

OUR NATIONAL MARINE SANCTUARIES



NATIONAL MARINE
SANCTUARIES



STATE OF THE SANCTUARY REPORT

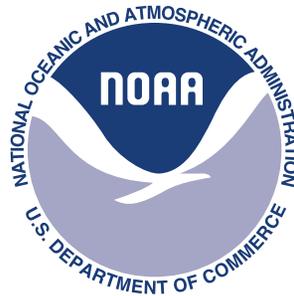
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NATIONAL MARINE
SANCTUARIES TM



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 over 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 underwater parks, encompassing 18,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys, and from Lake Huron to American Samoa. The National Oceanic and Atmospheric Administration's (NOAA) Ocean Service has managed National Marine Sanctuaries since passage of the Marine Protection, Research and Sanctuaries Act in 1972. Protecting sanctuary resources requires a great deal of planning, management and cooperation between federal, state and local officials. The National Marine Sanctuary Program works cooperatively with its partners and the public to balance enjoyment and use with long-term conservation. 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. The Program's staff is ever mindful of their responsibility to protect America's ocean treasures for this and future generations.



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Message from the Director

Recently, I was privileged to personally observe two antiquities from the days of conflict a generation past: John F. Kennedy's *PT 109* and a Japanese mini-sub sunk with the first shots of World War II. These one-time weapons of war are now priceless underwater relics, targets for conservation experts rather than bombs or bullets. It was a reminder to me that, during these times when our Nation's focus is on international concerns and security at home, the business of protecting our country's irreplaceable living and historic underwater treasures always must go on. NOAA's National Marine Sanctuary Program is proud to continue this mission in the trust of the American people.

In this annual "State of the Sanctuaries Report," it is my pleasure to announce that the state of your National Marine Sanctuary System has never been better. Our efforts to protect these special areas continue to gain national and international recognition and support.

In the pages that follow, you will learn about the significant accomplishments over the past year and the even higher expectations we've established for ourselves this year. From landmark submerged cultural resource advances to setting new standards for marine education and community involvement, the program continues to raise the bar for resource protection and conservation and meet the needs of sanctuary communities.

More than ever, the sanctuaries are a place where the diverse activities of NOAA come together. From coral reefs to education, exploration to scientific research, national marine sanctuaries provide a focal point for many of our parent organization's programs and projects. Our program continues to build closer relationships not only with our NOAA colleagues, but with our other state and federal partners as well.

Despite the accomplishments, this report won't come close to helping the reader appreciate our most important resource: our people. Whether it is the staff member handling a community concern, the volunteer conducting a wildlife survey, or the researcher surveying a coral reef, the people that work for and support this program are valuable beyond measure. Without these dedicated individuals, the program would be but a hollow shell of itself.

Thank you for your interest in your national marine sanctuaries and our efforts to protect these treasures for future generations. I look forward to sharing our continued successes with you.

Sincerely,



Daniel J. Basta

Director, NOAA's National Marine Sanctuary Program

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Three Decades of Marine Sanctuaries: A Maturing Program Moves Forward

Thirty years after the passage of the Marine Protection, Research and Sanctuaries Act, the National Marine Sanctuary Program continues to set new standards for management of these special marine and Great Lakes areas. Working in cooperation with the public and many partners, in 2002 the program reclaimed Civil War artifacts from the deep, created protective marine reserves, established international protection for fragile coral reef tracts, and documented new undersea habitats and cultural resources from American Samoa to the Florida Keys – all part of the stewardship national marine sanctuaries provide for the American people.

The program is looking to continue the successes of the past and open new windows of opportunity for the future. Rejuvenating management plans, focusing science on management needs, developing new ways to engage and educate the public, and finding methods to measure our own performance are only a few of many initiatives underway in 2003.

A Spectacular Summer of Exploration

From the wreckage of a Civil War ironclad to the tropical waters of Hawaii, 2002 was a banner year for exploring national marine sanctuaries. A highlight of those efforts was the historic recovery of the USS *Monitor's* gun turret in August. Capping a multiyear partnership between the *Monitor* National Marine Sanctuary, the U.S. Navy and The Mariners' Museum, the retrieval of this invaluable artifact, along with the remains of two *Monitor* crewmen, marked a significant milestone in the preservation of the rapidly decaying warship.

Shipwreck documentation reached far beyond the *Monitor*, however. In August, the identity of the steamship *Portland* (considered New England's *Titanic*) was confirmed in the waters of Stellwagen Bank National Marine Sanctuary. In Thunder Bay, the remains of several well-preserved ships were documented during a late summer mission conducted in cooperation with the Institute for Exploration and renowned ocean explorer Dr. Robert Ballard. Documentation, conservation and protection of submerged cultural resources, which will take a leap forward with the establishment of a new Maritime Archaeology Center in Newport News, Va., will remain a major program focus in 2003.

Explorations with a more ecological focus were conducted in sanctuaries on both coasts. Scientists participating in Sanctuary Quest: West Coast Explorations 2002 explored the complex relationships between ecosystems from the Channel Islands to the Olympic Coast. In Hawaii, a multi-agency expedition surveyed the coral reefs of the remote Northwestern Hawaiian Islands for a second year, gathering information valuable to managers and the public.

Sanctuary expeditions also described previously unknown habitats at Davidson Seamount and Cordell Bank, while the ongoing Sustainable Seas initiative led by explorer Dr. Sylvia Earle examined seafloor communities in the Flower Garden Banks and Florida Keys.

Achieving Resource Protection Through Dynamic Management

A high priority for national marine sanctuaries is to continuously improve resource protection by assessing and improving site management. Hawaiian Islands Humpback Whale National Marine Sanctuary completed its revised management plan in October 2002, and in 2003 expects to begin a process later to consider the addition of other resources to the site. A review of the Florida Keys sanctuary management plan is also nearing completion. Similar reviews are ongoing at the Channel Islands and Gray's Reef sanctuaries, with draft management plans expected from those sites later in 2003. The joint management plan review encompassing the Cordell Bank, Gulf of the Farallones and Monterey Bay sanctuaries is entering its second full year and will focus on preparing action plans for the remainder of 2003. Finally, the designation process for the proposed sanctuary in the Northwestern Hawaiian Islands continues.

Notable resource protection achievements in 2002 included expansion of a voluntary Area-to-be-Avoided in Olympic Coast National Marine Sanctuary, which guides large, commercial vessels away from sensitive ecological areas. On the other coast, Florida Keys reefs received international protection through designation as a Particularly Sensitive Sea Area, a designation that will highlight these fragile reefs on nautical charts worldwide. Finally, the state of California moved to establish marine reserves in the state waters around the Channel Islands. Culminating years of discussions involving the Channel Islands sanctuary, the state, and many stakeholder groups, these reserves will fully protect the unique marine ecosystems found in the Channel Islands and allow critically depleted fish species to recover.

Development of draft internal policies on artificial reefs, marine zoning, and marine wildlife interactions was completed in 2002. This national-level policymaking is intended to describe the program's decision-making process for these activities and form a consistent basis for permitting certain activities. Program policies all receive wide formal review, including a notice for public comment in the Federal Register, and are developed in close coordination with other partners and agencies.

Engaging Our Most Important Constituency: The Public

Fueled by internally funded, competitive "mini-grants," program education specialists conducted a number of new education programs in 2002, including naturalist certification training and a "whaling-to-watching" education initiative highlighting the changing valuation of whales by society. Some highly successful programs continued from previous





years, including the award-winning “Down Under, Out Yonder”, a workshop for teachers hosted by the Flower Garden Banks National Marine Sanctuary. Guiding all education initiatives is the program’s strategic education plan, initiated two years ago to ensure the effectiveness and relevancy of education programs. The plan is currently being implemented ahead of schedule.

Beyond traditional classrooms, the program hosted several large, public outreach events, including a Tall Ships® Festival in Thunder Bay and sanctuary 10th anniversary celebrations throughout the Monterey Bay watershed.

The program’s new “telepresence” initiative also took off in 2002. Using interactive technology, telepresence facilitates a direct interaction between the public and the sanctuaries through a variety of learning experiences. This summer, a successful pilot installation went online at Monterey Bay, linking live underwater camera imagery to an Immersion Theater at the Mystic Aquarium in Connecticut. Beginning this year, telepresence will expand to the Channel Islands, Thunder Bay and Florida Keys sanctuaries.

Finally, the program is developing learning centers, interpretive signage and other educational facilities. Interpretive center planning for the Northwestern Hawaiian Islands and the Florida Keys is nearing completion, and a 10-year facility plan for the program is being developed to guide future construction. Typical of program partnerships, in August a new exhibit featuring the Flower Garden Banks opened to rave reviews at the Audubon Aquarium of the Americas in New Orleans.

Focusing Conservation Science on Management Priorities

In order to ensure that management decisions are made using the best available science, the program recently identified the most pressing needs for research across the program. This analysis (*Sanctuary Science: Evaluation of Status and Information Needs*) will provide guidance and direction to NOAA and other agencies as they plan future research in the sanctuaries.

The development of a systemwide monitoring program also began in 2002. This initiative integrates data collection and reporting across the program, allowing managers to develop and implement policies based on scientifically rigorous information. The initiative is designed to respond to increasing demands to address and report on networks of sanctuaries and the system as a whole, as well as allow for tailored monitoring critical to management at individual sites.

Field efforts continue to provide critical scientific information on marine life and habitat distribution for individual sanctuaries. Discussions with the U.S. Geological Survey, Joint Hydrographic Center and U.S. Environmental

Cover
Dolphins
Photo: Jim Watts

Back Cover
Seascape
Photo: Rod Ehler

Protection Agency are ongoing to identify opportunities to coordinate data collection activities, particularly on the West Coast. The program continues to explore other mutually beneficial partnership opportunities to expand research capabilities. A new, formal agreement with NOAA's National Centers for Coastal Ocean Science, for example, will strengthen that existing relationship and result in more research opportunities in sanctuaries.

Restoring Habitats and Preparing for Emergencies

Improving emergency preparedness and contingency planning remains one of the program's higher priorities. SHIELDS—the Sanctuaries Hazardous Incident Emergency Logistics Database System—is a new intranet database containing key habitat and resource information, allowing for better planning and response during natural disasters, accidents, and homeland security incidents. Piloted at two sites in 2002, SHIELDS will be expanded to five additional sites in the coming year.

In the Florida Keys, restoration specialists completed an ambitious restoration project at the M/V *Wellwood* grounding site, using prefabricated reef modules to help restore habitat destroyed in the 1984 incident on Molasses Reef. On the Pacific coast, divers braved frigid temperatures and hazardous diving conditions to remove oil from the *Jacob Luckenbach*, the cargo ship responsible for mysterious oil spills near San Francisco over the last decade. Injury settlement awards continued to fund response and restoration efforts; 15 settlements in 2002 resulted in more than \$260,000 in awards.

Planning for the Future

As part of its evolution, the program is looking inward to improve internal operations and critically assess program performance. Three regional coordinator positions have been created to help organize sanctuary planning and activities. A strategic plan to manage the development and operation of the sanctuary small boat fleet has been developed, and the program is looking forward to delivery of a new, purpose-built vessel for the Channel Islands in early 2003. Finally, the program is developing both site and national performance assessment criteria to objectively measure achievement of management goals. These sanctuary and program-wide "report cards" are expected to be in use by year's end.

2003 promises to be another year of growth and maturity for the National Marine Sanctuary Program. While a full slate of management challenges await the entire sanctuary team, they are willing and prepared to take on these opportunities. Through public participation, education, and science, the program will continue to ensure that the unique resources of our national marine sanctuaries remain available for future generations of Americans to enjoy.

National Marine Sanctuary Program FAQs

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

Total area managed: 150,436-square-miles

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

The Sanctuary...

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



Channel Islands National Marine Sanctuary

Accomplishments 2002

Marine Reserves Approved for the Channel Islands

On October 23, the California Fish and Game Commission voted to establish 10 marine reserves and two marine conservation areas in the state waters of NOAA's Channel Islands National Marine Sanctuary. Scheduled to take effect in early 2003, this action will create one of the largest marine reserve networks in U.S. waters, placing 175 square miles of sanctuary waters off limits to commercial and recreational fishing. Following a four-year dialogue with scientists, user groups and the public, this accomplishment provides long-term protection to sanctuary resources and serves as a wise investment in the marine ecosystem and maritime economy.

Sanctuary Scientists Monitor Shipwreck for Possible Threats

Fifteen years after the sinking of the bulk-carrier *Pac Baroness*, sanctuary staff visited the site to determine if the ship's cargo poses a threat to sanctuary resources. The *Pac Baroness* sank in 1987, about 55 miles from Santa Barbara, carrying 21,000 metric tons of finely powdered copper concentrate and 340,000 gallons of fuel and oils. This unique mission, held during the week of July 8, employed a U.S. Navy remotely operated vehicle to videotape the site in more than 1,400 feet of water. The video revealed a major buildup of sediment around the wreck and an abundance of marine creatures. Although sediment samples are still being analyzed, initial indications are that the ship's cargo is not adversely affecting marine life.

2003 Planned Activities

New Vessel to Improve Sanctuary Research Capabilities

In early 2003, the sanctuary will take delivery of the newly constructed, 62-foot, high-speed catamaran research vessel *Shearwater*. Built specifically for sanctuary operations, the *Shearwater* will be equipped with state-of-the-art technologies designed to support a variety of research projects of management interest and will serve as the sanctuary's primary research platform. The *Shearwater* will also host educational activities to raise awareness and understanding of the sanctuary. A variety of research and education initiatives, involving university, agency and other sanctuary partners, are scheduled to use the new vessel in 2003.

JASON XIV Takes Channel Islands to Students Nationwide

Using live broadcasts to school auditoriums around the country, JASON XIV: From Shore to Sea will engage 25,000 teachers and more than one million students in an exciting exploration of Channel Islands National Marine Sanctuary and Channel Islands National Park. The two-week project, set for late January, will promote education, understanding and awareness of the sanctuary, as well as the need to protect it, to an unprecedented number of students. This hands-on, scientific, real-time educational project will also provide numerous

opportunities for local community participation, including a researcher lecture series, a Channel Islands Argonauts Program, and community events with ocean explorer Dr. Robert Ballard. Curriculum, digital labs and hands-on activities developed through the project will be used at professional teacher workshops and in classrooms. Partners include Channel Islands National Park, Santa Barbara Maritime Museum, Santa Barbara Museum of Natural History, Santa Barbara Botanic Garden, Marine Science Institute at the University of California Santa Barbara, Santa Barbara County Education Office and Ventura County Superintendent of Schools Office.

Revised Management Plan to Be Completed in 2003

Completion of an updated, draft sanctuary management plan, designed to guide the sanctuary into a new era of improved resource management, is scheduled for 2003. The new plan has spent three years in development through extensive collaborations with partner agencies, input from the Sanctuary Advisory Council and comments from the public. When complete, the five-year management document will include modified sanctuary regulations and will lay out a suite of research, education and resource protection strategies designed to meet the goals of the National Marine Sanctuary Program, while also responding to current resource issues and concerns. A draft management plan and a draft environmental impact statement are expected to be released for public comment later this year.

Consideration of Additional Marine Reserves

Following California's recent adoption of 10 marine reserves and two marine conservation areas within the sanctuary's state waters, the National Marine Sanctuary Program will consider extending the reserves into federal sanctuary waters. If implemented, the expanded network of reserves would provide long-term, ecosystem-based protection to the sanctuary's habitats and species. This process, which will build on four years of public input and the best available scientific and socioeconomic information, will consider a number of options for expanding the reserves network into federal waters, including the proposal originally described in the state of California's environmental review document. The public process will draw on several partners for assistance, including NOAA Fisheries, the Pacific Fisheries Management Council and the Sanctuary Advisory Council.

Educational CD-ROM Featuring Channel Islands To Be Released

In early 2003, the sanctuary will distribute a new, interactive, educational CD-ROM about the Channel Islands. This product is designed to deliver important educational messages about the sanctuary to a wide variety of audiences by packaging the sanctuary's beauty, mysteries, marine life, habitats, scientific research projects, cultural resources, resource protection issues, maps, photos, and more into an easy to use, Web-linked product.

Sanctuary FAQs

Designated: September 22, 1980

Protected area: 1,658-square-miles

Key species: California sea lion, elephant seal, harbor seal, blue and 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

Sanctuary manager: Chris Mobley

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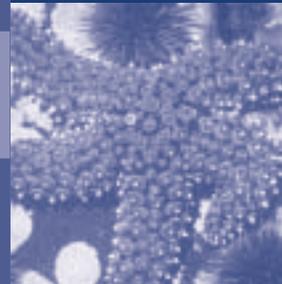
Website: <http://channelislands.noaa.gov>



Exploring a kelp forest
Photo: Kip Evans



Garibaldi (*Hypsypops rubicundus*)
in kelp habitat
Photo: Kip Evans



Sand Star (*Astropecten foliata*)
Photo: Channel Islands NMS



San Miguel Island
Photo: Glenn Allen

The most abundant pinniped (seals and sea lions) in the Sanctuary is the California sea lion (*Zalophus californianus*). Over 80,000 California sea lions live and breed in the Channel Islands. Sea lions live in herds and can weigh up to 700 pounds! One will usually see these playful mammals basking in the sun on shore or playing with other sea lions underwater. (photo: Glenn Allen)

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 above 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 2002

Sanctuary Quest Scientists Survey Areas of Cordell Bank for First Time

NOAA scientists explored regions of Cordell Bank National Marine Sanctuary that humans have never seen before during Sanctuary Quest: West Coast Expedition 2002. Using the NOAA ship *McArthur* as a platform, the team deployed a remotely operated vehicle equipped with three cameras, sonar and positioning laser beams to six different stations on the bank. On the first day, the team covered the sand-furrowed habitat common to the southern end of the bank. On the second and third days, the team explored pinnacle habitats in the bank's northern reaches. Hours of video footage and 1,000 digital still images of the bank's previously unexplored areas will be used by sanctuary management to understand these relatively unknown communities and develop better, science-based management measures.

Public Provides Valuable Input to Management Plan Review Process

The sanctuary kicked off review of its management plan with more than 20 public meetings held in communities throughout northern and central California. Thousands of public comments were gathered during these scoping meetings, which were designed to identify issues worthy of more detailed discussion as the management plan review progresses. In addition, Cordell Bank's Sanctuary Advisory Council was formed, providing yet another formal conduit for the public to provide input to this participatory process. The sanctuary's management plan is being reviewed jointly with the Monterey Bay and Gulf of the Farallones sanctuaries.

Cordell Bank Strengthens Ties With Point Reyes National Seashore

In June, the sanctuary moved into its new office space adjacent to the administrative center for Point Reyes National Seashore. Co-locating the offices has allowed managers from both federal partners to better leverage resources and knowledge to provide coordinated and effective management and education. One example is the training sanctuary staff provide to the park's interpretive rangers to familiarize them with California's national marine sanctuaries; these messages will be woven into park programs during whale-watching and elephant seal seasons. Park officials are providing similar training to sanctuary staff. The sanctuary will work to strengthen this relationship in coming years.

Submersible Helps Scientists Study Bank Habitats

In September, the sanctuary completed a 10-day cruise using the two-person Delta submersible to document the habitats and bottom-dwelling communities on and around Cordell Bank. The cruise was a joint project with NOAA Fisheries (Santa Cruz laboratory), California Department of Fish and Game and Washington State University. The sanctuary is currently analyzing video from the cruise to document habitats and to

estimate abundance and distribution of fishes and invertebrates on Cordell Bank and the surrounding continental shelf and slope.

New Products and Opportunities Help Educators Reach Audiences

Several new education and outreach products, including Cordell Bank's first-ever sanctuary brochure and a revised and improved Web site, were created to help sanctuary staff take the Cordell Bank messages to various constituent groups. The launch of these products was designed to coincide with the start of the management plan review, as educating the public about sanctuary resources enables informed participation. In addition, sanctuary staff took advantage of unique opportunities to reach out to educators. For example, 30 local teachers were invited aboard the research vessel *McArthur* when it was in port during Sanctuary Quest 2002 to learn about the latest sanctuary research, sampling equipment and technology.

2003 Planned Activities

Management Plan Review High Priority for Site

Staff will continue to be highly engaged in the management plan review process as it develops. Having gathered a vast array of public comments, the next steps are to develop working groups to discuss these issues and recommend alternatives to managers. In addition, staff will begin to formulate particular action plans to address the biggest management concerns.

Field Season to Improve Knowledge of Bank Ecosystems

A variety of scientific efforts are scheduled in 2003 to continue habitat characterization and monitoring efforts using both submersible and research vessel assets. Cruises will include a week in the spring onboard the new NOAA vessel *Indomitable* and a week in the fall on a submersible. Scientists seek to learn more about the impacts of fishing gear on sanctuary habitats and the current condition of biological resources. In addition, the sanctuary will be developing a science needs assessment, and initiating habitat and seafloor mapping projects.

Workshop to Engage Educators, Teach Monitoring Techniques

The sanctuary will host a teacher workshop in March as part of a new Long-Term Monitoring Program and Experiential Training for Students (LIMPETS) network project. The workshop will bring together educators from the five West Coast sanctuaries to teach them how to train students to monitor coastal and offshore environments and compare results with other sites. The workshop is co-sponsored by Gulf of the Farallones National Marine Sanctuary.

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

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Elephant seal
Photo: Gulf of the Farallones NMS



Red sea urchin
Photo: Gulf of the Farallones NMS



Snail riding on strawberry anemones
Photo: Cordell Bank Expeditions



Blue whales
Photo: Dan Shapiro

Tiny strawberry anemones stretch their starry crowns of tentacles to catch prey from the food-rich currents.
(photo: Cordell Bank Expeditions)

Fagatele Bay

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% 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*

Vaitogi ●

*Fagatele Bay
NMS*

Pacific Ocean

**Fagatele Bay National Marine Sanctuary****Accomplishments 2002****Sustainable Seas Expedition Brings Scientists, Educators to Sanctuary**

In early March, Fagatele Bay welcomed a diverse group of scientists, photographers, marine advocates and educators for a week of training and research under the auspices of the Sustainable Seas Expedition Program. Marine biologist Dr. Sylvia Earle, National Geographic Society Explorer-in-Residence, led the team as they explored, photographed and documented Fagatele Bay. Highlights included a marine education workshop for teachers and a survey of reef fish populations. The expedition collaborated with the American Samoa Departments of Commerce and Marine and Wildlife Resources, and the American Samoa Environmental Protection Agency, as well as federal partners NOAA Fisheries and the National Park of American Samoa. One of the expedition's cultural highlights was a traditional Samoan *ava* ceremony welcoming the guests and the bestowing of the honorary title *Penina o le Moana* (Pearl of the Ocean) on Dr. Earle by Lt. Gov. Togiolo Tulafono.

Experts Improve Fagatele Bay and Territory Staffs' Mapping Skills

Experts converged on the sanctuary to help build Geographic Information System (GIS) capacity to better understand the nature and location of Fagatele Bay's natural resources. Dr. David Naar and Brian Donahue from the University of South Florida and Dr. Dawn Wright from Oregon State University led training on GIS techniques and met with government representatives to discuss mapping efforts in American Samoa. They also led a daylong mapping expedition aboard the Scripps Institution of Oceanography research vessel *Roger Revelle*, demonstrating multi-beam sonar mapping to American Samoa Community College students and teachers, as well as to government researchers. These GIS development efforts will help both sanctuary and territory staffs develop sustainable, ecosystem-sensitive coastal management initiatives. Dr. Wright's GIS database for Fagatele Bay can be found at <http://dusk.geo.orst.edu/djl/samoa/>.

Sanctuary Builds Local Capacity Through Training and Education

Education Coordinator Rosia Tavita planned several workshops and training sessions in 2002, part of the sanctuary's ongoing commitment to build local understanding of Fagatele Bay's marine life. Elementary school teachers were the primary audience for these efforts, which included a marine science workshop taught by Larry Madrigal, a former teacher in American Samoa. In August, more than 30 local teachers attended a five-day course on marine science activities, which was co-funded by the American Samoan environmental organization *Le Vaomatua*. Beyond the traditional classroom, the sanctuary also sponsored professional training in dive accident awareness and whale watching.

Beyond the Bay: Sanctuary Helps Protect Coral Reefs

Fagatele Bay provided technical assistance to several coral reef projects in American Samoa, including co-sponsoring a marine protected areas workshop where local government officials, members of the public and off-island guests gathered to develop a territorial marine protected areas plan. The sanctuary also funded an invasive marine species survey of American Samoa by Hawaii's Bishop Museum. Finally, Sanctuary Manager Nancy Daschbach lent her expertise to local benthic habitat and coral disease surveys, part of the continuing partnership between the sanctuary and broader territory coral reef initiatives.

2003 Planned Activities

Sanctuary to Raise Awareness During Ocean Fest

The sanctuary will invite the local community to celebrate the marine environment during Ocean Fest in August. The festival will coincide with the annual conference of Pacific region coastal managers and will feature celebrity presentations, entertainment and activity booths staffed by local agencies. The National Marine Sanctuary Foundation will co-sponsor the event.

Humpback Whale Census Highlights 2003 Science Activities

In late summer, Hawaiian Islands Humpback Whale NMS Research Coordinator David Mattila will conduct a census of humpback whales throughout American Samoa. This will mark the first survey of these Antarctic-associated whales that calve in the sanctuary and the waters of the Samoan archipelago. In addition, Eric Trembl of Duke University will initiate an ocean transport study to determine larval dispersion patterns for corals. Both studies will contribute much-needed information about these important marine organisms.

Management Plan Review Preparations Begin

In 2004, Fagatele Bay is scheduled to begin a review of its 1986 management plan. To prepare for this multi-year process, the sanctuary will develop a formal sanctuary advisory council and publish a state of the sanctuary report. Both activities are critical to achieving public participation in reviewing management effectiveness and developing future initiatives.

Local Collegians to Lead Sanctuary Projects

The sanctuary will employ two college interns this summer as part of its continuing commitment to involve next-generation Samoans in marine and coastal management. One student will develop a GIS-based searchable inventory of dive sites around American Samoa in collaboration with a local dive club. The other student will conduct a cultural resource inventory of Fagatele Bay and adjacent areas. Such a survey has never been attempted and will provide valuable information on historical uses of the bay.

Sanctuary FAQs

Designated: April 29, 1986

Protected area: 0.25-square-miles

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

Key habitats: Tropical coral reef

Sanctuary manager: Nancy Daschbach

Headquarters address:

P.O. Box 4318, Pago Pago, AS 96799

Telephone: 684-633-7354

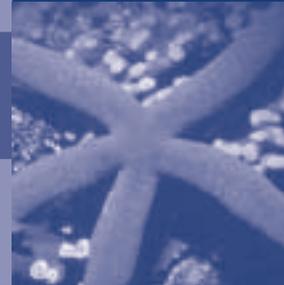
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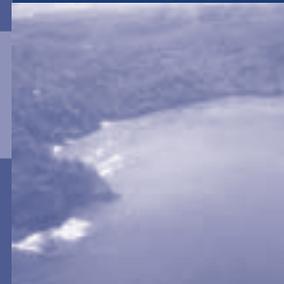
Website: <http://fagatelebay.noaa.gov/>



Damselfish hiding in branching coral
Photo: Kip Evans



Striking bright blue sea star is known locally as a lima
Photo: Kip Evans



Fagatele Bay from the air
Photo: Kip Evans



Celebrating Samoan culture
Photo: Kip Evans

On densely populated Indo-Pacific reefs, many coral species coexist through a complex series of inter-, and intra-specific competitive interactions, establishing a hierarchical dominance amongst themselves. Here species of *Pocillopora* and *Porites* coral grow in close proximity. (photo: KipEvans)

The Sanctuary...

The 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 2002

Reefs in the Florida Keys Receive International Protection

NOAA worked with the International Maritime Organization to designate the Florida Keys National Marine Sanctuary and surrounding waters as a Particularly Sensitive Sea Area (PSSA). The historic designation, which went into effect December 1, protects Florida's coral reefs and seagrass meadows from potentially harmful international shipping activity. While a number of domestic protections for the Keys have been in place for years, PSSA designation means that mandatory restrictions to protect these critical habitats will now be shown on international charts. Specific protections include four Areas-to-Be-Avoided (ATBA) to keep large ships away from coral reefs, and three No Anchoring Areas over reefs in the Tortugas. These navigational guidelines are designed to reduce the number of groundings, collisions, anchoring incidents and operational discharges occurring in the heavily trafficked but ecologically sensitive Florida Keys. The Florida PSSA is one of only five such areas worldwide.

New No Discharge Zone Protects Sanctuary Waters

State waters of the sanctuary achieved a higher level of protection on June 19 with the establishment of a No Discharge Zone (NDZ) designation. Under rules published by the U.S. Environmental Protection Agency (EPA), boaters must now ensure that their marine sanitation devices do not discharge overboard while in state sanctuary waters. While the EPA estimates that nutrients from vessel discharges account for only three percent of the total nutrients in sanctuary waters, pollutants from vessel discharges constitute a significant source of water pollution in harbors, marinas and other areas with poor circulation. A working group led by the Florida Department of Environmental Protection, and composed of government representatives, local environmental groups and the marine industry, has developed an implementation plan for the NDZ. This plan includes a public outreach and education program, a strategy to fund and develop adequate vessel pump-out services in the Keys, and an enforcement strategy. A proposal to extend the NDZ to the sanctuary's federal waters is in development.

Sanctuary Scientists Restore Coral Habitat at Grounding Site

In the summer of 2002, the sanctuary worked with contractors to restore the structure of Molasses Reef off Key Largo, where the freighter *Wellwood* went aground in 1984. The grounding destroyed more than 5,000 square meters of living coral, causing widespread destruction of bottom-dwelling organisms and displacing fish and other marine life at one of the most popular reefs in the sanctuary. Sanctuary restoration specialists worked with Underwater Engineering Services, Inc. to place 22 modules at 14 locations on the grounding site. The modules are concrete casts designed to replicate as closely as possible the ancient spur and groove formation of the



grounding site. The Reef Environmental Education Foundation will monitor the return of fish life to the restored site, and sanctuary biologists may later transplant coral and other organisms to the new structures to speed the recovery.

Sanctuary Increases Enforcement of Rules to Protect Critical Resources

The sanctuary's enforcement program grew into maturity, expanding from seven officers to 17. Effective enforcement of the Sanctuary Preservation Areas and Ecological Reserves is critical to ensuring that the potential environmental and economic benefits of no-take areas become a reality. Enforcement occurs primarily by Florida Fish and Wildlife Conservation Commission officers hired under a cooperative agreement with NOAA. The sanctuary also began routine patrols of the new Tortugas Ecological Reserve using the former 82-foot U.S. Coast Guard cutter *Point Monroe*. In March, NOAA attorneys issued citations totaling \$112,000 in the first eight Tortugas Ecological Reserve violations, sending the message that the federal and state governments will enforce the rules in this crown jewel of the sanctuary. Enforcement will continue to be a focus in 2003.

2003 Planned Activities

Working With Community Partners to Restore Water Quality

The coral reefs of the Florida Keys depend on clean, clear, low-nutrient water to thrive, and all components of the Keys' marine environment benefit from high water quality. However, the Keys' growing resident and tourist populations have resulted in degraded water quality, particularly in nearshore waters. The Sanctuary Advisory Council has made addressing declining water quality its top priority. In 2003, the sanctuary will join with its community partners, including other agencies, nongovernmental organizations and local citizens, to build support for, and make progress on, water quality improvements.

Protecting Sensitive Shallow-Water Habitats Through Marine Zoning

In 2003, the sanctuary plans to work with its advisory council and other stakeholders to use Wildlife Management Areas as a tool to protect critical shallow-water habitats, such as seagrass flats and mangrove shorelines. These areas provide important nursery and foraging habitats for many species of fish and other marine life, including those with commercial and recreational value.

Using Innovative Techniques to Restore Seagrass Habitat

Seagrass meadows play an important role in coral reef ecosystems, but propeller scars and boat groundings destroy both the environmental and economic value of seagrass habitats. With stabilization and restoration of coral habitats following vessel groundings becoming increasingly common, NOAA biologists plan to begin a similar intensive campaign of seagrass restoration in 2003. Techniques to restore seagrass meadows include transplanting healthy plants and restoring blowout areas.

Sanctuary FAQs

Designated: November 16, 1990

Protected area: 3,674-square-miles

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

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

In addition to the hard corals, there are a variety of soft corals like this common sea fan (*Gorgonia ventalina*). The calcium carbonate skeleton of soft corals is located within their bodies, allowing them to move with the wave action. Sea fans typically grow so that the wave action is moving over the broad plane of their bodies, so all of the sea fans in an area will be oriented in the same direction. (photo: Larry Zetwoch)



Endangered West Indian manatee
Photo: Laurel Canty-Ehrlich



Yellowtail snapper
Photo: Jim Raymont



Red mangroves
Photo: Florida Keys NMS



Team OCEAN volunteer
Photo: Laura Urian

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 Caribbean reef fishes and invertebrates. Like oases in the desert, 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, and in summer, coral spawning attracts scientists and divers from around the world.

**Flower Garden Banks National Marine Sanctuary****Accomplishments 2002****Sanctuary Celebrates 10 Years of Stewardship**

Sanctuary friends took advantage of opportunities throughout 2002 to celebrate the 10-year anniversary of the sanctuary's designation. Celebrations kicked off on Jan. 17 (the actual designation date) with a cake-cutting ceremony and open house at the sanctuary office. In early summer, Girl Scouts from three different area councils joined staff and volunteers in sponsoring Ocean Discovery Day, an event highlighted by hands-on activities designed to teach children about coral reefs. The year of celebrations culminated with a gala attended by almost 250 fans of the sanctuary. Sponsored by the private sector, the event included dinner, music, a visual montage and a visit to the Moody Gardens Aquarium. Sanctuary staff took advantage of the event to recognize the many volunteers and sanctuary supporters that have helped make the sanctuary a success over the past decade.

Award-Winning Down Under, Out Yonder Takes Teachers Under the Sea

In July, Flower Garden Banks National Marine Sanctuary once again invited educators from around the country to get out of their classrooms and into the Gulf of Mexico for a weeklong underwater workshop called Down Under, Out Yonder. Three dozen teachers participated in the 2002 workshop. During the dives, the educators counted fish, monitored transect photos and conducted general observations on the status of the coral reef environment. More importantly, they developed a curriculum to share with students in their schools. In November, the Down Under, Out Yonder workshop received second place honors in the Youth/Education category of the Gulf Guardian Awards. The U.S. Environmental Protection Agency sponsors these awards to honor "community groups, businesses, individuals and agencies who are taking positive steps to keep the Gulf healthy, beautiful and productive." The recognition is a distinguished honor for this popular program.

Flower Garden Banks Featured at Audubon Aquarium of the Americas

The sanctuary partnered with the Audubon Aquarium of the Americas to create a new exhibit highlighting the unique ecosystems of Flower Garden Banks. On Aug. 8, the exhibit opened at the New Orleans aquarium with dedication ceremonies attended by renowned ocean explorers Jean-Michel Cousteau and Dr. Sylvia Earle. The exhibit gives visitors a look at the incredible variety of sea creatures that inhabit the northernmost coral reefs in the continental United States. Using fish tanks, interactive displays and new video imagery, the exhibit will tell the Flower Garden Banks story to more than 1 million visitors a year.

Sustainable Seas Expedition Links Sanctuary to Gulf Ecosystems

NOAA scientists explored regions of the northwestern Gulf of Mexico as part of the final year of the Sustainable Seas Expeditions. The research team used small, one-person submersibles to observe previously undescribed bottom habitats. Numerous biological communities were documented atop salt domes, dispelling any lingering misconceptions of the Gulf as a uniform, flat environment. Scientists also found complex habitat structures inhabited by species similar to those of the Flower Garden Banks. These observations reflect links between the Flower Garden Banks and other Gulf communities as part of one complex, interconnected system. Information collected during the expedition will provide a basis for investigating additional links between the Flower Garden and Stetson Banks and other underwater features in the area.

Remote Vehicles Study Deepwater Fish Habitats

In a collaborative effort between NOAA and private institutions, remotely operated vehicles were used to explore regions of the sanctuary far beyond the range of scuba gear. Scientists were encouraged by the habitat complexity of the deepwater regions of the banks, where they found larger than expected concentrations of several important fish populations. Documenting these relatively unknown communities will help the sanctuary develop better science-based management measures for the Flower Garden Banks ecosystem.

2003 Planned Activities

Council to Advise Sanctuary on Management Issues

The sanctuary will create an official advisory council in 2003, providing a channel through which interested public stakeholder groups can provide input into management actions and priorities. Creating this council is a required step before beginning a formal review of the sanctuary's management plan, which is anticipated for 2004. As part of these preparations, sanctuary staff will also begin assessing management needs and compiling a state of the sanctuary report to guide public discussion.

Tennessee Aquarium to Profile Sanctuary in New Expansion

The Tennessee Aquarium, located in Chattanooga, has announced it will highlight the sanctuary as the centerpiece of a major expansion. The aquarium's new wing, scheduled to open in 2005, will feature a half-million-gallon tank constructed to mimic the unique Flower Garden Banks habitat. Sanctuary staff will provide technical assistance as the tank is designed, help develop the associated interpretive exhibits and student-oriented education programs, and educate aquarium staff and volunteers about sanctuary resources and programs.

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, artificial reef and open ocean

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Mass coral spawning
Photo: Emma Hickerson



The normally shy balloonfish
Photo: Ed Enns



Fire coral on Stetson Bank
Photo: Frank and Joyce Burek



Close encounter with a juvenile
manta ray
Photo: Kalle Tsapis

The ridges of the brain coral, (*Colpophyllia natans*), are truly a work of art. If you look carefully you may see the tiny round mouths of the individual polyps. Two species of brain coral occur at the Flower Gardens - the other is (*Diploria strigosa*), which has smaller spaces between each ridge, and does not have the pronounced ridge running down the center of the primary ridge. This picture is an example of what the coral looks like during the daylight hours. At night the tentacles of the polyps will extend to feed on small particles in the water.
(photo: Frank and Joyce Burek)

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 2002

New Research Vessel *Joe Ferguson* Expands Sanctuary Research Capabilities

Gray's Reef National Marine Sanctuary dedicated its new research vessel *Joe Ferguson* in a Feb. 19 ceremony at the University of Georgia's Marine Education Center and Aquarium dock on Skidaway Island. National Geographic Society Expeditions Leader Joe Ferguson died, along with four students, their teachers and National Geographic Society staff, on the plane that struck the Pentagon on Sept. 11, 2001. The group was enroute to the Channel Islands to join a Sustainable Seas Expedition. The *Joe Ferguson*, a former U.S. Coast Guard vessel converted to meet marine research requirements, is the sanctuary's primary scientific platform. With a cruising speed of 26 knots, the vessel is used to support sanctuary patrols, conduct buoy maintenance, study reef fish and habitat, monitor water quality and assist local scientists in individual projects.

Ocean Fest 2002 Teaches Public About Sanctuary Ecosystems

Gray's Reef hosted its fourth annual Gray's Reef Ocean Fest on April 13 on Savannah's River Street at Rousakis Plaza. The annual public event uses educational activities and family entertainment to raise awareness of the sanctuary's ecosystems and Georgia's coastal environment. In 2002, an estimated 2,000 people attended the daylong celebration. Festivities included hands-on ocean environment activities for all ages, dockside boat tours of the Skidaway Institute of Oceanography's research vessel *Savannah*, local bands and entertainment, and the annual Kid's Art and Poetry Contest.

Scientists Conduct New Surveys of Bottom-Dwelling Creatures

As part of an ongoing effort to create an ecological portrait of the richly diverse ecosystem of Gray's Reef, scientists from the sanctuary and NOAA's National Centers for Coastal Ocean Science conducted a series of research surveys within the sanctuary. The goal was to determine the extent to which land-based sources of pollution and other materials are transported via river systems to Gray's Reef and surrounding areas. Samples obtained by scientists will enable them to track changes in the distribution of marine life and the amount of pollution that is finding its way into the sanctuary. Similar studies conducted in 2000 and 2001 have helped scientists better understand the abundant "live bottom habitat" of the reef.

Scientists Characterize Habitat Types and Distribution Within Sanctuary

In 2002, a collaborative project to map bottom features within the sanctuary and to classify the biological communities on exposed habitat was initiated between NOAA's National Centers for Coastal Ocean Science and the sanctuary. Towed video cameras and scuba dives were conducted to match actual habitat type with



previously gathered sonar imagery. The resulting maps establish a baseline of information on the sanctuary's bottom habitats and will enable scientists and managers to monitor future changes in habitat distribution and condition.

Socioeconomic Study Documents Uses of Gray's Reef

To support the sanctuary's review of its management plan, in January a study was completed that identified the major socioeconomic activities that occur within sanctuary boundaries. Based on personal interviews conducted from Savannah to Brunswick, the survey showed that the most significant user group is private boat owners who are members of fishing clubs, camps and marinas. The results also showed strong support for banning spearfishing and anchoring in the sanctuary, as well as for improving law enforcement. Survey data will be used by sanctuary staff as they make decisions regarding future management activities.

2003 Planned Activities

New Management Plan to Chart Course for Gray's Reef Programs

A revised sanctuary management plan is expected to be ready for public review in late 2003. The plan will culminate a three-year effort to ensure that the research, educational and resource protection measures at Gray's Reef meet contemporary conservation and management needs. Sanctuary constituents are helping shape the new plan through meetings, workshops and involvement with the Sanctuary Advisory Council. The revised plan is expected to include a new, periodic public evaluation process to maintain this high level of public feedback.

Damage Assessment Monitoring Program to Begin in Sanctuary

In 2003, staff divers will begin a new monitoring program to assess the level of debris found in the sanctuary and to document and monitor the damage caused to natural resources by anchoring and diving. By monitoring the impact of these activities, managers will have the information necessary to determine whether changes need to be made to regulations or if education programs can be implemented to reduce damage to natural resources.

Weather Buoy in Gray's Reef Slated for Replacement and Upgrade

Sanctuary officials are working with the National Weather Service's National Data Buoy Center (NDBC) to discuss upgrading a weather buoy currently deployed in Gray's Reef that monitors oceanic and atmospheric conditions. NDBC engineers are designing methods to incorporate additional sensors placed on the ocean floor to monitor a variety of standard parameters. If successful, the new instrumentation package could become standard on buoys across the National Marine Sanctuary System, allowing detailed and continuous monitoring of water column conditions.

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 whips

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

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Worm-like tube anemones
Photo: Dean DePhilipo
Passage Productions



Belted sand fish hiding among sponges
Photo: Bruce Cowden



Nurse shark
Photo: Dr. Matt Gilligan
Savannah State Univ.



Special fishing gear on shrimp boats protects turtles
Photo: Karen Angle

Horizontal reef tops provide habitat for sessile (attached) benthic (bottom dwelling) invertebrates, which rely upon ocean currents for food, gas exchange, waste removal, and egg dispersal. Examples include hard corals, soft corals, sponges and hydroids. (photo: Karen Angle)



The Sanctuary...

Along the coast of California north and west of San Francisco, the 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 2002

Source of Mystery Oil Spill off San Francisco Found

In February, NOAA researchers announced that they had determined the source of episodic mystery oil spills off San Francisco that have been blamed for the deaths of hundreds of seabirds within the West Coast sanctuaries over the past decade. After an extensive search, the S.S. *Jacob Luckenbach*, which sank in a collision in 1953 approximately 17 miles southwest of San Francisco's Golden Gate Bridge, was determined to be the culprit. A \$20 million salvage operation to pump the leaking oil from the sunken vessel was completed in mid-September. Sanctuary staff conducted wildlife observations and assisted in spill detection during the U.S. Coast Guard-led operation. "Beach Watch" volunteers played a key role by collecting oiled wildlife and tarball samples that were instrumental in linking the mystery spills to the ship. A natural resources damage assessment is underway.

Expedition Scientists Explore Sanctuary Wildlife

In June, sanctuary staff aboard the NOAA research vessel *McArthur*, despite challenging seas, conducted water column sampling and explored bottom habitats in the Gulf of the Farallones. The lively sea state was a factor in what proved to be a season of exceptional upwelling and high productivity. These research operations, part of a larger West Coast mission called Sanctuary Quest, continued around the clock with plankton and water column sampling at night and wildlife observations during the day. Bottom habitats were also observed using the ship's remotely operated vehicle. Tucker and manta trawls yielded juvenile rockfish, krill and juvenile Dungeness crab. Surface feeding shearwaters, Cassin's Auklets and Common Murres, as well as feeding humpback whales, were observed.

Advisory Council Helps Study Management Issues

A panel of community representatives was sworn in to advise the sanctuary on management issues. The Sanctuary Advisory Council, representing interests such as education, industry, conservation, business and government, immediately became involved in the five-year review of the sanctuary's management plan by assisting management in identifying and prioritizing key issues and participating in working groups. The sanctuary is conducting its management plan review in conjunction with Cordell Bank and Monterey Bay sanctuaries.

A Range of Research Helps Managers Assess Ecosystem

The staff continued a number of research programs critical to understanding the sanctuary environment, including the long-term, thrice-yearly monitoring of the rocky intertidal area of the Farallon Islands, the collection of historical pollution data from the *Jacob Luckenbach*, and the beginning of a biological inventory for Tomales Bay,

in conjunction with Point Reyes National Seashore. Volunteers monitored harbor seal rookeries at Bolinas Lagoon and wildlife disturbances at Tomales Bay, as well as conducted wildlife and use surveys on sanctuary beaches from Point Año Nuevo to Bodega Head.

Education Programs Link Students and Teachers to the Sanctuary

Education efforts, many conducted in partnership with the Farallones Marine Sanctuary Association, included a four-week Sanctuary Explorers Camp for inner city youths, and programs offered by the Presidio Visitor Center that reached hundreds of students in kindergarten through 12th grades. Throughout the year, students from The Branson School monitored the rocky shore at Duxbury Reef and shared their knowledge with the public during a special tidepool walk and at an interpretive kiosk. In addition, the sanctuary's Sandy Beach Monitoring Program taught 265 local high-school students how to document sand crab abundance and collect crabs for researchers. Finally, nearly 50,000 people were reached through sanctuary outreach activities, including Ocean Fest 2002, held at San Francisco's Presidio.

2003 Planned Activities

Team to Examine Management Plan Review Issues

The sanctuary will continue to identify and formulate priority action plans for the joint management plan review. Working groups and the full review team will examine issues specific to the Gulf of the Farallones sanctuary as well as cross-cutting issues that also affect the Cordell Bank and Monterey Bay sanctuaries. Issues will include topics such as wildlife disturbances, exotic and invasive species, water quality, fishing activities, sanctuary boundaries, education and vessel traffic.

Volunteers and Scientists to Continue Ecosystem Studies

The sanctuary's Beach Watch volunteer program, now in its 10th year, will continue to document wildlife and human use of coastal beaches and record other impacts on the marine environment. Sanctuary researchers will also continue gathering information as part of the multiyear Ecosystem Dynamics Study, as well as the ongoing Intertidal Monitoring Program of marine algae and invertebrates at the Farallon Islands.

Expanding the Coastal Monitoring Education Program

The sanctuary will be expanding the Coastal Ecosystem Monitoring Network to other West Coast sites. In cooperation with the Farallones Marine Sanctuary Association, a six-unit curriculum and teachers handbook were designed, a monitoring program was implemented, and many teachers were trained. Long-Term Monitoring Project and Experiential Training for Students (LiMPETS) will be implemented this year to study the intertidal zones and sandy beaches of the West Coast sanctuaries.

Sanctuary FAQs

Designated: January 16, 1981

Protected area: 1,255-square-miles

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

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

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Basking elephant seal
Photo: Jan Roletto



A fully-opened giant green anemone
Photo: Karina Racz



Rocky intertidal habitat
Photo: Joe Heath



A beach volunteer records wildlife
Photo: Gulf of the Farallones NMS

Schools of rockfish congregate in forests of nearshore kelp. (photo: Tony Chess)

The Sanctuary...

One of the world's most important humpback whale habitats lies within the warm and shallow protected waters of the 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 2002

Sanctuary Reauthorized Upon Completion of Management Plan Review

On Sept. 12, NOAA formally announced the reauthorization of the Hawaiian Islands Humpback Whale National Marine Sanctuary for another five years. The reauthorization is the product of a substantial community review process and resulted in a revised management plan to guide sanctuary managers. No new regulation or boundary changes were proposed during this five-year review; however, the review includes the possibility of sanctuary protection for additional species, such as monk seals and sea turtles, over the next few years. Hawaii Gov. Benjamin J. Cayetano approved the revised management plan (thus reauthorizing the sanctuary in state waters) in a letter to NOAA Administrator Vice Adm. Conrad Lautenbacher, expressing continued support for the sanctuary. This successful reauthorization marks an important milestone for the National Marine Sanctuary Program, which has similar reviews underway in sanctuaries throughout the system.

Volunteers Tally Whales During Sanctuary Ocean Count

One of the most successful sanctuary community outreach programs—the annual Sanctuary Ocean Count—also benefits the study of local humpback whale populations. Each year, the sanctuary staff rely upon hundreds of volunteers to tally sightings of humpbacks and document patterns of whale behavior from designated shore stations throughout the state. In 2002, the sanctuary conducted three counts (during the months of January, February and March) involving more than 2,000 volunteers. The counts took place on the islands of O'ahu, Kaua'i, and Hawai'i and were a popular activity for both residents and visitors. Having volunteers count whales at the same time on the same day on three islands gives the sanctuary a snapshot of how many whales are viewable across the island chain. In 2003, the sanctuary will work with the Kaho'olawe Island Reserve Commission to add Kaho'olawe to the list of islands to be surveyed.

Whale Rescue Specialist Educates Staff on Entanglements

In an effort to determine how big a problem entanglement is for the North Pacific humpback whale, the sanctuary worked with the Massachusetts-based Center for Coastal Studies to bring one of its lead rescue experts to Hawaii. David Mattila, a research and rescue specialist, spent four months at the sanctuary photo-documenting and identifying entanglement scars on humpback whales in sanctuary waters. He also advised the sanctuary on how to establish a sighting and alert network in Hawaii to report entanglement incidents. Mattila has since joined the sanctuary full-time to continue working on these issues.

2003 Planned Activities

Addressing Vessel-Whale Interactions

In recent years, several collisions between boats and whales have been reported in Hawaii. Such interactions are expected to increase as the numbers of vessels and whales increase. Little attempt has been made in Hawaii to assess the frequency of collisions, the types of vessels involved, the ships' speeds when whales were hit, the locations of the collisions, and other contributing factors. In 2003, the sanctuary will seek to host a workshop to identify and assess the need for potential management actions, including education, policy changes, and other measures, to avoid and minimize mortalities and injuries resulting from collisions between whales and boats in waters surrounding the Hawaiian Islands.

Gathering Information on Humpback Whale Populations

The sanctuary is partnering with several different agencies and organizations to investigate the feasibility of conducting a dedicated sampling and analysis of humpback whales across the entire North Pacific. The Structure of Populations, Levels of Abundance and Status of Humpbacks (SPLASH) project would have a number of objectives, including obtaining a better estimate of overall whale numbers in the North Pacific, providing a better understanding of population structure, improving understanding of reproductive and mortality rates, studying specific wintering and feeding areas, and identifying human impacts on the population. These data are important to understanding how management actions can be designed to best protect the humpbacks within the sanctuary.

New Educational Facilities Planned for Kihei and Kona

The sanctuary is currently working on plans to construct a multipurpose outreach, education and administrative building at the Maui sanctuary office in Kihei with funds the program received under last year's congressional appropriations. The sanctuary is seeking informal public comments on the proposed building and will be working on a draft environmental assessment for the project. In addition, the sanctuary will be seeking to expand its efforts to reach constituents on Hawai'i by exploring the possibility of opening a field office in Kona.

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; sandy beaches

Sanctuary manager:

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Website:

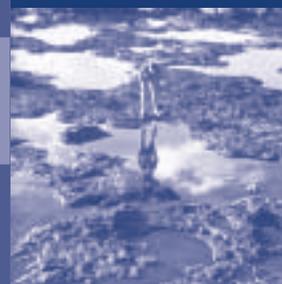
<http://hawaiihumpbackwhale.noaa.gov/>



Humpback whales
Photo: Joseph Mobely -
NMFS Permit #810)



Threatened green sea turtle
Photo: Stan Butler



Exploring coastal tide pools
Photo: Susan Scott



North Shore, Oahu
Photo: Jean Souza

The dazzling peaks off the island of Kahoolawe are just one of the many types of coastlines seen throughout Hawaii. Shorelines range from white sandy beaches on Oahu to the tallest sea cliffs in the world on Molokai. Each island offers its own unique habitat for marine life. (photo: Marc Hodges)

The Sanctuary...

The *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

Cape
Hatteras

Monitor
NMS

Atlantic
Ocean



NATIONAL MARINE
SANCTUARIES

Monitor National Marine Sanctuary**Accomplishments 2002****USS *Monitor's* Gun Turret Recovered During *Monitor* Expedition 2002**

NOAA and the U.S. Navy recovered the revolving gun turret of the famous Civil War ironclad USS *Monitor* on Aug. 5 following a historic, 41-day joint expedition. The turret, along with its two 11-inch Dahlgren guns and carriages, was lifted from the wreck off of Cape Hatteras, N.C., and brought to The Mariners' Museum in Newport News, Va., for further excavation and conservation. During weeks of digging through more than four feet of silt that filled the gun turret, archaeologists and conservators from the sanctuary and the museum recovered a wide array of artifacts ranging from clothing to cannon parts. The excavation team also recovered the remains of two *Monitor* sailors, which were buried in the silt. The remains were carefully removed and sent to the U.S. Army's Central Identification Laboratory in Hawaii, where scientists hope to identify each individual. The *Monitor* is famous for its engagement with the Confederate ironclad *Virginia* on March 9, 1862, the first battle between ironclad warships. This expedition received worldwide media attention and resulted in numerous television news stories, live interviews and two documentaries. The first was a 70-minute National Geographic Explorer special on MSNBC that aired in November 2002; the second is scheduled to air in early 2003 on The Learning Channel and will also be distributed by BBC in Great Britain.

Program Launches Maritime Archaeology Program

The National Marine Sanctuary Program officially launched its Maritime Archaeology Program in 2002. The new program, co-located with the office of the *Monitor* National Marine Sanctuary, will coordinate submerged cultural resource activities across the program and provide technical assistance to sanctuary staff and other partners. Initially, the program will be staffed by the part-time services of personnel at the *Monitor* NMS, the sanctuary program's maritime archaeologist and historian, and occasional participation by personnel at other sanctuaries, particularly the Thunder Bay National Marine Sanctuary and Underwater Preserve.

NOAA Dive Team Assists Navy During *Monitor* Expedition 2002

In July, while Navy divers were busy excavating the *Monitor's* turret, a team of NOAA scientific divers assisted the Navy by recording the excavation with measurements and on digital video. After the turret was recovered, the NOAA team conducted site survey and mapping activities designed to document changes to the site as a result of the turret recovery. The science team was made up of divers from NOAA's National Undersea Research Center at the University of North Carolina at Wilmington, the Maritime Studies Program at East Carolina University, and the U.S. Navy, as well as volunteer divers.

Workshop Participants Praise Pacific Coast Marine Archaeological Summary Project

In November, the National Marine Sanctuary Program and the Santa Barbara Maritime Museum hosted a workshop to review the results of the first phase of a planned national shipwreck database. The Pacific Coast Marine Archaeological Summary (PCMAS), a compilation of 14 separate federal, state and private databases, documented more than 10,000 reported shipwrecks along the U.S. Pacific Coast from Alaska to Mexico. Eventually, the National Shipwreck Database will include shipwreck reports from both U.S. coasts, the Great Lakes and the Gulf of Mexico. Workshop participants represented the Departments of Commerce and Interior, all of the Pacific coastal states, and British Columbia, and expressed enthusiasm and support for the database. Development will continue during 2003, with activities being conducted through the Maritime Archaeology Program.

2003 Planned Activities

New Agreement and Management Plan With The Mariners' Museum in Development

With the successful recovery of the *Monitor's* turret in August 2002, NOAA completed the final phase of the *Monitor* Long-Range Comprehensive Preservation Plan that was submitted to Congress in April 1998. As a result, the National Marine Sanctuary Program is working closely with The Mariners' Museum to develop a programmatic agreement and management plan for the *Monitor* National Marine Sanctuary. Also participating in the programmatic agreement will be the U.S. Department of the Interior Advisory Council on Historic Preservation, The Smithsonian Institution, and the Naval Historical Center. This agreement will define relationships and responsibilities between NOAA and the museum concerning the conservation, long-term curation and display of *Monitor* artifacts.

Ground to be Broken for NOAA's Maritime Archaeology Center

The construction of a 5,000-square-foot building to house the program's new Maritime Archaeology Program will begin in 2003. The center will coordinate submerged cultural resource activities across the program, and will be co-located with the offices of the *Monitor* sanctuary on the grounds of The Mariners' Museum. A \$5 million appropriation from Congress, which will be administered by a NOAA grant to The Mariners' Museum, will be used for phase one of the USS *Monitor* Center, a \$30 million facility to be built by the museum. Phase one is a conservation laboratory that will ensure that all *Monitor* artifacts, including the steam engine, guns and turret, will be properly preserved before becoming focal points of the USS *Monitor* Center exhibits.

Sanctuary FAQs

Designated: January 30, 1975

Protected area: 1-square-mile

Key species: Amberjack, black sea bass, red barbler, scad, dolphin, sand tiger shark, corals, sea anemone, sea urchin

Key habitats: Open ocean, artificial reef

Sanctuary manager:

Dr. John Broadwater

Headquarters address:

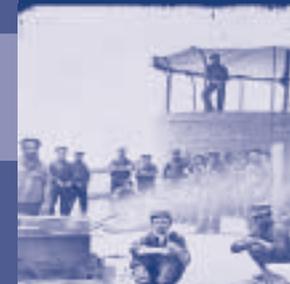
c/o The Mariners' Museum,
100 Museum Drive,
Newport News, VA 23606

Telephone: 757-599-3122

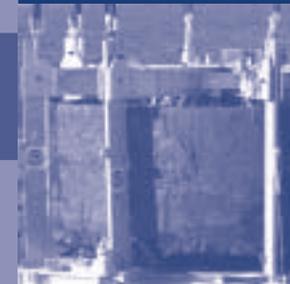
Fax: 757-591-7353

E-mail: monitor@noaa.gov

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



USS *Monitor* sailors,
July 9, 1862
Photo: James F. Gibson, b.1828)



The turret is recovered,
Aug 5, 2002
Photo: AP Pool/Steve Helber



Collapsed midships bulkhead
Photo: *Monitor* NMS

James River, Va. Close-up view of officers on the deck of the USS *Monitor* near the turret.

Taken July 9, 1862 (photo: James F. Gibson, b.1828)
(source: United States Library of Congress)

Wreck of the USS *Monitor*
Photo: *Monitor* NMS

The Sanctuary...

The 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 2002

Sanctuary Celebrates 10 Years of Science and Education

Throughout September, the sanctuary celebrated a decade of successful marine resource protection, education and research with a series of free community events that promoted coastal awareness, ocean exploration and environmental stewardship. More than 15,000 people attended anniversary celebrations in San Simeon, Half Moon Bay, Monterey and Santa Cruz. A new, enhanced Web site (<http://montereybay.noaa.gov>) was launched to kick off the month, allowing the public to learn more about the sanctuary and its management activities.

Davidson Seamount Mission Documents Rare Biological Communities

Sanctuary staff led the first-ever biological exploration of the Davidson Seamount, a 7,500-foot volcano whose peak lies almost 3,700 feet below the sea surface. The expedition's goal was to increase scientific knowledge of the seamount, which lies 60 miles off the central California coast and just outside the sanctuary's boundary. Scientists conducted video surveys, collected living specimens and seafloor samples, and placed baited traps in various communities on all sides of the seamount. Initial results revealed stark biological patterns, huge "forests" of cool-water corals, extensive sponge beds and several species of fish and invertebrates never before seen alive. Data collected on the biology of this relatively undisturbed seamount will help determine if it harbors unique associations of animals and, if so, what the sanctuary might do to protect them in the future. NOAA's Office of Ocean Exploration provided support for the expedition.

Public Weighs In on Management Plan Review Topics

Throughout 2002, the sanctuary moved forward with an evaluation and update of its management plan, a joint effort being conducted with the Cordell Bank and Gulf of the Farallones sanctuaries. At nearly 30 public meetings, more than 1,200 people gave insights and advice on issues sanctuary management might face over the next decade. Based on that input, the sanctuary's advisory council and staff have settled on 21 critical issues for the future, with extensive working group and public participation on these topics planned for the coming year. This management plan review represents a significant investment in the future of marine management in central California, where 8 million people live within an hour's drive of Monterey Bay.

Sanctuary Expands Multicultural Outreach

In 2002, sanctuary education professionals launched MERITO (Multicultural Education for Resource Issues Threatening Oceans), a marine education program focusing on Hispanic families and cultures in central California. The program provides bilingual outreach at Elkhorn Slough, a site heavily visited by Hispanic families, as well as bilingual assistance to inland after-school programs, community centers and adult education centers where

marine education is not taught. The sanctuary developed MERITO to reach out to underserved communities where culture and language have historically been barriers to marine issue awareness and coastal stewardship.

Monterey Bay Goes “Live” at Mystic Aquarium

On June 21, Monterey Bay National Marine Sanctuary officially “opened for viewing” at the Mystic Aquarium and the Institute for Exploration’s (IFE) new Immersion Institute theater in Mystic, Conn. The theater combines live video, robotics and interactive games to educate the public about the wonders of Monterey Bay. During the multimedia experience, visitors are treated to a live, short underwater tour of the bay’s kelp forests provided by a remotely operated vehicle (ROV) tethered near the Monterey Bay Aquarium. The ROV’s orientation and cameras can be controlled remotely from the Connecticut theater allowing one to “visit” the sanctuary in real time, observing the activities of sanctuary inhabitants such as rockfish, sea anemones and bat stars. The Monterey Bay installation, a joint initiative between Mystic Aquarium/IFE and the National Marine Sanctuary Program, is considered a pilot site for a broader “telepresence” initiative. The theater experience is but one potential use of this technology; telepresence is also planned to support future sanctuary education programs and exhibits.

2003 Planned Activities

Developing Management Plan Improvements

A major focus for the sanctuary in 2003 will be completing a draft revision of the site’s management plan. Various public working groups, including the Sanctuary Advisory Council, will help craft “action plans” that address issues such as water quality, wildlife disturbances, improved ecosystem protection, marine reserves, protection of bottom habitats from trawling, sanctuary designation for the Davidson Seamount and the effects of coastal development and pollution. Nearly 300 people, representing stakeholder groups, the public and government agencies, will participate in 15 working groups over the course of the year to develop recommendations for changes to the sanctuary’s management plan.

Increasing Ecosystem Monitoring Capabilities

After two years of planning, the sanctuary will fully implement the Sanctuary Integrated Monitoring Network (SIMoN), a new scientific monitoring program. SIMoN will add value to the existing data collected in and around Monterey Bay and will allow a more comprehensive state of the sanctuary to be determined. By integrating existing data from dozens of regional researchers, SIMoN will allow the entire ecosystem’s health to be more accurately assessed, to the benefit of marine scientists and managers throughout the region. This information will also be distributed to the public and other agencies via the Internet. The program’s development was aided by a grant from the David and Lucile Packard Foundation.

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 pelagic, open ocean

Sanctuary superintendent:

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Male Elephant seal
Photo: Kip Evans



Scenic sandy beach coast
Photo: Kip Evans



Southern sea otter enjoying the kelp
Photo: Kip Evans

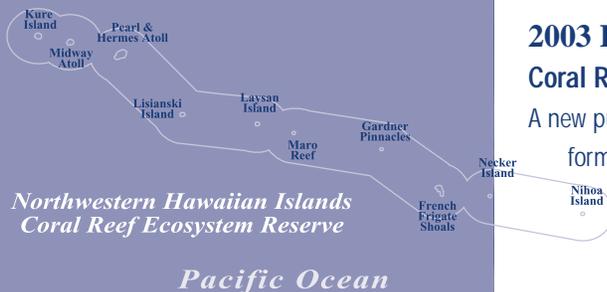


World-renowned surfing
Photo: Kip Evans

Rocky reef and kelp forest at Point Lobos State Park.
photo: Kathy deWet-Oleson

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 seventy percent of the United States' coral reefs and over 7,000 marine species, half of which are unique to the Hawaiian Islands. This uninhabited area contains critical habitat for many endangered and threatened species, including sea turtles and the monk seal. The reserve is the largest conservation area (marine or terrestrial) in the U.S. and the second largest on earth. 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 2002

Expedition Documents Northwestern Hawaiian Islands Ecosystems

Study of the Northwestern Hawaiian Islands (NWHI) ecosystem continued with a second NWHI Reef Assessment and Monitoring Program expedition. This comprehensive, multi-agency expedition followed a similar effort made in 2000 and increased the knowledge about the biological, historical and cultural resources of these remote reefs. Baseline data gathered by scientists are critical for the development of effective management strategies and are of value to all agencies with NWHI jurisdiction. Using three teams of divers based on the research vessels *Rapture* and *Townsend Cromwell*, rapid ecological assessments were made at each island, reef and atoll. Other activities included seafloor mapping, towed camera habitat surveys, coral monitoring and hyperspectral imaging, shallow water surveys and documentation of known and suspected ship and aircraft wrecks.

Public Weighs In on Proposed National Marine Sanctuary

Formal, ecosystem-based management of the NWHI took a giant step forward in 2002 with a very successful series of public meetings held to discuss the proposed establishment of a national marine sanctuary in the Northwestern Hawaiian Islands. Ten meetings were held on six islands and in Washington, D.C., and an opportunity to submit written comments was provided from March until August. More than 12,000 comments were received from interested members of the public, interest groups and partner agencies. These comments will be ranked by issue and will be addressed by working groups as the designation process moves forward.

Education Project Designed to Bring the Northwestern Hawaiian Islands to the People

The reserve launched the Northwestern Hawaiian Islands Multi-Agency Education Project, a comprehensive educational planning team comprised of more than a dozen resource management agencies and educational organizations dedicated to expanding public knowledge about the NWHI. Given the remote nature of the NWHI, a Web portal (accessed through www.hawaiianatolls.org) was created to provide easy public access to information about this area. The project also collaborated to provide daily coverage of two research expeditions to the NWHI in late 2002.

2003 Planned Activities

Coral Reef Discovery Center to Open in Hilo

A new public learning center called Mokupapapa (Hawaiian for "remote, low lying islets and reefs") will formally open in Hilo in March. Dedicated to educating visitors about the marine environment of the Northwestern Hawaiian Islands, the center will feature interactive exhibits about the region's ecosystems.



The interpretive center is being designed and constructed in partnership with the University of Hawaii at Hilo and other partners.

Major Scientific Gathering to Develop Research Priorities

To support the sanctuary designation process and longer-term research needs of the reserve, a science workshop to identify and prioritize research and monitoring needs will be conducted in May 2003. This important workshop will convene nearly 100 experts in various fields to develop a comprehensive research strategy to guide the reserve's science initiatives over the next few years.

Field Season to Investigate Coral Bleaching and Reef Ecosystems

Building on existing research, the reserve will initiate a Midway-based research and education field camp focused on Pearl and Hermes, Midway and Kure atolls, the three northernmost atolls of the NWHI chain. A major focus of the expedition will be studying the effects of the first recorded "coral bleaching" event in the NWHI that occurred in the fall of 2002. In addition, scientists will resurvey existing monitoring stations, establish additional long-term monitoring stations, document submerged historical resources and investigate poorly understood, bottom-dwelling reef creatures. The field camp will be developed in conjunction with the U.S. Fish and Wildlife Service and the state of Hawaii, and will provide much needed information to all NWHI management partners.

Mapping Habitat and Updating Navigational Charts

In conjunction with ongoing expeditions, the reserve will add information to several new mapping activities, including developing new nautical charts and an atlas for the NWHI. In addition, the reserve will compile habitat information of interest to all management partners. These initiatives will be conducted in partnership with NOAA's Pacific and Coastal Service Centers and other offices.

Reserve FAQs

Established: December 4, 2000

Protected area: 131,767-square-miles

Key species: 7,000 marine species including the endangered monk seal, the threatened green sea turtle, the endangered leatherback and hawksbill sea turtles, and black coral

Key habitats: Coral reefs, seamounts, banks and shoals

Reserve coordinator: Robert Smith

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Hilo, HI 96720

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Fax: 808-933-8186

E-mail: hawaiireef@noaa.gov

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



Porcupinefish, *Diadon hystrix*
Photo: James Watt



Galapagos sharks often travel in groups
Photo: James Watt



Submerged wreck at Midway Atoll
Photo: John Brooks



Shallow back reef rice corals at Midway Atoll
Photo: James Watt



Gray chubs, nenu, feed on algae and school in shallows.
photo: James Watt

The Sanctuary...

Spanning 3,310-square miles of marine waters and rugged undeveloped 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, air traffic and recreational uses are all carefully monitored to ensure preservation of this unique and largely undisturbed environment.

**Olympic Coast National Marine Sanctuary****Accomplishments 2002****Research Mission Finds Record Number of Whales**

The final segment of the Sanctuary Quest expedition took place at the Olympic Coast National Marine Sanctuary during a nine-day cruise in June. The NOAA vessel *McArthur* served as a platform for scientists to conduct habitat mapping using sidescan sonar, collect samples of the seafloor, characterize undersea habitats and conduct marine mammal and seabird surveys. Expedition highlights include documentation of nearly 140 humpback whales (the most ever seen in the sanctuary), tens of thousands of sooty shearwaters, and hermit crabs congregated on the ocean floor. These data will help establish baseline information on natural resources in the sanctuary as it begins planning for its 2003 management plan review. A public open house, which drew hundreds to the Port Angeles City Pier, showed off the *McArthur* as well as expedition results.

Improved Vessel Traffic Schemes Approved by IMO

Sanctuary staff played a critical role in the International Maritime Organization's (IMO) redrawing of the Area-to-Be-Avoided (ATBA) off the Olympic Coast. An ATBA is an area that certain classes of ships should avoid because navigation is particularly hazardous, or where it is exceptionally important to avoid environmental impacts within the area. Based on years of sanctuary data on ship traffic and movement patterns, the IMO approved a U.S. Coast Guard and NOAA proposal to enlarge the existing ATBA, applying it to a larger group of vessels and altering shipping lanes further offshore. Although voluntary, the measure is expected to keep large commercial ships away from the coast and reduce the threat of oil spills at the entrance to the Strait of Juan de Fuca and along the outer Washington coast.

Science "Swat Team" Investigates Invasive Species

The sanctuary mobilized a group of 15 marine taxonomists to complete a nine-day survey of intertidal habitats in search of exotic species—invasive organisms that pose a threat to natural communities and habitats. This science "swat team" conducted a rapid assessment of 18 sites representing more than 120 miles of coastline. Six invasive species were detected as a result of this sampling, including bivalves, algae, worms and an ascidian (sea squirt).

Surveys Help Unmask Sanctuary Floor

Approximately 365 square miles of surveys were conducted in 2002, contributing to a long-term goal of mapping seafloor habitats throughout the sanctuary. Surveys using multi-beam, single beam and sidescan sonar technologies were conducted by the NOAA ships *Rainier* and *McArthur*, and by charters. Together, these detailed maps help managers understand what the seafloor looks like and how habitats are distributed, information important for effective management.

Sanctuary Supports Northwest Coast Tribal Celebration

In August, the sanctuary provided logistical and documentary support for Tribal Journeys, a multi-tribe celebration of Northwest Coast Native American and First Nation canoe culture. Tribes from Vancouver Island, mainland British Columbia and the Puget Sound region traveled by canoe to the village of Taholah, where they were hosted by the Quinault Indian Nation. During the journey, canoe crews, their families and supporters camped at villages of the Makah, Quileute and Hoh tribes. The sanctuary outfitted the research vessel *Tatoosh* to provide safety and support for the participants, and also documented the journey with still and video photography.

2003 Planned Activities

New Offices to Increase Sanctuary Visibility

After eight years in the basement of the Federal Building in Port Angeles, this year the sanctuary headquarters staff will take up residence in vastly improved facilities. By moving to The Landing, a multipurpose commercial building on the Port Angeles waterfront near the ferry terminal and visitor's center, the sanctuary will greatly increase its visibility in the community. The move also offers opportunities for exciting new outreach exhibits in this high-traffic visitor area.

Interpretive Exhibits Planned Throughout Region

Construction of the Kalaloch Visitor Contact Station is due to be completed in July. This project, developed cooperatively with Olympic National Park (National Park Service) and the Washington Coastal Wildlife Refuge Complex (U.S. Fish and Wildlife Service) will feature 800 square feet of exhibits relating to the coastal environment. Also in development are new visitor information exhibits in Port Angeles and Neah Bay.

Management Plan Review Preparations Begin

This year, sanctuary staff will begin the groundwork for management plan review by developing a state of the sanctuary report and organizing a round of community open houses. These informal outreach events are designed to educate the interested public and key stakeholders about current sanctuary management and issues, enabling more informed public input during the formal scoping meetings to occur later on.

Research To Continue on Algal Blooms and Sanctuary Wildlife

Ongoing research into harmful algal blooms and water quality will continue cooperatively with federal and state agencies, tribes and industry groups. In addition, the sanctuary will continue nearshore sea otter and kelp surveys, conduct humpback and orca whale identification, and participate in cable surveys and seafloor mapping cruises.

Sanctuary FAQs

Designated: July 16, 1994

Protected area: 3,310-square miles, from Neah Bay to the mouth of the Copalis River, on Washington's Pacific coast

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

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

Sanctuary superintendent:

Carol Bernthal

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



Clownlike tufted puffins
Photo: Olympic Coast NMS



Sea urchins
Photo: Nancy Sefton



The remote coastline of
Olympic Coast
Photo: Olympic Coast NMS



Quinault Indian Nation paddlers
commemorate their cultural
traditions
Photo: Kip Evans

The Olympic Coast's remoteness assures that inter tidal communities are spared the pressure of sheer numbers of people. In this wild environment, habitats remain intact and organisms interact through natural processes, including competition for space and predation. (photo: Nancy Sefton)

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 2002****Sanctuary Celebrates 10 Years With Great Annual Fish Count**

The sanctuary celebrated 10 years of management by holding a series of events throughout the region including a one-day public event in Gloucester, Mass., on July 20. The free festival included exhibits about the sanctuary, storytellers, sea chanteys and music, and children's activities. The celebration also included divers participating in the Great Annual Fish Count (GAFC), an international program that encourages divers and snorkelers to identify and count fish in local waters. The 79 divers who counted fish around Cape Ann constituted the largest single GAFC contingent in the nation this year. Over the course of the past year-and-a-half, a sanctuary sponsored fish identification program has trained more than 300 divers to recognize local species in the Gulf of Maine.

Archaeologists Identify Historic Shipwrecks

During an expedition in late July, the sanctuary visually confirmed the final resting place of New England's most sought-after and mysterious wreck, the steamship *Portland*. All 192 passengers and crew were lost when the paddlewheel passenger steamer disappeared in a severe gale on Nov. 27, 1898, while enroute from Boston to Portland. Because of the loss of life, the *Portland* later became known as New England's *Titanic*. Scientists also located the wrecks of two of the largest schooners ever constructed, the *Frank A. Palmer* and *Louise B. Crary*. The two vessels were bringing coal to Boston when they collided and sank 100 years ago, killing 11 crew. Sonar imagery clearly showed them still locked at the bows. This joint expedition between NOAA and the National Undersea Research Center at the University of Connecticut confirmed earlier efforts of American Underwater Search and Survey, the original discoverer of the wrecks. The vessels are federally protected by sanctuary regulations against injury and disturbance.

Management Plan Review Gets Underway

The five-year management plan review process for the sanctuary is well underway, beginning with a three-and-a-half-month comment period that attracted nearly 20,000 responses from the public. Nine scoping meetings held in cities stretching from Mystic, Conn., to Portland, Maine, generated strong public interest. Collecting and analyzing public comment from all interested stakeholders is an important step toward identifying issues the review will address over the next year.

Study Generates Intriguing Results on Fish Behavior

A multiyear project looking at fish "fidelity" to particular habitats has revealed some interesting results on marine

life behavior. Initiated in 1998, the project seeks to quantify movement rates and site utilization of fishes with different life histories (particularly Atlantic cod and Acadian redfish), relative to certain landscape features. Preliminary results from the 2002 field season suggest that two distinct groups of cod are using piled boulder reefs in the sanctuary—a "resident" group and a "transient" group. Insights gained from this study may prove useful in the design of potential habitat research areas in the sanctuary, with implications for fisheries management in the Gulf of Maine.

Sanctuary Scientists Document Resource Use

Thanks to NOAA and Switzer Leadership Fellowship funding, sanctuary scientists have developed a methodology to assess sanctuary resource use by humans and marine mammals alike. Using a research vessel to follow specific paths through the sanctuary, locations of recreational and commercial vessels, fixed fishing gear and marine mammals are recorded using a hand-held computer. These data are then plotted and mapped so that the researchers can evaluate patterns and correlate use with physical and geographic characteristics, such as water temperature and habitat type. These data then serve as a baseline for future studies and provide managers with valuable information on animal and human interactions. These surveys will also help sanctuary staff make informed, science-based decisions during the management plan review process.

2003 Planned Activities

Sanctuary to Draft Revised Management Plan

The management plan review process continues with the overall goal to develop a draft management plan and environmental impact statement by the end of the year. The numerous public comments that were received at scoping meetings, by mail and by e-mail will be reviewed and prioritized. Issues identified as being of critical importance to the sanctuary will be addressed in working groups organized by the Sanctuary Advisory Council, which will then formulate recommendations to NOAA. Once the draft plan is issued, the public will have additional opportunities to comment.

Expanding Outreach and Improving Facilities

New education and outreach opportunities are being developed with Boston's New England Aquarium, the Gloucester Maritime Heritage Center, the Scituate Maritime and Irish Mossing Museum, the Portland Harbor Museum, and the Center for Coastal Studies and Cape Cod National Seashore in Provincetown. In addition, major renovations to the sanctuary's new offices (a former Coast Guard station in Scituate) will provide expanded facilities for staff and improved outreach opportunities for the public. Renovations to the former Coast Guard station will include a high-tech, environmentally friendly geothermal temperature control system.

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, northern lobster

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

Sanctuary superintendent:

Dr. Craig MacDonald

Headquarters address:

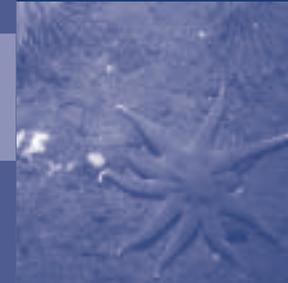
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Multi-armed smooth sunstar
Photo: ann Blackwood and
Page Valentine, USGS



Blue shark
Photo: Greg Skomal



Greater shearwaters
Photo: Dann Blackwood, USGS



Local commercial trawler
Photo: Center for Coastal Studies

A field of live sand dollars (*Echinarachnius parma*) sits on a sandy plain along with one test (the white inner structural form from a dead sand dollar).
(photo: Dann Blackwood and Page Valentine, USGS)

The Sanctuary...

Dozens of historic shipwrecks receive special protection in the 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 2002**Second Annual Tall Ships® Festival Raises Community Awareness**

In celebration of northern Michigan's rich Great Lakes heritage, the Thunder Bay National Marine Sanctuary and Underwater Preserve played host to the second annual Thunder Bay Tall Ships® Festival from Aug. 16 to 18. The three-day event attracted several thousand visitors to Alpena, Mich., to see replicas of the famous brigs and schooners that once plied Lake Huron's waters. In addition to three tall ships (including the U.S. brig *Niagara*), the festival featured music, storytelling, and an appearance by U.S. Congressman Vernon Ehlers (R-Mich.). The event, sponsored by the National Marine Sanctuary Foundation, was aimed at raising regional awareness about the sanctuary.

Ballard Expedition Documents Thunder Bay Shipwrecks

Dr. Robert Ballard and the Institute for Exploration (IFE), in collaboration with scientists from NOAA and the Michigan Department of History, Arts and Libraries, conducted a mission to explore and document the cultural resources within Thunder Bay from August 28 to September 11. Using IFE's *Little Hercules*, a remotely operated vehicle (ROV), the Thunder Bay expedition team collected images of both known and newly discovered shipwrecks. Among the new discoveries is a 19th century wooden schooner, preserved on the bottom with masts still upright. Other highlights included a public presentation by Dr. Ballard at Alpena High School, and an opportunity for Dr. Ballard to meet with U.S. Congressman Bart Stupak (D-Mich.) and U.S. Senator Carl Levin (D-Mich.).

Sanctuary Helps Local Students Design Underwater Vehicle

Thanks to sanctuary sponsorship, a group of Alpena High School students made a strong showing at a national ROV competition in May. Sanctuary staff, using guidance from the Marine Advanced Technology Education Center, mentored the students as they designed and built a homemade ROV, which had to be able to retrieve objects from the bottom of a pool. The national competition, held in Cape Canaveral, Fla., was held in conjunction with a NOAA-NASA symposium that explored the notion of using the same expertise and technology once used for space exploration to benefit underwater exploration. It is hoped that activities like this competition help motivate students to become interested in exploring the historic shipwrecks located in their backyards.

Live Underwater Webcast Connects Sanctuary to Students

In September, a live webcast was used to show students at the American School for the Deaf (ASD) in West Hartford, Conn., the rich cultural resources lying on the bottom of Lake Huron. Using a mobile, low-cost wireless network developed by The National Undersea Research Center for the North Atlantic and Great Lakes, in partnership with the University of Connecticut's Information Technology Services, sanctuary staff used a ROV to show and describe the wreck of the *Montana* to the students in real time. Instant messaging over the wireless network provided a means for ASD students to interact with the divers and technicians as they explored the wreck.

Sanctuary Gains Use of Research Vessel

The sanctuary entered into a new partnership with NOAA's Great Lakes Environmental Research Laboratory (GLERL) to share use of GLERL's research vessel *Shenohon*. This agreement vastly improves the sanctuary's ability to conduct activities such as placing mooring buoys, gathering baseline data on the shipwrecks, supporting summer expeditions and conducting Great Lakes research. The 65-foot-long *Shenohon* operated out of the Thunder Bay River in Alpena from May to September, supporting both sanctuary and GLERL activities.

2003 Planned Activities

Ramping Up Education and Outreach Programs

In the first full year of implementing its education plan, the sanctuary will develop various maritime heritage educational materials and again will sponsor a high-school team to build an ROV for participation in a national competition. In addition, the sanctuary will design and install the first phase of interpretive displays in the Federal Building, where its offices are located. The displays will focus on Great Lakes maritime history, Thunder Bay's shipwrecks and maritime archaeology. The sanctuary is also evaluating several locations for a planned interpretive center.

Sinkholes on Research Agenda

The sanctuary will partner with the IFE for a third year to continue exploration of Thunder Bay. This year, the team will explore underwater sinkhole formations that were discovered by the 2002 expedition. Little is known about the processes that form these sinkholes or the materials they harbor.

Shipwreck Documentation Continues

Sanctuary staff and other researchers will conduct on-site archaeological documentation of the shipwrecks in Thunder Bay. Using video captured by the 2002 field season, as well as new site surveys, the sanctuary will begin drafting detailed site plans of the shipwrecks. This documentation is required to determine appropriate management actions for each site.

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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Kayaker exploring Lake Huron
Photo: Gary Nelkie



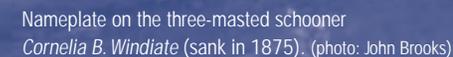
Thunder Bay River Light
Photo: Jessica Pitelka Opfer



Fly wheel on the turtleback steamer *Grecian* (sank in 1906)
Photo: John Brooks



Diver over a cargo hold of the *Grecian*
Photo: John Brooks



Nameplate on the three-masted schooner *Cornelia B. Windiate* (sank in 1875). (photo: John Brooks)

