

OUR NATIONAL MARINE SANCTUARIES



NATIONAL MARINE
SANCTUARIES



S T A T E O F T H E S A N C T U A R Y R E P O R T

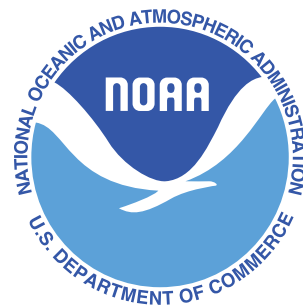
2003



2004



NATIONAL MARINE SANCTUARIES



NOAA's National Ocean Service

The National Marine Sanctuary System

Our national marine sanctuaries embrace part of our collective riches as a nation. Within their protected waters, giant humpback whales breed and calve their young, coral colonies flourish and shipwrecks tell stories of our maritime history. Sanctuary habitats include beautiful rocky reefs, lush kelp forests, whale migration corridors, spectacular deep-sea canyons and underwater archaeological sites. Our nation's sanctuaries can provide a safe habitat for species close to extinction or protect historically significant shipwrecks. Ranging in size from less than one square mile to more than 5,300 square miles, each sanctuary is a unique place needing special protections. Natural classrooms, cherished recreational spots and valuable commercial industries—marine sanctuaries represent many things to many people.

The National Marine Sanctuary Program serves as the trustee for a system of thirteen sanctuaries, encompassing more than 18,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys, and from Lake Huron to American Samoa. In addition, the sanctuary program is conducting a process to designate the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve as the nation's 14th marine sanctuary. The National Oceanic and Atmospheric Administration's (NOAA) manages national marine sanctuaries under the authority of the National Marine Sanctuaries Act. Since 1972, the National Marine Sanctuary Program has worked cooperatively with its partners and the public to promote conservation while allowing compatible commercial and recreational activities. Increasing public awareness of our marine heritage, scientific research, monitoring, exploration, educational programs and outreach are just a few of the ways the National Marine Sanctuary Program fulfills its mission to the American people.



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NATIONAL MARINE
SANCTUARIES

Message from the Director

No one really knew what happened to the *Portland*, a majestic steamship that sank during a ferocious gale in 1898. Her fate would remain a mystery for more than 100 years until two men contacted NOAA's Stellwagen Bank National Marine Sanctuary. Researchers John Fish and Arnold Carr believed they had found the long-lost steamer, but without visual confirmation, they could not be sure. With the help of NOAA's National Undersea Research Center at the University of Connecticut, a sanctuary-led expedition confirmed the final resting place of *Portland* in 2002. The story of the *Portland* illustrates a key tenet that solutions to most problems or issues are resolved through some type of partnership, whether with a friend, colleague, or even a government agency.

All of our accomplishments described in this **State of the Sanctuaries Report** happened because of partnerships. As director of NOAA's National Marine Sanctuary Program, restoring and protecting the oceans through partnerships is what I would call the "sanctuary way."

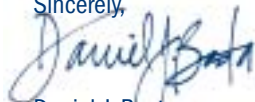
The sanctuary way is articulated in our program-wide partnership survey that documents more than 400 partnerships that are integral to our success. A consistent theme in all these partnerships is the focus on the outcomes necessary to achieve our mission to preserve our nation's natural and cultural treasures.

Nowhere is this focus on outcomes more evident than with our most important partnership—the one we have forged with our local sanctuary communities. Several of our sites have revised or are in the process of updating their sanctuary management plans. The process of updating a management plan involves a comprehensive public participatory process that involves ocean-related businesses, environmental organizations, scientists, educators and the general public. These processes are giving sanctuary communities direct ownership over the outcomes on deciding how to best protect sanctuary marine life, harness the expertise and experience of renowned scientists and scholars, and further education within our schools.

Partnerships have allowed the program to engage local communities in devising ways to better protect marine ecosystems that sustain livelihoods and recreational activities, team up with educators to increase the ocean literacy of our nation's children, and to enhance collaborations with scientists to explore and improve our knowledge of America's ocean and Great Lakes treasures.

The sanctuary way is simple; we can do more together to keep our oceans healthy than we can ever do alone. Through partnerships, we keep our commitment to uphold the public trust in promoting healthy oceans for future generations. We must strive to face the challenge of reaching all Americans, not just those along our coasts, if we are to widen the circle of ocean stewardship around the globe.

Sincerely,



Daniel J. Basta

Director, NOAA's National Marine Sanctuary Program

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National Marine Sanctuaries: Preserving America's Natural and Cultural Heritage Through Partnerships

On any given day, National Marine Sanctuary Program staff and volunteers are engaged in monitoring wildlife, educating the public, responding to emergencies, excavating maritime artifacts, restoring habitats and innumerable other projects that collectively maintain some of the most beautiful and rare marine protected areas on earth. In 2003, and more than ever before, this team effort was enhanced by partnerships with agencies, communities, nonprofit groups and other interests that share the same passion and responsibility for marine protection. Teamwork has sustained our progress; partnerships will ensure our success.

Technology and Partnerships Advance Ocean Education

Never before has the National Marine Sanctuary Program been so empowered to create an ocean literate society, one that will foster the environmental stewardship necessary to protect our natural and cultural marine legacy. Education and outreach staff throughout the sanctuary system are using the power of partnerships and new technology to reach an eager public. Perhaps the most notable technological advance has been "telepresence," which uses live, interactive video feeds to connect the public with breathtaking undersea vistas and exciting ocean expeditions. The success of telepresence is evidenced by the overwhelming response to the pilot installation at Monterey Bay, where live underwater video cameras are introducing kelp forests to visitors at the Mystic Aquarium in Connecticut, thousands of miles away. In 2003, planning workshops advanced agreements with partner organizations, Mystic Aquarium/Institute for Exploration, JASON Foundation for Education and Mote Marine Laboratory, to expand telepresence to Channel Islands and Florida Keys national marine sanctuaries in 2004, and Thunder Bay National Marine Sanctuary and Underwater Preserve in 2005.

Innovative nontraditional marine science education efforts expanded with the new Argonauts program at Channel Islands, a legacy of Dr. Robert Ballard's JASON expedition to the sanctuary in January. Argonauts are middle school students selected to work side-by-side with marine scientists in the field. Channel Islands will also be the location in 2004 for the annual National Marine Sanctuary Field Study program, created in partnership with the National Geographic Society to provide under-served urban teachers and students hands-on science education. Florida Keys hosted the Sanctuary Field Study Program in 2003, which highlighted the region's history and culture, as well as marine research and conservation. The students and teachers engaged in marine monitoring activities with sanctuary education specialists and research scientists, toured the research facility at the Keys Marine Lab, visited historic Fort Jefferson, and snorkeled at several coral reefs.

Reaching out to under-served populations is also the focus of MERITO, a multicultural Hispanic ocean education program initiated by Monterey Bay National Marine Sanctuary. This comprehensive marine stewardship

Front Cover: Endangered Hawaiian Monk Seal and Giant Trevally. Photo: © Jim Watt/NOAA

Back Cover: Recreational fishing boat at sunset in Santa Barbara. Photo: Glenn Allen

Crinoids on Cordell Bank.
Photo: CBNMS-Michael Carver



program has already educated thousands of adults, teachers and school children with after-school programs, youth leadership training, high school and college mentoring, internship and professional development programs, and weekend community events. Plans are underway to expand MERITO to other California sanctuaries in 2004.

The National Marine Sanctuary Program's education program will continue to use new technology and strategic partnerships to transcend the geographic and institutional challenges of the past, creating opportunity for all Americans to understand, enjoy and protect our precious ocean and Great Lakes environments.

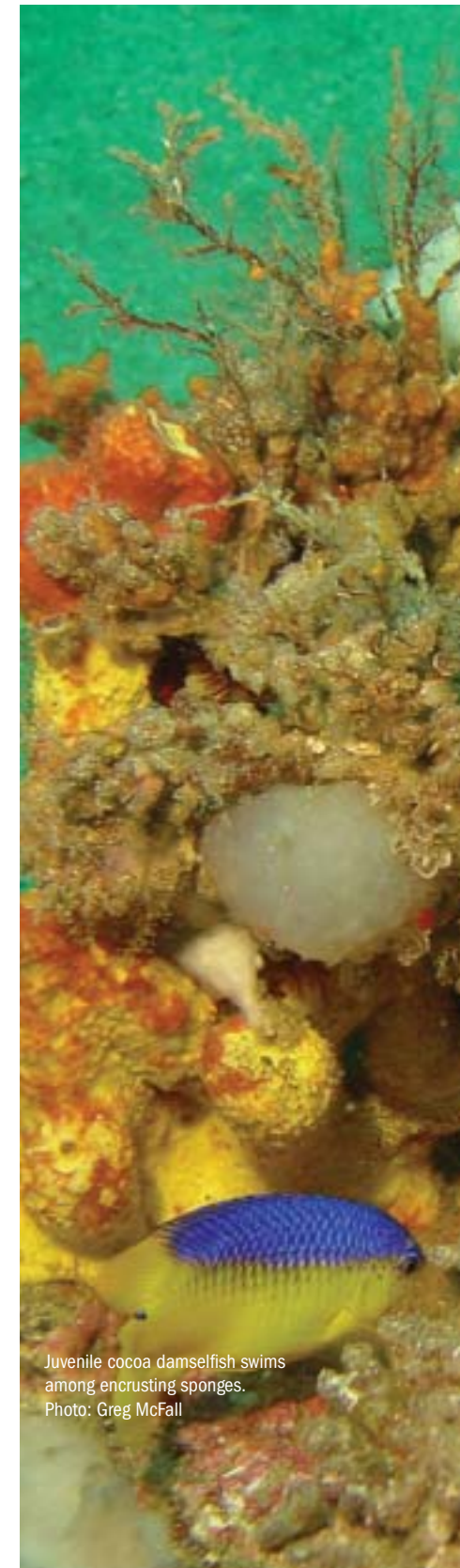
Recognizing a Precious Marine Resource – Our Volunteers

The National Marine Sanctuary Program stepped up efforts in 2003 to nationally recognize the volunteers who generously dedicate their time to support the program's mission. More than 5,000 volunteers are active in at least 17 different projects at our national marine sanctuaries. In addition to providing invaluable assistance with conservation, research, enforcement, education and outreach, these volunteers strengthen the bond between sanctuaries and their surrounding communities. They embody the environmental stewardship that must prevail if our national marine sanctuaries are to thrive.

In June, two volunteers from Gulf of the Farallones and Olympic Coast national marine sanctuaries were honored with the first Volunteer of the Year awards, presented by the National Marine Sanctuary Foundation. The issue of volunteer recognition was also addressed in the draft Volunteer Program National Plan of Action, which is based on evaluations of each sanctuary's volunteer programs and community partnerships. This action plan is a national blueprint for creating and supporting volunteer projects that are as compelling for the volunteers as they are effective for the sanctuaries. It also establishes a national volunteer database, which will ease some of the management burden on individual sanctuaries. This is the next step toward an even more dynamic volunteer program that addresses the needs and resources unique to each sanctuary. With the support of a national plan of action, the program will challenge itself to double the number of volunteers working in sanctuaries across the nation.

Revising Management Plans to Meet New Challenges

The health of our nation's thriving marine habitats and the survival of its endangered and threatened marine species depend in part on how we manage our national marine sanctuaries. Many of the sanctuaries are in the final stages of a community-based public review and revision of their management plans. This process, launched in 1999, has been exhaustive, incorporating passionate viewpoints expressed by the public, industry groups, conservation organizations, the research and education community, and government entities.



Juvenile cocoa damselfish swims among encrusting sponges.
Photo: Greg McFall



California sea lions
Photo: Brad Damitz



In November, Gray's Reef National Marine Sanctuary released its draft management plan and draft environmental impact statement, which include proposals to ban anchoring and to allow fishing only with rod and reel and handline gear. The plan was produced with extensive input from the public and the sanctuary advisory council, in close coordination with NOAA Fisheries Southeast Region, the South Atlantic Fishery Management Council and the Georgia Department of Natural Resources. The input received during the public comment period is currently under review by the National Marine Sanctuary Program; a final management plan and environmental impact statement are expected to be released by summer 2004.

Channel Islands National Marine Sanctuary is scheduled to complete its draft management plan in 2004. The central California sanctuaries—Monterey Bay, Gulf of the Farallones and Cordell Bank—are reviewing their management plans jointly. Thousands of public comments have helped guide the preparation of more than two dozen draft action plans for these sanctuaries. The issues addressed include coastal development, species and habitat protection, water quality and wildlife disturbance. A similar process is underway at Stellwagen Bank National Marine Sanctuary, where action plans will be presented to the sanctuary advisory council in 2004.

Thousands of people contributed their expertise and perspectives to the management review process in 2003. Sanctuary and headquarters staff will endeavor to engage an even greater number of stakeholders in the future to ensure that each sanctuary is fully prepared to meet the challenges of the next decade and beyond.

Protecting Our Marine Habitats

A primary objective of the National Marine Sanctuary Program is resource protection, an awesome task when one considers that threats to a sanctuary's resources are as varied as the resources themselves. This responsibility must encompass a broad range of activities, such as emergency response, contingency planning, damage assessment, restoration and enforcement. In 2003 alone, the program's Resource Protection Team handled more than 60 natural resource damage assessment cases. Ten of those cases recovered approximately \$290,000 in fines. In October, the program held the first ever National Marine Sanctuary Enforcement Summit, attended by representatives from the sanctuaries, U.S. Coast Guard, NOAA Office of Law Enforcement and General Counsels for Law Enforcement and Natural Resources. They discussed strategies and exchanged ideas on how to leverage limited enforcement resources.

The Resource Protection Team also focused on helping nine of the sanctuaries dramatically increase their emergency response capabilities with the Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS). During an emergency, such as an oil spill, this thorough Web-based tool will give sanctuary and headquarters staff immediate and simultaneous access to information about the habitats and species at risk, any additional threats, resources available to help, notification contacts, maps and agency jurisdictions. Included within

SHIELDS is the Resources and Under Sea Threats (RUST) database, which allows the program to inventory and assess the relative threat of shipwrecks, pipelines, platforms, munitions, radioactive wastes, chemical warfare agents and industrial wastes.

The National Marine Sanctuary Program will use more innovative emergency response tools, such as SHIELDS, and peer outreach efforts, such as the sanctuary enforcement summit, to overcome future challenges in all aspects of resource protection. These are only two recent examples of the program's proactive and comprehensive approach to protecting a staggering 150,000 square miles of ocean and Great Lakes habitats, marine life and maritime heritage resources.

Sanctuary Program Launches Maritime Heritage Program

Designation in 1975 of the remains of the Civil War ironclad *Monitor* as the first national marine sanctuary ushered in a new era of stewardship for America's maritime heritage. The National Marine Sanctuary Program has received widespread acclaim for its protection and management of the *Monitor* and numerous historically significant shipwrecks in its newest sanctuary (2000), Thunder Bay National Marine Sanctuary and Underwater Preserve. In 2003, a groundbreaking ceremony unveiled plans for the new Maritime Archaeology Center at The Mariners' Museum in Newport News, Virginia. The center will serve as headquarters for the NMSP Maritime Heritage Program, created in 2002 to protect and manage the archaeological and cultural resources within all sanctuaries. In addition to sunken ships, maritime heritage sites include submerged wharves, ferry docks and what remains of North America's first human settlements dating back thousands of years.

The Maritime Heritage Program assisted with numerous projects in 2003, many of which are detailed in this report, including the first comprehensive survey of the *Monitor*; identification and mapping of the Canadian Navy vessel *Queen of Nassau* in the Florida Keys; identification and mapping of the passenger steamer SS *Portland* in Stellwagen Bank; discovery of the USS *Saginaw* in the Northwestern Hawaiian Islands; mapping of a World War II Japanese midget submarine at Pearl Harbor; the discovery of new information about the U.S. Navy's first submarine, *Alligator*; and the development of a maritime heritage resource database.

In 2004, the Maritime Heritage Program will assist with expeditions in *Monitor*, Thunder Bay, Stellwagen Bank, Florida Keys and Hawaii Islands Humpback Whale national marine sanctuaries. Each expedition is a race with time to reveal or confirm what historic details remain from decades or even centuries ago. The challenge embraced by the Maritime Heritage Program is to give us all greater insight into the history of life on the Great Lakes and the high seas.



National Marine Sanctuary Program FAQs

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Total area managed: 150,436-square-miles

Date created: October 23, 1972 with the passage of Title III of the Marine Protection, Research, and Sanctuaries Act

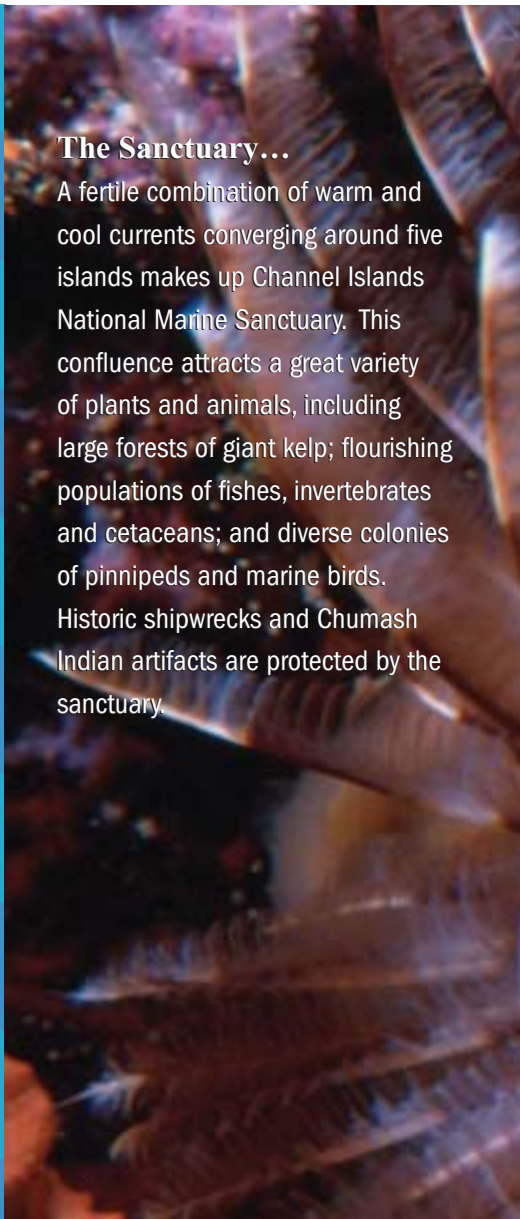
French Frigate Shoals
Photo: ©Jim Watt/NOAA





The Sanctuary...

A fertile combination of warm and cool currents converging around five islands makes up Channel Islands National Marine Sanctuary. This confluence attracts a great variety of plants and animals, including large forests of giant kelp; flourishing populations of fishes, invertebrates and cetaceans; and diverse colonies of pinnipeds and marine birds. Historic shipwrecks and Chumash Indian artifacts are protected by the sanctuary.



Channel Islands National Marine Sanctuary

Accomplishments 2003

12 New Marine Protected Areas Established in Sanctuary Waters

In April, the California Fish and Game Commission established a network of 12 marine protected areas (MPAs) within Channel Islands National Marine Sanctuary, a significant step forward for marine conservation in California. The MPAs were set aside to protect and restore habitats and ecosystems, conserve biodiversity, provide a refuge for sea life, enhance recreational and educational opportunities, and provide reference areas for research. The network encompasses 146 square nautical miles, or roughly 12 percent of sanctuary waters.

Ten of the 12 MPAs are “no-take” marine reserves, which means no fishing is allowed. Two others are conservation areas that allow fishing for pelagic (open ocean) species and lobsters. Sanctuary staff acted swiftly to educate 25,000 registered boaters in Ventura County with a new brochure about the Channel Islands and the MPA network. The sanctuary also sponsored workshops at the University of California Santa Barbara seeking public and professional input on biological and socioeconomic monitoring strategies for the MPA network. Heightened public awareness and continued input on monitoring from commercial, academic and environmental interests is expected to build a deeper understanding of the Channel Islands ecosystems and the role of MPAs in resource protection. Plans are underway to consider extending the state MPAs into deeper waters of the sanctuary.

Expedition Brings Sanctuary's Kelp Forest into Hundreds of Classrooms

Channel Islands National Marine Sanctuary was a key partner in the 2003 JASON Project, *JASON XIV: From Shore to Sea*. This project educated an astonishing 33,000 teachers and more than 1.6 million school children across the U.S. and around the world about the Channel Islands, the kelp forest ecosystem, marine reserves and the native Chumash people. JASON began as the dream of Dr. Robert Ballard, the ocean explorer who discovered the wreck of the RMS *Titanic* in 1986. JASON enables students and teachers to monitor the fieldwork of the project's research cruises from their classrooms in real time and communicate with scientists and students aboard ship. The sanctuary's partnership with the JASON Foundation for Education is a prime example of how marine research is being used successfully to both educate and inspire future generations.

New State-of-the-Art Research Vessel Plying Sanctuary Waters

The new research vessel (R/V) *Shearwater* is a 62-foot, aluminum, high-speed catamaran custom designed and built to serve Channel Islands National Marine Sanctuary. The state-of-the-art vessel has been conducting at-sea operations ever since its arrival in March, operating over 80 percent of the available sea days. The sanctuary has partnered with state, federal and university scientists on numerous projects, including species and shipwreck surveys, education and outreach field trips, and the successful recovery of a sophisticated sonar instrument lost during a NOAA research cruise. Even in its first year, the R/V *Shearwater* has proven itself to be invaluable to the sanctuary's mission to support scientific research and long-term monitoring of its cultural and natural resources.

New Education CD-Rom Explores Channel Islands

In February, the sanctuary released a new multi-media CD-ROM entitled "Exploring the Channel Islands National Marine Sanctuary." The result of two years' work by sanctuary staff, in partnership with Green Meadow Entertainment, this comprehensive CD-ROM offers an interactive virtual tour of the sanctuary's programs, marine life and maritime heritage. It features hundreds of pages of information, images and Web links, dozens of video clips and interactive maps, above- and below-water panoramic images of the islands and sanctuary, a calendar of natural events, and identification cards for more than 100 species of marine life. It is an ideal learning tool for children and adults alike.

Sanctuary Partners with National Park to Expand Outreach

The sanctuary's Naturalist Corps educates thousands of residents, school children and tourists during whale watches, natural history tours and various outreach events. Nearly 100 Naturalist Corps volunteers logged more than 10,000 hours, both on the water and during community events, accomplishing the equivalent of five full-time staff. In addition, the Naturalist Corps program was expanded to include Channel Islands National Park. This partnership enables the sanctuary to reach a broader audience and demonstrates to the public that both agencies stand united in protecting the health and resilience of the Channel Islands ecosystems.

6th California Islands Symposium

In December 2003, the sanctuary co-sponsored the 6th California Islands Symposium, a multidisciplinary conference focusing on recent research, resource management and educational efforts in the California Islands and their surrounding marine environments. More than 300 people attended the three-day symposium, which included discussions on maritime heritage, terrestrial and marine resources, as well as field trips to the Channel Islands. This conference, held every few years, is generally considered by marine researchers and resource managers to be one of the region's best opportunities for exchanging ideas and information. The sanctuary organized and sponsored the poster session, which was an opportunity for various students and researchers to present and discuss their scientific research.

Plans for 2004

R/V *Shearwater* research and monitoring cruises

2004 will be a busy year for the R/V *Shearwater*, the only hi-tech research catamaran in Southern California. The sanctuary has planned a variety of research and monitoring cruises in Channel Islands and Monterey Bay national marine sanctuaries. Projects include sanctuary habitat mapping, Xantus's murrelet nesting surveys, water quality sampling, shipwreck surveys, fish distribution and abundance studies, and marine reserve and marine conservation area monitoring studies.

Sanctuary FAQs

Designated: September 22, 1980

Protected area: 1,658-square-miles

Key species: California sea lion, elephant seal, harbor seal, blue whale, gray whale, dolphin, blue shark, brown pelican, western gull, abalone, garibaldi and rockfish

Key habitats: Kelp forests, rocky shores, sandy beaches, seagrass meadows, deep rocky reefs and open ocean

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Another unique organism is the feather duster worm. While this species may look like a plant, it is actually an animal. Its feathery plumes are used to filter water for nutrients and will retract into its tube when it is disturbed.

Photo: Chris Gotschalk



Channel Islands naturalist corps along the Santa Barbara coastline. Photo: CINMS



Xantus's murrelets
Photo: CINMS



Science team measuring fish during Bight 2003.
Photo: Robert V. Schwemmer



Blue whale
Photo: Fred Benko

The Sanctuary...

Located at the edge of the continental shelf, sixty miles northwest of California's Golden Gate Bridge, Cordell Bank rises from the seafloor. Although the water around the bank is generally 400 feet deep, along a few of its ridges and pinnacles this submerged island rises to within 120 feet of the ocean surface. Upwellings of nutrient rich ocean waters created by the bank's topography create a lush feeding ground for many marine mammals and seabirds. The depth, currents and distance from the mainland have largely kept this special part of the California seafloor a mystery to both scientists and the public.



Cordell Bank National Marine Sanctuary

Accomplishments 2003

Exploring the Mysteries of Cordell Bank

Sanctuary staff, in partnership with scientists from NOAA Fisheries and the California Fish and Game Department, continued their exploration of Cordell Bank's habitats and marine life. Now in its second year, this coordinated research effort includes the first survey of Cordell Bank's species in a generation. The data will support long-term monitoring and management of the sanctuary's health. The scientific teams completed five dives in 2003, using a miniature submarine equipped with a video camera that can operate more than 1,200 feet below the ocean's surface. They identified 60 species of fish, including 42 species of the sanctuary's dominant fish family, the rockfish or *Sebastes*. Surveys repeatedly demonstrate the importance of Cordell Bank as habitat for both juvenile and adult rockfishes, although this offshore bank provides shelter and food for a diverse and productive biological community.

Sanctuary Reaches Thousands with Seminar and Lecture Series

2003 was a particularly productive year for education and outreach efforts. Cordell Bank sanctuary staff developed a collaborative on-going adult education field seminar with the Point Reyes National Seashore Association, which includes classroom activities and a wildlife-watching trip through sanctuary waters. The first year was an extreme success, evidenced by the waiting list of people who want to participate in 2004. Plans have been made to expand the seminar. Cordell Bank also co-hosted with Gulf of the Farallones National Marine Sanctuary the issue-based "Take the Plunge" lecture series, which was attended by 600 people. In addition, sanctuary staff delivered 40 presentations to various schools, community events and interest groups.

Public Benefits from Expanded Whale Watching Opportunities

Diligence on the part of education staff opened up new opportunities for the public to enjoy whale watching in sanctuary waters. Staff outreach assistance resulted in an agreement by The Oceanic Society to add three new trips from Bodega Bay to Cordell Bank. Public response was enthusiastic and the full enrollment is likely to encourage The Oceanic Society to repeat the schedule in 2004. The timing was especially fortunate because 2003 was an exceptional year for blue and humpback whale sightings, due to the abundant amount of krill.

New Marine Science Curriculum Kit Unveiled

Cordell Bank National Marine Sanctuary is entirely offshore and strives to create educational programming that fosters public appreciation of its remote marine habitats. In keeping with that mission, the sanctuary unveiled its new offshore monitoring curriculum kit, LiMPETS, or Long Term Monitoring Program and Experiential Training for Students. Aligned with California state science standards, the kit contains activities that are focused on monitoring the pelagic (open ocean) environment.



The LiMPETS kit was formally presented to marine science educators during both the National Marine Educators Association Conference in Wilmington, North Carolina and the Coastal Ecosystem Workshop in San Francisco. The kit was first demonstrated in the field in March, during a LiMPETS Workshop co-hosted by Cordell Bank and Gulf of the Farallones national marine sanctuaries. Seventeen teachers from all five West Coast national marine sanctuaries attended the workshop, which trained them how to implement long term monitoring studies of rocky intertidal and sandy beach environments. The sanctuary plans to adjust the LiMPETS kit in 2004 after further evaluation from local teachers.

Major Milestone with Hiring of Fulltime Manager

In June, Dan Howard was appointed as the first fulltime manager of Cordell Bank National Marine Sanctuary. His appointment officially separates the management of Cordell Bank and Gulf of the Farallones national marine sanctuaries. Previously the sanctuaries had been sharing a manager. Even before becoming sanctuary manager, Dan had for many years played a key role in exploring Cordell Bank. Working with its newly created advisory council, the sanctuary can now develop education and research programs focused on the unique qualities of Cordell Bank.

Plans for 2004

15th Anniversary Celebration

2004 marks the 15th anniversary of the designation of Cordell Bank National Marine Sanctuary. The sanctuary will be celebrating throughout the year with a lecture series about its extraordinarily rich marine environment. In the fall, the sanctuary will host a celebration and unveil a new exhibit at the Point Reyes National Seashore Red Barn, documenting the history of Cordell Bank from discovery to protection. The exhibit will also highlight the work of local marine artists.

Mapping Cordell Bank's Seabed

Cordell Bank National Marine Sanctuary is planning a cooperative project with the U.S. Geological Survey to map the sanctuary's seabed. The project will use multi-beam sonar equipment to collect depth and habitat information. This survey will provide the base maps for geographic information systems. Ultimately all data, including firsthand observations from submersibles, will be combined to provide a foundation of knowledge for future scientific investigations.

New Exhibit to Engage Visitors

Cordell Bank and Gulf of the Farallones national marine sanctuaries are collaborating on a new exhibit in the Point Reyes National Seashore Bear Valley Visitor Center. This center is the main stop for 500,000 annual visitors to the seashore, as well as a destination for many school groups. The focus in 2004 will be fabrication of the exhibit.

Sanctuary FAQs

Designated: May 24, 1989

Protected area: 526-square-miles

Key species: Krill, Pacific salmon, rockfish, humpback whale, blue whale, Dall's porpoise, albatross and shearwater

Key habitats: Rocky reefs, open ocean, soft sediment, continental slope and shelf

Sanctuary manager: Dan Howard

Headquarters address:

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Point Reyes Station, CA 95950

Telephone: (415) 663-0314

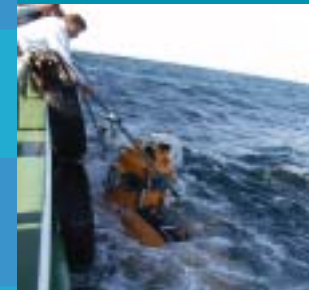
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China rockfish
Photo: CBNMS



Delta submersible
Photo: CBNMS



Basket star
Photo: CBNMS



Giant ocean sunfish,
or *Mola Mola*
Photo: Steve Lock

Quillback rockfish
Photo: CBNMS

The Sanctuary...

This remote sanctuary lies nestled in an eroded volcanic crater on the southwest shore of the island of Tutuila, American Samoa. An ancient Polynesian culture has served as steward of this fringing coral reef ecosystem rich in reef fish, giant clams and blacktip reef sharks. In the late 1970s, Fagatele Bay was devastated by a crown-of-thorns starfish attack that destroyed over 90 percent of the coral. This incident was followed by two hurricanes, tropical storms and coral bleaching, each further stressing the reefs. Despite these damaging natural events, the coral has proved resilient, providing a valuable opportunity for scientists to study how tropical reefs recover from such episodes.

*Tutuila Island
American Samoa*

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*Fagatele Bay
NMS*

Pacific Ocean



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Fagatele Bay National Marine Sanctuary

Accomplishments 2003

Research on Coral Bleaching Could Impact Worldwide Preservation Efforts

Fagatele Bay is the smallest and most remote of the national marine sanctuaries, with the unique quality of being the only true tropical coral reef in the sanctuary system. In late 2002 and early 2003, the sanctuary received worldwide attention when it experienced low to moderate (as much as 50 percent) coral bleaching, which occurs when coral expel the algae they depend on for food. No one knows for sure what causes this phenomenon, but marine biologists have blamed salt level and water temperature changes and pollution. In cooperation with global efforts encouraging coral reef preservation, the sanctuary provided its boat and staff time to research the bleaching and its possible connection to climate change. In 2004, Fagatele Bay sanctuary will contribute to the scientific research with its regularly scheduled biological survey, one of the longest running coral reef monitoring programs in the world.

First Whale Survey Ever Yields Surprising Results

In 2003, researchers discovered that the humpback whale population traveling through American Samoa waters may be much larger than previously thought, suggesting this sub-population of South Pacific humpback whales could make up a more significant portion of the total population of whales in the South Pacific. That's one of the major conclusions of the first humpback whale count ever conducted in American Samoa. In September, two representatives from Hawaiian Islands Humpback Whale National Marine Sanctuary and the Center for Marine Studies conducted an eight-day survey of the whales. The team counted 33 humpback whales, a number much higher than anticipated, and observed for the first time whale feeding behavior in the calving grounds. It is believed that humpbacks generally do not feed during their tropical travels. Researchers were also able to collect DNA from 17 whales; scientific data vital to ensuring these gentle giants continue to swim in Samoan waters.

Save a Beach Program Returns for Hundreds of School Children

Fagatele Bay National Marine Sanctuary has relaunched its popular Save a Beach program, which combines environmental education and outreach with restoration efforts. The program returned for the 2002-2003 school year to an enthusiastic response, drawing hundreds of children from three schools. The students learn about environmental stewardship first hand by cleaning beaches at least once a month. Those experiences are complemented in the classroom with marine poetry, art and essay contests. The winners are announced regularly in the Samoa News. Save a Beach continues during the 2003-2004 school year, with nine schools now participating in an expanded program that includes water quality monitoring.

Samoa's Marine Environment Featured in New Annual Festival

Fagatele Bay National Marine Sanctuary hosted Ocean Fest in August, the first island-wide festival ever held to highlight American Samoa's marine environment. Approximately 400 people attended the kick-off of this new annual event, which promises to greatly enhance the sanctuary's community outreach efforts. Art workshops, co-directed by renowned marine artist Robert Lyn Nelson, were a major feature of the event. The public also enjoyed a variety of hands-on ocean related activities coordinated by various agencies, entertainment by youth groups and the presentation of the first sanctuary scholarship to a marine science student attending the University of Hawai'i.

Partnerships Expand Programs to Educate Samoan Children

Education and outreach is particularly challenging for Fagatele Bay National Marine Sanctuary because of its small staff. However, achievements in 2003 confirm that creative and energetic partnerships can stretch a few resources a long way. Throughout the school year, fourth-grade students from four schools took part in the month-long ReefWeeks, which includes environmental presentations, reef walks, wetland tours and writing and art contests. ReefWeeks is a sanctuary program in partnership with Le Tausagi, a local environmental educators group. In October, the sanctuary participated in the annual Coastweeks, educating several hundred children on the habitats and marine species that led to Fagatele Bay's designation as a national marine sanctuary. Fagatele Bay sanctuary staff hosted a tour of the sanctuary and joined Le Tausagi in school presentations and various outreach activities. In addition, the sanctuary partnered with various local agencies to host 100 children for EnviroDiscoveries, a three-day summer camp focusing on the marine environment.

Plans for 2004

Teachers Voyaging the Pacific

In summer 2004, the sanctuary is launching "Teachers Voyaging the Pacific," a one-year training and professional development program for elementary and middle school teachers from American Samoa and Hawai'i. The teachers will participate in experiential institutes in marine science, facilitated by practicing scientists and exemplary marine educators. The mission is to develop curriculum that fully utilizes the marine environment as a teaching tool.

First Cultural Resource Inventory Released

The sanctuary is scheduled to release its first cultural resource inventory in March. The inventory, funded and conducted by sanctuary staff, surveyed an old village that was abandoned in the 1960s. The findings will be released in a brochure to educate the public about the Samoan culture of Fagatele Bay.

Sanctuary FAQs

Designated: April 29, 1986

Protected area: 0.25-square-miles

Key species: Crown-of-thorns starfish, blacktip reef shark, surgeon fish, hawksbill turtle, parrotfish and giant clam

Key habitats: Tropical coral reef

Sanctuary manager: Nancy Daschbach

Headquarters address:

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Pago Pago, AS 96799

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Fax: 684-633-7355

E-mail: fagatelebay@noaa.gov

Website: <http://fagatelebay.noaa.gov>



Clown fish
Photo: Kip Evans



Fagatele Bay viewed from the cliffs above.
Photo: Kip Evans



Large sea star is known locally as an aveau.
Photo: Kip Evans



Reef scape
Photo: Kip Evans

Above and below photo of the Fagatele Bay National Marine Sanctuary.
Photo: Kip Evans

The Sanctuary...

Florida Keys National Marine Sanctuary contains one of the most diverse underwater communities of plants and animals in North America. Its dazzling coral reefs support rich marine populations that depend on the reefs for shelter and food. This complex marine ecosystem, which also includes fringing mangroves, seagrass meadows, hardbottom communities and bank reefs, supports the commercial fishing and tourism-based businesses that are crucial to Florida's economy. The sanctuary also protects the final resting places of shipwrecks that span both pre-colonial and modern maritime history. Even though the sanctuary serves as a model for international marine management and resource protection efforts; nutrient runoff, pollution, groundings and coral bleaching increasingly threaten its reefs.



Florida Keys National Marine Sanctuary

Accomplishments 2003

Sanctuary Rescues Coral From Certain Destruction

Florida Keys National Marine Sanctuary worked with coral nursery and university aquaculture laboratories to rescue more than 1,000 corals and coral fragments that would have otherwise been destroyed by a U.S. Navy pier restoration project in Key West. Sanctuary staff worked in partnership with the U.S. Navy, contractors and other agency personnel in 2003 to develop detailed permit special conditions, monitoring and mitigation plans to address coral resource protection issues. This coral rescue effort will continue in 2004, focusing on transplanting larger colonies.

Efforts to Restore and Protect Seagrass Succeed Beyond Sanctuary Waters

South Florida is home to the largest seagrass meadow in the world and supports a commercial fisheries harvest worth an estimated \$74.6 million. In 2003, the Florida Keys sanctuary firmly established a comprehensive plan for the preservation of this invaluable marine habitat. The sanctuary's Seagrass Outreach Partnership greatly enhanced public awareness, even at the national level. The partnership produced a seagrass toolkit CD that includes images, activities, presentations and media tips. The sanctuary also stepped up restoration of damaged seagrass and equipped its law enforcement officers with new kayaks to help them reach grounded boats.

Temporary Reef Closure Stops Spread of Coral Disease and Educates Public

During the summer, the Florida Keys sanctuary was faced with a new, rapidly spreading disease-like condition that was killing staghorn coral colonies on White Banks Dry Rocks Reef, a popular diving destination. Posed with the immediate need to determine the cause of the syndrome and to prevent it from spreading, the sanctuary issued a 60-day emergency closure. This is only the second time in its history that the sanctuary has issued such an emergency closure and it proved to be highly successful.

The scientific community rapidly mobilized, designing and conducting novel experiments on short notice to assist in the understanding and preservation of this important coral species. Sanctuary staff launched an extensive education and media campaign, both to explain the closure and to enlist the help of divers who could possibly affect the spread of coral disease in the future. The outbreak was stopped but not before approximately 65 percent of the staghorn coral colonies died. Researchers continue their efforts to identify the cause and spread of this mysterious disease-like condition.

Sanctuary Partnerships Address Water Quality

Water pollution continues to be a major threat to Florida Keys marine life. During 2003, the sanctuary worked in partnership with the State of Florida, U.S. Environmental Protection Agency (EPA), NOAA, local governments and conservation groups, such as Reef Relief, to educate boaters about the no-discharge zone. The sanctuary's Water Quality Steering Committee, under the leadership of the EPA, will continue to play an

active role, providing input to state and local agencies and implementing measures to improve water quality in the Florida Keys. In 2004, the Florida Keys sanctuary plans to hold a State of the Sanctuary Summit to address the relationship between water quality and the health of the Florida Keys coral reef ecosystem.

Sanctuary Biologist Helps Revolutionize Coral Reef Protection Worldwide

In early 2003, the sanctuary was honored to have one of its employees recognized for an invention that is now used in marine protected areas worldwide. Biologist John Halas received a Bronze Medal from the U.S. Department of Commerce for developing a mooring device for boats that is designed to protect coral reef and seagrass habitats from anchor damage. The Halas Mooring Buoy System significantly reduces damage to Florida Keys reefs and has helped revolutionize coral reef management.

Plans for 2004

New Lobster Tagging Project Tests Value of Ecological Reserve

The Florida Keys National Marine Sanctuary is undertaking a project that may underscore the value of marine reserves in replenishing surrounding waters with marine life. In partnership with the Florida Marine Research Institute (Florida Fish and Wildlife Conservation Commission), sanctuary staff plan to launch a lobster tagging project in a patch reef environment within and adjacent to the Western Sambos Ecological Reserve. This reserve was established in 1997 both to protect habitat and species and to replenish the surrounding fishery. The tagging project will provide valuable new details about the lobster populations and help determine spillover into the lobster fishery.

New Partnership with Dive Operators Promotes Reef Conservation

In October, the Florida Keys sanctuary plans to present its Blue Star program at the annual Dive Equipment and Marketing Association show in Houston. Blue Star is a voluntary certification program to recognize dive and snorkel operations that promote awareness of the coral reef ecosystem and the sanctuary. These operators will commit to enlisting their customers as partners in protecting the reefs by encouraging minimum impact diving and snorkeling. A steering committee comprised of dive and snorkel industry leaders and sanctuary staff will develop standards and training methods for Blue Star operators, seek funding for program materials, and draft strategies for publicizing the program.

Protecting Sanctuary Resources Through Marine Zoning

Since the implementation of the marine zoning plan in 1997, this management tool has gained widespread community support. In 2004, Florida Keys National Marine Sanctuary plans to work at the request of local citizens to increase the number of Wildlife Management Areas and Sanctuary Preservation Areas. The Wildlife Management Areas minimize disturbance to especially sensitive wildlife populations and their habitats. The Sanctuary Preservation Areas are designed to enhance the reproductive capabilities of renewable resources, protect areas critical for sustaining important marine species, and reduce user conflict in high-use areas.

Sanctuary FAQs

Designated: November 16, 1990

Protected area: 3,674-square-miles

Key species: Hard corals (elkhorn, staghorn, pillar, brain and star corals, soft corals (sea fans, sea rods, and sea whips), sponges; turtle grass, angelfish, spiny lobster, stone crab, grouper and tarpon

Key habitats: Coral reefs, patch and bank reefs, mangrove-fringed shorelines and islands, sand flats, seagrass meadows, hardbottom communities, open ocean

Sanctuary superintendent: Billy Causey

Headquarters address:

P.O. Box 500368

Marathon, FL 33050

Regional operations offices are located in Key West and Key Largo.

Telephone: 305-743-2437

Fax: 305-743-2357

E-mail: floridakeys@noaa.gov

Web site: <http://floridakeys.noaa.gov>

Seagrass beds, one of the most productive communities on earth, support a diverse array of organisms from algae to invertebrates and fish. Many fish, crustaceans and shellfish use seagrass beds as nursery grounds. Species diversity of seagrass communities can range from 292 individuals to 10,644 per square meter.

Photo: Paige Gill, FKNMS



Seagrass festival
Photo: Nancy Diersing, FKNMS



Florida Keys reef scene with rock beauty.
Photo: Mike White, FKNMS



Spiny lobsters
Photo: FKNMS



Coral polyps
Photo: FKNMS



The Sanctuary...

One hundred miles off the coasts of Texas and Louisiana, a trio of underwater gardens emerge from the depths of the Gulf of Mexico. These fertile coral reefs, the northernmost in the continental U.S., serve as regional reservoirs of shallow water for Caribbean reef fishes and invertebrates. The salt domes of Flower Garden and Stetson Banks provide homes for corals, sponges and fish of such beauty that they have become a premier diving destination in the United States. Each winter, schools of hammerhead sharks and spotted eagle rays visit the sanctuary. In summer, coral spawning attracts scientists and divers from around the world.



Flower Garden Banks National Marine Sanctuary

Accomplishments 2003

Good News About the Sanctuary's Coral Reefs

The Flower Garden Banks have been the subject of one of the longest continuous coral reef monitoring programs in the U.S. Data collected over a four year period was compiled and analyzed in a 2003 report commissioned by the sanctuary. The report, "Long-Term Monitoring at the East and West Flower Garden Banks National Marine Sanctuary, 1998-2001," reveals that the reefs are amazingly healthy. This conclusion is further supported by findings outlined in a Smithsonian bulletin that show the Flower Garden Banks reefs compare favorably with other prominent reefs around the region.

Voyage of Discovery Boosts Education and Research

The sanctuary learned much more about its deep water species and corals during a voyage of discovery sponsored by the NOAA Office of Ocean Exploration. The expedition, aboard the NOAA Ship *Ronald H. Brown*, included a team of scientists from four universities and the U.S. Geological Survey. They explored deep-water-coral habitats, which are crucial spawning sites for commercially important fishes and reef-building corals. The 274-foot *Brown* is one of the nation's most technologically advanced research vessels and is equipped to conduct worldwide oceanographic and atmospheric research.

The team documented coral habitats through images and specimens, measured bottom currents, and mapped the biology and geology of the northern Gulf of Mexico outer shelf and upper continental slope region. This information is essential for the most effective management of the sanctuary's fragile and diverse habitats, which exist in a region of extensive commercial and recreational activity. The expedition brought up a number of specimens, including corals and some interesting deep-sea crabs. Daily mission logs and images are posted on the Web, providing a front row seat for students, scientists and explorers-at-heart.

Sanctuary Documents New Information about Rarely Seen Species

Sanctuary staff have, for the first time, collected documentation of marbled grouper spawning activity, which will help to better protect and manage this elusive species. The marbled grouper is one of the least sighted groupers in all of the Caribbean and Gulf of Mexico. These colorful fish are usually found at depths below safe diving limits and only rarely venture up to the top of the reef. This project provided an excellent opportunity to use marine research technology. Remotely operated vehicles, high-resolution multi-beam bathymetry, and high-resolution digital imaging provided researchers with the status of the marbled grouper and possibly its spawning aggregations.

New Outreach Partnership with the Tennessee Aquarium

The sanctuary has initiated an exciting new partnership with the popular Tennessee Aquarium to bring the entrancing coral reefs of Flower Garden Banks to America's heartland. The aquarium is adding

a multi-million-dollar wing, the centerpiece of which will be an astonishingly large, 500,000-gallon tank modeled after the Flower Garden Banks. The wing, scheduled to open in Spring 2005, will include interpretive exhibits and programs about Flower Garden Banks National Marine Sanctuary, making it an invaluable outreach tool to a million visitors each year. Imparting information to the public about the role water quality plays in the health of the reefs is particularly important when one considers that two-thirds of U.S. natural waterways drain into the Gulf of Mexico.

Milestone for Innovative Industry Outreach Approach

2003 marked the 10th anniversary of the Agency/Industry Information Transfer Meeting and Expedition, an outreach event hosted by the sanctuary to bring together conservation and industry representatives. Participants experience the Flower Garden Banks firsthand as they address from all perspectives the current issues regarding spill prevention and response. This proactive approach to resolving potential conflicts between conservation organizations and the oil and gas industry has proven to be highly successful over the years. Conservationists often gain better insight into the challenges faced by commercial industries, while oil and gas representatives actually experience the breathtaking beauty and biological diversity they are encouraged to protect.

Sanctuary Recognized Statewide for Education Efforts

One of the main goals of Flower Garden Banks National Marine Sanctuary is to foster public appreciation and stewardship of the sanctuary's pristine marine habitats. In 2003, the sanctuary was especially proud of that effort when one of their own was acknowledged during a statewide conference. Sanctuary Education Specialist Sarah Bernhardt was recognized by the Texas Marine Educators Association for Outstanding Marine Education by a Non-classroom Educator. Sarah received this honor during the 2003 Texas Conference for the Advancement of Science Teaching. Many of the sanctuary's education opportunities are outside classrooms in a variety of venues, such as trade shows, conferences, community events and formal workshops. The annual Down Under, Out Yonder education workshops, in partnership with the Gulf of Mexico Foundation, have been especially effective, educating more than 200 teachers from a dozen states. Land-based lectures are enhanced by three days of diving with sanctuary staff and researchers.

Plans for 2004

Expanding the Successful Naturalist-on-Board Program

The Flower Garden Banks National Marine Sanctuary is developing a new naturalist manual in 2004, in conjunction with plans to expand its Naturalist-on-Board program. The program places trained volunteer naturalists on visiting dive charter vessels. These naturalists reach about 750 divers annually, teaching them about the sanctuary and how they can help protect it. The sanctuary's coral reef cap is extremely popular with the public. With 50 percent reef cover and 80- to 100-foot visibility, it's easy to understand why. Divers are also likely to see "charismatic mega fauna," such as turtles, manta rays and sharks.

Sanctuary FAQs

Designated: January 17, 1992

Protected area: 56-square-miles

Key species: Star coral, brain coral, manta ray, hammerhead shark and loggerhead turtle

Key habitats: Coral reefs, algal-sponge communities, brine seep, sand flats and open ocean

Sanctuary manager: G.P. Schmahl

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E-mail: flowergarden@noaa.gov

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Loggerhead sea turtle
Photo: Joyce and Frank Burek



Spanish hogfish
Photo: Greg Bunch
www.gbundersea.com



Marbled grouper
Photo: Joyce and Frank Burek

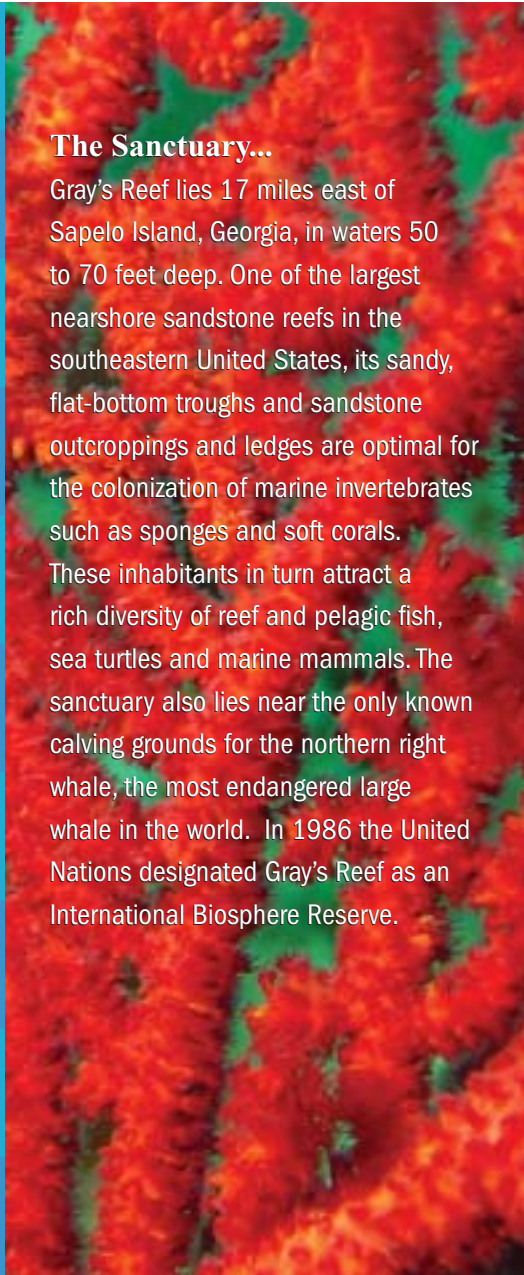


Yellowhead jawfish
Photo: Joyce and Frank Burek

Spawning brain coral with Christmas tree worm.
Photo: Greg Bunch, www.gbundersea.com

The Sanctuary...

Gray's Reef lies 17 miles east of Sapelo Island, Georgia, in waters 50 to 70 feet deep. One of the largest nearshore sandstone reefs in the southeastern United States, its sandy, flat-bottom troughs and sandstone outcroppings and ledges are optimal for the colonization of marine invertebrates such as sponges and soft corals. These inhabitants in turn attract a rich diversity of reef and pelagic fish, sea turtles and marine mammals. The sanctuary also lies near the only known calving grounds for the northern right whale, the most endangered large whale in the world. In 1986 the United Nations designated Gray's Reef as an International Biosphere Reserve.



Gray's Reef National Marine Sanctuary

Accomplishments 2003

Reporting Live from the Bottom of the Ocean

In July, Gray's Reef National Marine Sanctuary teamed up with Savannah's NBC affiliate WSAV-TV to broadcast live underwater interviews with divers at the reef. It was the first broadcast of its kind in Georgia and incorporated the same videophone technology used by embedded TV reporters during the Operation Iraqi Freedom. The event was coordinated with an educator's workshop aboard the research vessel Savannah, in partnership with the Skidaway Institute of Oceanography. Sanctuary staff met a major challenge of the broadcast by ensuring that a live video and audio signal could be sent back up to the ship and ultimately to the TV studio for the evening news program. The NOAA dive center provided special scuba masks with voice-activated waterproof microphones and earphones. They allowed divers to communicate in real-time with both the remotely operated vehicle operator and the television reporter aboard ship.

First Detailed Look at the Sanctuary's Seafloor Habitats

Sanctuary scientists developed the first detailed map of the Gray's Reef seabed. The map is essentially a breakdown of the sanctuary's ecosystem into four distinct habitats. The data was collected with side scan sonar and multi-beam technologies, combined with signal-processing and modeling efforts. Scientists with the NOAA Biogeography Program were able to use this data, coupled with firsthand observations from divers and underwater video, to map the distribution of the habitat types throughout the sanctuary. The map will serve as a foundation for future scientific comparisons of these habitats, revealing changes that could ultimately endanger or threaten marine life.

Sanctuary Partners with Aquarium to Expand Distance Learning

Gray's Reef National Marine Sanctuary has been a leader among sanctuaries in the use of distance learning technologies, one of its keystone education and outreach tools. This communications technology enables the sanctuaries to share exciting exploration and research discoveries in real time with students hundreds and even thousands of miles away. The sanctuary's Distance Learning Program serves classrooms across Georgia, as well 12 other states. In 2003, the Gray's Reef sanctuary supported the development of a distance learning mobile studio in the South Carolina Aquarium in Charleston. The sanctuary and aquarium partnered for their first joint broadcast, during which South Carolina students interacted with staff from both facilities simultaneously. The joint broadcast was highly successful as an education and outreach tool and another is planned for 2004.

Changes Recommended to Protect Sanctuary Marine Life

The Gray's Reef Sanctuary Advisory Council and partner agencies, including the Georgia Department of Natural Resources, NOAA Fisheries and the South Atlantic Fishery Management Council, recommended major changes in resource protection in 2003. The proposed changes include a complete ban on anchoring and prohibition

on the use of all fishing gear, except rod and reel and handline. The sanctuary, through the management plan review process, advanced these proposals to NOAA, which will make final decisions on the new conservation recommendations in 2004. These proposed changes are designed to ensure that corals and other long-lived organisms will be protected from potentially damaging activities.

Revealing the Elusive Warty Sea Slug

Gray's Reef sanctuary scientists created a stir in 2003 by providing rare documentation and photographs of the elusive warty sea slug. The slug, *Dendrodoris warta*, was captured on both video and in still photographs maneuvering across the sanctuary's reef. Sea slugs, or nudibranchs, are some of the most beautiful and diverse creatures in the ocean. Little is known about the warty sea slug, except that, like most nudibranchs, it possesses a chemical defense system that wards off all natural predators. The sanctuary's new information on the warty sea slug is considered by slug scientists to be a significant discovery and will increase scientific knowledge about the diversity of marine life found in the sanctuary.

Plans for 2004

Sanctuary Expedition to Test Various Fish Monitoring Techniques

The Gray's Reef sanctuary plans an expedition to research the abundance and distribution of recreationally important fishes, such as king mackerel and snapper. This information is essential in designing effective management plans for these species. The expedition will also test simultaneously various methods for monitoring fish to determine which are the most effective in terms of meeting the sanctuary's needs and providing meaningful data. The staff will employ the typical monitoring techniques, such as firsthand diver counts and baited traps, as well as new strategies, such as video data-loggers that collect data without disturbing the fish. The sanctuary will work in partnership with NOAA Fisheries and the South Atlantic Fishery Management Council to determine how useful new methods may be for broader regional fishery assessments.

Gray's Reef Initiates Underwater Acoustics Program for All Sanctuaries

The sanctuary has initiated "Sanctuary Sounds," a new underwater acoustics program that launches in 2004. The program will eventually deploy newly designed Autonomous Underwater Listening Stations, or AULS, in all the national marine sanctuaries, beginning with the Florida Keys in March. AULS record sounds made by marine mammals, fish, birds and invertebrates, as well as those produced by water, weather and manmade disturbances. Over time, this data will indicate stability or change in natural and human generated sounds. The international community of underwater acoustic scientists has expressed keen interest in and support of the project.

Sanctuary FAQs

Designated: January 16, 1981

Protected area: 23-square-miles

Key species: Loggerhead sea turtle, spotted and bottlenose dolphins, gag grouper, black sea bass, angelfish, barrel sponge, ivory bush coral and sea whip

Key habitats: Calcareous sandstone reefs, sand bottom communities, moderate relief ledges, patch reefs and temperate reef

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Web site: <http://graysreef.noaa.gov>



Newly recruited coral amidst several species of sponge.
Photo: Greg McFall



Diver holding ROV for live broadcast from GRNMS seafloor. Photo: Greg McFall



Soft corals and sponges
Photo: Greg McFall



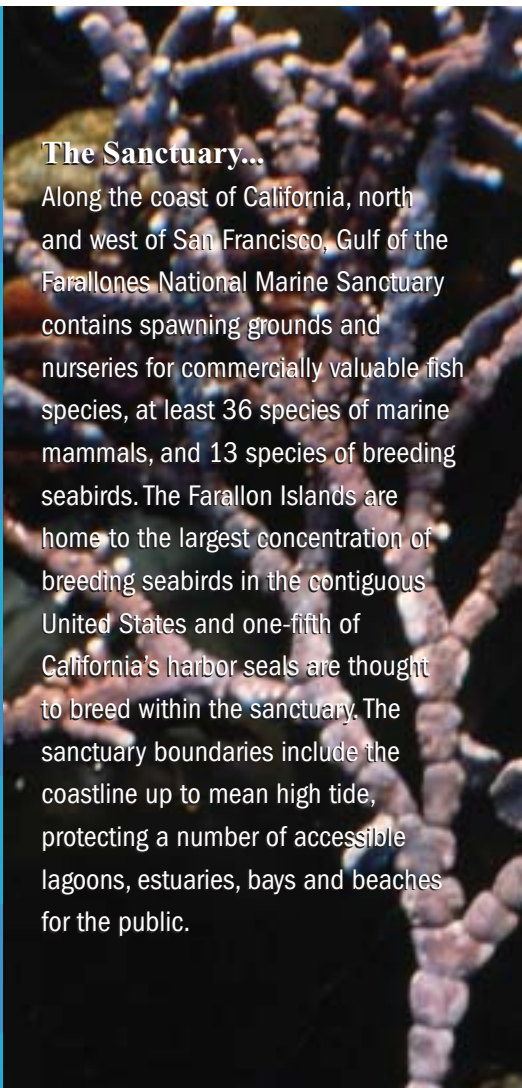
Nudibranch, warty sea slug
Photo: Greg McFall

Red soft coral
Photo: Greg McFall



The Sanctuary...

Along the coast of California, north and west of San Francisco, Gulf of the Farallones National Marine Sanctuary contains spawning grounds and nurseries for commercially valuable fish species, at least 36 species of marine mammals, and 13 species of breeding seabirds. The Farallon Islands are home to the largest concentration of breeding seabirds in the contiguous United States and one-fifth of California's harbor seals are thought to breed within the sanctuary. The sanctuary boundaries include the coastline up to mean high tide, protecting a number of accessible lagoons, estuaries, bays and beaches for the public.



Gulf of the Farallones National Marine Sanctuary

Accomplishments 2003

SEALS Volunteers Reverse Decline of Harbor Seal Pupping

The Sanctuary Education Awareness and Long-term Stewardship program (SEALS) celebrated a significant conservation victory in 2003 after reversing a steady drop in harbor seal pupping. Gulf of the Farallones National Marine Sanctuary is home to one fifth of the harbor seal population in the State of California. Volunteer monitoring has confirmed the sanctuary's seal populations are stabilized. The reversal is due in large part to the efforts of SEALS volunteers who have eliminated most human disturbances caused by clambers, birders and other recreational users in Tomales Bay and Bolinas Lagoon. Armed with telescopes and a wealth of knowledge about harbor seal natural history, SEALS volunteers interact with visitors and invite noninvasive observation of marine mammals. The information they have gathered about the sanctuary's harbor seal populations and the impact of disturbances from humans, domestic animals and other marine life will be highlighted in a new report, to be released in 2004.

Researchers Explore Underwater Habitats

In the fall, Farallones research staff, in cooperation with Cordell Bank National Marine Sanctuary scientists, conducted habitat characterization surveys in both sanctuaries. Working aboard the research vessel *Velero* and utilizing the *Delta* submersible and a remotely operated vehicle, the team conducted habitat characterization studies and assessments of seabed habitats and marine life. The information gathered during this and similar research missions will help the sanctuary develop appropriate management plans.

Wildlife and Volunteers Reap Rewards of Jacob Luckenbach Lightering

The sanctuary confirmed in 2003 that its efforts to prevent further damage from a leaking shipwreck proved successful. For years, Beach Watch volunteers reported "mystery spills" and innumerable seabird deaths and tarball incidents. The volunteers' detailed coastal surveys and strict monitoring procedures led the sanctuary to the source of the problem, the sunken SS *Jacob Luckenbach*. The sanctuary worked in partnership with the U.S. Coast Guard and other agencies to remove 100,000 gallons of oil from the 50-year-old shipwreck in 2002. The real test came with the first serious winter storms in 2003, which produced significantly fewer incidents of tarball and oiled wildlife. The sanctuary will continue to monitor the situation in 2004.

Common Murres Repopulate Abandoned Nest Sites

Murres continued to make a strong comeback at the Devil's Slide Rock rookery, south of San Francisco, thanks to the Common Murre Restoration Project (CMRP). Murres abandoned Devil's Slide Rock for more than a decade after the Apex Houston oil spill, but the sanctuary recorded 123 nesting sites and 43 additional territorial sites in 2003. The CMRP employs decoys, birdcalls and mirrors to attract passing murres. These efforts have produced a steady increase in breeding activities.

New Voluntary Code of Conduct Protects Sharks

Farallones sanctuary staff used innovative management and public outreach strategies to resolve a conflict between white shark researchers and dive tour operators. The solution fulfills the sanctuary's mission of resource protection, while also facilitating to the extent possible recreational use of its waters. The sanctuary's Wildlife Disturbance Working Group initiated a dialogue between researchers studying white sharks at the Farallon Islands and dive tour operators who were offering white shark encounters. Dive tours that focus on sharks may affect the sharks' natural behaviors and feeding ecology, and thus current research efforts to understand the white shark, in particular. To avoid the problem, the working group facilitated the formulation of a voluntary code of conduct that may ultimately be adopted by other tour operators within sanctuary waters.

Farallones Sanctuary Volunteer Recognized Nationally

Longtime sanctuary volunteer Gordon Bennett was honored with the first ever Volunteer of the Year Award by the National Marine Sanctuary Foundation, the nonprofit partner of the National Marine Sanctuary Program. Gordon monitors harbor seals in Bolinas Lagoon and regularly surveys wildlife under the Beach Watch volunteer program. Since 1993, he has dedicated an astounding 2,000 hours to monitoring beaches, responding to oil spills, and documenting sanctuary wildlife. In addition, Gordon provided valuable input on the sanctuary's first visitor center and was instrumental in creating education programs to help reduce disturbance to harbor seals.

Sanctuary Visitor Centers Set New Outreach Record

Over 55,000 people, the highest number ever, learned about the sanctuary through various outreach venues, including its visitor centers at Crissy Field and Pacifica, the "Take the Plunge" lecture series, Sanctuary Explorers Camp, field adventures and community fairs. This includes 7,500 people who took part in the annual Ocean Fest, a celebration of the national marine sanctuaries off the California coast. Throughout the school year, the sanctuary's coastal ecosystem education programs engaged hundreds of high school students in monitoring intertidal and sandy beach habitats.

Plans in 2004

Launch of Sanctuary Naturalist Corps

Gulf of the Farallones National Marine Sanctuary is launching its Naturalist Corps, which will review and assess current programs as they relate to the joint management plan review process. The Naturalist Corps will identify volunteer programs best suited to the needs and mission of the sanctuary in the areas of interpretation, education, outreach, enforcement and recruiting.

Farallones Hosts Regional Workshop for Sanctuaries

In February, the sanctuary will convene its 7th Biennial Marine Research Workshop, a multi-disciplinary symposium that focuses on the three Northern California national marine sanctuaries and surrounding waters. Whale biologists, seabird specialists, oceanographers, geographers, resource managers and educators will exchange information on their scientific investigations and current and emerging issues. This workshop will focus on strengthening existing ties and developing new partnerships with institutions involved in conserving the marine environment.

Sanctuary FAQs

Designated: January 16, 1981

Protected area: 1,255-square-miles

Key species: Steller sea lion, gray whale, blue whale, humpback whale, Dungeness crab, common murre and ashly storm-petrel

Key habitats: Coastal beaches, rocky shores, salt marsh, estuaries, mud flats, tidal flats, open ocean, deep benthos, continental slope and shelf

Sanctuary manager: Maria Brown

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Telephone: 415-561-6622

Fax: 415-561-6616

E-mail: farallones@noaa.gov

Web site: <http://farallones.noaa.gov>

Pink coralline algae forms branches in the rock intertidal of the Sanctuary and provides shelter for many small invertebrates.

Photo: Joe Heath



Dungeness crab
Photo: GFNMS



Kayaking the Estero de San Antonio.
Photo: Maria Brown



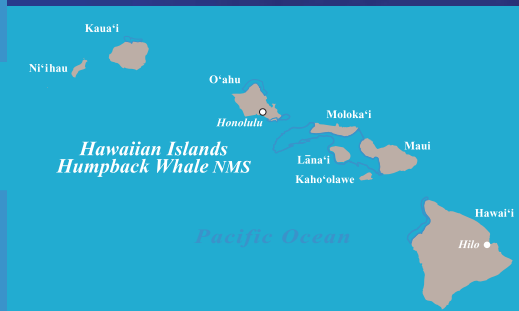
Black-necked stilts
Photo: GFNMS



Two spanish shawl nudibranches mating.
Photo: Tony Chess

The Sanctuary...

One of the world's most important humpback whale habitats lies within the warm and shallow protected waters of Hawaiian Islands Humpback Whale National Marine Sanctuary. Scientists estimate that two-thirds of the entire North Pacific humpback whale (*Megaptera novaeangliae*) population migrates to Hawaiian waters to breed, calve and nurse their newborns. The sanctuary is also home to a fascinating array of other marine animals, corals, and plants, some of which are found nowhere else on earth. Its cultural heritage includes native Hawaiian traditions of living in harmony with the sea.



Hawaiian Islands Humpback Whale National Marine Sanctuary

Accomplishments 2003

Sanctuary's First Ever Disentanglement of a Humpback Whale

The science and rescue team, in partnership with the NOAA Fisheries Marine Mammal Stranding Response Program, led the sanctuary's first successful effort to disentangle a humpback whale. The 35-foot whale was entangled in approximately 80 feet of polypropylene line in ocean waters off the island of Maui. The line was wrapped around the young whale's midsection and beginning to cut into its back. Eventually, the rescue team was able to slow down the whale by attaching an underwater parachute to the polypropylene line. The resistance also caused the line to break and the whale was able to free itself.

Expansion of the Maui Education Center

Plans are well underway to enhance the education and research efforts of Hawaiian Islands Humpback Whale National Marine Sanctuary by expanding its headquarters in Kihei, on the island of Maui. In March, the sanctuary hosted an open house, inviting the public to view site drawings and a model of the proposed building. Among other benefits, the expansion will provide space for additional staff and a modern facility for seminars and community outreach efforts. The new 4,625-square-foot multi-purpose building will include exhibit space and a public lecture room that can accommodate 100 people.

Ocean Count Expands to Include Schools

2003 opened up new possibilities for the sanctuary's popular Ocean Count program when, for the first time, it was adopted by schools. The two participating elementary and middle school campuses have ocean views, thus providing the perfect setting for observation and research. More than 100 sixth graders participated in this comprehensive program, which required students to produce essays, drawings, maps, movies and Power Point presentations. Their subjects included humpback whales, reef habitats and preservation issues, such as marine debris and whale disentanglement. This pilot effort was highly successful and the sanctuary is currently working closely with teachers to refine the school-based Ocean Count curriculum and its alignment with national science education standards.

Sanctuary Benefits from New Partnership with Outrigger Hotels and Resorts

Hawaiian Islands Humpback Whale National Marine Sanctuary and the National Marine Sanctuary Foundation formed a long-term partnership with Outrigger Hotels & Resorts to support comprehensive education and outreach programs about North Pacific humpback whales and Hawai'i's unique ocean habitats and marine life. Outrigger Hotels & Resorts will offer a series of permanent education exhibits, traveling exhibits, expert lectures, ocean activities and community service projects at various hotel properties on the islands of O'ahu, Maui and Hawai'i.

In February 2004, the foundation will unveil the first Marine Life Information Kiosk, which will be located in the lobby of an Outrigger Hotel in Waikiki. The whale tail-shaped kiosk includes a touch screen database of photographs and information about Hawai'i's marine life and ecosystems.

Workshop Produces Recommendations to Reduce Vessel-Whale Collisions

In September, the sanctuary hosted a workshop sponsored by the sanctuary advisory council to proactively address the threat of vessel-whale collisions in the Hawaiian Islands and other national marine sanctuaries. Approximately two-thirds of the entire North Pacific humpback whale population migrates to Hawai'ian waters each winter to calve, nurse and breed. The workshop engaged more than 80 resource managers, scientists and marine community representatives in a comprehensive discussion about vessel-whale collisions and the options for reducing them. Their in-depth analysis resulted in a summary report for the National Marine Sanctuary Program with recommendations regarding research, management and regulatory actions to minimize the risk of vessel-whale interactions.

Plans for 2004

New Comprehensive Study of North Pacific Humpback Population

In early 2004, the Hawaiian Islands sanctuary will begin participating in a three-year international effort to study the population status of humpback whales across the North Pacific. Humpbacks are among the most endangered whales. This comprehensive effort will assess their population status and trends in the North Pacific, as well as the impact of human activities. The study, "Structure of Populations, Levels of Abundance and Status of Humpbacks," or SPLASH, involves several countries: the United States, Mexico, Canada, Japan, Russia, Philippines, Costa Rica, Panama, Nicaragua and Guatemala. The value of SPLASH will be due in part to its consistent sampling efforts in feeding and wintering areas of humpbacks within the North Pacific. Researchers will use photo-identification and biopsy tissue sampling as their primary field methods.

New Kona Office Expands Research and Outreach

In 2004, the sanctuary plans to open an office in Kona, on the west coast of the island of Hawai'i. One hundred miles of the Hawaiian Islands sanctuary coastline and nearshore waters fall within the Kona and Kohala coasts. The new office will provide research and outreach support to the area's growing whale-watching and ocean eco-tourism industries. New office staff will also offer educational opportunities to local schools and community groups, and technical and logistical support to NOAA Fisheries and state agency marine management partners.

Sanctuary FAQs

Designated: November 4, 1992

Protected area: 1,370-square-miles

Key species: Humpback whale, pilot whale, Hawaiian monk seal, spinner dolphin, green sea turtle, coral reefs, limu (seaweed)

Key habitats: Humpback whale breeding, calving, nursing grounds, coral reefs and sandy beaches

Sanctuary manager:

Naomi McIntosh

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Fluke of humpback whale.
Photo: HINMS NOAA Fisheries
Permit #782-1438



The humpback whale is named for the arch of its back. Photo: HINMS NOAA Fisheries Permit #782-1438



A calf at the surface.
Photo: HINMS NOAA Fisheries
Permit #782-1438



Head lunge behavior.
Photo: HINMS NOAA Fisheries
Permit #782-1438

Pod of humpback whales.
Photo: HINMS NOAA Fisheries Permit #782-1438

The Sanctuary...

Monitor National Marine Sanctuary enjoys the distinction of being the nation's first national marine sanctuary. The *Monitor* is recognized worldwide for its significance as the vessel that revolutionized nineteenth-century naval technology and warfare. In 1862, the turreted ironclad engaged the Confederate warship *CSS Virginia* in battle. Less than a year later, the *Monitor* sank in a storm off Cape Hatteras, North Carolina. Since 1995, the National Marine Sanctuary Program and its partners have worked to stabilize the *Monitor's* hull and recover major components of the ship, including the propeller, propeller shaft, skeg and steam engine. Recovery of *Monitor's* famous revolving gun turret and cannon, along with the remains of two crewmen, was completed in August 2002.

North Carolina



Monitor National Marine Sanctuary

Accomplishments 2003

Excavation of the Famous Gun Turret Completed

NOAA archaeologists, assisted by staff and volunteers from The Mariners' Museum, completed excavation of the *Monitor's* famous armored gun turret. The turret was recovered in 2002 and transported to the museum, where months of work were required to remove soft sediments, coal and more than 400 artifacts. *Monitor's* 150-ton turret was the world's first such gun platform, capable of rotating on a central axle and training its guns quickly in any direction. Of all the *Monitor's* characteristic features, its gun turret is the most effective and enduring. The *Monitor's* two 11-inch Dahlgren guns and their unique carriages are still in the turret, cemented in place by more than a century of corrosion. The guns and carriages will be removed in spring 2004 and placed in separate tanks for a lengthy treatment that will preserve them for long-term exhibition. Divers also found the remains of two sailors in the turret. A team of forensic scientists is examining the remains and NOAA and the U.S. Navy are attempting to identify and pay final respects to these men.

Expedition Succeeds in Providing New Views of the *Monitor*

The sanctuary led a team of marine archeologists on a four-week expedition to the *Monitor* in July, documenting changes that have taken place since joint NOAA and U.S. Navy recovery operations began in 1998. Despite bad weather, divers were able to map the stern of the wreck and take a series of high-resolution photographs. Sanctuary staff used the photographs to compile the first ever photomosaics of the stern, both sides and lower hull of the historic ship. This accomplishment was especially significant because previous attempts at such detailed documentation have been thwarted by weather and equipment problems. The photomosaics, along with other measurements and imagery from the site, will provide NOAA with a comprehensive site description, so scientists may properly assess the *Monitor's* condition over time. The sanctuary was fortunate to have assistance on this expedition from the National Undersea Research Center at the University of North Carolina at Wilmington and the Maritime Studies Program at East Carolina University, as well as private volunteers.

BBC-TV Chronicles *Monitor* Turret Recovery

The *Monitor's* turret recovery was highlighted in the United Kingdom in a one-hour BBC-TV documentary, "The *Monitor's* Final Mission." A revised version of the documentary is expected to air on The Learning Channel in 2004. The documentary briefly reports on the *Monitor's* famous "Battle of the Ironclads" at Hampton Roads,

Virginia, on March 9, 1862, followed by an account of her sinking off Cape Hatteras, North Carolina, on New Year's Eve of that year. The story then relates the *Monitor's* discovery in 1973, its subsequent designation as a national marine sanctuary in 1975, and NOAA's discovery in the early 1990s that the *Monitor's* hull was rapidly collapsing. The rest of the documentary focuses on the five-year effort by NOAA and the U.S. Navy to save significant portions of the wreck, culminating in recovery of the gun turret in 2002. At least one documentary has been televised after each of the major *Monitor* recovery expeditions, providing extensive positive publicity for NOAA and its principal partners, which include the U.S. Navy, The Mariners' Museum, the National Undersea Research Program and several universities.

Maritime Archaeology Center Groundbreaking

On March 9, the 141st anniversary of the USS *Monitor's* famous battle with the Confederate ironclad CSS *Virginia* (ex-Merrimack), NOAA held a groundbreaking ceremony for the Maritime Archaeology Center at The Mariners' Museum in Newport News, Virginia. The Maritime Archaeology Center will include offices for the *Monitor* National Marine Sanctuary and the new Maritime Heritage Program being developed by NOAA's National Marine Sanctuary Program.

Plans for 2004

The Sanctuary Reopens to Private Divers and Researchers

The *Monitor* lies too deep for most scuba divers, but the site remains popular with a small group of technical divers who use the necessary sophisticated breathing gas mixes and procedures. Because of safety and scheduling issues resulting from annual large-scale recovery operations, no permits for private dives were granted from 2000-2003. NOAA plans to reopen the site in 2004 for private research and non-research dive expeditions.

Conservation and Exhibit Activities Will Reach New Milestone in 2004

In March, The Mariners' Museum is scheduled to open a new exhibit on the *Monitor* entitled, "Ironclad Evidence." This exhibit will feature the *Monitor's* four-bladed iron propeller, as well as dozens of other artifacts. The exhibit will remain open for approximately three years until the opening of the \$30 million USS *Monitor* Center in 2007.

Sanctuary FAQs

Designated: January 30, 1975

Protected area: 1 square mile

Key species: Amberjack, black sea bass, red barbier, scad, dolphin, sand tiger shark, coral, sea anemone and sea urchin

Key habitats: Open ocean, artificial reef

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Dr. John Broadwater

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Wool coat from the *Monitor* crew.
Photo: Jeff Johnston, MNMS



A "shot ladle" used for unloading the cannons.
Photo: Jeff Johnston, MNMS



Monitor Sanctuary Manager
Dr. John Broadwater
Photo: Jeff Johnston, MNMS

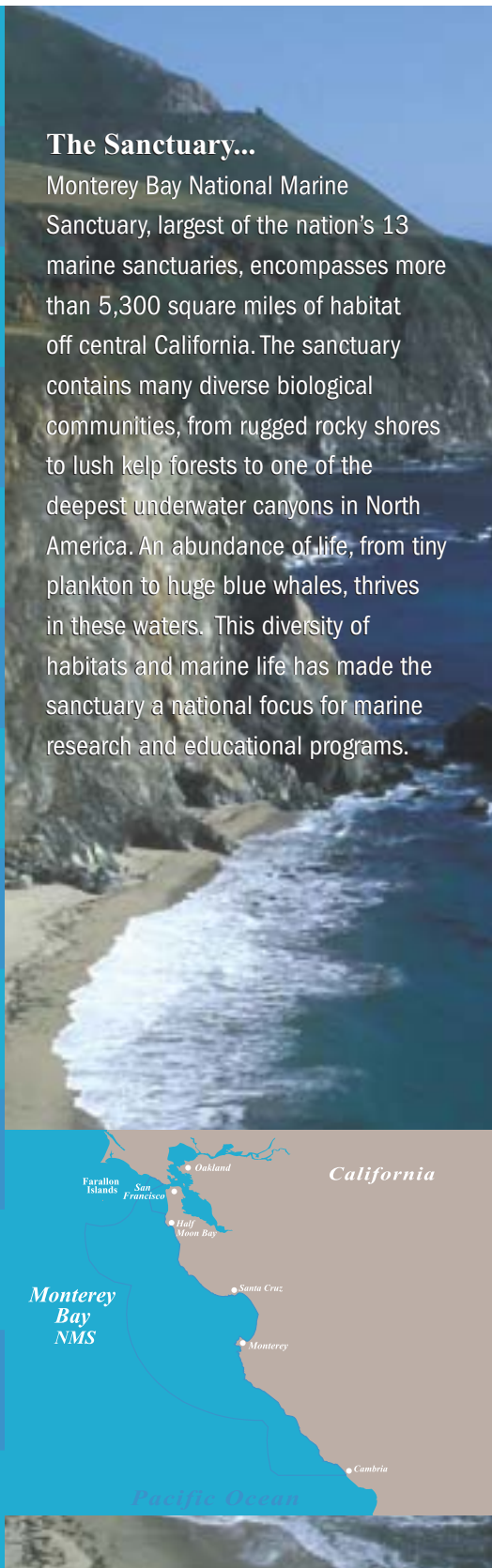


Divers explore the forward areas of the *Monitor's* hull.
Photo: Doug Kessler

Bow of the *Monitor*.
Photo: *Monitor* Collection, NOAA

The Sanctuary...

Monterey Bay National Marine Sanctuary, largest of the nation's 13 marine sanctuaries, encompasses more than 5,300 square miles of habitat off central California. The sanctuary contains many diverse biological communities, from rugged rocky shores to lush kelp forests to one of the deepest underwater canyons in North America. An abundance of life, from tiny plankton to huge blue whales, thrives in these waters. This diversity of habitats and marine life has made the sanctuary a national focus for marine research and educational programs.



Monterey Bay National Marine Sanctuary

Accomplishments 2003

New Interactive Web Site Provides Latest Info on Habitats and Species

Monterey Bay National Marine Sanctuary implemented the Sanctuary Integrated Monitoring Network, or SIMoN. SIMoN is a new and improved way to both gather and disseminate information about the state of the sanctuary. It synthesizes all the data retrieved from existing monitoring programs, allowing staff to better manage the issues facing habitats and wildlife. The process identifies gaps in data, which are then addressed with new, more efficient monitoring methods. In October, SIMoN unveiled its new interactive Web site, which provides the public with fast, easy access to the latest scientific research and monitoring information. The program's numerous accomplishments in 2003 include the first sanctuary education CD-ROM, "Exploring the Davidson Seamount;" the first cruise of a 25-year study to assess the sanctuary's fishes and invertebrates; and a partnership to complete the most comprehensive kelp forest survey of the Big Sur coast.

Sanctuary Launches Multicultural Outreach Program

Hispanic citizens represent 47 percent of Monterey County's population, so the sanctuary developed the MERITO (Multicultural Education for Resource Issues Threatening Oceans) program to appeal to the unique traditions and values of the region's Hispanic communities. MERITO made impressive steps forward during its first year and now comprises approximately 25 regional groups that participate in ocean and coastal outreach and education programs. MERITO provides classroom support, field trips, training and resources, college internships and event support, as well as a forum for expanding bilingual outreach programs within all sanctuaries. In 2003 alone, MERITO educated 5,500 Spanish-speaking citizens through events, presentations, field projects and bilingual lesson plans. In addition, the program launched its English/Spanish Web site and published a marine-themed storybook.

Innovative Partnership Addresses Threat of Agricultural Pollution

The productive agricultural lands surrounding Monterey Bay National Marine Sanctuary support a \$5 billion agriculture industry. In order to preserve regional water quality, the sanctuary formed partnerships with local agriculture industry groups and agencies to develop the Agriculture and Rural Lands Program in 1999. This industry-led voluntary program grew substantially in 2003 and now includes 18 watershed groups, which address agricultural runoff throughout six counties. More than 250 farmers have now taken the Farm Water Quality Management Plan course and technical assistance agencies have added staff to increase conservation consultations with landowners.

Sanctuary Leads Expedition to Sunken World War II Oil Tanker

In September, the sanctuary led a research mission to the sunken World War II oil tanker *Montebello* to determine whether it poses a threat to sanctuary habitats. The *Montebello* was carrying more than 3,000,000 gallons of crude oil when it was struck by a Japanese submarine in 1941, just outside sanctuary waters.

The expedition aboard the research vessel *Velero* used a *Delta* manned submersible to study the structural integrity of the hull and document marine life around the wreck. Researchers found no evidence of leaking oil, tar or hydrocarbons but they did discover robust fish and invertebrate populations and recommended periodic monitoring of the wreck. This research mission fulfilled the sanctuary's federal mandate to assess and protect both its natural and maritime heritage resources.

Team OCEAN Reduces Harassment of Threatened Species

The sanctuary's Team OCEAN volunteer programs help to fulfill its mission to improve conservation and enhance public appreciation of marine life. Team OCEAN includes kayak teams of staff and volunteers who interpret the sanctuary's resources to fellow kayakers on the water, while at the same time protecting marine mammals from harassment. In 2003, Team OCEAN greatly reduced harassment of southern sea otters, which are listed by the federal government as a threatened species. Though small in number, southern sea otters are a highly visible, keystone species and play an important role in the Monterey Bay kelp forest ecosystem. This year, the sanctuary also co-sponsored the production of laminated wildlife education cards for attachment to rental kayaks in the Monterey Bay area.

Citizen Water Quality Monitoring Network Expands in 2003

Perhaps no other event better promotes the environmental stewardship efforts of Monterey Bay National Marine Sanctuary than Snapshot Day, which organizes the simultaneous one-day testing of California's rivers and streams. Launched in 1999, Snapshot Day has grown into a statewide event. On May 17, 2003, thousands of volunteers, the largest turnout ever, collected California stream and river water samples from the Oregon border down to Mexico, including 11 major watersheds that drain into the sanctuary. Snapshot Day has become a valuable resource for maintaining water quality, especially given the fact that fewer than 5 percent of California's rivers and streams are monitored regularly.

Plans for 2004

30 New SIMoN Projects

The Sanctuary Integrated Monitoring Network, or SIMoN, will grow substantially in 2004. The SIMoN Web site will add at least 30 projects, enhance the online interactive mapping program, and begin to recover and list key historical monitoring programs. SIMoN staff will also continue intertidal and subtidal field research on the Big Sur coast, manage and monitor invasive species, and plan research cruises to map and survey deep-sea habitats.

Designs for a New Visitor's Center

Plans for the new Monterey Bay National Marine Sanctuary Interpretive Center in Santa Cruz will move forward in 2004, with the development of the interpretive and architectural designs. The 12,000 square foot facility will include interactive displays, a classroom, library and bookstore, all focusing on local marine life, ocean conservation and research. Two smaller local centers will be located in San Mateo and San Luis Obispo counties.

Sanctuary FAQs

Designated: September 18, 1992

Protected area: 5,328-square miles along nearly 300 miles of the coast from the Marin County headlands south to Cambria.

Key species: Sea otter, blue whale, market squid, brown pelican, rockfishes, giant kelp, krill, and leatherback sea turtle

Key habitats: Sandy beaches, rocky shores, kelp forests, subtidal rocky reefs, soft-bottom benthic submarine canyons, cold seeps, wetlands and open ocean

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William J. Douros

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Northern elephant seal
Photo: Robert Schwemmer



MBNMS TEAM Ocean volunteer
Photo: MBNMS



Kelp forest
Photo: Kip Evans



Snowy egret in Elkhorn Slough.
Photo: Kip Evans

Big Sur cliffs
Photo: Brad Damitz



The Reserve...

In recognition of the perilous state of the world's coral reefs, in December 2000 Executive Order 13178 established the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. Stretching nearly 1,500 miles, the reserve contains some of the healthiest and most undisturbed coral reefs on the planet and is one of the last predator-dominated coral reef ecosystems on Earth. Reserve waters are home to over 7,000 marine species, one quarter of which are unique to the Hawaiian Archipelago. This uninhabited area contains critical habitat for many endangered and threatened species, including the Hawaiian monk seal and the green sea turtle. The reserve is the largest conservation area (marine or terrestrial) in the U.S. and the second largest in the world. The National Marine Sanctuary Program has begun the process of designating the reserve as America's 14th national marine sanctuary.



**Northwestern Hawaiian Islands
Coral Reef Ecosystem Reserve**

Accomplishments 2003

Groundbreaking Workshop Sets Stage for Regional Conservation Plan

In May, the National Marine Sanctuary Program (NMSP) sponsored the first collaborative workshop of its kind in more than 20 years to lay the groundwork for a regional conservation plan for the Northwestern Hawaiian Islands. This largely uninhabited chain of small islands stretches more than 1,000 miles and is home to a majority of all coral reefs in the United States, as well as several federally protected species.

More than 100 scientists, educators and resource managers attended the three-day workshop in Honolulu, entitled "Information Needs for Conservation and Management: A Workshop on the Northwestern Hawaiian Islands." They generated nearly 100 strategies to address the highest priorities. The NMSP will continue working with various stakeholders in 2004 to develop a regional action plan for the conservation, management, protection and study of marine habitats and species in the Northwestern Hawaiian Islands.

First Atlases of the Islands' Seabeds in Unprecedented Detail

NOAA released the first-ever detailed maps of coral reefs in the Northwestern Hawaiian Islands, the second largest marine protected area on earth. The draft "Atlas of the Shallow-Water Benthic Habitats of the Northwestern Hawaiian Islands" represents 68 percent of the estimated 1,349 square miles of shallow-water coral reef ecosystems in the islands. It also provides baseline information to study the changes in reef cover, impacts of marine debris and effects of global climate change.

NOAA also released its draft "Bathymetric Atlas of the Northwestern Hawaiian Islands," which graphically summarizes bathymetric data for the region. Bathymetric images of the deep slopes, seamounts and banks of the islands were based on multibeam sonar data collected by the research vessels *Kilo Moana* and *Kai'imikai-o-Kanaloa*, as well as older single beam data from the NOAA research vessel *Townsend Cromwell*.

Sanctuary Opens New Discovery Center

The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve opened its new interactive education facility, *Mokupāpapa: Discovery Center for Hawai'i's Remote Coral Reefs*. The 4,000-square-foot center opened in May in downtown Hilo and has already become widely known for its engaging interpretation of the natural science, culture and history of the Northwestern Hawaiian Islands. *Mokupāpapa* features a 2,500-gallon saltwater aquarium; a life-size deep-sea submersible cockpit complete with working robot arms; and a 60-seat theater for multimedia educational programs and classes. *Mokupāpapa* is a joint project of the National Marine Sanctuary Program and the University of Hawai'i.



Expedition Finds Historic Shipwrecks at Kure Atoll

NOAA archaeologists aboard the research vessel *Mana Cat* conducted an extensive maritime heritage survey at Kure Atoll, where they identified the 19th century USS *Saginaw*. The navy warship, which served in the Civil War, sank at Kure Atoll in 1870. This expedition was led by the reserve's maritime heritage manager and coordinated with the State of Hawai'i and the Naval Historical Center. Reserve staff also conducted an extensive marine heritage survey at Midway Atoll. The mapping and cataloging of these sites, in partnership with the U.S. Fish and Wildlife Service, is an important step forward in the preservation of maritime heritage artifacts in the Northwestern Hawaiian Islands.

Research Cruise Discovers Possible Coral Disease Outbreak

The reserve co-sponsored with NOAA Fisheries a month-long summer coral reef monitoring cruise aboard the NOAA research vessel *Oscar Sette*. The major discovery of this expedition was an outbreak of a possible coral disease at French Frigate Shoals. Follow-up studies are planned for 2004 to study the outbreak's progression and the corals' recovery. The research divers surveyed sites representative of major coral reef habitats, such as the forereef, backreef and lagoonal environments. They also gathered information about a number of fish, corals, algae and invertebrate species. This is typical of the research and monitoring necessary for successful management of the reserve's invaluable coral reefs.

Tons of Progress on Marine Debris Cleanup

Divers removed 122.18 tons of marine debris, primarily derelict fishing gear, from the coral reefs and beaches of the Northwestern Hawaiian Islands. That puts the total amount of marine debris removed by the Multi-Agency Marine Debris Program (1996-2003) at an astounding 364 tons. This effort is directed primarily at marine debris that poses an entanglement hazard. Divers also rescued green sea turtles found entangled in fishnets and discovered a number of others basking on derelict fishing gear.

Plans for 2004

Reserve Operations Plan to Enter Final Phase

The reserve's operations plan (ROP) is expected to receive final approval by the National Ocean Service following a public comment period in February 2004. The ROP will guide the reserve during the sanctuary designation process and will form the foundation of the draft sanctuary management plan. The ROP was developed in cooperation with the State of Hawai'i and the U.S. Fish and Wildlife Service, with extensive input from the reserve advisory council.

Newly Commissioned Ship Maintains Reserve as Research Leader

The newly converted NOAA research vessel *Hi`ialakai* will be commissioned in Hawai'i to support the science and outreach needs of the National Ocean Service in the Northwestern Hawaiian Islands and elsewhere in the Pacific. This valuable research asset is designed and equipped to support diving operations and multi-beam sonar mapping of the ocean floor. It will enable the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve to

Reserve FAQs

Established: December 4, 2000

Protected area: 135,522-square-miles

Key species: Over 7,000 marine species, including the endangered Hawaiian monk seal and the threatened green sea turtle. One quarter of all marine species are endemic and found nowhere else on Earth.

Key habitats: Atolls, coral reefs, seamounts, banks, shoals and open ocean

Reserve coordinator: Robert Smith

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Millions of seabirds nest in the NWHI.

Photo: © Jim Watt/NOAA



Endangered Hawksbill sea turtle entangled in derelict fishing gear. Photo: Jason Baker



Slate pencil sea urchin on rice coral.

Photo: © Jim Watt/NOAA



Endangered Hawaiian monk seal

Photo: © Jim Watt/NOAA

Massive coral colonies, such as this lobe coral colony at Lisianski, are national treasures.

Photo: © Jim Watt/NOAA

The Sanctuary...

Spanning 3,310-square miles of marine waters and rugged beaches along Washington's Pacific coast, Olympic Coast National Marine Sanctuary provides habitat for 29 species of marine mammals and serves as a critical link along the Pacific flyway for migratory birds. The sanctuary protects a productive upwelling zone, home to rich marine mammal and seabird faunas, kelp forests and invertebrate communities. The sanctuary is also home to over 150 documented shipwrecks and the vibrant contemporary cultures of the Quinault, Hoh, Quileute and Makah nations. Human activities such as shipping, non-commercial air traffic, and recreational uses are monitored by a variety of agencies to ensure preservation of this unique and largely undeveloped coastline.



Olympic Coast National Marine Sanctuary

Accomplishments 2003

New Headquarters Increases Sanctuary Visibility

In 2003, Olympic Coast National Marine Sanctuary moved its headquarters from the Port Angeles Federal Building to a prominent location on the waterfront. The new headquarters is next to a ferry dock used by 400,000 people annually. The move enhances the sanctuary's ability to educate the public about the natural and cultural resources it protects.

Sanctuary, Coast Guard and IMO Widen Safety Zone Against Oil Spills

The first year of the newly expanded Area-To-Be-Avoided (ATBA) was highly successful in terms of compliance. The primary purpose of the ATBA is to decrease the potential for a catastrophic oil spill. In late 2002, the International Maritime Organization approved a sanctuary and U.S. Coast Guard proposal to expand the Olympic Coast ATBA. This voluntary program requests large ships travel further from shore to reduce the risk of oil spills. The expanded program applies to ships greater than 1,600 gross tons, which carry large amounts of bunker fuel. In 2003, the sanctuary's ATBA monitoring program, carried out with the U.S. and Canadian Coast Guards, showed 96 percent compliance. The near-perfect record greatly reduces concerns that the expansion confuses mariners and requires extensive adjustments to their operating procedures.

Progress on Habitat Mapping

The sanctuary's habitat mapping program made substantial progress in 2003, due to a cooperative project with the Office of Coast Survey and scientists aboard the NOAA Ship *Rainier*. One of sanctuary's major resource management challenges is the lack of high-resolution bathymetry and reliable sediment mapping, both necessary for accurate inventories of its seabed. In 2004, sanctuary staff will continue to work with multi-beam and side-scan sonar to fill in the map with high-resolution data.

Seafloor Recovery Monitoring of Cable Line

Olympic Coast sanctuary staff completed another successful year of seafloor monitoring under a special use permit issued to the telecommunications company Pacific Crossing Ltd. In 2003, the monitoring cruise used ROPOS, one of the west coast's premier remotely operated vehicles, to acquire video images of sections of the ocean floor along or adjacent to the cable. The long-term project aims to better understand how seafloor communities recover from disturbance, information critical to evaluating this project and future proposals for commercial development of the seafloor.

Science Expedition Contributes to Studies on Marine Toxins

An Olympic Coast National Marine Sanctuary research team completed a weeklong cruise aboard the NOAA Ship *McArthur II*, the first scientific mission for the newly dedicated ship. The mission is part of on-going research into harmful algal blooms and water quality and how toxins spread throughout marine habitats and species. The scientists took bottom samples to look for background sediment contamination and to analyze community

organisms. They also collected water samples (contaminants, harmful algal blooms, and overall productivity) and flatfish to compare tissue contaminants with seafloor samples.

Sanctuary Hosts High School Students on the High Seas

The sanctuary sponsored high school students on a seven-day research cruise aboard the *Lady Washington*, the tall ship seen in last year's Disney blockbuster "Pirates of the Caribbean." The students monitored seabirds and marine mammals and studied oceanography and tall ship navigation as part of life aboard an 18th century vessel. The pilot project, which will continue in 2004, is the sanctuary's first-ever partnership with schools in Aberdeen and Hoquiam and the Grays Harbor Historic Seaport, which operates the replica vessel.

New Local Friends Group

An Olympic Coast sanctuary friends group has formed as a nonprofit partner to advance the sanctuary's education and outreach mission. The group's board is comprised of highly respected leaders in conservation, education and the local Native American communities, all focused on increasing the public's appreciation of the sanctuary. The group's launch came at a critical time as the sanctuary is beginning plans for its 10th anniversary celebration in 2004. The local group will work closely with the National Marine Sanctuary Foundation in supporting that event.

Sanctuary Volunteer Receives National Recognition

Sanctuary Advisory Council Chair Alan Brooks was honored as a Volunteer of the Year by the National Marine Sanctuary Foundation. Alan is well known for his dedicated leadership in support of the Olympic Coast sanctuary. He has energized the group to take more active roles in representing their constituents and guided the sanctuary in building a valuable dialogue with regional business and civic groups.

Plans for 2004

Olympic Coast Celebrates Ten Years

In July, Olympic Coast will commemorate the 10th anniversary of its designation as the first national marine sanctuary in the Pacific Northwest. During the last decade, the sanctuary has focused national attention on some of the last remaining wilderness coastline in the lower 48 states so that it may be conserved for many generations to come. To mark this milestone, the sanctuary will open the Olympic Coast Discovery Center, an 800-square-foot visitor center equipped with interactive educational exhibits on sanctuary resources, marine conservation and undersea science and exploration. Anniversary celebrations will include Coast Fest, a community event on the Port Angeles waterfront.

Study on Use of Protected Areas for Vital Shoreline Habitats

The Olympic Coast Marine Conservation Working Group has spent the last two years analyzing the use of "protected areas" to conserve vital shoreline habitats on federally managed lands. An example would be the rocky headlands, which are highly productive breeding areas for many marine species. In 2004, the group's report will be presented to the sanctuary advisory council and forwarded to the sanctuary superintendent and other agencies for review. The group's ongoing work recognizes the importance of upholding Indian treaty rights while conserving critical segments of the intertidal zone.

Sanctuary FAQs

Designated: July 16, 1994

Protected area: 3,310 square miles, from Koitlah Point on Cape Flattery to the mouth of the Copalis River, on Washington's Pacific coast

Key species: Tufted puffin, bald eagle, northern sea otter, gray whale, humpback whale, dolphin, Pacific salmon and rockfish

Key habitats: Rocky and sandy shores, kelp forests, seaweeds and islands, continental shelf, open ocean and deepwater canyons

Sanctuary Superintendent:

Carol Bernthal

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Port Angeles, WA 98362-2925

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E-mail: olympiccoast@noaa.gov

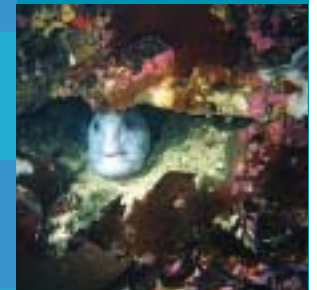
Web site: <http://olympiccoast.noaa.gov>

Point of Arches sunset

Photo: OCNMS



Sea urchin
Photo: OCNMS



Wolf eel
Photo: Mike Kesl



Anemone
Photo: Mike Kesl



Octopus
Photo: OCNMS



The Sanctuary...

The slow retreat of massive Ice Age glaciers formed what is today Stellwagen Bank, a shallow sand and gravel plateau located at the mouth of Massachusetts Bay. Here, ocean currents sweep water in and out of the bay, with the bank funneling this flow into narrow passageways. The resulting nutrient-rich waters make this an area of high marine productivity, supporting a food web with species ranging from single-celled phytoplankton to great whales. This marine productivity supports local fishermen as well as a robust tourism industry. An estimated one million whalewatchers visit sanctuary waters each year, intent on witnessing the acrobatics of the gregarious but endangered humpback whale.



Gerry E. Studds Stellwagen Bank National Marine Sanctuary

Accomplishments 2003

New Research Insights into the Endangered Humpback Whale

The sanctuary has made a significant step toward better understanding its most popular species, the endangered humpback whale. Roughly one million people a year visit Stellwagen Bank to see these amazing cetaceans up close. In 2003, sanctuary staff acquired and combined data from various whale research efforts that spanned more than 20 years of humpback whale sightings in the vicinity of the Stellwagen Bank sanctuary. During the summer, the sanctuary also combined efforts with the Woods Hole Oceanographic Institution and Fujifilm to study whales from the air. Using the Fuji airship (blimp), scientists observed whale behavior from overhead as a variety of vessels traveled near the whales' feeding grounds. Analysis of such interactions may prove helpful in reducing the risk of whale-vessel collisions.

Habitat Studies May Help Guide Future Management

At no other time has there been more interest in the management of our nation's marine habitats. The Sanctuary Habitat Recovery and Monitoring Program, or SHRMP, reflects that fact. In 2003, SHRMP continued to study how much time it takes for seafloor habitats to recover from human activity, such as fishing and the laying of cable. This research includes a comparison of relatively unimpacted seafloor habitats in the Western Gulf of Maine Groundfish Closure Area with seafloor habitats in areas that are continually fished. Stellwagen Bank sanctuary researchers are also studying the Atlantic cod, an over-fished species vitally significant to New England for more than four centuries. Small, sound-emitting tags embedded in the fishes' backs have revealed higher than expected faithfulness to specific gravel fields and piled boulder reefs. The results from both projects hold potentially important implications for fisheries management and future design of marine protected areas in our region.

Return to New England's Titanic

Researchers from the sanctuary and the National Undersea Research Center at the University of Connecticut returned to the wreck of the 19th century steamship *Portland* in September 2003. The *Portland* sank and all 192 aboard perished during a ferocious storm in 1898. The *Portland* has since become known as New England's *Titanic*, given the number of lives lost and the impact of the disaster on the region. Researchers used side scan sonar and a high-definition digital video camera provided by The Science Channel to get their first detailed look at the *Portland* since its location was confirmed in 2002. Funded in part by the NOAA Office of Ocean Exploration, the *Portland* expedition attracted national media attention for the sanctuary and became the subject of an hour-long special on The Science Channel, scheduled to air in March 2004. During the expedition, NOAA produced a special Web site offering daily logs, photographs, educational materials and fact sheets to the public.

New Education Events and Outreach Products

The sanctuary enhanced its outreach efforts by co-sponsoring a number of events and products in 2003. The sanctuary worked with the New England Aquarium in developing a Student Ocean Summit for high school students and organized the annual marine art contest for the Massachusetts Marine Educators Association. Sanctuary staff also served as judges in regional and national

remotely operated vehicle design competitions for high school and college students. Education products included two posters entitled "Steamship *Portland*: Then and Now" and "Exploring the Deep Boulder Reefs," which were co-produced with the National Undersea Research Center. The boulder reef poster has a companion fact sheet and CD-ROM virtual underwater tour.

Sanctuary Celebrations and Fish Count

The sanctuary expanded its fish identification course, developed two years earlier in conjunction with the Reef Environmental Education Foundation (REEF). To date, the Gulf of Maine (Northeast) Fish Identification program has been taught by sanctuary educators to more than 600 individuals, including nearly 400 divers and several dozen educators. As part of this program, the sanctuary also sponsors the Stellwagen Bank Sanctuary Celebration in conjunction with REEF's Great Annual Fish Count (GAFC). In 2003, just as in 2002, the celebration in Gloucester, Massachusetts became the largest one-day fish count event in the nation.

Plans for 2004

Taking Stock of Human Impact on Marine Life

Sanctuary staff is inventorying marine life and human activities within sanctuary waters, a daunting task for a sanctuary that stretches over 842 square miles with depths ranging from 65 to 600 feet. In 2004, sanctuary staff will continue analyzing the most recent round of use surveys for information on how major marine species and humans use the sanctuary and interact with each other. Many of the sanctuary's species move freely among various depths and habitats. Others leave the sanctuary's waters entirely, only to return weeks, months or even years later. The use surveys provide a monthly snapshot of marine life, such as whales and bluefin tuna, as well as the human activity that they attract, such as commercial fishing and whale watching. Ultimately, this information will result in more effective management of Stellwagen Bank's natural resources.

New Offices and Web site Boost Public Outreach

The sanctuary will unveil its expanded headquarters in 2004. The newly renovated Stellwagen Bank sanctuary headquarters features a large space for meetings and public presentations, and an alternative-energy geothermal heating and cooling system. The sanctuary's Web site will also be updated to include additional features on maritime heritage, research, education and resource protection.

Sanctuary FAQs

Designated: November 4, 1992

Protected area: 842-square-miles

Key species: Humpback whale, northern right whale, white-sided dolphin, storm petrel, northern gannet, bluefin tuna, Atlantic cod, winter flounder, sea scallop and northern lobster

Key habitats: Sand and gravel bank, muddy basins, boulder fields, rocky ledges and open water

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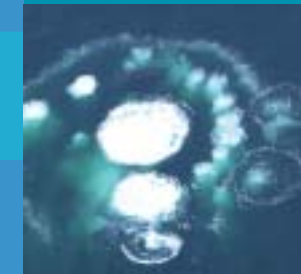
Web site: <http://stellwagen.noaa.gov>

A collection of sea stars gives a "starry night" effect to this muddy basin area in the sanctuary.

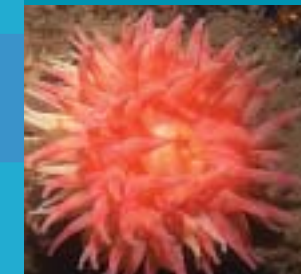
Photo: Dann Blackwood and Page Valentine, USGS



Atlantic cod find refuge on the wreck of the *Portland*.
Photo: Science Channel/NURC/SBNMS



Humpback whales use bubble nets during feeding.
Photo: Woods Hole Oceanographic Institution



Northern red anemone
Photo: Dann Blackwood and Page Valentine, USGS



Moon jelly
Photo: Jeff Hannigan

The Sanctuary...

Dozens of historic shipwrecks receive special protection in Thunder Bay National Marine Sanctuary and Underwater Preserve. Designated in 2000, the nation's newest sanctuary is the first to be located in the Great Lakes and one of only two created solely to protect submerged cultural resources. Located just off the coast of Alpena, Michigan, the known shipwrecks in Thunder Bay rest as close to the surface as 12 feet and as deep as 180 feet. The sanctuary's shipwreck collection includes wooden schooners, barks, brigs, steamers, barges, tugboats, steel-hulled steamers and freighters—a vast collection of maritime history spanning 200 years. To the delight of marine archaeologists and recreational divers alike, the cold, fresh waters of Lake Huron have preserved these relics in excellent condition.



Thunder Bay National Marine Sanctuary and Underwater Preserve

Accomplishments 2003

Fall Shipwreck Expedition Tests New Ship-to-Shore Live Video

In partnership with the Institute for Exploration and the University of Michigan, a team of scientists and archaeologists explored 10 Thunder Bay shipwrecks and gathered 60 hours of footage to be used for research and public education. The expedition team, with scientists from the Great Lakes Environmental Research Lab and Grand Valley State University, also examined several submerged limestone sinkholes for evidence of significant geologic and hydrologic features and Paleo-Indian habitation 8,000 to 10,000 years ago.

This expedition also tested the technology for sending underwater video from shipwrecks back to shore using a remotely operated vehicle (ROV) linked to a wireless network. Sanctuary divers exploring the shipwreck *Montana* were able to share their experience in real time with classrooms via a ship-to-shore video link with the American School for the Deaf and four local elementary schools. The students used instant messaging and received immediate answers to questions posed to the divers. The test was successful, establishing that these technologies can be used to bring the excitement of underwater discovery and archaeological research into classrooms throughout the nation.

The Thunder Bay Maritime Festival

One of the sanctuary's most effective outreach and educational events is the Thunder Bay Maritime Festival, a free family event in August that highlights the maritime history of the Great Lakes. This year's festival featured music, displays and educational games, enabling the sanctuary to share with children and adults alike the maritime artifacts and culture that make Thunder Bay a national treasure. It also included tours of the research vessel *Laurentian*, which supports the activities of the sanctuary and the NOAA Great Lakes Environmental Research Laboratory.

Sailing into the Past

The shipwrecks and other maritime artifacts in Thunder Bay National Marine Sanctuary and Underwater Preserve often inspire educational efforts that include a taste of life on the Great Lakes centuries ago. This year was no exception. The Thunder Bay sanctuary hosted four student sails for 160 students and teachers aboard the tall ship *Denis Sullivan*, a replica of a traditional Great Lakes schooner. The *Denis Sullivan* also served as the perfect location for a sanctuary workshop entitled "Sail into the Past," which was attended by 70 teachers from around the state of Michigan. Such workshops inspire and empower teachers to include Thunder Bay's maritime history in their curriculum, ultimately enhancing public appreciation of the sanctuary's unique cultural resources.

Sanctuary Sponsors Local High School for National ROV Design Contest

ROVs have revolutionized marine expeditions, allowing researchers unprecedented access to undersea cultural and natural resources. In 2003, the sanctuary sponsored Alpena High School students in a national ROV design competition held by the Marine Advanced Technology Education Center. The students designed and constructed an ROV, and then traveled in June to the Massachusetts Institute of Technology in Cambridge, Massachusetts to compete against 34 other teams. The Thunder Bay team received three awards, including one for team management. The ROV competition inspired enthusiasm among Alpena High School students for the modern research technology used by Thunder Bay National Marine Sanctuary and Underwater Preserve to investigate its shipwrecks and other historical and archaeological resources.

New Mooring Buoys Protect Shipwrecks From Anchor Damage

The sanctuary eased a threat to its historic shipwrecks by installing ten new mooring buoys near popular recreational dive sites. Mooring buoys greatly reduce the likelihood of anchor damage to shipwrecks, as well as improve diver safety by providing continuous descent and ascent lines. This staff and volunteer effort will facilitate use of the sanctuary's cultural resources while fulfilling its primary objective of resource protection.

Plans for 2004

Breaking Ground on the New Thunder Bay Maritime Center

The Thunder Bay sanctuary is creating a new facility to showcase its shipwrecks and the maritime heritage of the Great Lakes. In late 2004, the sanctuary will relocate to a renovated 20,000-square-foot building along the Thunder Bay River near the mouth of Lake Huron. In addition to offices and research facilities, the new Thunder Bay Maritime Center will eventually feature state-of-the-art shipwreck exhibits, an auditorium for films and shipwreck footage, an archaeological conservation lab and space for hosting school programs.

Premiere of Film Documenting Thunder Bay Shipwrecks

For the first time, the stories of Thunder Bay's shipwrecks will appear on the big screen in a film entitled "Tragedies in the Mists," scheduled to premiere in April. Using footage from high definition cameras mounted on remotely operated vehicles, the film explores several shipwrecks with renowned underwater explorer Dr. Robert Ballard, founder of the Institute for Exploration and discoverer of the *Titanic*. "Tragedies in the Mists" is engaging, as well as educational, as it describes these vessels and seafarers who met their tragic end centuries ago in the waters of the Great Lakes.

Sanctuary Unveils its First Shipwreck Exhibit

In an effort to bring the shipwreck experience to non-divers, the sanctuary will open a new exhibit at its headquarters this spring. The exhibit will feature a life-size section of the *Pewabic*, a 19th-century vessel lost in August 1865 after a collision with her sister ship. The exhibit will also display the location of hundreds of area shipwrecks, as well as artifacts, models and interpretive panels.

Sanctuary FAQs

Designated: October 7, 2000

Protected area: 448-square-miles

Cultural resources: Dozens of shipwrecks including the sidewheeler *New Orleans* (1844-1849) and the steel-hulled propeller *Isaac M. Scott* (1909-1913)

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Students on board the *Denis Sullivan*.
Photo: John Brooks



Capstan on the *Grecian*.
Photo: John Brooks



Diver on the *E.B. Allen*.
Photo: John Brooks



Boiler on the *Thew*.
Photo: John Brooks

Nordmeer engine
Photo: John Brooks



