System.

Sanctuary Management Involves Tribal, State Authorities

At Olympic Coast National Marine Sanctuary, tribal and state partners play an important role in the sanctuary's management. To facilitate collaboration between these diverse authorities, the Office of National Marine Sanctuaries worked with the Hoh, Makah and Quileute tribes, the Quinault Indian Nation, and the state of Washington in 2007 to create the Olympic Coast Intergovernmental Policy Council. The first of its kind in the nation, the council provides a forum to develop recommendations for resource management within the sanctuary and has enriched the sanctuary's understanding of critical marine issues. The council participated in the review of the sanctuary's management plan in 2010, marking the first time an intergovernmental group involving treaty tribes has been such an integral part of this review process. The revised plan documents the sanctuary's treaty trust responsibility, as well as highlighting the importance of working with the tribes. The council has also become increasingly involved in broader national ocean management issues, and worked last year on a planned indigenous climate change summit.



SANCTUARIES ANCHOR ECONOMIC DEVELOPMENT

NOAA's Office of National Marine Sanctuaries is committed to supporting lives and livelihoods across the nation and in sanctuary communities through socioeconomic research to better understand the economic and social drivers of sanctuary resources and improve management practices.

As important spots for recreation like sport fishing, diving, kayaking and surfing, sanctuaries support tourism and can provide a foundation for economic growth. At Florida Keys National Marine Sanctuary, for example, research has shown that **more than 33,000 jobs in the Florida Keys are supported by ocean recreation and tourism, accounting for 58 percent of the local economy and \$2.3 billion in annual sales.** This highlights the dependency of lives and livelihoods in the Keys on a healthy, vibrant marine environment. In no other place in the nation are lives so closely and critically tied to the ocean.

Through the construction and operation of visitor centers, vessels and other facilities, sanctuaries also directly create jobs and help sustain local economies. In the three Michigan counties adjacent to Thunder Bay National Marine Sanctuary, total visitor spending on recreation in 2006 was estimated at \$110 million, including \$36 million in income to residents and 1,700 jobs. The town of Alpena has declared the sanctuary and its visitor center an ideal "anchor" for economic development, setting the tone for similar partnerships across the nation.



SCIENCE & EXPLORATION

ABOVE: A tiny krill balances on the fingertip of a researcher. Sanctuary scientists are studying ocean acidification and its potential impacts on krill and other key marine organisms.
BELOW: Fish tagging at Gray's Reef; Research diver along central coast of California; Masked angel fish at Papahānaumokuākea.



Sanctuary scientists and their partners work to understand and predict natural and human-caused changes throughout the National Marine Sanctuary System. From environmental monitoring to ocean science education to development of partnerships that enhance the system's research capacity, science and exploration are essential to the effective management of our special underwater places.

Expeditions Unlock Secrets of Deepwater Corals around the Nation

Across the National Marine Sanctuary System, scientists delved far below the surface into the world of deepwater corals in 2010. Research expeditions involving numerous sanctuary partners targeted these little-understood habitats in Cordell Bank, Gulf of the Farallones, Channel Islands and Olympic Coast national marine sanctuaries on the West Coast; Gray's Reef National Marine Sanctuary off the coast of Georgia; and Papahānaumokuākea Marine National Monument. Researchers on the West Coast missions used underwater robots and a submersible to document deepwater corals in and around the sanctuaries, bringing back never-before-seen images from Cordell Bank of corals 1,300 feet below the surface of the sanctuary. At Papahānaumokuākea, divers used specialized equipment to descend as far as 250 feet underwater, finding several new species and high concentrations of fish found nowhere else in the world. Groundbreaking expeditions like these let us assess the health of deepwater corals and help improve our understanding of their role in the greater ocean ecosystem.

Photos (top to bottom): Sophie Webb/PRBO; GRNMS; Chad King/MBNMS; Greg McFall/GRNMS

Sanctuary researchers developed a groundbreaking socioeconomic model that sheds new light on the coral reefs of Florida and the Caribbean.

Sanctuary Research Enters the “Twilight Zone”

Flower Garden Banks National Marine Sanctuary in the Gulf of Mexico is home to thriving coral reefs perched atop underwater mountains called salt domes. Below the tops of these domes — from about 150 to 500 feet deep — less sunlight filters down through the water into the murky region known as the “twilight zone.” The challenges of conducting research at these depths have prevented scientists from exploring and studying it in detail, but recent technological advances allowed the sanctuary science team to initiate an ambitious program in 2010 to monitor habitats in the twilight zone in partnership with the University of North Carolina - Wilmington, NOAA’s National Centers for Coastal Ocean Science, and the Harbor Branch Oceanographic Institution. The resulting information will be a valuable resource in assessing and responding to threats like the MC252 Deepwater Horizon Oil Spill, other oil spills, and declining water quality.

First-Ever International Workshop Dives into Undersea Corrosion

The Office of National Marine Sanctuaries hosted the first-ever meeting of international experts on the science of shipwreck corrosion, Oct. 18-20 in Newport News, Va. The International Corrosion Workshop, organized in conjunction with NOAA’s Office of Response and Restoration, the National Marine Sanctuary Foundation and CALIBRE Systems Inc., brought together nearly 100 scientists and historians with expertise in corrosion science, underwater munitions and maritime history to discuss how marine corrosion affects a variety of resources and potential threats. The workshop explored current methods and technologies, such as the Resources and UnderSea Threats (RUST) database, that are used to assess the condition of metal shipwrecks on the seafloor and to predict how quickly hazardous items like bombs and fuel tanks will corrode in seawater. These discussions highlighted NOAA’s proactive efforts to address and spread awareness of corrosion-related threats both within and beyond sanctuary boundaries.

Gray’s Reef Seafloor Observatory Tracks Ocean Acidification

In an ongoing effort to better understand and monitor the effects of ocean acidification throughout the National Marine Sanctuary System, researchers at Gray’s Reef National Marine Sanctuary partnered with the University of Georgia in 2010 to develop and install a scientific “observatory” on the seafloor of the sanctuary. Sensors on the remote station record measurements like seawater pH, temperature, salt content and dissolved oxygen levels, helping create a baseline for tracking changes in the ocean conditions in the sanctuary. Along with data collected by the National Data Buoy Center and the Pacific Marine Environmental Lab, scientists will be able to use this information to learn more about how ocean acidification and other climate-related shifts affect marine ecosystems over time.

Scientists Monitor Underwater Noise at Channel Islands Sanctuary

Last year marked the final year of the Office of National Marine Sanctuaries’ involvement in one of the most intensive, continuous acoustic monitoring efforts in the National Marine Sanctuary System, a five-year project documenting underwater noise in and around Channel Islands National Marine Sanctuary. Marine scientists and managers are recognizing the importance of sounds in the ocean and the potential harmful effects of noise on marine life like whales and dolphins, but this kind of continuous research is essential to understanding the issue more fully. Since its creation in 2005, the program expanded to include monitoring of large ship traffic (the greatest source of marine sound) in 2007, and tagging of large whales with acoustic monitors in 2009. This innovative use of technology applied to conservation science stemmed from a partnership including the Scripps Institution of Oceanography, U.S. Navy, NOAA Fisheries Service and groups like the Cascadia Research Collective.



Photo: Frazier Nivens/Ocean Imaging

ECONOMIC RESEARCH IMPROVES MANAGEMENT

Studying the socioeconomic relationships between people and the ocean is a key priority for the National Marine Sanctuary System. Through this research, the sanctuaries work to improve our understanding of how diverse ecosystems and ocean users interact, and how to protect fragile marine resources in a way that also protects communities and their livelihoods.

In 2010, researchers with the Office of National Marine Sanctuaries developed a groundbreaking socioeconomic model that sheds new light on the coral reef ecosystems of Florida and the eastern Caribbean. Their research explores the relationships between coral reefs, the ocean environment and humans, presenting a comprehensive picture of the many ways in which the reefs are valuable to people, as well as the potential effects of threats like ocean acidification.

This model provides marine resource managers with new decision-making tools, supporting efforts like the U.S. EPA’s initiative to help coral reef ecosystem managers assess the costs and benefits of potential restoration strategies.



PROTECTION & MANAGEMENT

ABOVE: Science team divers install monitoring equipment to detect traces of oil or gas at Flower Garden Banks National Marine Sanctuary in the Gulf of Mexico.

BELOW: NOAA scientist on oil spill overflight mission above Florida Keys; Bigeye, soldierfish, and table coral at Papahānaumokuākea; Divers install seafloor observatory at Gray's Reef.



Resource protection and management are at the core of the Office of National Marine Sanctuaries' mission. Backed by one of the strongest pieces of ocean conservation legislation and through management plans, the National Marine Sanctuary System uses tools like coastal and marine spatial planning, regulations, zoning, permitting and interpretive enforcement to ensure that the ecology, economy and culture of our nation's underwater parks are sustained for future generations.



Papahānaumokuākea Marine National Monument Becomes First Mixed UNESCO World Heritage Site in the U.S.

Delegates to the United Nations Educational, Scientific and Cultural Organization's (UNESCO) 34th World Heritage Convention in Brasilia, Brazil, agreed July 30, 2010, to inscribe Papahānaumokuākea Marine National Monument as one of only 27 mixed (natural and cultural) World Heritage sites in the world. The monument is the first U.S. site nominated to the World Heritage List in more than 15 years, and one of the largest on the planet, covering nearly 140,000 square miles of remote ocean and coral reefs. It is the only World Heritage site in the National Marine Sanctuary System, and its designation has energized a worldwide sharing of knowledge and experience with other marine protected areas. Also in 2010, the 10th anniversary of the establishment of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve — now overlaid by the monument — was commemorated in a letter from President Bill Clinton. The designation of this special place to the World Heritage List recognizes the global significance of its near-pristine habitats, diverse marine life, and living, indigenous, cultural connections to the sea.



“Our national marine sanctuaries help maintain a healthy and sustainable balance in our environment.”

— President William J. Clinton, December 2010

Cooperative Enforcement Enhances Sanctuary Protection

On the water, in the air, and in the classroom, the Office of National Marine Sanctuaries collaborated with partners such as the National Park Service, California Department of Fish and Game and U.S. Coast Guard to address enforcement issues in 2010 and also issued a new three-year strategic plan for enforcement. The Coast Guard increased its support of sanctuary enforcement, conducting focused aerial surveys around the sanctuary system, while sanctuary staff developed patrol guides for aerial and vessel-based enforcement and held training sessions with federal and state law enforcement personnel at seven sanctuaries and the Papahānaumokuākea Marine National Monument. Additionally, cooperative efforts at Channel Islands, Cordell Bank, Gulf of the Farallones and Stellwagen Bank national marine sanctuaries helped protect endangered whales through scientific observation, vessel traffic monitoring and outreach initiatives targeted at encouraging whale-friendly boating practices.

Stellwagen Bank Releases New Science-Based Management Plan

On June 17, 2010, Stellwagen Bank National Marine Sanctuary achieved a major milestone with the release of its final management plan, which will guide the sanctuary’s resource protection and conservation efforts over the next five years. Based on years of scientific study, and developed with extensive public input, the new management plan focuses on key issues affecting the sanctuary, including wildlife disturbance, vessel traffic and invasive species. Many of these issues were not well understood or recognized when the original management plan was published in 1993. The plan also addresses sanctuary programs such as maritime heritage preservation, conservation science, enforcement, and public outreach and education. In developing the new management plan, the sanctuary relied on data and expertise from NOAA’s Fisheries Service, worked in consultation with many local, state, federal and non-governmental entities, and received more than 45,000 public comments. The plan is available on the sanctuary’s website, <http://stellwagen.noaa.gov>.

Sanctuary Staff Provide Wide-Ranging Support to Deepwater Horizon Spill Response

More than 40 staff from the Office of National Marine Sanctuaries contributed to NOAA’s response to the MC252 Deepwater Horizon Oil Spill, beginning in April 2010. Personnel from across the National Marine Sanctuary System provided scientific and technical support, public affairs assistance, shoreline cleanup assessment, financial management, cultural resource expertise and environmental unit leadership. Many of these staff deployed to the field for multiple two-week rotations, traveling to all areas of the response, from the National Incident Command Center at Coast Guard Headquarters in Washington, D.C., to Incident Command Posts in Louisiana, Alabama and Florida. While much of the oil spill response activities have concluded, Shoreline Cleanup Assessment Team and Natural Resource Damage Assessment efforts will continue to evaluate impacts in the region for some time.



Photo: Mary Jane Schramm/GF/NMS

TAKING ACTION: PROTECTION HIGHLIGHTS

Through development and periodic review of sanctuary management plans and regulations, **the sanctuary system works with partners, advisory councils and the public to implement effective coastal and marine spatial planning.** Significant actions taken in 2010 include:

- Proposed establishment of a fully protected Research Area for conducting controlled scientific studies in Gray’s Reef National Marine Sanctuary. Proposed Research Area regulations would prohibit fishing and diving without a permit.
- Initiated management plan review for the Hawaiian Islands Humpback Whale National Marine Sanctuary, in accordance with the National Marine Sanctuaries Act.
- Issued final regulations banning spearfishing in Gray’s Reef National Marine Sanctuary, providing protection to its fish and habitats.
- Issued a final rule to prohibit vessel sewage discharges in Florida Keys National Marine Sanctuary and require marine sanitation devices be secured by an acceptable method.

NATIONAL MARINE



Olympic Coast National Marine Sanctuary spans 3,310 square miles of marine waters off the rugged Olympic Peninsula. The sanctuary is home to many marine mammals and seabirds, diverse populations of kelp and intertidal algae, and thriving invertebrate communities. This sanctuary is also rich in cultural resources, with more than 180 documented historical shipwrecks and the vibrant contemporary cultures of the Makah, Hoh and Quileute Tribes and the Quinault Indian Nation. *Established July 16, 1994.*



Cordell Bank National Marine Sanctuary gets its name from the underwater mountain that rises to within 115 feet of the ocean's surface off Point Reyes, Calif. Upwelling of nutrient-rich deep water supports a flourishing ecosystem on and around Cordell Bank, making the 529-square-mile sanctuary a productive feeding destination for diverse marine creatures. Common sanctuary inhabitants and migratory visitors include whales, dolphins, sea lions, seabirds, rockfish and Pacific salmon. *Established May 24, 1989.*



Gulf of the Farallones National Marine Sanctuary covers nearly 1,300 square miles of coastal and ocean wilderness west of San Francisco. The sanctuary is home to some of the largest concentrations of white sharks and blue whales on Earth, along with one-fifth of California's breeding harbor seals and hundred of thousands of breeding seabirds. The sanctuary also protects numerous estuaries, bays and beaches for the public to enjoy. *Established Jan. 16, 1981.*



Monterey Bay National Marine Sanctuary is the nation's largest marine sanctuary, spanning more than 6,000 square miles of coastal waters off central California. Within its boundaries — which were expanded to include the Davidson Seamount in 2009 — are a variety of habitats, from rocky shores and lush kelp forests to an underwater canyon over 10,000 feet deep. The sanctuary's diverse marine life includes 33 species of marine mammals, 94 species of seabirds, 345 species of fish and thousands of invertebrates. *Established Sept. 18, 1992.*



Channel Islands National Marine Sanctuary encompasses the waters surrounding San Miguel, Santa Rosa, Santa Cruz, Anacapa and Santa Barbara islands off the coast of California. The combination of warm and cold water currents around the Channel Islands results in a great variety of plants and animals, including large forests of giant kelp, flourishing populations of fish and invertebrates, and abundant and diverse populations of whales, dolphins, sea lions, harbor seals and seabirds. *Established Sept. 22, 1980.*



Papahānaumokuākea Marine National Monument contains one of the last large-scale, predator-dominated coral reef ecosystems on the planet. The monument's waters are home to more than 7,000 marine species — a quarter of which are found only in the Northwestern Hawaiian Islands — including endangered and threatened species like Hawaiian monk seals and green sea turtles. Encompassing nearly 140,000 square miles of ocean and coral reefs, the monument has great cultural significance to Native Hawaiians and blends the management of terrestrial, marine and cultural resources with a focus on the connections between land and sea. *Established June 15, 2006.*



Hawaiian Islands Humpback Whale National Marine Sanctuary lies within the shallow, warm waters surrounding the main Hawaiian Islands and is one of the most important humpback whale habitats in the world. Scientists estimate that two-thirds of the entire North Pacific humpback whale population migrate to Hawaiian waters each winter to breed, calve and nurse their young. The continued protection of humpback whales and their habitat is crucial to the long-term recovery of this endangered species. *Established Nov. 4, 1992.*



SANCTUARY SYSTEM



Thunder Bay National Marine Sanctuary boasts nearly 100 shipwrecks preserved by the cold, fresh waters of Lake Huron within its 448-square-mile boundary. Thunder Bay's unpredictable weather and treacherous shoals have earned it the nickname "Shipwreck Alley," and its collection of wrecks represents a cross-section of the diverse vessels that have traveled the Great Lakes since the 19th century. From wooden schooners to modern freighters, these cultural treasures provide a window into the region's rich maritime history. *Established Oct. 7, 2000.*



Gerry E. Studds Stellwagen Bank National Marine Sanctuary sits at the mouth of Massachusetts Bay, just 25 miles from the busy port of Boston. The 842-square-mile sanctuary is one of the world's premier whale watching destinations and a historically important fishing ground. Its waters support a rich assortment of marine life, including the critically endangered North Atlantic right whale and the economically important Atlantic cod. A plethora of shipwrecks representing more than 400 years of maritime travel rest on the sanctuary seafloor. *Established Nov. 4, 1992.*



Monitor National Marine Sanctuary was designated the nation's first national marine sanctuary in 1975. The site protects the wreck of the famed Civil War ironclad USS *Monitor* off Cape Hatteras, N.C., best known for its battle in 1862 with the Confederate ironclad CSS *Virginia* at Hampton Roads. In partnership with The Mariners' Museum in Newport News, Va., the sanctuary unveiled the \$30 million USS *Monitor* Center in 2007, further enhancing efforts to preserve, study and educate the public about this iconic piece of our nation's maritime past. *Established Jan. 30, 1975.*



Fagatele Bay National Marine Sanctuary embraces a fringing coral reef ecosystem contained within an eroded volcanic crater in American Samoa. Fagatele Bay is the nation's smallest marine sanctuary at one-quarter square mile and its only true tropical reef. Hundreds of species of corals, colorful reef fish, algae and other invertebrates can be found in the warm waters of the sanctuary, along with sea turtles, dolphins, sharks, giant clams and migratory humpback whales. *Established April 29, 1986.*



Gray's Reef National Marine Sanctuary, surrounds one of the largest live bottom reefs in the southeastern United States, located just off the Georgia coast. The 22-square-mile sanctuary consists of rocky outcroppings separated by sandy troughs, resulting in a complex habitat of ledges covered by a "living carpet" of algae and invertebrates ranging from sponges to sea stars. Gray's Reef also supports loggerhead sea turtles, migrating right whales and a wealth of fish species, making the sanctuary a popular sport fishing and diving destination. *Established Jan. 16, 1981.*

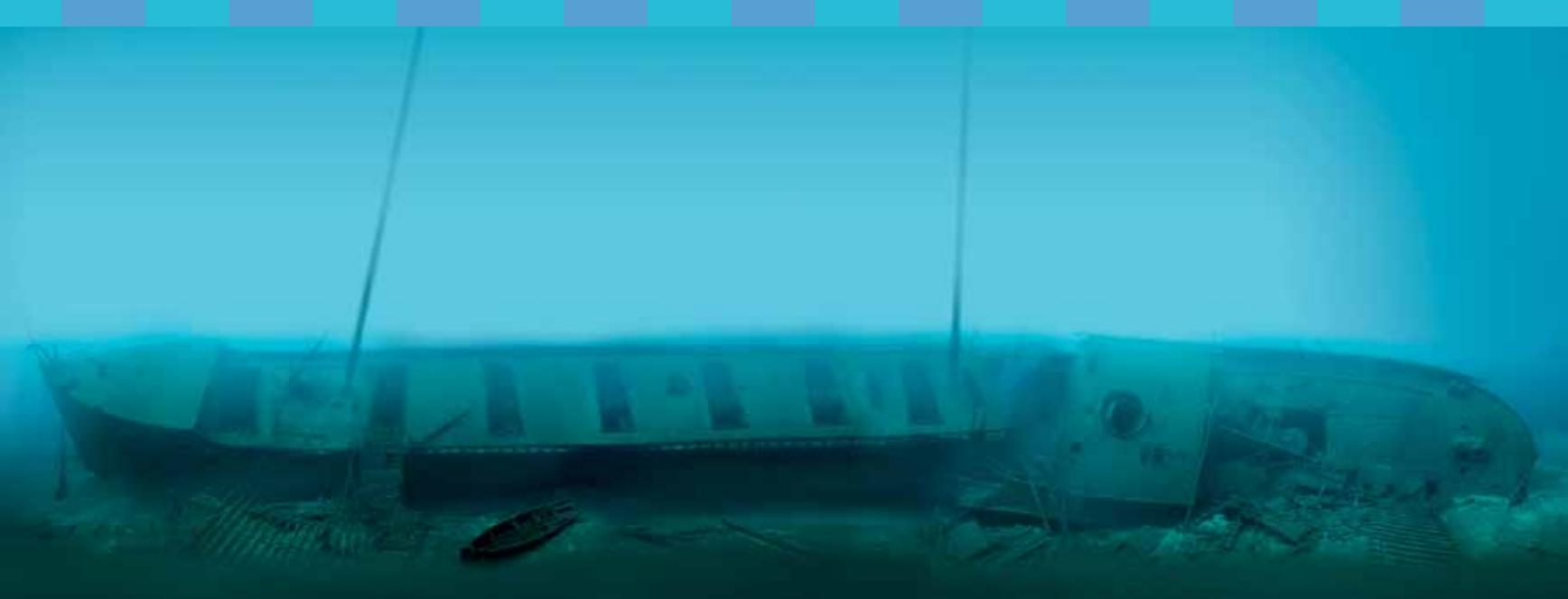


Flower Garden Banks National Marine Sanctuary lies 70 to 115 miles off the Texas-Louisiana coast, where underwater "gardens" emerge from the depths of the Gulf of Mexico. The sanctuary encompasses three submerged features called salt domes that harbor the northernmost coral reefs in the continental United States. These premier diving destinations feature numerous Caribbean reef fish and invertebrate species and are frequented by majestic whale sharks and graceful manta rays. *Established Jan. 17, 1992.*



Florida Keys National Marine Sanctuary surrounds the Florida Keys archipelago and supports one of the most diverse marine ecosystems in North America. The sanctuary is home to the continent's only living coral barrier reef and beckons divers from around the world. The shallow waters of the 2,900-square nautical mile sanctuary also contain mangrove-fringed islands and lush seagrass meadows. Together, these complex ecosystems provide the basis for the valuable tourism and fishing industries that are vital to Florida's economy. *Established Nov. 16, 1990.*





OUR MARITIME & CULTURAL HERITAGE

ABOVE: A photo-mosaic created by sanctuary researchers shows the wreck of the 300-foot bulk freighter *Norman*, which sank in Lake Huron in the late 19th century.
BELOW: The RMS *Titanic*; Launching an autonomous underwater vehicle in Lake Huron's "Shipwreck Alley"; Diver near *Norman* shipwreck that rests in 200 feet of water.



Understanding our country's cultural and maritime landscape helps Americans learn about their past and become engaged stewards of the maritime traditions of coastal communities, including exploration, immigration, and harvesting the bounty of the seas. Prehistoric sites, shipwrecks, and naval battlefields are among the resources protected by sanctuaries. They are places to explore, discover and appreciate.

Sanctuary Staff Help Map World-Famous *Titanic* Wreck

The *Titanic* is the most famous shipwreck of the 20th century. In 1986, Congress tasked NOAA with working with public and private partners to help manage and protect the wreck. Last year, the Office of National Marine Sanctuaries joined the Woods Hole Oceanographic Institution, the Waitt Institute for Discovery, the National Park Service, the Institute of Nautical Archaeology and RMS *Titanic*, Inc. to use revolutionary acoustic imaging, sonar technologies and high-resolution optical imaging to map 25 nautical miles of seabed with pinpoint accuracy and create detailed three-dimensional maps and footage of the *Titanic*'s bow and stern. The new director of the national marine sanctuaries' Maritime Heritage Program, Dr. James Delgado, served as principal investigator on the mission, and was joined by Monitor National Marine Sanctuary Superintendent David Alberg. Discussions about the future of the *Titanic* as a possible marine protected area and memorial are ongoing.

The Graveyard of the Atlantic is as significant a battlefield to honor, study and preserve as Gettysburg or Pearl Harbor.

Whaling Shipwreck *Two Brothers* Identified at Papahānaumokuākea

A collaborative team conducted 25 days of surveys on five islands and atolls during the Explorations 2010 research cruise to Papahānaumokuākea Marine National Monument. Focusing their efforts on documenting a previously unidentified whaling shipwreck site discovered at French Frigate Shoals in 2008, archaeologists identified the wreck as the *Two Brothers*, a whaler lost in 1823 under the command of Captain George Pollard. The shipwreck was Pollard's second; his first was the ship *Essex*, rammed by a whale and sunk in the South Pacific in 1820. The story of the loss of the *Essex* and its survivors inspired Herman Melville to write "Moby-Dick". The 2010 expedition also included exploration, surveys of numerous maritime archaeological sites, and biogeographical assessment of several shipwreck and sunken aircraft sites in the monument.

Exploring Maritime Landscapes of the Great Lakes at Thunder Bay

Innovative, cost-effective technologies have paved the way for sanctuary staff to locate and learn more about significant shipwrecks at Thunder Bay National Marine Sanctuary. With a grant from NOAA's Office of Exploration and Research, the sanctuary deployed cutting-edge shipwreck-finding technology to Lake Huron's "Shipwreck Alley." A 448-square-mile area with 50 known historic shipwrecks is protected by the Thunder Bay sanctuary, but there are more shipwrecks to be discovered beyond the sanctuary boundaries. From Aug. 16 to 27, a team from the sanctuary and the Applied Research Laboratories at the University of Texas at Austin set out to discover new shipwrecks and prehistoric archaeological sites using an autonomous underwater vehicle. Visitors who travel to Alpena, Mich., to dive on the wrecks of the sanctuary and learn about them in its visitor center have bolstered the local economy, sparking considerable local and regional interest in expanding the sanctuary to include more shipwrecks.

Annual Research Cruise Targets Seven Historic Shipwrecks

Over a two-day period in August 2010, a Stellwagen Bank sanctuary research team visited seven historic shipwrecks, ranging from fishing boats to wooden-hulled sailing vessels with cargoes of coal or stone, and gathered high-definition still and video imagery with the *Kraken 2* remotely operated vehicle. Sanctuary archaeologists joined staff from the Northeast Undersea Research Technology and Education Center (NURTEC) at the University of Connecticut to characterize newly located archaeological sites. Several shipwrecks without obvious cargo remains may be the oldest vessels yet located in the sanctuary. Preliminary research on these vessels indicates that the artifacts and vessel construction features date to the early 19th century. This was the sixth Stellwagen Bank sanctuary maritime heritage cruise with NURTEC since 2002. The partnership has successfully investigated 28 shipwreck sites. Archaeologists used data from these cruises to successfully nominate five archaeological sites to the National Register of Historic Places.



Photo: Joe Hoy/MNMS

DEFENDING AMERICA'S SHORES: THE BATTLE OF THE ATLANTIC EXPEDITION

In early 1942, America was under siege as U-boats struck Germany's first blows against America in World War II. They waged a bloody war in the seas off Cape Hatteras, N.C., attacking 285 vessels while losing only seven U-boats. The United States prevailed, however, and drove the Germans away. Unlike a battlefield on land, the warriors of 1942 still lie where they fell. **It is as significant a battlefield to honor, study and preserve as Gettysburg, or Pearl Harbor.**

Led by staff from Monitor National Marine Sanctuary with support from federal, state and academic partners, a team of experts in marine archaeology and technical diving successfully surveyed the wrecks of 10 World War II merchant vessels during the 2010 season of the Battle of the Atlantic project. These wrecks are important, not just to the families of their lost crew and the survivors who served on those vessels, but also to the thriving recreational diving community that is working with NOAA to ensure this sunken battlefield is documented and protected for future generations as a place to visit and to learn.



OUTREACH & EDUCATION

ABOVE: Sanctuary education programs reach thousands of children every year, providing hands-on learning experiences that encourage students to care about their ocean environment. **BELOW:** Teachers at “Dive Into Education” workshop; Gulf of the Farallones sanctuary hands-on marine education class; Channel Islands MERITO students explore a tide pool.



Challenges facing the ocean today cross national and ethnic boundaries, and marine sanctuaries serve as places where people can find common ground and discuss solutions. Sanctuary education and outreach efforts link communities through innovative programs and help spread awareness of the ocean’s connection to all life.



NOAA Strengthens Education Partnerships in American Samoa

In July 2010, a team of 19 sanctuary system educators hosted a “Dive Into Education” workshop on Tutuila Island, American Samoa, in partnership with Fagatele Bay National Marine Sanctuary and the American Samoa Department of Commerce and Department of Education. Dive Into Education provides teachers educational expertise, resources and training to support ocean and climate literacy in the classroom. More than 100 teachers attended the two-day workshop, where they chose from 29 engaging, hands-on sessions on topics like coral reef ecosystems, plate tectonics and climate change. After the workshop, 96 percent of teacher participants said their expectations were met or exceeded, and 87 percent felt confident in their ability to incorporate ocean literacy principles into their curriculum. In the following weeks, Fagatele Bay National Marine Sanctuary and the local Department of Education established a Teacher Program to provide teachers continued support in the skills and lessons learned during the workshop.



Photos (top to bottom): Amy Dean/FMSA; Michiko Martini/ONMS; Amy Dean/FMSA; Rocio Lozano-Knowlton/CINMS

The Fishermen in the Classroom program is part of a broader initiative to educate communities about their local fisheries.

Aquarius 2010 Mission Brings Coral Reefs to Diverse Audience

In October 2010, marine scientists spent nine days living and working in Aquarius, an undersea research lab located 60 feet below the surface of Florida Keys National Marine Sanctuary, conducting research and participating in education programs. The team studied habitat conditions and reef fish behavior and tested new technologies to track fish movement. They also participated in the OceanLive program, which included 34 live broadcasts — 11 in Spanish — watched by over 500,000 people, including more than 1,000 students at 18 locations around the globe. Daily broadcasts brought the ocean to viewers via live dives and interactive programming from the Aquarius Reef Base, including four special shows hosted with U.S. Congress members Ileana Ros-Lehtinen and Mario Diaz-Balart in both English and Spanish. Supported by AT&T and the National Marine Sanctuary Foundation, this mission involved partners including MERITO, the National Association of Black Scuba Divers, the University of Connecticut and California State University, Monterey Bay.

National Marine Sanctuary News Reaches Americans Every Day

The message of the national marine sanctuaries touches the public every day. FY 2010 news coverage set new records, as print and electronic news articles and stories about national marine sanctuaries generated more than 8,200 individual news clips. Sanctuary news stories totaled more than 710,000,000 impressions at an estimated advertising value of \$26,750,000. News stories highlighting the National Marine Sanctuary System appeared in national and local print publications, local and network television and radio news. In this digital age, the sanctuaries also used blogs, live webcasts, Facebook, Twitter and other social media sites to convey ocean messages to the public. News stories brought details of deep-sea exploration and ocean research to the interested public. The drama of science missions, historical discoveries and whale disentanglements reached international audiences, while local news covered wide-ranging stories highlighting sanctuaries in their communities.

Sanctuaries Connect with Next Generation of Ocean Leaders

The Office of National Marine Sanctuaries works to educate and engage the youth of today, who will become tomorrow's leaders in ocean science. Every year, tens of thousands of students participate in education programs across the National Marine Sanctuary System. In 2010, Gulf of the Farallones National Marine Sanctuary alone reached more than 11,000 students and teachers, giving participants the chance to learn about marine ecosystems through hands-on education as well as visits to sanctuary beaches and rocky shores with programs like Long-term Monitoring Program and Experiential Training for Students (LiMPETS). Also in California, the MERITO program engages Spanish-speaking students year-round and gives them the tools to tackle issues threatening ocean resources in the future. Elsewhere, sanctuary staff partnered with the National Association of Black Scuba Divers to increase ocean literacy in African-American populations and encourage young people to learn swimming and scuba diving, providing a group of students with the chance to dive with archaeologists on shipwrecks in Thunder Bay National Marine Sanctuary. Through efforts like these around the sanctuary system, students have opportunities to explore and gain an appreciation for the sanctuaries' diverse life and vast ecosystems and to learn to be better ocean and sanctuary stewards.



Photo: MERITIS

FISHERMEN CONNECT STUDENTS WITH RICH MONTEREY BAY HERITAGE

Students in California are learning about their fishing communities through a school enrichment program offered by local fishermen and the Office of National Marine Sanctuaries. The “Fishermen in the Classroom” program has used field trips to harbors and classroom visits by fishermen to expose more than 2,500 students to the rich cultural history and modern-day relevance of commercial fishing in the Monterey Bay and the Gulf of the Farallones national marine sanctuaries. The presentation topics range from a day in the life of a fisherman to the effects of environmental change on fisheries.

This program is part of a broader initiative at national marine sanctuaries to educate communities about the fisheries that have been a part of the local economy for hundreds of years. Hands-on learning opportunities like these foster a greater appreciation of the people working to bring seafood to our local restaurants and markets. According to one fisherman, “This is a chance to explain how sustainable fishing practices are part of the ecosystem-based approach of the sanctuary to protect our oceans.”



EXPERIENCING SANCTUARIES

ABOVE: Congresswoman Lois Capps and NOAA Administrator Dr. Jane Lubchenco join the groundbreaking ceremony for a new Ocean Science Education Building at UC Santa Barbara. BELOW: A smartphone imagined as an education tool; Conceptual design of a visitor center at Kihei, Maui; OceansLIVE production at BLUE Ocean Film Festival in Monterey, Calif.



New technologies and innovations are connecting people across the country to their national marine sanctuaries. From live webcasts and interactive, real-time kiosk displays to state-of-the-art visitor centers and applications for mobile devices, these diverse digital tools are making it possible for millions of Americans — wherever and whoever they are — to virtually visit and learn about the underwater world of national marine sanctuaries from the comfort of dry land.



Digital Tools Link People with Marine Sanctuaries

In a world of ever-advancing technology, the Office of National Marine Sanctuaries is always looking for new ideas to connect people with our precious underwater places. Several online tools debuted in 2010 that make it possible for the public to learn about sanctuary science in a whole new way, including two innovative websites that let users explore interactive maps of research expeditions and water quality readings in Monterey Bay National Marine Sanctuary. At Gulf of the Farallones National Marine Sanctuary, the popular “LiMPETS” monitoring network launched new education components, expanding its online tools for students to collect ocean observations in the sanctuaries and share them through the program’s website. Looking ahead, Monitor National Marine Sanctuary is working to enhance its outreach efforts through an interactive multimedia tour that will guide visitors to North Carolina’s Outer Banks through the region’s rich maritime heritage using video and audio content downloaded to a smartphone or iPod.



Photos (top to bottom): Laura Francis/CINMS; NOAA; HIHWNMS; Sarah Marquis/ONMS

“Today, I wept for joy at how good your broadcast was. I hope kids all over the world were as inspired as I was by it.” — OceansLIVE Viewer

Kiosks and Interpretive Signs Guide and Educate Sanctuary Visitors

Throughout the National Marine Sanctuary System, kiosks and signs play a key role in telling the public about sanctuary landmarks and resources that may not be visible from shore. Using video, sound and interactive elements to provide the public with a window into the sanctuaries, several kiosks were installed around the sanctuary system in 2010, including one at the Florida Keys Eco-Discovery Center in Key West, which shows visitors a real-time display of the energy generated by solar panels on the center’s roof that provide up to 30 percent of the building’s power. At Cape Cod National Seashore and Halibut Point State Park, new kiosks provide real-time shipping traffic imagery and a video on endangered whales in Stellwagen Bank National Marine Sanctuary. Additional kiosks were installed featuring sanctuary information and real-time ocean and weather conditions for Flower Garden Banks, Hawaiian Islands Humpback Whale and Channel Islands national marine sanctuaries, with more scheduled for development in 2011. Also at the Channel Islands sanctuary, signs highlighting the Channel Islands Marine Protected Area Network are now displayed at boat launch ramps and visitor centers on the islands, complete with maps, regulations, species of interest and recreational activities.

New Visitor Centers to Open in Santa Barbara, Santa Cruz

NOAA’s Office of National Marine Sanctuaries kicked off two major construction projects in 2010 that will enhance the science, education and public outreach efforts of sanctuary staff in California. The first, which broke ground Jan. 11, is a new Ocean Science Education Building at the University of California, Santa Barbara, that will house the Channel Islands National Marine Sanctuary headquarters and the state-of-the-art Outreach Center for Teaching Ocean Science (OCTOS). The result of a collaboration between sanctuary staff and the UCSB Marine Science Institute, OCTOS will provide diverse, interactive ocean education activities for children in grades K-12. The second facility, which broke ground July 12, is the long-awaited Sanctuary Exploration Center in Santa Cruz. As the gateway to NOAA’s Monterey Bay National Marine Sanctuary, the Exploration Center will serve the entire Central California region and will foster stewardship of the sanctuary by connecting people with, and educating them about, its ecosystems, geology and marine life.

Gulf of the Farallones Sanctuary Unveils Ocean Climate Center

NOAA’s Gulf of the Farallones National Marine Sanctuary opened the new Ocean Climate Center in October 2010 at its headquarters in San Francisco. The center will become an ocean and climate change communication hub for the Bay Area, serving as a place where scientists and policymakers from federal, state and local agencies, academic institutions, and other non-profit groups can exchange information and ideas. The sanctuary has also designed a new public interpretive center that will help inform people through a variety of outreach programs about how climate change may affect ocean ecosystems. Sanctuary staff will use the center to promote partnerships, share knowledge and resources, and work cooperatively to better understand and address the effects of climate change in national marine sanctuaries and throughout northern central California’s waters. The center is housed in an 1890s-era Coast Guard building retrofitted with numerous “green” features like LED lighting, dual-flush toilets and more efficient heating.

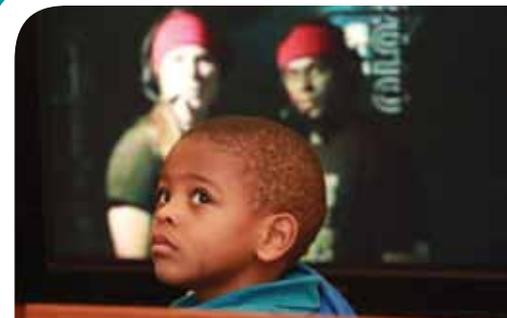


Photo: Terrance Middlebrooks

OCEANSLIVE BRINGS SANCTUARIES TO VIEWERS VIA LIVE WEBCASTS

Utilizing innovative multimedia capabilities, the Office of National Marine Sanctuaries has developed a way to bring our nation’s underwater treasures to millions of Americans. In 2010, OceansLIVE.org allowed viewers to explore a shipwreck in Lake Huron, attend an ocean film festival in Monterey, Calif., and visit the world’s only undersea research facility — all from a computer screen.

OceansLIVE goes beyond one-way transmissions. Through e-mail, social media and other tools, OceansLIVE programs let the audience participate in shows as they happen. During a “live dive” mission in Thunder Bay National Marine Sanctuary, viewers had their questions answered in real time by an archaeologist 70 feet below the surface.

OceansLIVE.org broadcast more than 50 hours of programming and reached more than 500,000 people around the world in 2010 alone. This innovative Web portal is a window into national marine sanctuaries, delivering informative, entertaining shows that make sanctuaries accessible to all.

AWARDS, HONORS & SPECIAL RECOGNITION

NATIONAL MARINE SANCTUARY AWARDS



Volunteer of the Year: Steve Kroll, Thunder Bay National Marine Sanctuary
Steve Kroll, a dive charter operator by trade, was presented with the National Marine Sanctuary Foundation's Volunteer of the Year Award for spreading awareness of the sanctuary and for his management plan review work which led to expansion of the boundaries to include waters off of Alcona, Alpena and Presque Isle – a nine-fold increase.

Sanctuary Site Volunteers of the Year:

- Jim Bunch, Monitor National Marine Sanctuary
- Evelyn Ganson, Stellwagen Bank National Marine Sanctuary
- Staci Kaye-Carr, Channel Islands Naturalist Corps Volunteer of the Year for 2009
- Joe Smith, Cordell Bank National Marine Sanctuary
- Jacqueline Stanley, Flower Garden Banks National Marine Sanctuary

DEPARTMENT OF COMMERCE SILVER MEDAL AWARD

Anne Walton, for leadership in marine protected area management capacity building around the world

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION AWARDS

Bronze Medal: Greg McFall

Gray's Reef National Marine Sanctuary Assistant Superintendent and Science Coordinator, for leadership in keeping the NOAA Diving Program safe, scientific and productive through development of dive manuals and implementation of lessons learned from a recent diving accident

Diversity Council Spectrum Achievement Award: Cathy Sakas

Gray's Reef National Marine Sanctuary Education Coordinator, for her help in the National Association of Black Scuba Divers' Youth Education Summit

NATIONAL OCEAN SERVICE AWARDS

EMPLOYEE OF THE YEAR – NON-SUPERVISORY:

Dr. Leila Hatch, Stellwagen Bank National Marine Sanctuary
For exceptional and sustained contributions to NOS programs and mission

EEO AND DIVERSITY AWARD:

Margo E. Jackson, Office of National Marine Sanctuaries
For exemplary contributions and exceptional efforts toward improvement and accomplishment of NOS EEO and Diversity goals

SANCTUARY ADVISORY COUNCILS

STELLWAGEN BANK COUNCIL LEADERSHIP AWARD:

Michael Cohen

CHANNEL ISLANDS COUNCIL INSPIRATION AWARD:

Bruce Steele

EXTERNAL AWARDS AND HONORS

AMERICAN RED CROSS "REAL HERO" AWARD:

Mary Jane Schramm, Gulf of the Farallones NMS
For long-standing efforts in marine mammal rescue

BLUE OCEAN FILM FESTIVAL BEST SANCTUARY SHORT:

"In the Wake of Giants" - A film chronicling whale disentanglements at Hawaiian Islands Humpback Whale NMS

BEST OF HONOLULU AWARD, HONOLULU MAGAZINE:

Hawaiian Islands Humpback Whale NMS Ocean Count project

BEST NATURE CENTER, FLORIDA MONTHLY MAGAZINE:

Florida Keys Eco-Discovery Center

30TH ANNIVERSARY:

Channel Islands National Marine Sanctuary
Designated in 1980, the Channel Islands sanctuary celebrated its 30th year in September 2010

MASSACHUSETTS MARINE EDUCATORS SERVICE AWARD:

Anne Smrcina, Stellwagen Bank National Marine Sanctuary
For organizing and promoting the annual marine art contest and supporting the Boston Harbor Educators Conference

NMS FOUNDATION LEADERSHIP AWARD:

Rep. Lois Capps
For her lifelong support of the National Marine Sanctuaries and America's oceans

NMS FOUNDATION LEADERSHIP AWARD:

Rep. Ileana Ros-Lehtinen
For her lifelong support of the national marine sanctuaries and America's oceans

NMS FOUNDATION LIFETIME ACHIEVEMENT AWARD:

Julie Packard, Monterey Bay Aquarium Executive Director
For her tireless career commitment to marine conservation regionally and nationally



OUR NATIONAL MARINE SANCTUARIES ACT

Protecting the special places in our ocean and Great Lakes is, and may always be, a complicated task. The beautiful and bountiful underwater areas that deserve our care are also enjoyed by millions of people for their recreational, commercial and aesthetic value, making thoughtful stewardship of these places both challenging and essential.

With overlapping ocean uses and authorities often leading to conflicts and confusion, one wonders how any single law could successfully protect our nation's underwater treasures. But nearly 40 years ago, Congress enacted just such a law when it passed Title III of the Marine, Protection, Research, and Sanctuaries Act of 1972 — known today as the National Marine Sanctuaries Act.

At a time when most other ocean resource laws focused on controlling specific activities or managing specific species, the authors of the Sanctuaries Act took a different approach: protect places, along with the natural, historical and cultural riches that make them worth preserving for future generations. Thus, the National Marine Sanctuary System was born. Its mission, set forth in the Act, is to protect the resources of the sanctuaries, but also to allow people to use and appreciate these special places responsibly. Sanctuary management involves science, outreach, education and the nation's most public participatory process for natural and cultural resource management.

The Sanctuaries Act has stayed relevant through six reauthorizations during the 1980s and 1990s. The most recent reauthorization occurred in 2000. During the next reauthorization update of the Act, Congress will have many new issues to consider, including impacts created by the designation of Papahānaumokuākea Marine National Monument — one of the largest areas devoted to marine conservation in the world — the potential effects of a changing ocean climate on special marine areas, and the integration of protected areas within the larger context of regional ocean management.

While the challenges of protecting our nation's special ocean and Great Lakes places are numerous, the sanctuary system is up to the task, backed by one of the strongest pieces of ocean conservation legislation in the Sanctuaries Act. By continuing to adapt and address new threats, the sanctuaries will ensure the future of America's underwater treasures for generations to come.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Gary Locke

Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
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COVER PHOTO

Two sand tiger sharks cruise above the wreckage of the *Dixie Arrow*, an oil tanker that was sunk off North Carolina on March 26, 1942, during the Battle of the Atlantic. See sidebar on page 11 for more information about the Battle of the Atlantic.

Photo: Joe Hoyt/MNMS



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enhance public awareness, understanding, & appreciation

NATIONAL MARINE SANCTUARIES