

SANCTUARY WATCH

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Photo: Russ Sanoian



Letter from the Director

It's a big ocean out there. The challenge of exploring, understanding and protecting it is even bigger.

But new technologies like robot subs, remote-controlled aircraft and high-tech sensor arrays are making it possible to meet that challenge more effectively and efficiently than ever before.

In this issue of *Sanctuary Watch*, you will learn how the NOAA National Marine Sanctuary Program and our public- and private-sector partners are using these and other cutting-edge tools to unravel the ocean's mysteries, monitor its health, and connect people to it in ways that not even Jules Verne could have imagined.

Indeed, what was once the stuff of dreams is now reality. Through an interactive, Internet-based technology called "telepresence," students in Connecticut can talk live with researchers working underwater in California's Monterey Bay National Marine Sanctuary.

Marine scientists from coast to coast can also use telepresence to study fish, marine mammals and corals without getting their feet wet. Soon, anyone with access to a computer will be able to take a virtual dive in a national marine sanctuary.

Off North Carolina, robotic scanning devices provided by the U.S. Navy are giving sanctuary program marine archaeologists a crystal-clear look at the seafloor while testing the technology's ability to detect underwater threats to national security.

Meanwhile, blimps normally used for advertising are being employed by marine mammal experts to observe whales and other sanctuary inhabitants. Soon, pilotless planes will be flying high over sanctuary waters, collecting valuable scientific data about marine resources. Tools like these can help provide much needed "eyes in the sky" in remote places such as the Northwestern Hawaiian Islands, which may soon become the 14th national marine sanctuary.

National marine sanctuaries truly are living laboratories, where new technological wonders can and are put to the test for the benefit of the ocean and the American people. And what we're learning locally is being shared globally, from the Great Barrier Reef to the Galapagos Islands.

It's a big ocean out there, but by continuing to "push the envelope" of technology in national marine sanctuaries and beyond, we can make it a lot smaller.

Sincerely,

Daniel J. Basta, Director
NOAA National Marine Sanctuary Program

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

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Cover: Diver Ernie Kovacs tests telepresence technology in Monterey Bay National Marine Sanctuary.
Photo: Russ Sanoian



During a recent Davidson Seamount expedition, researchers spent up to 12 hours a day in the control room, watching images sent back to the surface by the remotely operated vehicle *Tiburon*. In this image, Huff McGonigal of Monterey Bay National Marine Sanctuary zooms in on a yellow sponge covered with basket stars. Photo: Allen Andrews (c) 2006 MBARI/NOAA

Researchers Explore Undersea Mountain

NOAA, Monterey Bay Aquarium Research Institute (MBARI) and Moss Landing Marine Lab scientists conducted a research expedition Jan. 26-Feb. 24, 2006, to explore Davidson Seamount, a huge undersea mountain that harbors a variety of spectacular marine life, including large, ancient and fragile coral gardens. Davidson Seamount is located 75 miles southwest of Monterey, Calif., and is one of the largest known seamounts in the United States. An initial survey of the geology and biology of the Davidson Seamount was made by NOAA, MBARI and other partners in 2002. Discoveries during that cruise prompted members of the public to propose that Davidson Seamount be protected as part of Monterey Bay National Marine Sanctuary. To learn more about the expedition, visit www.oceanexplorer.noaa.gov

New Grant Opportunity for Santa Barbara Area Educators

California Congresswoman Lois Capps and staff from Channel Islands National Marine Sanctuary announced a new education grant opportunity in January 2006. NOAA's Bay Watershed Education and Training, or B-WET, program will offer \$350,000 for K-12 education efforts that help students and teachers in Santa Barbara and Ventura, Calif., better understand the coastal environment and the connection between land and sea. B-WET is the first federally supported grant program to focus solely on

Santa Barbara Channel watersheds. B-WET programs are also offered in the Chesapeake Bay area, Monterey and San Francisco and the Hawaiian Islands. For more information about the B-WET grant opportunity and deadlines, please contact Seaberry. Nachbar@noaa.gov.

New Marine Conservation Series Report Available

The NOAA National Marine Sanctuary Program is pleased to announce the release of a new Marine Conservation Series report, *Benthic Habitat Mapping in the Olympic Coast National Marine Sanctuary*. The report focuses on a 2002 survey of the northern portion of the sanctuary during which researchers used imaging equipment to produce highly detailed maps of the seafloor. This report is available at www.sanctuaries.noaa.gov/science/conservation/welcome.html

Hundreds Help Count Whales in Hawai'i

More than 650 shore-based volunteers counted and documented the surface behaviors of endangered humpback whales off O'ahu, Kaua'i, the Big Island and Kaho'olawe in January 2006 during the annual Hawaiian Islands Humpback Whale National Marine Sanctuary Ocean Count. The collected data will be used by researchers to monitor the status of the whales that migrate in the winter to Hawaiian waters to breed, calve and nurse. "The Ocean Count is a unique opportunity for the public to learn about Hawai'i's humpbacks while participating in a monitoring effort. It's wonderful to see that so many people respond to our call for volunteers," said Christine Brammer, Sanctuary Ocean Count coordinator. Final results from the Ocean Count will be available at www.hawaiihumpbackwhale.noaa.gov

Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Council member Bill Friedl watches for whales alongside sanctuary staff members Christine Brammer and Breena Martin during the January 2006 Sanctuary Ocean Count. Photo: Kevin Brammer





Researchers used a high-tech sonar device like this one to capture detailed images of the wreck of the 19th-century steamer *Portland*, which rests within Stellwagen Bank National Marine Sanctuary. Photo: Anne Smrcina/SBNMS

Spotlight on: Technology in the Sanctuaries

Scientists, explorers and inventors continually strive to come up with better, faster and more efficient ways to expand our knowledge of the ocean environment and its components. Many of the latest ocean exploration and monitoring technologies are being put to use in national marine sanctuaries.

From “telepresence” technology (see page 4) to an intricate network of monitoring systems, sanctuaries are alive not only with marine life but also technology to improve understanding of these special places.

“Through the application of leading-edge technologies in national marine sanctuaries, we’re opening new windows onto the marine world and connecting the American people to it like never

before,” says Daniel J. Basta, director of the NOAA National Marine Sanctuary Program. “Innovation and creativity will always have a home in national marine sanctuaries.”

Researchers today have a selection of high-tech tools with which to peer into the depths, from sonar devices that produce pictures of the seafloor using sound waves to camera-equipped robot subs and planes.

“Remote-controlled submersibles, called ROVs, are particularly useful because researchers can dive down to a sunken object and investigate it visually,” says Steve Gittings, the sanctuary program’s science coordinator. “They allow us to see what it sees, all from the relative safety of a research vessel.”

But the trick, say researchers, is to use the right tool, or combination of tools, for the job.

“Working with our partners in both the private and public sector, we are always trying new and different remote-sensing technologies to get the best information possible about whatever it is we’re investigating, whether it’s a shipwreck or coral

reef,” says Michael Overfield, a marine archaeologist with the sanctuary program. “It’s exciting when a new technology we’re trying reveals something that we couldn’t have seen with yesterday’s tools.”

It’s better still, he says, when a technology designed for one purpose, such as locating submerged mines or other weapons, is also useful for finding things like shipwrecks that are leaking oil.

During the upcoming field season, sanctuary program researchers plan to use ROVs, manned submersibles, sonar and other tools to explore the hidden regions deep off the California coast, investigate the wreck of a 1930s airship, assess the status of coral reefs in the Gulf of Mexico, and provide the American people with an unprecedented look at the wealth of natural and cultural resources that lie within national marine sanctuaries.

Soon, researchers will be using small robot planes, called unmanned aerial vehicles (UAVs), in the skies over national marine sanctuaries. Packed with cameras and other sensor equipment, UAVs can provide scientists and managers with “eyes in the sky” in places that are not easy to get to by other means. Amazingly, the UAV currently being tested in the airspace over Hawaiian Islands Humpback Whale National Marine Sanctuary, the *Silver Fox*, weighs only 20 pounds.

Often the greatest strides in science and exploration come from instruments that are smaller still. Take thermistors. As small as a matchbox, thermistors are tiny data recorders that are used to measure temperature changes.

Scientists from the sanctuary

(Cont’d. on pg. 6)

Connecting People to the Sea through ‘Telepresence’

Last fall, at the opening ceremony of the Great Lakes Maritime Heritage Center in Alpena, Mich., famed ocean explorer Dr. Robert Ballard welcomed two special guests. But they weren’t in the room. Instead, they were more than two thousand miles away, and underwater, in Monterey Bay National Marine Sanctuary.

Appearing on a giant screen behind Ballard, the two guests — a pair of scuba divers wearing special radio-equipped helmets — took the Michigan audience on a live, interactive tour of Monterey Bay’s underwater kelp forest.

This special connection was made possible through “telepresence,” an innovative technology Ballard pioneered in the 1980s while exploring the *Titanic*.

“Telepresence uses Internet2, a next generation network that allows real-time transmission of huge amounts of data and video,” explains David Bizot, who oversees telepresence applications for the NOAA National Marine Sanctuary Program. “This allows people to interact with divers underwater while watching video of extreme detail and clarity.”

Currently, visitors at specially equipped aquaria and universities can steer cameras through Monterey Bay’s kelp forests as they watch sea lions frolic and fish dart through their habitat. They can also interact directly with divers, as occurred with the Michigan audience.

Working in partnership with Mystic Aquarium Institute for Exploration, JASON Foundation for Education, and Mote Marine Laboratory, the sanctuary program is deploying the technology in the Florida Keys, Channel Islands and Thunder Bay national marine sanctuaries.

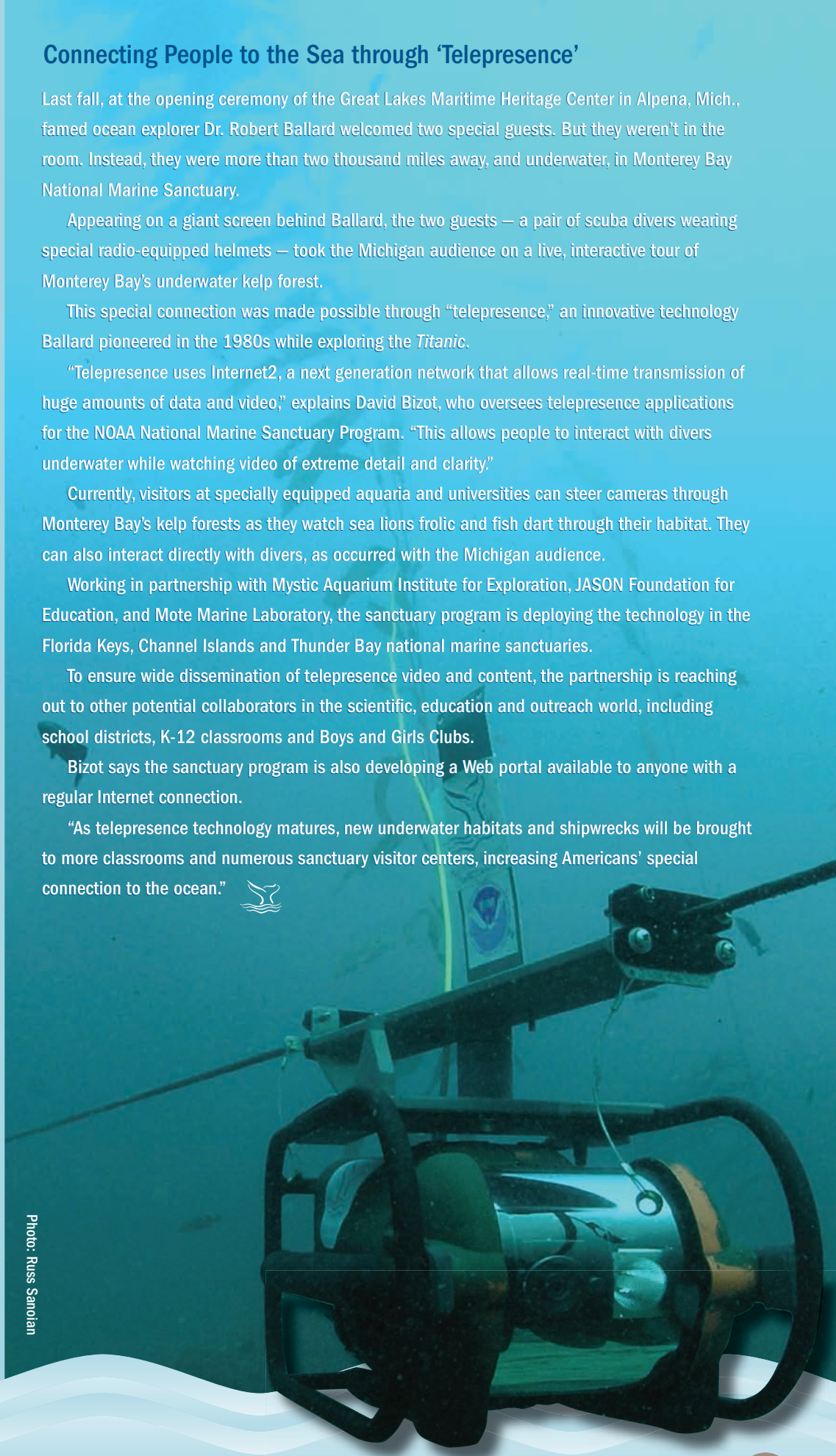
To ensure wide dissemination of telepresence video and content, the partnership is reaching out to other potential collaborators in the scientific, education and outreach world, including school districts, K-12 classrooms and Boys and Girls Clubs.

Bizot says the sanctuary program is also developing a Web portal available to anyone with a regular Internet connection.

“As telepresence technology matures, new underwater habitats and shipwrecks will be brought to more classrooms and numerous sanctuary visitor centers, increasing Americans’ special connection to the ocean.”

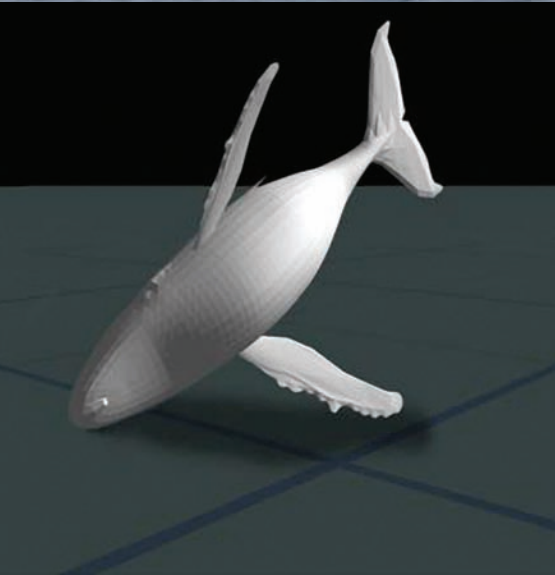


Photo: Russ Sanolian





Researchers at Stellwagen Bank National Marine Sanctuary carefully place a “D-Tag” on a whale to record its movement. Photo: SBNMS (under NOAA Fisheries permit)



This 3-D image helps researchers better understand whale behavior underwater. Image: SBNMS/UNH

High-Tech Tags Help Researchers Understand Whale Behavior

On a windy morning in early summer, scientist David Wiley of Stellwagen Bank National Marine Sanctuary and his team of researchers board the NOAA research vessel *Nancy Foster* to spend several weeks tagging humpback whales. Their mission: to provide key data for an innovative study to understand the foraging behavior of these awe-inspiring giants. Their hope: that the results of their study will help fishermen and mariners develop practices that significantly reduce risks to the whales.

Begun two years ago, the study is significant not just for purely scientific reasons. Despite warning networks and fishing gear modifications, whales continue to die because of ship collisions and entanglements with fishing gear. “Understanding their feeding behavior and water column use may lead to changes in shipping practices and/or changes in the nature and deployment of fishing gear,” says Wiley.

Collecting the data requires a multi-step process, including locating and tagging appropriate animals. Humpbacks are not easy subjects to study because they spend little time at the surface. Using the research vessel’s motorized inflatable boat and a 45-foot flexible pole, the researchers quickly approach the surfacing whale and place a benign suction-cup recording device, known as a D-Tag, on its back. This device captures whale movement, sound and depth.

After retrieving the tag, usually within 24 hours after placement, researchers analyze data from the device and use revolutionary visualization software developed at the University of New Hampshire to replicate the whale’s movements. The tracks show whales diving to the bottom, turning on their sides, and possibly foraging at or near the seafloor. This behavior can put an animal in direct contact with lobster and gill net gear, including the vertical lines that attach to floats at the surface and floating horizontal lines that string between lobster pots. Such encounters may result in life-threatening entanglements.

“With our information, we have suggested that lobster fishermen sink the lines between pots along the bottom, rather than have them hover above the seafloor,” says Wiley. “This method is much safer for the whales because it lessens the risk of their getting entangled.”

Wiley’s research also reinforces the importance of an established federally-funded program sponsored by the state of Massachusetts and the International Fund for Animal Welfare to buy back old fishing gear from fishermen so they can purchase newer, safer ones.

“Thanks to new technology like the D-Tag, we’re obtaining information about whale behavior that we simply couldn’t get before,” says Wiley. “And that helps us help them.”



Special software developed at the University of New Hampshire translates data recorded by the D-Tag into an image showing the whale’s movements. Image: SBNMS/UNH

(Cont'd. from pg. 4)

Technology in the Sanctuaries

program and the Partnership for Interdisciplinary Studies of Coastal Oceans recently installed several thermistors in California's Gulf of the Farallones National Marine Sanctuary to record sea temperatures and wave and depth variations throughout the water column. (Changes in water temperatures affect the growth rate of krill and plankton, a necessary food source for numerous types of fish and marine mammals.)

Further north, at Olympic Coast National Marine Sanctuary, scientists deployed 10 oceanographic mooring systems outfitted with high-tech instruments to measure water quality and currents in an effort to improve understanding of nearshore circulation patterns and upwelling events.

Scientists are also using the instruments to study harmful algal blooms. Because these blooms can cause biotoxin levels to increase in numerous shellfish and marine wildlife species, scientists are concerned about human consumption of these species. Data gathered from the mooring instruments will be used to better forecast such events, and reduce closures of some shellfish operations to ensure human safety.

Of course, any major study of the ocean ultimately requires



Soon, pilotless planes (above) will be flying high over sanctuaries.

Photo: Advanced Ceramics Research. NOAA National Marine Sanctuary Program marine archaeologist Michael Overfield (below) uses state-of-the-art seafloor imaging equipment deployed with support from East Carolina University and the Office of Naval Research. Photo: John F. Williams/ONR

the use of a vessel. The sanctuary program will soon launch three state-of-the-art surface vessels that will raise research, education, monitoring and enforcement in sanctuaries to new levels.

"We need to maintain a presence on the water to effectively manage and protect our sanctuaries," says Ted Lillestolen, the sanctuary program's deputy director for facilities, vessels, aircraft and safety. "To do that we need efficient vessels."

The new vessels will have the same hull design as the R/V *Shearwater*, a 62-foot aluminum catamaran built to support





Three new state-of-the-art research vessels like the R/V *Shearwater* (above) will soon be plying the waters of Florida Keys, Monterey Bay and Stellwagen Bank national marine sanctuaries. Photo: Robert Schwemmer

(Cont'd. from pg. 6)

Technology in the Sanctuaries

research and monitoring efforts on the West Coast. The vessel offers a stable platform ideal for deploying research equipment and bringing teachers and students on board.

This fall, Monterey Bay and Stellwagen Bank national marine sanctuaries will take delivery of new catamaran research vessels that will meet the sanctuaries' need for fast, stable, all-weather craft.

A new and faster enforcement vessel will soon ply the waters between Key West, Fla., and the Dry Tortugas, enabling officers to make runs to the Tortugas and stay aboard overnight if necessary.

“Whether we’re talking boats, subs, planes or thermistors,” says Basta, “we welcome and encourage our partners to come and test their best new technologies in national marine sanctuaries as we all work to shed new light on our ocean and Great Lakes treasures.”



Next issue: Science in the Sanctuaries

Critter Files: Garibaldi

Often when peering into the waters around Anacapa, one of California's Channel Islands, you can see kelp, rocks and little else. However, if you wait a minute or two you will see what looks like a giant goldfish darting from rock to rock. This fish is the Garibaldi and it is prevalent in the waters of Monterey Bay and Channel Islands national marine sanctuaries.

Bright orange, small and aggressive, the Garibaldi is California's state marine fish. A damselfish, the Garibaldi grows to 14 inches (35 cm), is astonishingly territorial, and will fend off larger fish and divers by making noise and aggressive passes. When spawning, the male will groom a section of the reef and farm a patch of red veleroa algae. Females are attracted to the best-groomed nest and will lay their eggs for the male to fertilize and guard until hatching. Garibaldi nests appear in the same areas year after year.

The males are resilient little guys, and with the exception of red algae, they will remove everything (including sea stars) from a nest they are preparing for eggs.

The name Garibaldi comes from Giuseppe Garibaldi, the Italian 19th century army leader who unified Italy, and whose forces wore bright red shirts.



Researcher's Notebook

Common name: Garibaldi damselfish

Scientific name: Hypsypops rubicundus

Max length: 14 inches (35 cm)

Max lifespan: Approximately 20 years

Distribution: Eastern Central Pacific, Monterey Bay in California, to southern Baja, California and Guadalupe Island (off northern central Baja California) in Mexico.

Diet: Mainly invertebrates

Status: Stable in sanctuary waters

Sanctuaries

Celebrate Milestones in 2005

Last fall, the National Marine Sanctuary Foundation, the nonprofit partner of the NOAA National Marine Sanctuary Program, honored national, state and civic leaders and sanctuary volunteers for their commitment to conserving and protecting our ocean and coastal treasures. The honors were given in conjunction with the anniversaries of *Monitor*, Thunder Bay, Channel Islands and Florida Keys national marine sanctuaries. Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve also celebrated an anniversary—its 5th—in 2005.

Thunder Bay National Marine Sanctuary 5th Anniversary

On Sept. 17, the foundation hosted a 5th anniversary event at the new Great Lakes Maritime Heritage Center in Alpena, Mich., to celebrate our nation's youngest and only fresh water sanctuary, Thunder Bay National Marine Sanctuary. World-renowned ocean explorer and NMSF Trustee Dr. Robert Ballard

(left) served as master of ceremonies and presented National Marine Sanctuary Foundation Stewardship Awards to U.S. Senator Carl Levin (right) for his leadership on Great Lakes issues, and to sanctuary volunteer Betty Krueger (center) for her tireless efforts on behalf of the sanctuary. The event was sponsored by Alpena Marc LLC, Thunder Bay Manufacturing Corporation, Alpena Power Company, Alpena Regional Medical Center, LaFarge North America-Alpena Plant, Oppenheimer, RS Information Systems, Inc., Sports Unlimited and Women's Health Center of Alpena.

Photo: Robert Schwemmer



Channel Islands National Marine Sanctuary 25th Anniversary

Channel Islands National Marine Sanctuary celebrated its silver

anniversary with a gala tribute dinner in Santa Barbara, Calif., on Oct. 7, where the foundation honored three distinguished guests with Stewardship Awards. Congresswoman Lois Capps and Governor Arnold Schwarzenegger were honored for their leadership on ocean issues in the State of California, particularly their support of the Channel Islands National Marine Sanctuary. Captain Fred Benko (second from left) was also recognized for his dedication to protecting and preserving this unique marine environment. Sanctuary champions Jean and Barry Schuyler (second and third from right) received the Foundation Lifetime Achievement Award for their commitment to the conservation and protection of our marine resources. Ocean conservationist, explorer and foundation trustee Jean-Michel Cousteau (third from left) served as master of ceremonies for the awards program. The gala was co-hosted by Channel Islands National Marine Sanctuary, the Channel Islands Marine Sanctuary Foundation and the National Marine Sanctuary Foundation. Sponsors included Inamed Corporation, Aquarium of the Pacific, The Gordon and Betty Moore Foundation, Kavlico Corporation, Oppenheimer, The Ocean Foundation, and Venoco, Inc.

Monitor National Marine Sanctuary 30th Anniversary

More than a hundred federal, state and local officials and other supporters of *Monitor* National Marine Sanctuary joined the foundation on Oct. 25 to celebrate the 30th

anniversary of nation's oldest national marine sanctuary. During the Washington, D.C. event, the foundation honored U.S. Senator John W. Warner (third from left) for his leadership on ocean and maritime heritage issues and posthumously honored former Congressman Herb Bateman for his integral role in the protection of the Civil War ironclad USS *Monitor* and the conservation of her artifacts. Both received the National Marine Sanctuary Foundation Stewardship Award. Admiral James D. Watkins, USN (Ret.), chairman of the U.S. Commission on Ocean Policy and president emeritus of the Consortium for Oceanographic Research and Education (second from left), provided keynote remarks during this special event, which included the unveiling of a *Monitor* Artifacts Conservation Campaign public service announcement (to learn more visit Monitor.NMSFOcean.org). The event was hosted by the National Marine Sanctuary Foundation. Partners included *Monitor* National Marine Sanctuary and The Mariners' Museum. The event was sponsored by Dominion, John L. Nau, III, Northrup Grumman Newport News, The Ocean Foundation, RS Information Systems, Inc. and Sodexho.



Photo: Juan Trioche

Photo: ONR



Star of the Sea



Rear Adm. Jay M. Cohen, USN (Ret.)

Spend five minutes with U.S. Navy Rear Adm. Jay M. Cohen and you'll catch the bug.

The ocean exploration bug, that is.

Cohen is so passionate about science, technology and the watery world in which he, as a submariner, was literally immersed for much of his distinguished naval career that you'd think you were talking to Captain Nemo himself.

Like so many others, Cohen was inspired by the adventures of legendary ocean explorer Jacques Cousteau.

"I just couldn't believe the work he was doing, and the technology he was developing. I knew early on that I would dedicate my life to the sea."

Before he knew it, he was graduating from the U.S. Naval Academy. Cohen then studied at the Massachusetts Institute of Technology and Woods Hole Oceanographic Institution, where he received a joint ocean engineering degree and a masters of science in marine engineering and naval architecture. Soon thereafter, he joined the "silent service," and eventually commanded nuclear submarines.

In 2000, Cohen became the chief of naval research, enabling him to play a leading role in guiding the development of new technologies—from self-guided robot subs to super ships—aimed at enhancing the Navy's ocean research, surveillance and monitoring capabilities.

One of the things of which Cohen is most proud while serving as chief of naval research is the strong partnership he fostered with NOAA, specifically the National Marine Sanctuary Program. And perhaps nowhere was that more evident than in the collaboration between the Office of Naval Research and NOAA to locate the lost the Civil War submarine USS *Alligator*, the U.S. Navy's first submarine.

"The expeditions to find the *Alligator* not only enabled us to use great technology in and around a national marine sanctuary, but it was also a crowning example of applying funds to science with a specific goal," Cohen says.

The project, Cohen added, has also helped make science and technology more tangible and exciting to young people. That's critical, he says, to building a strong workforce for the Navy and the nation.

Daniel J. Basta, director of the NOAA National Marine Sanctuary Program, stressed the importance of the partnership with the Navy in carrying out NOAA's mission. "The U.S. Navy, and in particular, the Office of Naval Research, is one of our chief partners in applying ocean research and technology. We could not accomplish some of our goals without their help. And Jay's leadership has been instrumental in furthering our alliance."

"Working with [NOAA] has been a wonderful marriage," says Cohen. "A marriage made in Atlantis!"



Florida Keys National Marine Sanctuary 15th Anniversary

At a special Nov. 12 event at Casa Antigua in Key West, Fla., the foundation honored Congresswoman Ileana Ros-Lehtinen (center) for her leadership on oceans issues, particularly her support of Florida Keys National Marine Sanctuary and the Florida Keys Eco-Discovery Center. The evening included remarks by foundation trustee and marine photographer Bob Talbot (right), and the debut of a public service announcement about the Florida Keys Eco-Discovery Center's Sea Star campaign. The dinner tribute was hosted by the foundation and sponsored by the Mystic Aquarium and Institute for Exploration: Immersion Presents.



Photo: David Hall





NATIONAL MARINE
SANCTUARIES

The National Marine Sanctuary
Program is part of the NOAA
National Ocean Service

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SANCTUARY
WATOH

vision

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

mission

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

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National Marine Sanctuary System



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