

NOAA'S NATIONAL OCEAN SERVICE

ACCOMPLISHMENTS 2002

WORKING FOR AMERICA'S COASTS

# Message from the Assistant Administrator

Thomas Edison once said, “If there’s a better way to do something, find it.”

In the year since Vice Admiral Conrad Lautenbacher assumed the role as NOAA Administrator, I’ve seen a demonstrable difference in the way we work together — a “better way” — to achieve the bigger NOAA mission. The Vice Admiral has insisted on a transparent decision-making process, more rigorous business practices, and a renewed attention to the requirements of our users. And in doing so, he has fostered a more open and constructive climate in which to plan and carry out the agency’s business. Upon his arrival he revealed his code of conduct as a list of “standing orders.” Here is one of my favorites from the list: “We will be gracious, open minded, and supportive of our customers.” The successes detailed in this report seem to indicate that the 1200 men and women of NOAA’s Ocean Service got the message! Week after week, NOS people have demonstrated a commitment to the ideals of collaboration and innovation, which in turn, have contributed to a successful year for our stakeholders.

...and what a year!

In 2002, NOS distinguished itself with an impressive list of accomplishments -

- We published the first-ever Report to Congress on the state of coral reefs.
- We dedicated PORTS systems in Chesapeake Bay and Anchorage to improve safety and advance commerce.
- We set up a Spatial Reference Center in Louisiana, which has the highest rate of land loss from erosion in the world.
- We surveyed and mapped 1700 of miles of our coastal waters.
- We developed an advanced warning system to notify Gulf of Mexico communities when conditions are ripe for harmful algal blooms.
- We completed a comprehensive assessment of science activities in our marine sanctuaries.
- Indiana became the 34th state to join the Coastal Zone Management Program.
- We trained 425 state and local partners in the use of coastal spatial data tools.
- We published two Environmental Sensitivity Index atlases for the East Coast for use during hazardous material spills.
- We raised the turret of the Civil War vessel USS Monitor 140 years after sinking off the coast of North Carolina, and recovered more than 600 sunken artifacts.
- Our web sites are being lauded by the National Science Teachers Association for their content and overall excellence.



And it continues to be an exciting time for the people of NOS; we're moving forward and working more closely with partners in other NOAA offices to provide better, more comprehensive products and services. We're working on projects that merge our traditional navigation and coastal management portfolios to both promote commerce and ensure environmentally sound decision-making. And in the coming year, the U.S. Commission on Ocean Policy will call for a renewed national focus on ocean science and the next generation of coastal management.

NOS is poised and energized to respond to any and all important national challenges the Commission identifies. I'm certain the NOS spirit of collaboration and innovation will once again be brought to bear to the satisfaction of our customers.

And as always — we'll "find a better way."

**Jamison S. Hawkins**

Assistant Administrator for Ocean Services and Coastal Zone Management (Acting)

# *NOAA's National Ocean Service Goals*

**Navigation and Commerce**

Promoting safe navigation, because accurate and timely navigation services are critical to safety, economic productivity, and environmental protection.

**Coastal Communities**

Supporting coastal communities, because their long-term viability depends on achieving a balance between economic development and environmental protection.

**Habitat**

Sustaining coastal habitat, because the coast is highly valued for the services it provides, but is vulnerable to degradation.

**Coastal Hazards**

Mitigating coastal hazards, because communities must reduce their vulnerability and respond immediately when disasters strike.



# Navigation and Commerce

In the last five decades, the average size of ships has doubled and seagoing commerce has tripled. Half of the cargo transported through U.S. waters consists of hazardous materials. The National Ocean Service provides the nation with the information, tools, and services necessary for safe, efficient marine navigation. These include up-to-date paper and electronic nautical charts, shoreline surveys, and information on water levels, currents, and weather. NOS also maintains the National Spatial Reference System, a set of geographic coordinates that support land surveying, navigation, mapping, and the users of the Global Positioning System (GPS).



*“The National Ocean Service provides the nation with the information, tools, and services necessary for safe, efficient marine navigation.”*

## **With Only 2 Feet to Spare, Navigation Tools Proved Critical**

NOS provided the critical navigation information necessary for the safe passage of the freighter *Zhen Hua 1* carrying four immense cranes en route to the port of Oakland, CA. Real-time water levels helped determine actual water depths at transit time, while nautical charts were used to identify normal water depths and obstructions. The National Spatial Reference System was used to position the ship relative to the bridge. Utilizing NOS’s suite of navigation information services ensured a safe ending to this trans-Pacific journey. The cranes, standing 22 stories high, passed under the San Francisco-Oakland Bay Bridge with approximately two feet to spare.

## **Volvo Race Participants Navigate with Confidence**

Volvo sailboat racers “breezed” out of Annapolis at the restart of the Volvo Race this past April as easily as they breezed in. The sailboat’s captains utilized NOS’s experimental current and tide predictions and wind analysis to navigate the Chesapeake Bay on leg six of the race. The experimental numerical model of the Chesapeake Bay produced maps of the speed and direction of the bay’s currents. The model may one day provide an on-line replacement for the tide and current tables used by mariners. The Volvo Race was formerly known as the Whitbread Round the World Race.

## **PORTS® Dedicated in Alaska and the Chesapeake Bay**

NOS dedicated two new PORTS®—Chesapeake Bay and Anchorage, Alaska—bringing the total number of PORTS® to nine. The Physical Oceanographic Real-Time System (PORTS®) is a centralized system that helps mariners avoid groundings and collisions in bays and harbors by providing accurate, up-to-the-minute information, such as: water levels, currents, salinity, and other oceanographic and meteorological data.

## **Real-Time Water Levels in Great Lakes**

NOS upgraded the National Water Level Observation Network (NWLON) in the Great Lakes in 2002. Up-to-the-minute access to all the Great Lakes water-level gauges is now available from the Internet and by telephone. Additionally, two new water-level gauges were added, bringing the total number of stations in the network to 51. The NWLON supports the marine transportation system, coastal managers, the scientific community, and others by providing a long-term record of water levels, relevant to climate change and sea-level trends, and real-time observations—critical for safe navigation and storm surge warnings.

## **Commemorative Geodetic Markers Also Serve Spatial Reference System**

NOS, in cooperation with its many partners, set and accurately positioned several permanent commemorative monuments that also serve as geodetic control points for spatial reference. The new markers include one set in Salt Lake City, UT, commemorating the 2002 Winter Olympics. Other markers denote centers of U.S. population based on 2000 census in Edgar Springs, Missouri, Maryland, New Jersey, and Washington. All of the monuments were marked with a permanent brass disk. The geographic coordinates of each location were determined to an accuracy of two centimeters through Global Positioning System observations.





### Height Modernization Improves National Spatial Reference System (NSRS)

Height Modernization is an NOS-led effort to enhance the vertical component of the NSRS utilizing Global Positioning System (GPS) surveying rather than the time-consuming line-of-sight leveling method. NOS developed new technical guidelines for utilizing GPS to determine heights. NOS sponsored forums in California, Louisiana, and Wisconsin with users of accurate height information to obtain recommendations on requirements and applications. Height Modernization is currently being implemented through \$3.5M in NOS grants to state-based partners, including the California Spatial Reference Center, the Louisiana Spatial Reference Center, the North Carolina Geodetic Survey, and the Wisconsin Department of Transportation.

### New Spatial Reference Center for Louisiana

Louisiana has the highest rate of land loss from erosion in the world. To help tackle this problem, Louisiana State University established the Louisiana Spatial Reference Center with a grant and technical assistance from NOS. The Center will work with NOS to develop a network of local Continuously Operating Reference Stations (CORS). The stations provide the accurate height data needed to determine land slope and water levels. The information is then used to design strategies to slow the rate of erosion.

### Puerto Rico Develops a Comprehensive Height Control Network

NOS initiated a project to help Puerto Rico construct a modern height reference system. Accurate height information is needed in Puerto Rico for topographic and flood plain mapping, numerous engineering projects, and storm evacuation and recovery planning. Partners include: NOS, private companies, federal and local agencies, including the Federal Emergency Management Agency, U.S. Army Corps of Engineers, U.S. Defense Department, the U.S. Geological Survey, the University of Puerto Rico at Mayaguez, the Puerto Rico Department of Transportation, and the Colegio de Ingenieros y Agrimensores de Puerto Rico.

### Thousands of Miles of Coastal Mapping Completed

NOS is responsible for surveying U.S. coastal regions and navigable waters, and for providing the nation with up-to-date nautical charts. This past year, a large portion of NOS shoreline mapping centered on the Gulf coast, the Northwest Hawaiian Islands, and Southeast Alaska. These ports were included: Belmon, Baton Rouge, Lake Charles, and Morgan City, LA; Beaumont, Orange, and Port Arthur, TX; and Jacksonville, FL. NOS mapped the shoreline in 17 coastal areas including: the Gulf Intercoastal Waterway from New Orleans to Galveston; Aialik Bay, Kasaan Bay, and Icy Bay, AK; and Necker Island, French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes, Midway Island, Kure Island, Kiihau Island, and the Gardner Pinnacles in the Northwest Hawaiian Islands.



### Navigation Products Available on Net

NOS placed provisional Electronic Navigational Charts (ENC) on the Internet for evaluation by the public. Downloads of the ENCs have exceeded 1/4 million. Historical maps and charts, the coastal maps series, and vector shoreline are also available. More than 20,000 images of charts and maps from the early 1800s up to the 1990s make up the nation's largest digital repository of historical nautical charts, including an extensive Civil War collection, topographic series, city plans, and bathymetric maps. The coastal map series is produced directly from current editions of NOS's nautical charts with navigational symbols removed—leaving only basic topographical and hydrographic data. The vector shoreline project provides access to current coastline data extracted from NOS charts.

*NOS altered its planned 2001–2002 survey schedule after September 11th, 2001 in order to survey a number of critical ports and harbor approaches.*

*The updates will help protect military and commercial ship routes from possible terrorist strikes.*

### Hydrographic Surveys Support Homeland Security and Safe Navigation

Safe navigation through U.S. ports and waterways depends upon highly accurate nautical charts and updates to chart data, particularly for vessels carrying petroleum or other hazardous materials. In cooperation with the U.S. Navy and the U.S. Coast Guard, NOS altered its planned 2001–2002 survey schedule after September 11th, 2001, in order to survey a number of critical ports and harbor approaches. The updates will help protect military and commercial ship routes from potential accidents and possible terrorist strikes.

### New Method Improves Bathymetry Mapping in Remote Areas

NOS scientists developed a new method for processing satellite imagery to determine water depth. The technique was tested in the Northwest Hawaiian Islands and is now being used by NOS to resurvey some remote reefs as part of an updated nautical chart for that region of the Pacific. The new methodology provides an inexpensive way to rapidly determine water depths in remote locations while maintaining charting standards.

### **Programs Designed to Improve Flight Safety**

NOS is responsible for providing the Federal Aviation Administration with information needed for safe air transportation. NOS's Airport Survey Program supports a wide range of national airspace system activities, including information about latitude, longitude, height, navigational aids, obstructions, and orientation for airport runways and taxiways. In FY 2002, NOS conducted 805 surveys, including 42 obstruction charts, and 42 Area Navigation Approach and eight Safe Flight Geographic Information Systems of airport movement areas. The program also supports future engineering projects such as construction of runways and taxiways, establishment of aids to navigation, and clearing of obstructions.

### **Safe Flight 21**

NOS assisted the U.S. Department of Transportation's National Aeronautical Charting Office (NACO) in a program called, Safe Flight 21, designed to improve national airspace safety. NOS and NACO created accurate airport maps and implemented digital Surface Map Display technology. NOS provided accurate location and height data for Reagan National and O'Hare airports following a demonstration of the cockpit Surface Moving Map display technology at Memphis International Airport.



# Habitat

Coastal areas are constantly changing because of both natural and human forces. Expanding coastal populations and development can threaten the health and survival of plants, animals, and habitats necessary for sustained economic and environmental vitality. The challenge for the National Ocean Service and its partners is to increase public understanding and awareness of coastal habitats and the threats to them in order to protect, enhance, and restore these critical areas. Coral reef destruction, harmful algal blooms, coastal “dead” zones, chemical contaminants, human population pressures, climate change, and other threats to marine life will continue to dominate NOS’s attention in the years to come.

## Gulf Coast Communities Get HAB Advance Warning System

Within the last few years, scientists utilized remote sensing to predict and monitor harmful algal blooms—quick-growing microscopic plants (sometimes called red tide) that can cause beach closures and contaminate seafood. In 2002, NOS applied this forecasting ability and created an email system that notifies communities along the Gulf of Mexico when conditions are ripe for a harmful algal bloom event. An associated Web site includes information about environmental conditions that may affect the spread of harmful algal blooms. Advance notification helps communities lessen negative impacts from the noxious plant.

## Rare Biological Communities Documented at Davidson Seamount

NOS and the Monterey Bay Aquarium Research Institute (MBARI) together conducted a week-long mission to document the unusual biological communities on and around the Davidson Seamount—a giant underwater mountain located near the Monterey Bay National Marine Sanctuary. Using a remotely operated vehicle, scientists collected living specimens and bottom samples and recorded hours of video. The seamount, because of its unusual size and location, is believed to harbor a variety of unique marine life.

## Approved Nonpoint Programs Now Total 10

NOS and the Environmental Protection Agency granted full approval to two new state coastal nonpoint pollution programs, bringing the total number to 10. The Virgin Islands and Delaware join Maryland, Rhode Island, California, Puerto Rico, Virginia, Pennsylvania, New Hampshire, and Massachusetts as the only coastal states/territories with fully approved plans. In an effort to develop a more comprehensive solution to the problem of polluted

runoff in coastal areas, the U.S. Congress expanded the Coastal Zone Management Act (CZMA) in 1990 to include a new section, entitled “Protecting Coastal Waters” (6217). States and territories with approved coastal nonpoint programs are eligible for federal funds.

## Support for Oceans, Coasts, and Islands Action Plan

NOS contributions to preparations for the World Summit On Sustainable Development (WSSD) resulted in a strong WSSD action plan that not only identified specific marine and coastal goals, but also established timetables. In December 2001, NOS and international partners organized “The Global Conference on Oceans and Coasts at Rio+10 Toward the 2002 World Summit on Sustainable Development.” Oceanic, coastal, and island issues were included on the WSSD agenda following this meeting in France. The WSSD timetable calls for applying an ecosystem approach to marine areas by 2010, and for establishing a global network of marine protected areas by 2012. In addition, governments promised to work better together when developing ocean and coastal policies, establishing management practices, and managing fishery capacity.

## Florida Keys Sanctuary Restores Coral Habitat at Grounding Site

Work began on the more than 15,000 square feet of coral destroyed by the Wellwood, a 366-foot freighter registered in Cyprus. On August 4, 1984, the vessel ran aground in 18 feet of water on Molasses Reef near Key Largo, where it remained for 12 days. Sanctuary restoration specialists placed 22 concrete casts, known as modules, at 14 locations at the grounding site. The modules are designed to replicate the spur and groove formations of the coral reef. The grounding had caused widespread destruction of bottom-dwelling organisms and displaced fish and other marine life.







### **System-wide Sanctuary Science Report Completed**

The NOS Marine Sanctuary Program completed a report, entitled “Sanctuary Science: Evaluation of Status and Information Needs.” The report is a comprehensive assessment of science activities within the Sanctuary Program. It also examines the needs of sanctuaries that share either common resources or are in close proximity to one another. The report evaluates how well sanctuary management issues are being addressed by science activity. The report is a first step toward developing a system-wide science and monitoring program to support management decisions.

### **Coral Reef Mapping Milestone Reached**

The U.S. Coral Reef Task Force’s 2000 Action Plan on Coral Reef Protection calls for the mapping of coral reef ecosystems. Under the plan, NOS mapped areas surrounding Puerto Rico and the U.S. Virgin Islands. The new maps help conservation groups better identify critical habitat and commercial interests meet economic objectives while remaining sensitive to environmental concerns, and the mapping gives researchers a framework within which to conduct habitat studies. Ecosystem mapping is scheduled for Hawaii and the U.S. Pacific Territories.

### **Coral Reef Ecosystem Health Report Card Issued**

Under the auspices of the U.S. Coral Reef Task Force, NOS released the first-ever assessment of the conditions of the U.S. coral reefs. The interagency report highlights the increasing degradation of shallow-water coral reefs near inhabited coastal areas, while distant reefs, where fishing pressure is low, remain in near-pristine condition. Coastal pollution, runoff, ship groundings, diseases, climate change, trade in coral, and destructive fishing practices are among the top-ranked threats. The report establishes a baseline against which future assessments can be compared. This will help scientists anticipate changes in reef ecosystem conditions.

### **Coral Reef Action Strategy Issued**

NOAA and the U.S. Coral Reef Task Force issued a report to Congress, entitled “The National Coral Reef Action Strategy.” The document is a status report on the National Action Plan to Conserve Reefs and the Coral Reef Conservation Act of 2000. The report highlights accomplishments and lists future actions. It also provides a region-by-region ranking of threats to reefs and regional rankings of management actions needed to address these threats.

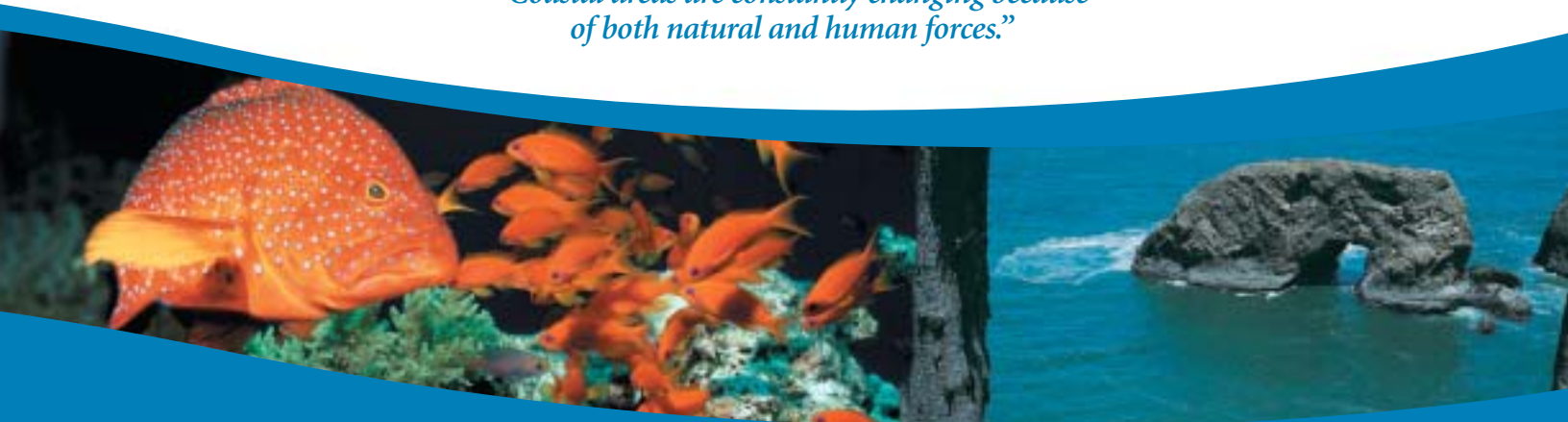
### **Comprehensive Coral Reefs Web Site Unveiled**

NOS helped develop and unveil a new NOAA Internet site designed as a single point of access for information on coral reefs. The site, known as the Coral Reef Information System, or CoRIS, provides data and information derived from NOAA programs and projects, such as: 19,000 aerial photos, 400 preview navigational charts, climate studies, and bleaching reports. Before CoRIS, information about coral was located on more than 50 NOAA coral reef Web sites. <http://www.coris.noaa.gov/>.

### **Estuary Management Benefits from New Technology**

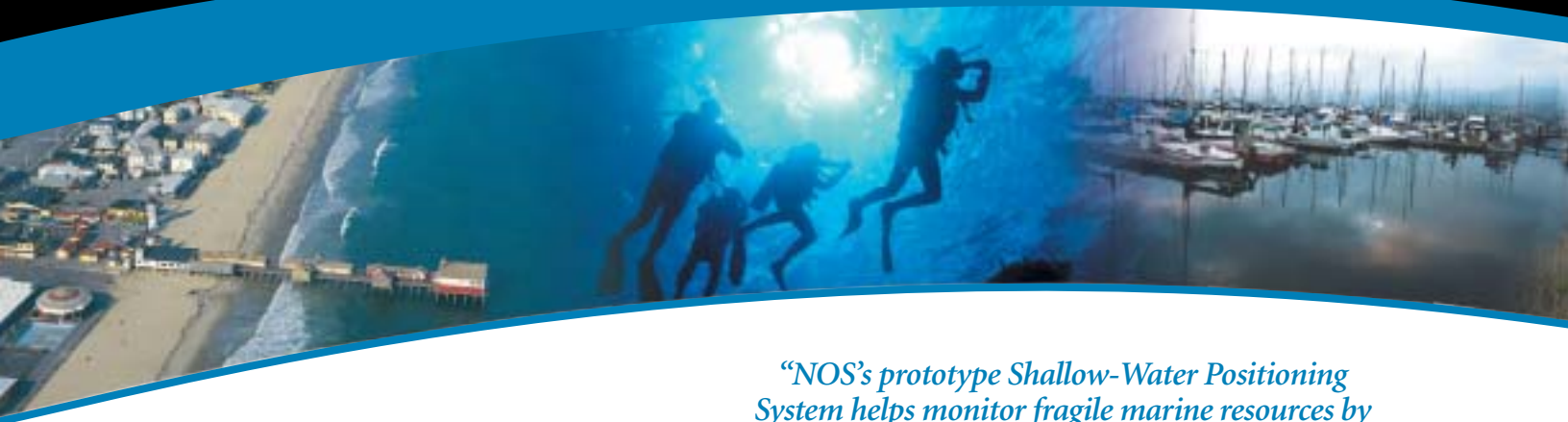
Excessive nutrients from human activities such as wastewater treatment and agricultural runoff can lead to blooms of undesirable marine plants, which then reduces oxygen levels in estuaries. This usually results in fish kills. Traditional nutrient sampling techniques are costly and time consuming. A technology development project funded by the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) produced a break-through tool that improves the way scientists monitor nutrients. The new instrument allows sampling and analysis over extended periods of time, giving scientists and coastal managers the data needed to better deal with excess nutrients and their sources. A commercial version of the monitoring technology is expected by August 2003.

*“Coastal areas are constantly changing because of both natural and human forces.”*



# Coastal Communities

The coastal zone contains some of our nation's most economically valuable, ecologically diverse, and sensitive natural resources. Although this area covers only 17 percent of the U.S. landmass, almost half of the U.S. population lives along the coast, and most of our largest cities are located there. The pressures of increasing population, recreation, and development have fragmented spawning grounds, degraded water quality, and increased the vulnerability of communities to natural hazards. The National Ocean Service and its state and local partners must revitalize waterfronts and industrial sites, reduce damage from natural disasters, and promote new development that minimizes impacts on natural resources.



*“NOS’s prototype Shallow-Water Positioning System helps monitor fragile marine resources by utilizing GPS to track changes in the ocean floor.”*

## Coastal Services Magazine Lauded with National Awards

Helping coastal states benefit from the experiences of their peers is the purpose behind NOS's bimonthly publication, *Coastal Services*. The trade journal profiles the way state and local coastal organizations address coastal management issues. When appropriate, the magazine devotes an entire publication to a single issue or event, which happened twice in 2002. The first looked at how the events of September 11th impacted coastal management, and the second contained a Coastal Zone Management Act 30th anniversary special report. In 2002, *Coastal Services* magazine was honored with five national awards.

## Pribilof Islands Restoration Program Well Underway

NOS led the NOAA cleanup of the Pribilof Islands, Alaska. Under NOAA and its predecessor agencies, the U.S. operated a commercial fur-sealing fishery on the Pribilof Islands (St. George and St. Paul), contributing more than \$46 million to the U.S. Treasury. The Pribilof Environmental Restoration Act of 1996 and Pribilof Islands Transition Act allows NOAA, through NOS, to restore the islands from spoils left during the sealing operations in order to complete the transfer of the islands to Aleut Native Americans. By the end of FY02, nearly half the work was completed.

## Prototype System Tracks Ocean Floor Changes

NOS demonstrated the Shallow-Water Positioning System (SWaPS), a prototype system that tracks changes in the ocean floor. SWaPS consists of a Global Positioning System (GPS) receiver and a digital camera mounted to a floatation device. Underwater features are identified, precisely positioned by the GPS, and their digital image stored. Scientists hope to find a variety of applications for SWaPS, especially in monitoring fragile marine resources and in assessing habitat damage from ship groundings.

## Restoring Natural Resources Near Los Angeles

NOS, through the Montrose Settlements Restoration Program (MSRP), initiated several studies and surveys that will provide the public with accurate information about contaminated fish and other injured natural resources in the Los Angeles-Orange County area. The injuries were a result of DDT and PCBs that were dumped in the ocean decades ago. The dumped chemicals continue to ravage the marine environment and wildlife, including the bald eagle, along the Southern California coast. NOS assisted in the reintroduction of the bald eagle to California's Northern Channel Islands. In 2002, juvenile bald eagles were released on Santa Cruz Island. This was the first time these birds have returned to the Channel Islands since their numbers were decimated by DDT and PCBs.

## Work Continues on Contaminated Hudson River

PCB contamination in the Hudson River, New York, has been historical and widespread. Coordinating with the EPA and the state of New York, NOS has worked for 10 years to ensure the site was properly assessed and a protective remedy selected. In 2002, the Hudson River Natural Resource Damage Assessment (NRDA) Plan was released by NOS. The plan describes studies that are completed, underway, or will be implemented by NOS and other agencies to determine the effects of the PCB contamination on wildlife, fish, surface-water, including river sediments, groundwater, and air quality. Results from the studies will guide restoration efforts. Also, to assist in the remediation and restoration planning, NOS maintains the Hudson River Watershed Database and Mapping Project.

## Indiana Joins Coastal Zone Management Program

Indiana became the 34th state to join the Coastal Zone Management Program. Indiana is now eligible for federal funds to better manage its coastal areas. Under the program, Indiana has the opportunity to balance economic growth and sensible coastal development with protection of natural resources.





### **Educators Learn Benefits of Marine Protected Areas**

The National Marine Protected Areas Center brought together more than 70 educators from the U.S. west coast and Great Lakes region to learn about the importance of Marine Protected Areas (MPAs). The NOS-sponsored workshops were held in California and Minnesota. The attending educators left with a better understanding of MPA goals and ideas on how to include MPA-related themes in educational materials.

### **Far East Benefits from NOS Expertise**

In support of the U.S.-Vietnam Science and Technology Agreement, the U.S. State Department/Agency for International Development provided funding to NOS to begin a two-year program with Vietnam to build capacity for integrated coastal management in Quang Ninh Province in northern Vietnam. Ha Long Bay, the focus of the project, contains one of the world's 12 marine heritage sites and is facing development pressures. Over the next two years, NOS will provide Vietnam with assistance in coastal management.

### **U.S./Korean Marine Management**

NOS developed a four-year cooperative program with the Ministry of Maritime Affairs and Fisheries of the Republic of Korea to build capacity for coastal and marine resource management in the U.S. and Korea. Under the program, nearly two dozen NOAA and Korean experts exchanged visits and began working together in the areas of marine resource policy, management, and science. Other NOAA line offices provided expertise in fisheries, research, and data management.

### **Ocean Management Help for South Africa**

With the culmination of a two-year project initiated by NOS, and in cooperation with the U.S. Agency for International Development, NOS marine protected area specialist worked with South Africa to draft a management plan for the Aliwal Shoals marine protected area in the KwaZulu-Natal Province. Aliwal Shoals MPA is a near-shore area that contains important resources, including habitat, benthic species, and concentrations of ragged tooth sharks. The area is a popular dive and recreational fishing site.

### **One-Stop Shop for Strategies and Case Studies**

With millions of people visiting the coast each year, coastal resource managers must cope with both the positive and negative effects of recreation and tourism. The NOAA Coastal Services Center has developed "The Coastal Recreation and Tourism Web Site" ([www.csc.noaa.gov/techniques/recreation](http://www.csc.noaa.gov/techniques/recreation)). The site is a comprehensive repository of information about the impacts of recreation and tourism on the natural environment. Topics include management strategies, case studies in coastal management, and useful links.

### **Ninety-Four New CORS Stations Added**

NOS added 94 new Continuously Operating Reference Stations (CORS), bringing the total number of stations in its nationwide network to 323. The CORS network provides Global Positioning System measurements in support of 3-dimensional positioning activities. CORS data assist in short-term weather forecasting by allowing meteorologists to measure the spatial distribution of water vapor in the atmosphere. Additional CORS applications include supporting the development of Geographic Information Systems, monitoring movements in the earth's crust, and supporting remote sensing operations.



# Coastal Hazards

Storms batter coastal areas with high winds, huge waves, and storm surges that threaten human communities and natural habitats. The National Ocean Service works to find innovative ways to provide information, tools, and techniques that will reduce the vulnerability of communities to storms, tsunamis, harmful algal blooms, fish kills, marine mammal strandings, and other coastal hazards. For example, NOS, NOAA's National Weather Service, and other federal and state partners are studying the Earth's climate to improve storm prediction and warning systems. NOS also establishes coastal preparedness plans, educates the public about coastal hazards, and develops tools such as geographic information systems (GIS) to help communities plan for and respond to coastal hazards.

## Source of San Francisco Mystery Oil Spill Found

NOS found the source of a mystery oil spill off San Francisco that had been blamed for the deaths of hundreds of seabirds within NOS West Coast sanctuaries over the past decade. After an extensive search, the S.S. *Jacob Lukenbach*, which sank in a collision in 1953, 17 miles southwest of San Francisco's Golden Gate Bridge, was determined to be the culprit. A salvage operation to pump leaking oil from the sunken vessel began in June and was completed in mid-September. The vessel lies in the Gulf of the Farallones Marine Sanctuary.

## General Public Now Has Inside Track on Hurricane Troubles

With the help of a new NOS Web site, people living in the path of a hurricane can gain access to information previously available only to a select group of meteorologists. The Historical Hurricane Mapping Tool allows users to select a geographical area and then view 150 years-worth of historical information about hurricanes in that area. By learning about an area's hurricane history, residents can better prepare for future storms. Thousands of people visited the Web site during the 2002 hurricane season.

## Check Up on Shipwreck in the Channel Islands

NOS revisited the bulk carrier *Pac Baroness*, 15 years after its sinking, to determine if its cargo poses a threat to sanctuary resources. The *Pac Baroness* collided with another vessel in foggy weather in 1987, about 16 miles off Santa Barbara, CA, where it promptly sank in 14,000 feet of water. The vessel's cargo consisted of 278,000 gallons of oil and 21,000 tons of copper ore. Working with the U.S. Navy, NOS researchers utilized a remotely operated vehicle to videotape the site and to take sediment samples. The expedition will allow researchers to map and characterize the site for future ecological impacts and potential threats to marine life. The checkup on the wreck was part of Sanctuary Quest 2002, a NOS-led expedition of the coast from southern California to Washington State.

## Expertise Brought to Bear in Anthrax Incident

In response to reported allergic reactions to mail irradiated by the U.S. Postal Service following the anthrax mail incidents, NOS performed risk, chemical analysis, and indoor air quality assessments to ensure the safety and health of mail handlers and others in the building. NOS also facilitated coordination among the following responders: the National Institute of Standards and Technology, National Institute for Occupational Safety and Health, the Environmental Protection Agency, and other federal agencies.

## Environmental Sensitivity Atlas Published for Critical Areas

NOS expanded its catalogue of Environmental Sensitivity Index (ESI) atlases by publishing two new ESIs, one for the coastline from New Jersey to Rhode Island and another for the New York-New Jersey Metropolitan Area. An ESI is a map that contains specific information about the shoreline, including what natural and man-made resources are at risk during a hazardous material spill or other emergency incident. ESIs are an essential resource and quick reference for both response planning and responding during the aftermath of an emergency. NOS has created atlases for most coastal areas in the United States, including Alaska, Hawaii, the Great Lakes, and the Trust Territories.

## Abandoned Vessel Database Available on the Net

NOS created an Internet-based database of abandoned vessels that could pose a threat to coral ecosystems in U.S. waters. Abandoned vessels pose a threat to coastal resources through physical destruction of coral habitats and dispersion of toxic chemicals and gear. Although the number continues to grow, as newly discovered vessels are added, the inventory contains records for over 150 abandoned vessels. Visitors to the Web site can enter additional information about a wreck or report a wreck not currently in the inventory. Information in the database is used to identify wrecks for further attention and to initiate removal of the highest-priority cases.





### Big Spills and a Leak

NOS is the federal agency responsible for providing scientific support during responses to oil and hazardous material spills. More than 90 releases into our nation's waterways occurred in 2002. Three noteworthy events included: nearly 90,000 gallons of oil spilled from a ruptured pipeline in Little Lake north of Timbalier Bay, LA. The submerged pipeline ruptured when it was struck by a tugboat. In Detroit, 1,000 to 5,000 gallons of oil were discharged, contaminating 17 miles of shoreline along both the U.S. and Canadian mainland. The S.S. *Jacob Lukenbach*, a freighter that sank off California in 1953 with 132,000 gallons of oil onboard, was identified in 2002 as the source of a mystery spill first observed in 1992 that was responsible for injuring or killing thousands of birds and oiling beaches. Responses to such incidents are often followed by NOS-led damage assessments and restoration activities.

### Groundwork Set for Successful Restoration

Coastal areas and marshlands are in serious decline, making their restoration a national priority. NOS provided remote sensing and geodetic surveying technologies at a number of restoration sites. In 2002, NOS conducted positioning surveys and developed Digital Elevation Models (DEMs) for Poplar Point on the Anacostia River in Washington, D.C., Fort McHenry in Baltimore, MD, and Barren Island and Eastern Neck in the Chesapeake Bay. NOS also collected and analyzed water levels for the DEMs and to assist with successful restoration. Partners include the Maryland Port Administration, the Maryland Transportation Authority, the National Aquarium in Baltimore, and the U.S. Geological Survey.

*“NOS found the source of a mystery oil spill off San Francisco that had been blamed for the deaths of hundreds of seabirds over the past decade.”*

### Algae Monitoring Protects Public Health and Safeguards Economy

NOS helped create Washington State's Olympic Region Harmful Algal Bloom (ORHAB) project to identify, monitor, and respond to outbreaks of toxic marine algae. The outbreaks have caused economic losses and health risks within the region's \$100 million coastal fisheries. In the early 1990s, fisheries in Washington State faced annual closures due to natural toxins produced by marine algae. Consumption of affected seafood by humans resulted in illness and several deaths. When state and tribal managers adopted strict beach closure regulations, public confidence was rattled. The ORHAB program helped to bring state standards into conformity with federal standards.

### Louisiana Hypoxic Zone Increased in 2002

A NOS-supported hypoxia assessment study found that, again, the estimated size of the Dead Zone off Louisiana and Texas has grown beyond the scale of previous years. The area covered in the Gulf of Mexico is now larger than the Commonwealth of Massachusetts. The zone stretches from the Mississippi River delta across the Louisiana coast onto the upper Texas coast near Galveston. It ranges from very near shore to as far as 25 miles off Grand Isle, LA and 60 miles off Cameron, LA.

### Is *Pfiesteria* toxic?

*Pfiesteria piscicida*, a dinoflagellate associated with fish kills and human health problems in the mid-1990s in North Carolina and Maryland, may have a very simple life cycle. This conclusion was presented in the June 20th issue of the *Journal of Phycology*, the leading U.S. publication on algae. Past research indicated that *Pfiesteria* had a complex life cycle that included toxic stages. New research revealed no toxic stages in *Pfiesteria's* life cycle. Research continues in order to understand the causes of fish kills and human health problems previously attributed to *Pfiesteria*. Research conducted by NOS, the University of North Carolina, and North Carolina State University in 2002 was made possible by utilizing sophisticated molecular technology adapted from human medical research.



# Organization and Culture

The National Ocean Service promotes the evolution of a more inclusive, internal corporate culture that is science-based, service-oriented, and responsive and adaptive to change. To make progress in any of its programmatic areas of responsibility, NOS must have a strong, effective workforce and organization and new ways to reach its customers and constituents. NOS is also working on educating its current and future workforce and breaking down institutional barriers to progress by promoting educational opportunities for its current and future workforce.



*“NOS helped raise the USS Monitor’s 150-ton gun turret from the ocean floor.”*

## Hollings Marine Laboratory Opens

Construction was completed on the Hollings Marine Laboratory, a modern research facility located in Charleston, SC. The facility is a cooperative project of NOS, the National Institute of Standards and Technology, the South Carolina Department of Natural Resources, the University of Charleston, SC, and the Medical University of South Carolina. Named for Fritz Hollings, U.S. senator from South Carolina, the laboratory is a gathering place for scientists who work on some of our country’s most important and perplexing marine environment concerns. The Hollings Marine Laboratory is located within the Fort Johnson campus of the South Carolina Marine Resources Center in Charleston, SC.

## Turret of USS Monitor Home Again after 140 Years

NOS, in conjunction with the U.S. Navy and the Mariners’ Museum in Newport News, VA, successfully raised the USS *Monitor*’s 150-ton revolving gun turret from the ocean floor, 140 years after it sank off the coast of North Carolina. The massive gun turret was the warship’s most prominent feature and a landmark in naval engineering. The first revolving gun turret in the world, it allowed two 11-inch Dahlgren cannons to be aimed independently from the ship’s heading, a substantial war fighting advantage. The cooperative expedition has recovered more than 600 artifacts from the historic Civil War vessel, including its steam engine, hydrometers, working thermometers, and several intact lantern chimneys.

## Expedition Documents Shipwrecks in Thunder Bay Sanctuary

A NOS-led expedition, in collaboration with Dr. Robert Ballard, the Institute for Exploration (IFE), and the Michigan Department of History, Arts and Libraries, documented dozens of well-preserved shipwrecks lying beneath the waters of Lake Hurons’ Thunder Bay National Marine Sanctuary and Underwater Preserve. Among the new discoveries was a 19th century wooden schooner with its masts still upright. IFE’s remotely operated vehicle, nicknamed “Little Hercules,” was utilized extensively during the expedition.

## Portland Wreck Found

NOS confirmed the final resting place of one of New England’s most sought after and mysterious shipwrecks, the steamship *Portland*. The 281-foot steamer was found off the coast of Massachusetts within the boundaries of Stellwagen Bank National Marine Sanctuary. The *Portland* fell prey to a vicious storm in November 1898, as it made its way from Boston, MA, to Portland, ME. All 192 souls aboard were lost. Because the wreck is located within the sanctuary, it is afforded protection unavailable in other waters. Sanctuary regulations prohibit the disturbance of submerged cultural or historical resources, including artifacts and pieces of shipwrecks.





### Florida Keys Achieve Historic Protection

NOS worked with the International Maritime Organization to designate the Florida Keys National Marine Sanctuary as a Particularly Sensitive Sea Area (PSSA). The historic designation helps safeguard both economic growth and our marine environment—simultaneously protecting America’s special places and resources. As a comprehensive management tool, PSSA designation provides protection from specified global maritime activities, particularly international shipping. While measures have already been enacted to protect the Florida Keys area under domestic law, this area will now be marked on international charts.

### Celebrating National Estuaries Day

In celebration of National Estuaries Day, students in classrooms across America logged onto the Internet to participate in interactive tours of 13 estuaries. It was estimated Estuary Live reached nearly one million people. The National Estuarine Research Reserve System and the Environmental Protection Agency provided the Internet-based tours, while North Carolina Reserve served as host. Estuaries are special places where rivers meet the sea and provide essential habitat for a variety of creatures.

### Ocean Policy Commission Supported

NOS support of the U.S. Commission on Ocean Policy included maintaining the Commission’s official Web site, tracking and reporting on the Commission’s meetings and establishing an internal Web site chronicling NOAA’s interactions with the Commission. Convened in September 2001, the Commission is charged with developing recommendations for a comprehensive and coordinated national ocean policy. Its final report to the President and Congress is due in June 2003.

### Office of Response and Restoration Receives Environmental Excellence Award

The Washington Department of Ecology presented an Environmental Excellence Award to NOS’s Office of Response and Restoration (OR&R). The award was given for OR&R’s role in applying its spill-response planning technology to Puget Sound. OR&R developed enhanced software for the Puget Sound Trajectory Analysis. Although the software is designed to aid in planning, it also helps responders at the time of a spill. For example, the program can forecast 500 probable outcomes for spills in the Puget Sound region and the San Juan Islands.

### Federally Employed Women (FEW) Chapter

NOS was out in front in establishing a new chapter of Federally Employed Women (FEW) within NOAA. FEW is a private, non-profit organization that strives to strengthen the position of women in the federal workforce. NOAA’s chapter focuses on promoting equity, diversity, and professional and personal growth in the federal sector. Chapter goals include career and skill enhancement through training.

### NOS Knowledge, Skills, and Abilities

NOS hired a consulting firm to conduct a thorough study of the NOS current workforce and future workforce needs. All NOS employees were asked to complete an extensive survey to detail their individual areas of expertise. Knowledge, Skills, and Abilities survey data will be used to identify gaps in NOS’s knowledge base, allowing management to address those gaps with targeted training, recruitment, and retention measures.



## **Hawaiian Islands Humpback Whale Sanctuary Reauthorized**

The Hawaiian Islands Humpback Whale National Marine Sanctuary was reauthorized for another five years. The reauthorization is the result of a strong community-based review process and includes the possibility of sanctuary protection for additional species, such as monk seals and sea turtles, within the next five years. No new regulation or boundary changes were proposed. Hawaii's governor approved the management plan, thus reauthorizing the sanctuary in state waters.

## **Coastal Marine Demonstration Project Receives Award for Excellence in Partnering**

The National Oceanographic Partnership Program (NOPP) selected NOAA's Coastal Marine Demonstration Project (CMDP) for its 2002 Award for Excellence in Partnering. The Coast Survey Development Laboratory collaborated with the NOAA Weather Environmental Monitoring Center and the University of Maryland Horn Point Laboratory to make high-resolution forecasts of surface winds, fog, visibility, currents, wave heights, water levels, and water temperatures and salinity available to the public. The demonstration area stretched from New England to the Carolinas, but focused on the Chesapeake Bay. Two of the experimental models demonstrated in the CMDP are now operational, including the Chesapeake Bay Operational Forecast System and the Coastal Ocean Forecast System.





### **Sustainable Seas Expedition Concludes Five-Year Voyage**

The 2002 Sustainable Seas Expedition explored deep-water coral and hard-bottom communities from the west coast of Florida to Louisiana. Scientists focused on characterizing these unique habitats, studying the corals, sponges, and other sessile organisms that comprise the structure of the reefs, as well as the fish and invertebrate communities that rely upon them for food and shelter. The expedition used one-person submersibles equipped with cameras and scientific instruments. The voyage, co-sponsored by NOAA's National Marine Sanctuary Program and the National Geographic Society, concluded a five-year expedition of National Marine Sanctuaries and was led by underwater explorer Dr. Sylvia Earle.

### **Islands in the Stream 2002**

The Islands in the Stream 2002 Expedition brought together scientists from a variety of organizations—each wanting to explore certain areas along the southeast coast of the U.S. from Florida to North Carolina. Research was conducted using the Harbor Branch Oceanographic Institution four-person submersible, the Johnson-Sea-Link II. Dives were made to conduct geological, biological, and ecological observations of deep-water reefs, rocky outcrops, and hard-bottom areas at the edge of the Continental Shelf and Continental Slope. The expedition was sponsored by the NOAA Office of Ocean Exploration.

*“The National Oceanographic Partnership Program (NOPP) selected NOAA’s Coastal Marine Demonstration Project for its 2002 Award for Excellence in Partnering.”*



# NOAA National Ocean Service at a Glance

**We value your interest, questions, and comments. Please feel free to contact us.**

## **National Oceanic and Atmospheric Administration National Ocean Service**

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(301) 713-3074  
[www.nos.noaa.gov](http://www.nos.noaa.gov)  
Public Affairs (301) 713-3066  
External Affairs (301) 713-3060

## **NOAA Coastal Services Center**

(843) 740-1200  
[www.csc.noaa.gov](http://www.csc.noaa.gov)

Located in Charleston, SC, the Coastal Services Center is NOS' linchpin for bringing new technology, training, and information to coastal resource managers throughout the country. Many of the products and services provided by the Center would otherwise be unattainable for most local and state coastal programs. With the Center's help, managers have the skills, data, and information they need to do the best job possible.

## **Center for Operational Oceanographic Products and Services**

(301) 713-2981  
[www.co-ops.nos.noaa.gov](http://www.co-ops.nos.noaa.gov)

The Center for Operational Oceanographic Products and Services provides water-level and current information for our coastal regions and the Great Lakes. They offer one-stop shopping for near real-time water-level and tide data at 175 different sites across the United States, and distribute historical data for water levels, coastal currents, and other information. In addition, its Physical Oceanographic Real-Time System (PORTS) supports safe and cost-efficient navigation by providing accurate, real-time environmental information required to avoid groundings and collisions and providing coastal managers with wetlands restoration information, tsunami and storm surge measurements, and other data.

## **National Centers for Coastal Ocean Science**

(301) 713-3020  
[www.nccos.noaa.gov](http://www.nccos.noaa.gov)

Coastal stewardship means solving the problems of today, while planning better for the future. Scientists at the National Centers for Coastal Ocean Science study, monitor, and assess both natural and human impacts on coastal ecosystems—giving our nation the information and, ultimately, the understanding needed to be better coastal stewards. The NOS Science Office oversees laboratories in Charleston, SC; Beaufort, NC; and Oxford, MD.

## **Office of Coast Survey**

(301) 713-2770  
<http://chartmaker.ncd.noaa.gov>

Navigating ships and boats safely in and out of ports and along our coasts requires accurate nautical charts. In many of our busiest waterways, unknown rocks, wrecks, and obstructions wait below the surface to be “discovered” by unfortunate mariners. The Office of Coast Survey provides a wide range of navigational products to help vessels safely move through U.S. waters.

## **National Geodetic Survey**

(301) 713-3242  
[www.ngs.noaa.gov](http://www.ngs.noaa.gov)

The National Geodetic Survey (NGS) defines and manages the National Spatial Reference System—the nationwide framework for determining latitude, longitude, and elevation. NGS surveys promote safe navigation by defining the national shoreline and locating features needed to construct nautical charts, and by precisely locating obstructions and aids to air navigation at the nation's airports.



### **Office of Ocean and Coastal Resource Management**

(301) 713-3155

[www.ocrm.nos.noaa.gov](http://www.ocrm.nos.noaa.gov)

Managing our nation's 95,000 miles of coastline is a daunting task. The Office of Ocean and Coastal Resource Management provides the national policy leadership and conflict resolution necessary to maintain our nation's valuable coastal resources. Additionally, it is responsible for administering the Coastal Zone Management Act and assisting individual states in managing the system of national estuarine research reserves.

### **Office of Response and Restoration**

(301) 713-2989

[www.response.restoration.noaa.gov](http://www.response.restoration.noaa.gov)

The Office of Response and Restoration is the focal point for NOS spill preparedness and response, hazardous waste site investigation, environmental damage assessment, and coastal ecosystem restoration programs. OR&R tackles environmental threats from catastrophic emergencies, such as oil and chemical spills, chronic toxic releases from Superfund waste sites, and vessel groundings in marine sanctuaries. We help emergency planners create software and other tools to help people respond to hazardous materials accidents and resolve contamination problems; find remedies for environmental damage; assess injury to coastal resources from releases of oil and hazardous materials; and pursue restoration from those responsible for the harm.

### **Staff Office for International Programs**

(301) 713-3078

[www.nos.noaa.gov/ipo](http://www.nos.noaa.gov/ipo)

Recognizing that the challenges to our nation's coastal environment are global problems too, the Staff Office for International Programs works to build partnerships with other countries to share information and lessons learned in coastal management.

### **National Marine Sanctuary Program**

(301) 713-3125

[www.sanctuaries.nos.noaa.gov](http://www.sanctuaries.nos.noaa.gov)

Marine sanctuaries, or underwater national parks, form a network of protected areas that are both environmentally and culturally important to our nation. They provide habitat for creatures and plants of the sea and serve as living laboratories for the study of coastal and ocean environments. There are currently 13 marine sanctuaries in the national system.

### **Management and Budget Office**

(301) 713-3056

[www.nos.noaa.gov](http://www.nos.noaa.gov)

The Management and Budget Office provides leadership in procurement, budget, strategic planning, policy development, communications, human resources, information technology, safety and security, and other administrative and management areas. This office also provides guidance and development expertise for highly technical and scientific special projects.





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