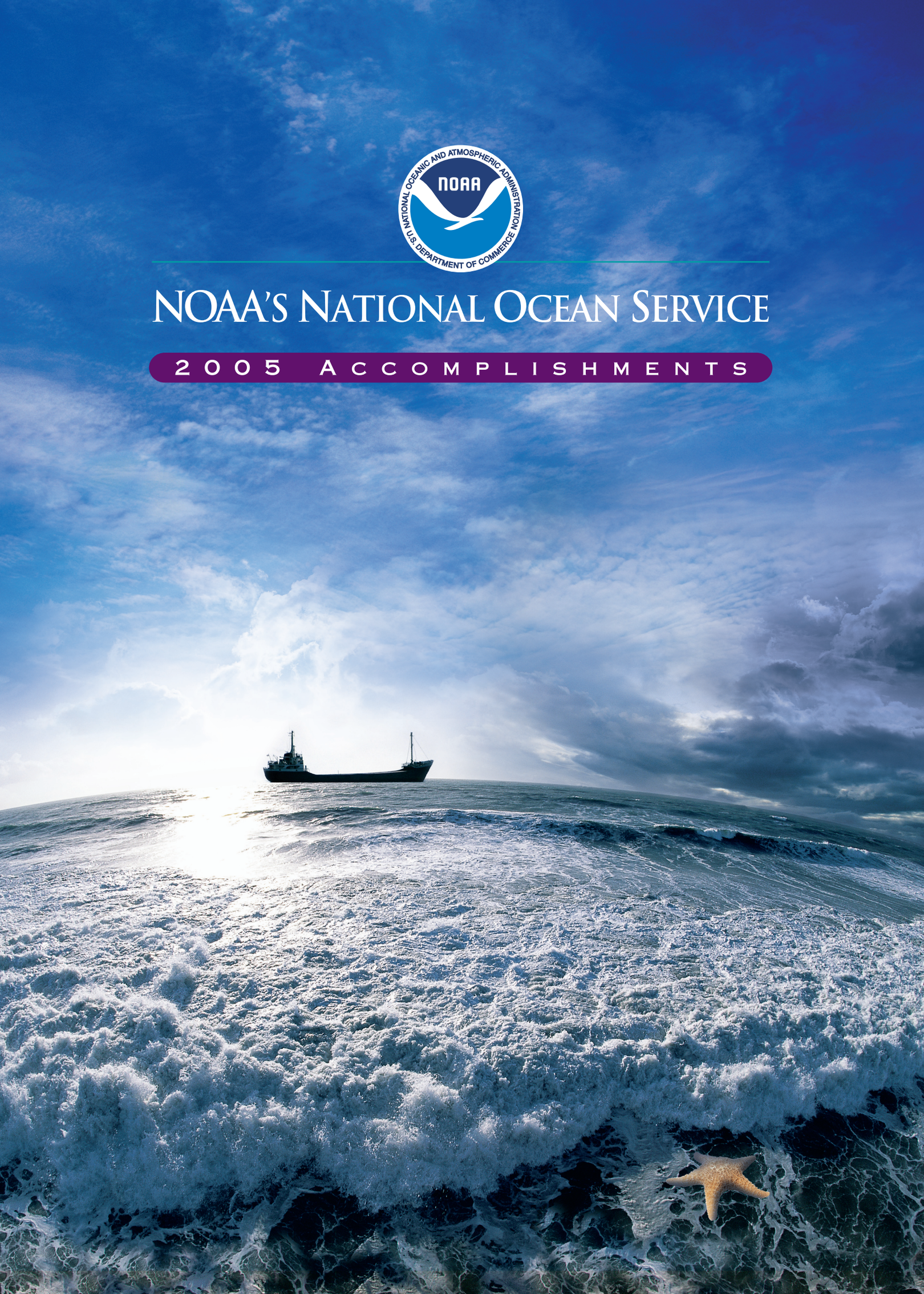


NOAA'S NATIONAL OCEAN SERVICE

2005 ACCOMPLISHMENTS

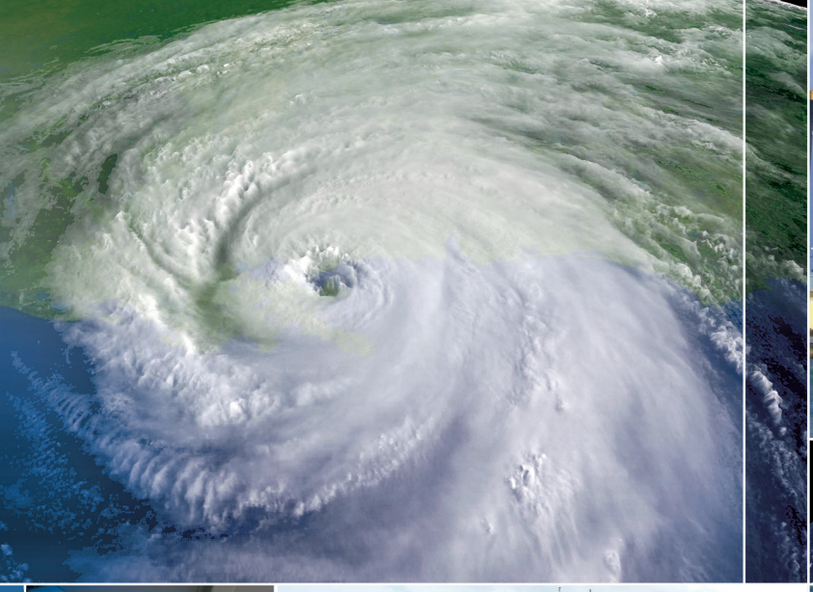
Message from the Assistant Administrator

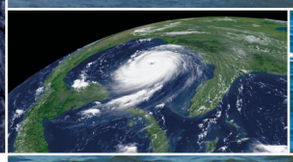
This has been a year marked by challenges for the ocean community in general and NOS in particular. There were leadership changes at NOS, both at the Line Office and Program Office levels. Our scientific and technical expertise was tested as we ensured safe navigation and preserved and enhanced the nation's coastal resources and ecosystems. The worst hurricane season on record made it necessary to reinforce and apply our essential functions and capabilities. I am pleased to report that we have met these challenges and responded effectively to the needs of the nation. The successes NOS has demonstrated have been the result of superb team work at all levels and I am proud of our accomplishments.

Our work is not over. In 2006, we will proceed forward with hurricane recovery and restoration efforts at the same time that we prepare to respond to next year's hurricane season. To do this, we will need to emphasis our products and services that prevent or mitigate impacts from extreme weather and storm surges and resulting ecosystem stressors. We will continue to underpin NOAA's efforts as a global leader in designing and implementing the Global Earth Observing System of Systems (GEOSS). I am confident that we are up to these and other challenges. The same teamwork, expertise, and dedication that made NOS strong in 2005 will no doubt see us through the year to come.

The report that follows enumerates a sampling of our accomplishments from 2005.

Charlie Challstrom
Acting Assistant Administrator
NOAA's Ocean Service



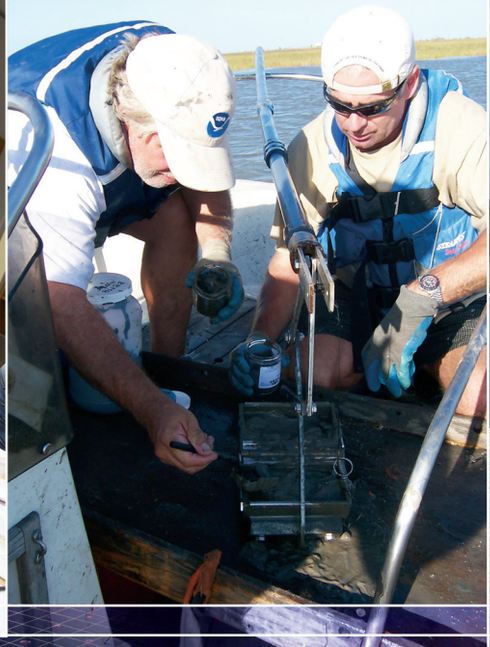


Record Hurricane Response

NOAA Responds to Volatile Hurricane Season in 2005

The 2005 Atlantic Hurricane Season was one of the busiest in recorded history. The Gulf Coast region was especially hard-hit, when Hurricanes Katrina and Rita struck the Central Gulf Coast. At more than $62 billion, Hurricane Katrina was the costliest economic, environmental and public health disaster on record in the Gulf Region. NOAA and NOS played integral roles in preparedness, response and recovery efforts in the region. Activities include conducting aerial surveys over the affected areas, conducting navigational surveys in hurricane-affected waterways, conducting ecological assessments of affected resources, helping officials identify evacuation routes, and maintaining valuable tidal information despite terrible conditions.

Immediately following Hurricane Katrina, NOS collected more than 8,300 aerial images of the hurricane-damaged areas along the coasts of Alabama, Mississippi and Louisiana. The Federal Emergency Management Agency, the U.S. Coast Guard, the U.S. Department of Defense, and several state agencies used this critical data to determine response efforts. NOS also provided pre-Katrina imagery; digital elevation data; and maps depicting ecological impacts, debris assessment and wetland losses to the U.S. Geological Survey and others to help determine short-term, mid-term, and long-term recovery efforts. In addition, companies such as Google Earth and GlobeXplorer used the imagery (available on *http://ngs.woc.noaa.gov/katrina/*) on their own Web sites, and the insurance industry used the images to expedite claims disbursement.



Record Hurricane Response
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NOS's Navigation Managers and Navigation Response Teams provided critical services to the affected region. The Navigation Managers assisted with regional response coordination. The Navigation Response Teams, small survey teams, conducted emergency hydrographic surveys in the affected port areas, particularly critical because of the major oil-production and maritime import/export traffic in the region. For safety reasons, local port activity was limited until these critical surveys were completed and impacted waterways cleared of hurricane-related obstructions. The data collected will also update NOAA's navigation products, including NOAA's Electronic Navigational Charts, Print-on-Demand and raster nautical charts.

NOS is working in partnership with the U.S. Environmental Protection Agency, the Food and Drug Administration, and U.S. Geological Survey, to conduct six major projects to assess the biological conditions, fisheries, water and sediment quality, seafood safety and human health risks associated with the hurricane damage. One such project is NOAA's Mussel Watch Program, where scientists are monitoring oysters, coastal waters and sediments in the Gulf Region for chemical contaminants, bacteria and viral agents. Using the 20-year series of data already collected for the region as the baseline comparison, NOAA will be able to assess the impacts of the hurricanes on these resources, and determine whether oysters are safe to harvest and eat. Other results of the monitoring and assessment will be used to support environmental and public health recovery and restoration efforts.

NOS helped Louisiana officials determine safe evacuation routes by identifying areas most prone to flooding and therefore which to evacuate first by providing up-to-date information on the rate of land subsidence (sinking) in several southern parishes. This height information is essential for helping officials conduct hurricane recovery, evacuation routes, rebuilding levees, and ensure that shipping lanes have appropriate clearance.

NOS maintains 32 tide stations in the Gulf Region. Hurricanes Katrina and Rita destroyed eight of the 32 stations in the Gulf Region, and communication with several others was temporarily lost. But two "hardened" stations—those with elevated, strengthened support platforms—along the Gulf Coast operated successfully through both storms, transmitting valuable storm data to meteorologists. In addition, the Galveston Bay Operational Forecast System operated successfully throughout Hurricane Rita. Short-term stations are compensating for the lost stations in the area, and most communications with other stations in the region have been restored. NOAA's tide stations are multi-mission—they support safe navigation, record long-term sea levels, and provide real-time storm tide observations that are critical to emergency response efforts. Weather forecasters and others use NOAA's tide stations to collect oceanographic and meteorological data such as wind speed and direction, barometric pressure and other parameters that are important to measuring and predicting storm events.

NOS provided scientific support for multiple pollution events following the storms. Extensive flooding in the Gulf Coast region resulted in over 350 reported pollution incidents, including 16 major incidents, with the largest being over 3.5 million gallons. The storm season also resulted in damage to hundreds of offshore rigs, platforms, and pipelines and sank thousands of yachts and fishing vessels. NOS provided support at three

U.S. Coast Guard command posts and assisted with situational mapping for search and rescue efforts, provided field and aerial reconnaissance, trajectory predictions, pollution effect assessments and prioritized response and cleanup activities.

Most hurricane related deaths are flood related. A new tool developed by NOAA helps emergency managers predict and track flood waters. The newly developed HURREVAC Inland Flood Module is part of a restricted-use computer program used by government officials to track hurricanes and assist in evacuation decision making. The new component provides the latest flood watches and warnings, rainfall, and river forecast data. Rain forecasts for one, two, and three days and lists of potentially affected areas are available and there are graphs for major, moderate, minor, and 100-year floods predictions.

NOAA's response to the storms of 2005 does not stop with the end of hurricane season. NOAA is the steward of integrated ocean and coastal management and will preserve and emphasize its core capabilities to address coastal vulnerabilities and stresses to the ecosystem in the years to come. ■

Navigation *and* Commerce

Positioning Assistance Provided to the U.S. Military in Iraq

This year, NOS provided critical assistance in the design, development and implementation of the Iraqi Geospatial Reference System (IGRS). The IGRS was modeled after NOAA's National Spatial Reference System in the United States and is a demonstration of NOAA's leadership in Global Earth Observing System of Systems (GEOSS). Army, Air Force, Marine, and civilian surveyors from many nations and disciplines are beginning to use the Continuously Operating Reference Stations for projects all around Iraq. In August, more than 170 points were positioned in the country using NOS's Online User Positioning Service.

13th System Makes Baker's Dozen

A new Physical Oceanographic Real-Time System (PORTS®) was installed in the Columbia River—the 13th major U.S. waterway to get one. PORTS® provides accurate, real-time oceanographic and meteorological data to support safe, cost-efficient marine transportation. Users can access data via the telephone or the Internet. The Columbia River annually handles nearly 48 million tons of cargo. Vessel operators must know the depth of the water to move the greatest amount of cargo without running the ship aground. In port areas, water levels and currents frequently differ from predictions because of wind changes and water run off. Users of PORTS® information include port authorities, vessel pilots, shipping companies, the U.S. Coast Guard, the U.S. Navy, recreational boaters, fishermen, coastal managers, environmental organizations, academia and surfers. PORTS® is available online at *http://tidesandcurrents.noaa.gov/d_ports.html.*

National Water Level Observation Network Significantly Improved

Significant enhancements to the National Water Level Observation Network (NWLON) began this year as part of a three-year effort to upgrade the NWLON to provide real-time data every six minutes, and to expand the NWLON to support NOAA's Tsunami Warning System. The NWLON consists of 175 long-term, water level observation systems around the United States and its territories. They provide information about storm tide warnings, sea level rise, habitat restoration and other federal, state and local applications. NWLON real-time data can also be used to detect and forecast tsunamis. Fifty NWLON Data Collection Platforms (a system that collects, formats, and transmits data) were upgraded this year to enable real-time data transmission. All 175 stations will be upgraded by 2007, as called for by the Bush Administration's Ocean Action Plan. In addition, seven new NWLON stations were established this year in Alaska, Washington, Oregon, California and Puerto Rico.

Three New Online Operational Forecast Systems Launched

In September, NOS launched three new Operational Forecast System models—two in the Great Lakes and one in Florida. These models provide mariners, port managers, and emergency responders with present (nowcast) and future (forecast) conditions of water levels, currents, water temperature, and other oceanographic parameters. The systems run numerical models hourly (nowcast) to simulate water levels, current velocities, and water temperatures, and four times a day to produce a forecast of water levels, current velocities, and water temperature for the next 30-36 hours. They help port managers and shippers make better decisions involving maximum tonnage and efficient transit schedules, and they improve hazardous material trajectory model results.

New Navigation Tool Measures Bridge Clearance

The City of Long Beach, California, asked NOS to expedite an installation of the recently developed air gap (bridge clearance) sensor prior to the maiden call of the *MSC Texas*, one of a new breed of container ship known as a megaship. The city was concerned about the 202-foot-high *MSC Texas's* ability to safely pass under the 155-foot-high *Gerald Desmond* Bridge in the Port of Long Beach. With a vessel draft of 47.6 feet, the stage and actual height of tide at the time of the passage of the *MSC Texas* under the bridge left little room for error. The air gap sensor provides accurate, real-time clearance information between the water surface and the bridge. NOS developed the sensor to address the issue of larger vessel superstructures and antennas striking bridges of the nation's largest seaports. The new system was installed and operational at the Port of Long Beach just days before the magaship's October 12, 2004, port call, allowing a safe and efficient transit into port. Long Beach is one of only three seaports in the nation large enough to accommodate megaships such as the *MSC Texas*. Forty percent of the goods entering the United States via containerships enter through the Port of Long Beach.

Vertical Datum Expanded Throughout the Country

This year, NOS created Vertical Datum (VDatum) models for Lake Charles, Louisiana, Puget Sound, Washington, and a portion of North Carolina from the New River inlet to Albemarle Sound. VDatum is a software tool capable of transforming coastal bathymetry and land topographic elevations between 28 different vertical datums. NOS provides information that ties together land surface and tidal elevations—critical information to coastal managers, emergency response planners, and port authorities. Vertical datum transformations are essential for combining or comparing data collected from diverse sources. Elevations that are referenced to inconsistent vertical datums can cause artificial discontinuities in maps and nautical charts, especially in coastal areas.

Navigation *and* Commerce

(Continued)

NOS Participates in International Mapping and Charting Activities

As a leader in hydrographic surveying and charting, NOS participated in several navigation-related international activities in 2005. For example, in April NOAA transferred the survey vessel WHITING to Mexico, in support of U.S.-Mexican efforts to promote coordination of survey and nautical charting operations. Now called the ARM RIO TUXPAN, the vessel is Mexico's first dedicated hydrographic survey vessel. NOS also served as a member of the U.S. delegation to the 3rd Extraordinary International Hydrographic Conference in Monaco, to streamline the International Hydrographic Organization and increase its effectiveness in the 21st Century. The United States was successful in ensuring that the terms of the Convention changes were in keeping with U.S. objectives and interests. Finally, NOS and the U.S. Navy worked together to map 300,000 square kilometers of U.S. continental margin along the East Coast in support of a potential national claim for extending the continental shelf beyond the Exclusive Economic Zone, under Article 76 of the U.N. Convention on Law of the Sea.

Remotely Operated Tools for Hydrographic Surveyed Tested

This year, NOS studied the viability of both Autonomous Underwater Vehicles (AUVs) and Remotely Operated Vehicles (ROVs) to help hydrographers survey the ocean depths. Using the NOAA Research Vessel BAY HYDROGRAPHER, a team conducted exercises in the Chesapeake Bay with a Benthos Stingray ROV and a REMUS AUV. Equipped with state-of-the-art color and black/white cameras, and a 360-degree scanning sonar, the ROV showed potential as a tool for identifying objects on the seafloor and improving operational safety in conditions unfavorable for diver investigations. The AUV could make significant contributions as a platform for conducting supplementary side scan surveys, helping NOAA to acquire more survey data in a shorter time. These data help mariners navigate around hazards in U.S. waters.

Online Navigation Tools and Services Improved and Updated

In May, NOS released version 2.1 of the *nowCOAST* Web mapping portal, at *http://nowcoast.noaa.gov/*. *NowCOAST* is a planning aid designed to provide geo-referenced links to real-time meteorological, oceanographic, river, and water quality observations from federal and state networks, and regional land and ocean observing systems for U.S. coastal areas and the Great Lakes. NOS also improved access to electronic navigational chart (ENC) data by adding a geographic name search capability to its ENC-Direct-to-GIS (Geographic Information System) service, available at *www.nauticalcharts.noaa.gov.* ENC Direct-to-GIS translates ENC data into a variety of formats for non-navigational purposes.

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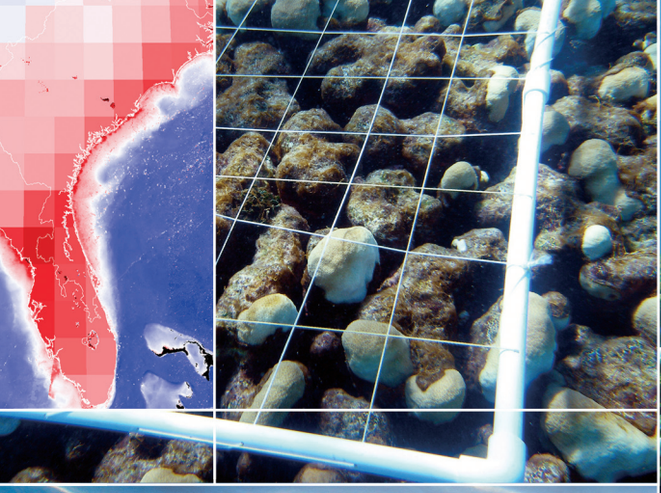
Marine Protected Areas Information Added to Coast Pilots

NOS has begun to publish information about the nation's marine managed areas (MMAs) in the U.S. *Coast Pilot* series. The addition will help improve safe navigation and coastal stewardship, and protect the nation's natural marine resources. The maritime community uses the *Coast Pilot* nautical charts to keep abreast of navigation issues, logistic support, and maritime regulations. The first *Coast Pilot* to include MMA information identifies MMA sites in the central California coast. Plans are underway to include MMA information into other navigation tools, such as paper and electronic charts.

GPS Data Used to Enhance NOAA Weather Models

In June, NOAA began to officially incorporate global positioning system (GPS) data from NOS's Continuously Operating Reference Station (CORS) network into its Rapid Update Cycle weather model, which monitors the distribution of precipitous water vapor over the United States. Integrating CORS data with weather models improves weather monitoring accuracy at a minimal cost because it takes advantage of the already existing CORS infrastructure. ■



Ecosystems

NOS Releases Two National Progress Reports on Reef Conservation

This year, NOS released two major progress reports on coral reef research, monitoring and management. *The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005* established the first quantitative baseline of the conditions of shallow water coral reef ecosystems in the U.S., the Republic of Palau, the Republic of the Marshall Islands, and the Federated States of Micronesia. More than 160 scientists and resource managers contributed to the report, which documents the geographic extent of reef ecosystems and the status of water quality, benthic habitats, associated biological communities and key threats to coral ecosystem health. The second report, *Implementation of the National Coral Reef Action Strategy: Report on U.S. Coral Reef Agency Activities from 2002 to 2003,* highlights the activities of NOAA and the U.S. Coral Reef Task Force under each of the 13 national conservation goals defined by the 2002 U.S. National Coral Reef Action Strategy. The report indicates that collective research and management actions are moving in the right direction, citing examples like the creation of 14 new coral reef protected areas and the creation of Local Action Strategies for conservation.

Tortugas Ecological Reserve Show Signs of Species Abundance

Four years after the establishment of the Tortugas Ecological Reserve, NOS scientists are studying how the ecosystem is changing as a result of reserve status. This year, scientists conducted 253 dives to collect data and fish samples, and found that certain fish species are increasingly abundant.

New Tide and Water Quality Monitoring Station Includes Multiple Features

In August, NOS installed a tide and water quality monitoring station at the Wells National Estuarine Research Reserve (NERR), in Wells, Maine. The station combines the capabilities of the National Water Level Observation Network (NWLON) and the System-wide Monitoring Network. The station, which is the first of its kind installed at a NERR, includes primary and backup water level sensors, a suite of meteorological sensors, and a water quality sensor that measures several parameters. The NWLON technology allows Wells NERR staff to access water level, weather, and water quality data all from the same platform at the same time. Products generated from these data will benefit both short-term (such as habitat restoration) and long-term (such as sea level trends) applications, as well as research and education objectives.

Restoration Efforts at Blackwater National Wildlife Refuge

NOS and NOAA Fisheries are working with the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Aquarium in Baltimore, and others to restore 8,000 acres of wetlands at the Blackwater National Wildlife Refuge in eastern Maryland. Under common observing and data management principles of the Integrated Ocean Observing System, the partners are collecting water level data so that NOAA can process and conduct analyses of the data to apply to the restoration project. The Refuge also hosted a workshop on the importance of geodetic control for tidal analysis and applications. After the workshop, a global positioning system survey was conducted to connect NOAA's and USGS's water level stations, and USGS's surface elevation tables to the same geodetic network.

NOAA Launches Summer SPLASH Research Cruise

This summer, NOS and NOAA Fisheries launched a West Coast research cruise to continue the single largest whale survey ever undertaken to assess humpback whale populations throughout the North Pacific Ocean. The Structures of Populations, Levels of Abundance and Status of Humpbacks (SPLASH) project conducted surveys along the west coast of the United States, emphasizing the five national marine sanctuaries in California and Washington. With this information, scientist will better understand how humpbacks are recovering from the population pressures that resulted from whaling through the mid-1960s, and what threats they currently face. SPLASH's long-term goal is to recover the species to a viable, self-sustaining population throughout its Pacific range.

NOAA Coordinates Emergency Coral Restoration with New Technique

On February 2, the vessel *Cape Flattery* grounded off Oahu, Hawaii, damaging over six acres of coral reef habitat. Nine more acres of coral reef habitat were damaged while the ship was being recovered. NOAA scientists led efforts to assess damage to sensitive reefs, prioritize restoration areas, and carry out emergency restoration. Using a newly developed coral restoration technique, the NOAA team reattached overturned coral boulders and broken coral branches using cement, creating new aggregate coral structures that mimic the natural habitat. By March, NOAA scientists had stabilized more than 600 corals over a 27-square-meter area. NOAA will continue to monitor the area over the next five years to determine the long-term success of this unique emergency restoration effort.

Using a newly developed coral restoration technique, the NOAA team reattached overturned coral boulders and broken coral branches... NOAA scientists had stabilized more than 600 corals over a 27-square-meter

NOAA Investigates Disease Outbreak in National Marine Sanctuary

Early this year, NOAA's Coral Reef Conservation Program partnered with the U.S. Environmental Protection Agency, Florida International University, Mote Marine Laboratory and George Mason University to investigate a white plague outbreak among the corals in the Flower Garden Banks National Marine Sanctuary in the Gulf of Mexico. White plague is caused by a bacterial pathogen that can kill coral tissue at rates ranging from 3 mm to 10 cm a day. Over the course of 26 separate dives, researchers found that the outbreak had spread to more than 40 coral colonies and three other species in sanctuary waters. By May, the outbreak appeared to slow down, but scientists are continuing to monitor the affected corals.

New Coral Reef Bleaching Satellite Monitoring System Launched

In 2005, NOAA launched a Coral Reef Watch (CRW) Satellite Bleaching Alert system to track thermal (temperature) stress on corals. When conditions are detected that could lead to coral bleaching, the system generates automated e-mail

Ecosystems
(Continued)

alerts. Available for 24 coral reefs around the world, the new system allows coral reef managers and scientists to predict coral bleaching outbreaks weeks before they occur, potentially improving prevention and response. To complement NOAA's satellite-based monitoring, Coral Reef Conservation Program scientists installed the first near real-time (hourly) monitoring system in the waters near Lee Stocking Island, Bahamas. These new monitoring instruments, part of the Coral Reef Early Warning System (CREWS) of monitoring stations, will track "fluorescent yield," a direct measurement of coral reef health. After evaluating this new product, researchers plan to deploy similar instruments in the Great Barrier Reef and in Puerto Rico.

NOAA Awards $10 Million in Coral Reef Conservation Grants

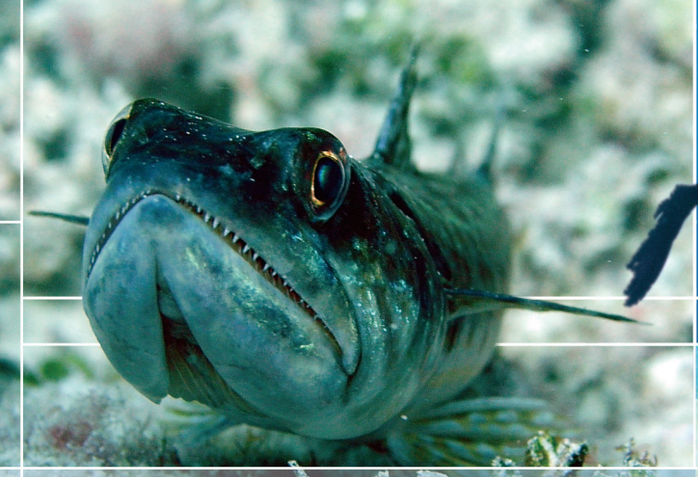
This year, the NOAA Coral Reef Conservation Program (CRCP) awarded nearly $10 million in grants to external partners in support of coral reef management, conservation, education and research. These awards reflect NOAA's strong support for coral reef conservation efforts outside the agency and represent over 33 percent of the CRCP budget for 2005. Funds supported a range of activities, from community conservation projects to large-scale coral reef observation systems, and included support for three coral reef research institutes in Hawai'i, Florida and Puerto Rico. Grants also included the jointly managed NOAA-National Fish and Wildlife Foundation Coral Reef Conservation Fund and NOAA's Coral Reef Conservation Grants Program, which supports grants in six categories to address ecosystem monitoring and management, coral reef ecosystem research, improvements to fishery management plan, and national and international conservation efforts.

Major Research Expedition in Hawaiian Coral Reef Ecosystem

This year, the 224-foot HI_IALAKAI research vessel completed a 35-day coral reef research expedition in the Northwest Hawaiian Islands (NWHI) Coral Reef Ecosystem Reserve and adjacent waters. During the cruise, researchers conducted nearly 500 scuba dives, substantial oceanographic sampling, and deployed oceanographic buoys to allow remote, long-term monitoring of oceanographic and environmental conditions affecting NWHI coral reef ecosystems. Coral biologists documented the condition of the reefs, which were affected by a major coral bleaching event in 2002. They also monitored an unidentified syndrome that researchers discovered last year. The same syndrome was found in two additional reefs during this HI_IALAKAI cruise. Results of this cruise will provide valuable characterization of the biology and oceanography of the NWHI, which will serve as a foundation for resource management.

Estuarine Monitoring Program Celebrates Anniversary, Improves on Capabilities

This year marked the 10th anniversary of the National Estuarine Research Reserve System's System-wide Monitoring Program (SWMP). SWMP collects a wide variety of water quality and meteorological data from all 26 estuarine research reserves, helping scientists, educators, students and coastal decision makers understand the short-term and long-term changes that characterize these vital ecosystems. SWMP captures more than 13 million water quality data points and more than 34 million weather data points every year. In an effort to improve the system, a new pilot study begun this year will monitor the health of aquatic vegetation in 16 reserves, part of an effort to conduct biological monitoring in the system as well. Five reserves also are participating in a pilot study to test a new classification scheme that will ensure consistent inventorying, and habitat and watershed mapping efforts.



MPA Federal Advisory Committee Provides Recommendations

After two years of deliberation, the Marine Protected Areas (MPA) Federal Advisory Committee delivered its first set of recommendations for creating a national system of MPAs. The report, which is consistent with the Bush Administration's U.S. Ocean Action Plan, recommends processes to establish a national system of MPAs built on existing sites and new areas that meet specific criteria. Authorized in 2000 by Presidential Executive Order 13158 to provide advice and recommendations to the Departments of Commerce and the Interior, the 30-member advisory committee represents scientists, academia, commercial and recreational fishermen, tourism, the oil and gas industry, state and tribal resource managers, environmentalists, and other resource users.

Shallow Water Positioning System Proven Successful

This year, NOAA's Shallow Water Positioning System (SWaPS) proved to be very useful. SWaPS, currently used in Biscayne Bay in Florida to collect data on seagrass, allows researchers to track changes in the bay seafloor by using global positioning system data to make corrections for wave action and other factors. The University of Miami will use the data to develop guidelines for the Everglades Restoration Program. A new version of SWaPS was developed this year that can be deployed anywhere there is coral reef or seagrass damage in shallow waters. NOAA and the Florida Institute of Technology intend to use SWaPS to study seagrass in the northern part of Florida as well.

Surveys Indicate Invasive Lionfish is Spreading

This year, NOS scientists conducted surveys at 27 locations from North Carolina to Cape Fear, looking for the invasive Indo-Pacific lionfish. They found lionfish at 95 percent of the locations, which suggests that the invasive species is becoming widespread and increasing in density. Other surveys have found similar results. It is increasingly likely that the lionfish will have a significant impact on the ecosystems within Atlantic coastal waters.

New Digital Mapping Product Developed for Pacific Island Ecosystems

This year, NOS published *Shallow-water Benthic Habitats of American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands.* The digital product, available on CD-ROM and on the Web, includes detailed digital maps depicting the location and distribution of shallow-water seafloor habitats, satellite imagery, and a detailed mapping methodology. This product represents thirty-four maps and is the first comprehensive assessment of shallow-water benthic habitats for these Pacific Island ecosystems. The maps and associated data products, coupled with a robust archive of marine biological data, serve as valuable tools for evaluating and delineating potential marine protected areas and for developing coral ecosystem monitoring strategies. The product is available online at *http://ccma.nos.noaa.gov/ecosystems/coralreef/us_pac_mapping.html.*

Coastal Hazards

NOS Issues Gulf of Mexico 'Dead Zone' Forecast

NOS scientists developed the third annual Gulf of Mexico hypoxia forecast to predict the size of the region's hypoxic (low oxygen) zone, or "Dead Zone." The forecast helps watershed managers evaluate different management strategies for reducing the impact of hypoxia in the Gulf of Mexico. To confirm this year's forecast, NOS-funded scientists at Louisiana Universities Marine Consortium (LUMCON) surveyed the extent of the hypoxic zone in the northern Gulf of Mexico and found hypoxic conditions over an area covering 11,840 square kilometers. Despite the influence of hurricanes and tropical storms that hit the area, this year's Dead Zone was only slightly smaller than the long-term average.

NOS Responds To New England Harmful Algal Bloom Event

This summer, the most severe harmful algal bloom since 1972 spread from Maine to Massachusetts, resulting in extensive closures of commercial and recreational shellfisheries. NOS provided emergency funding for new and expanded sampling of the toxic algae in Massachusetts Bay. New molecular methods for rapidly detecting and mapping the alga were used to track the bloom in near-real time to forecast the spread of the red tide and to understand the factors leading to the event. This integration of ocean observing system data is an example of the predictive, regional, ecosystem-based research that NOS is conducting to help coastal managers understand and respond to coastal ocean issues.

Improved Identification of Harmful Algal Bloom Species Using DNA Barcodes

This year, NOS began to develop a DNA barcode system to accurately identify toxic species and improve management responses to harmful algal blooms (HABs) that threaten public health. The barcodes will also help assess health risks, and improve research and development of HAB detection and forecasting tools.

***NOS** scientists have established a Pathogen Source Tracking program that aims to develop novel techniques capable of rapidly detecting and tracking microbes of public health concern in the coastal environment.*

Height Modernization Project Improves Gulf Coast Safety and Planning

This year, NOAA invested more than $3.7 million in grant funding to implement its Height Modernization Project in the Gulf States. The project builds state infrastructure and capacity to determine and deliver consistent, accurate, and timely height information. The data helps managers plan highway evacuation routes, model storm surges, map flood plains, calculate sea level rise, monitor subsidence levels, and restore coastal habitats.

NOS Responds to Overturned Barge in San Francisco Bay

On January 13, NOS's quick response to an overturned vessel in the San Francisco Bay allowed the city to keep its port open. NOS located the 230-foot barge that had overturned on January 10, dumping gravel and several pieces of heavy construction equipment off of Point Avisadero. At the request of the U.S. Coast Guard, the NOS Navigation Response Team (NRT) surveyed for possible navigation hazards, and found a 60-meter-long pile of gravel with machinery lying on and around it. The NRT helped with the placement of four lighted buoys around the area to identify the hazard to navigators. NRT's activities also allowed salvage operations to begin the next day.

Reducing Coastal Hazards

Life in the coastal zone is fraught with potential natural hazards. In an effort to more effectively and efficiently develop tools to address these hazards, the Coastal Storms Program was created. The goal was to get all of the appropriate expertise that exists across NOAA focused on one particular region, and then develop the tools and data that this region needed. The pilot project was the St. Johns River Watershed in Florida. The resulting products addressed needs related to navigational safety, storm predictions and observations, and storm preparation. Similar efforts have begun for southern California and the lower Columbia River in Oregon and Washington. Expansion to the Gulf of Mexico is also planned. Visit *www.csc.noaa.gov/csp* for details.

Hydrographic Surveyors Discover Uncharted Navigation Hazard

During hydrographic survey operations in April, the NOAA Ship THOMAS JEFFERSON discovered a previously uncharted obstruction in the Eastern Long Island Sound. Using side-

Coastal Hazards
(Continued)

scan sonar, the crew detected the 60-foot-long object, later identified as a crane that was swept into the water during a storm about 25 years ago. The discovery has been identified as a danger to navigation and noted in the U.S. Coast Guard's "Notice to Mariners."

Oil Spill Drill Exercises NOAA's Efforts to Keep Sanctuary Waters Safe

In April, NOS worked with the U.S. Coast Guard, the Florida Department of Environmental Protection and the Fish and Wildlife Research Institute to conduct an emergency response drill based in the Florida Keys National Marine Sanctuary. During this "Safe Sanctuaries" operation, participants deployed more than 2,700 drift cards to represent an oil spill resulting from a hypothetical ship grounding in sanctuary waters and spilling 270,000 gallons of fuel. The team worked together to collect real-time weather, ocean currents and aerial observations, and deliver this information to HAZMAT and other first responders. The drill was a successful opportunity to exercise NOAA's Response Plan through coordinated efforts. It also enhanced regional partnerships with response agencies and trustees, and provided training for more than 200 NOAA staff.

NOS Continues to Assess Damages in Delaware River Oil Spill

NOS is continuing to assess and restore losses resulting from a November 2004 oil spill on the Delaware River. The incident occurred when the 750-foot-tanker *Athos I* hit several submerged objects as it was preparing to dock near Philadelphia, Pennsylvania, spilling approximately 265,000 gallons of heavy crude oil into the river. The spill closed the Salem Creek Nuclear Power Plant for 10 days, and prevented shipping operations on the river for 11 days. NOAA has been working closely with the U.S. Fish and Wildlife Service and the states of New Jersey, Pennsylvania and Delaware to determine the nature and severity of damage to natural resources, and to determine restoration efforts.

NOS Provides Natural Resource Damage Assessment for Alaska Oil Spill

NOS worked with stakeholders and natural resource trustees to provide damage assessments and restoration possibilities in response to a December 2004 ship grounding and oil spill in Alaska's Bering Sea. The cargo vessel *M/V Selendang Ayu* lost power, ran aground and broke in half on the shore of Unalaska Island, within the U.S. Maritime National Wildlife Refuge. The vessel was carrying approximately 470,000 gallons of fuel oil and threatened the local wildlife and crab fishery. NOS scientists provided spill trajectory predictions and effects assessments, and prioritized cleanup activities. Public review of the draft restoration plan and environmental assessment report is planned.

Pathogen Source Tracking Program Established

NOS scientists have established a Pathogen Source Tracking program that aims to develop novel techniques capable of rapidly detecting and tracking microbes of public health concern in the coastal environment. Ultimately the program will allow for rapid diagnosis of microbial threats and improved assessments of public health risks.

Airport Survey Program Improves Airspace Safety

This year, NOS's Airport Survey Program (ASP) conducted more than 568 airport surveys and developed 37 airport obstruction charts, contributing to the nation's airspace safety. The data is used to help aircraft land safely and to effectively plan airport development. The program also developed several tools to help assure private-sector survey data meets the same rigorous standards met by ASP. These tools will allow the Federal Aviation Administration to confidently use private sector capabilities, knowing they meet rigorous standards designed to ensure airport and airspace safety. ■

Coastal Communities

Second Science-Based Habitat Restoration Monitoring Volume Produced

NOS scientists led the production of a new book, *Science-Based Restoration Monitoring of Coastal Habitats, Volume Two: Tools for Monitoring Coastal Habitats.* This volume expands upon the first volume, *A Framework for Monitoring Plans under the Estuaries and Clean Waters Act of 2000 (Public law 160-457).* It provides detailed information about coastal habitat types and restoration approaches relevant to each, costs associated with project monitoring, and information on how to monitor human activities affecting projects. Scientists from the National Ocean Service, the National Marine Fisheries Service and the University of Massachusetts at Amherst produced the two volumes. Authors, contributors and reviewers in this project came from academia, private industry, non-governmental organizations, and federal and state government agencies.

New Sea Center Focusing on Marine Conservation Opens in Santa Barbara

In April, the new Ty Warner Sea Center opened in Santa Barbara, featuring an exhibit about NOAA's weather and national marine sanctuary missions. The Sea Center, which is owned and managed by the Santa Barbara Museum of Natural History, is an education and research facility focused on marine conservation within the Channel Islands National Marine Sanctuary region. The facility welcomes all ages and is located in a very popular tourist area in Santa Barbara, but its exhibits and programs are targeted to elementary school children. The new NOAA exhibit includes a multimedia, interactive information kiosk about NOAA weather products; updated information on Channel Islands National Marine Sanctuary research, education, outreach and resource protection programs; and extensive information on sanctuary species, habitats, and trends.

Sanctuary Volunteers Stop Illegal Lobster Harvesting

During this year's Lobster Mini-Season in the Florida Keys National Marine Sanctuary, volunteers from Team OCEAN prevented more than a dozen boats from illegally harvesting lobster inside the Western Sambos Ecological Reserve, the Eastern Sambos Special Use Area and Eastern Dry Rocks Sanctuary Preservation Area. Team OCEAN is a volunteer program that places trained volunteer teams at heavily visited reef sites throughout the Keys during peak recreational boating seasons. In addition to disrupting illegal lobster harvesting, Team OCEAN educates boaters about the unique nature of the coral reef habitat, the best approach to certain areas, and the proper use of mooring buoys.

Tennessee Aquarium Premiers New 'Secret Reef' Exhibit

In April, the Tennessee Aquarium premiered its new Ocean Journey hall, complete with a spectacular 600,000-gallon "Secret Reef" exhibit modeled after the Flower Garden Banks National Marine Sanctuary. Since its opening in 1992, the aquarium has told the story of the Tennessee River's journey to the

Coastal Communities
(Continued)

Gulf of Mexico. The exhibit is fully equipped with interpretive signage and interactive multimedia stations that offer visitors an opportunity to learn about the sanctuary's unique treasures and NOAA's role in managing it for future generations.

Shipwreck in Stellwagen Bank National Marine Sanctuary Given National Historic Status

After three years of historical and archaeological studies in the Stellwagen Bank National Marine Sanctuary by researchers and other technical specialists, the wreck of the Steamship *Portland* was listed on the National Register of Historic Places, the nation's official list of cultural resources worthy of preservation. Launched in 1889, the *Portland* was one of the most palatial coastal steamships afloat as it traveled between Portland, Maine, and Boston, Massachusetts. Measuring more than 280 feet long, the Maine-built, wooden-hulled, side paddle wheel steamship transported passengers and freight along the New England coast with a relatively uneventful record until it sunk with its crew of 192 people in November 1898. The *Portland* became known as the "Titanic of New England." Today, the *Portland* rests on the sea bottom in the Stellwagen Bank National Marine Sanctuary off the Massachusetts coast.

American Samoa Reef Restored

In May, NOAA dedicated a commemorative marker in American Samoa signifying the restoration of a Samoan coral reef system that was heavily damaged when nine longline fishing vessels wrecked in Pago Pago Harbor. NOAA, the U.S. Coast Guard, and the Government of American Samoa worked together to remove the fishing vessels. In addition to the dedication, the ceremony highlighted NOAA's recent work in American Samoa, including the establishment of a Continuously Operating Reference

Station, a 2002 island leveling project, a proposal to use global positioning to measure tide gauge elevation, and the potential use of NOAA products in coral monitoring.

NOS Supports Cleanup of Vieques, Puerto Rico

NOS is providing scientific support to the U.S. Navy and the U.S. Environmental Protection Agency on the investigation and cleanup of Vieques, Puerto Rico. Vieques is a small island east of Puerto Rico that was formerly used by the Navy for military training operations. NOS is helping to assess contamination levels; identifying risks to humans and the environment; and developing strategies to assess, clean up, and restore natural resources. In addition to technical assistance, NOS conducted a study to determine whether contamination is present in crabs on Vieques. The data will help determine whether certain areas can be re-opened to the public for land crab harvesting, and will be useful in the investigation and cleanup of Vieques.

NOS Leads New Initiative to Revitalize Port Communities

NOS is leading the economic and environmental revitalization activities of some port communities through its Portfields Initiative pilot project. Federal, state and local partners are working together and leveraging resources to help three port cities (Tampa, FL; Bellingham, WA; New Bedford, MA) revitalize waterfront areas, improve marine transportation, and restore coastal habitat. The project is helping New Bedford streamline the permitting process to expedite the navigational dredging of New Bedford Harbor, and is helping the city develop a revitalization plan for a waterfront neighborhood. In Bellingham, Portfields is helping the city revitalize its waterfront and is working to streamline the project permitting process. Portfields is helping Tampa Port Authority plan and design stormwater improvements that will improve water quality in Tampa Bay and serve as a national model for innovative stormwater management. NOS staff received a U.S. Environmental Protection Agency Bronze Medal Award for its leadership in the Portfields effort.

When the plan is approved, Illinois will become the 35th and final coastal state to join the Coastal Zone Management Program

Oyster Reef Created at Superfund Site

As lead trustee for the Lavaca Bay Superfund Site in Texas, NOAA has been working with the U.S. Environmental Protection Agency, Alcoa, Inc.—the party responsible for the contamination, and other co-trustees to clean up the 64-square-mile estuary and restore natural resources damaged by chronic mercury releases. This year, NOS and its partners successfully built a new, 15-acre oyster reef habitat in the area—a step in the right direction toward restoration.

NOS Participates in Tidal Wetland and Oyster Reef Restoration in Chesapeake Bay

This year, NOS staff worked to restore oyster reefs in Paradise Creek as part of the Elizabeth River Project. Scientists hope that such oyster reefs restored in tributaries like Paradise Creek will jump-start the restoration process in the Elizabeth River. NOS continues to monitor post-restoration conditions at several sites in the Elizabeth River to assess habitat use by oysters and other organisms.

Contaminant and Risk Assessment Sampling Completed in Saipan

NOS traveled to Saipan, Commonwealth of the Northern Mariana Islands, to complete sampling activities of emperor fish and sea cucumbers to analyze contaminant levels off the Puerto Rico Dump site, which extends into the harbor. Results will be used to help determine future monitoring and assessment needs at the site after the dump is closed.

Coastal Communities
(Continued)

Marine Protected Area Stakeholder Meetings Held

This year, the National Marine Protected Areas (MPA) Center began a multi-year process to publicly engage the nation in developing a national system of MPAs. The MPA Center collected stakeholder and partner input for the development of the national system of MPAs; enhanced relationships with stakeholders; developed and applied sound science about marine resources and their use; and communicated clear, consistent information about the process. The MPA Center is conducting workshops and regional public dialogue meetings—with federal agencies, state/territory representatives, and the public—to gather input so as to develop the draft framework for the national system of MPAs.

Improved Testing Method for Paralytic Shellfish Poisoning Developed

NOS scientists are making progress toward developing a new testing method for paralytic shellfish poisoning, a condition associated with harmful algal blooms that can affect human health and damage local economies. NOS is working with the U.S. Food and Drug Administration and the International Atomic Energy Agency to share the new technology with regulatory laboratories in the United States and internationally. The new technology may eventually replace existing regulatory testing methods currently used worldwide for shellfish.

Illinois Coastal Management Plan Begun

This year, NOS's Coastal Zone Management Program began working with the state of Illinois to develop its Coastal Management Program. NOS and Illinois officials discussed the financial and technical benefits of the program, and the state's potential participation in the regional and national network of coastal managers. When the plan is approved, Illinois will become the 35th and final coastal state to join the Coastal Zone Management Program.

Predicting Water Quality Impacts

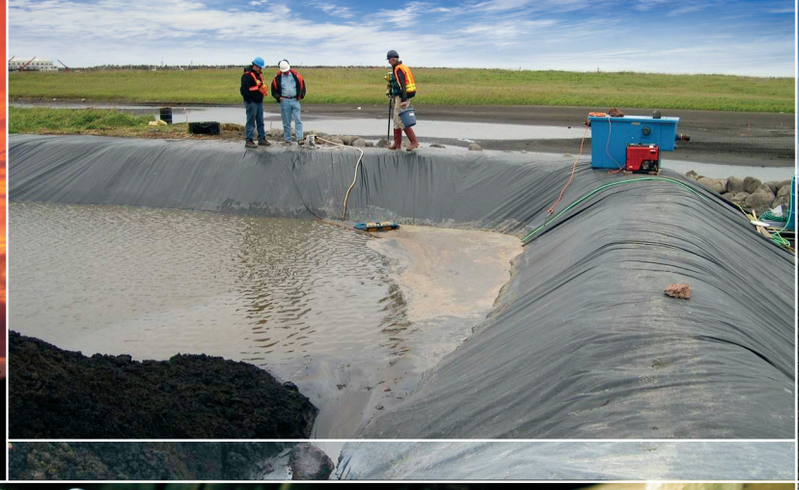
A new computer tool developed by NOAA helps coastal managers and local officials predict potential water quality impacts to streams and rivers from erosion and nonpoint pollution. The Nonpoint Source Pollution and Erosion Comparison Tool (N-SPECT) allows users to input different land cover scenarios to compute estimated potential impacts to water. N-SPECT was developed as a decision-support tool for the Wai'anae area of O'ahu, Hawaii; however, other coastal communities can use the tool if they have the necessary information.

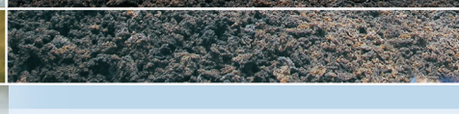
Estuarine Land Conservation Program Funds Projects Around the Nation

NOS awarded $41 million to state and local governments to fund 29 Estuarine Land Conservation Program projects around the contiguous United States. The projects will help preserve coastal and estuarine lands that have conservation, ecological, recreation, historic, and aesthetic values. Once acquired, the lands will be protected in perpetuity as wildlife habitat and/or open space, but may allow recreational activities such as walking, bird watching, and canoeing and kayaking.

American Samoa Celebrates 25 Years in the Coastal Management Program

This year, American Samoa celebrated 25 years in the Coastal Zone Management Program. American Samoa, which received federal approval for its Coastal Zone Management program in September 1980, has 126 miles of coastline. The American Samoa Coastal Management Program (ASCMP) has been a leader in protecting Samoa's coastal resources and has served as a model for other pacific islands' coastal management program.





National Coastal Management Performance Measurement System

This year, NOS's Coastal Zone Management (CZM) Program began a pilot program to develop and implement performance measures for evaluating the effectiveness of state CZM programs. The pilot examined CZM programs in the Northern Mariana Islands, Florida, Maine, New York, South Carolina, Virginia, Washington and Wisconsin. Eventually, all state coastal management programs will evaluate their programs using established performance measures.

Integrated Ocean Observing System became a NOS priority

NOS formed a team of dedicated personnel to focus on planning and integrating efforts within NOAA and other external partners within the Integrated Ocean Observing System (IOOS) community. The new group prepared planning and budget documents and coordinated with internal and external partners, and began to focus effort to implement IOOS across the public, private and academic sectors. Additionally, a NOAA-wide team was formed to implement IOOS and coordinate internal and external ocean observing activities.

Understanding the Human Dimension of Coastal Management

Sometimes used in conjunction with the term human dimensions, social science is the process of explaining, describing, and predicting how individuals and groups act and behave. Some of the most challenging decisions in coastal management depend on the relationship between people and the environment. The Social Science Web site showcases many of the tools, methods, case studies, and references that can be used to help coastal officials more adequately address the people side of coastal resource management. The Web address is *www.csc.noaa.gov/socialscience.*

Tools to Manage Hawaii's Coast

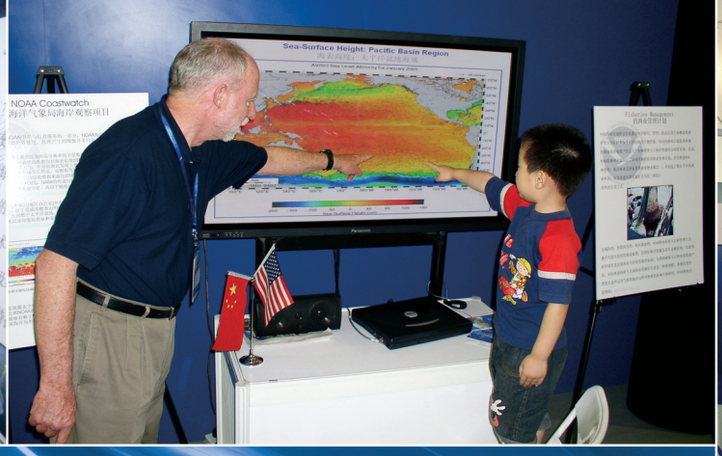
The state of Hawaii faces many challenges due to its finite land and water resources and its dependence on imported consumptive goods. To develop a natural resource management plan, a NOAA compilation of scientific and cultural information was developed for the coastal managers in the Wai'anae region of O'ahu, Hawaii. The effort includes a tool developed to examine potential effects of land use changes on nearshore resources, and narrative and graphic information on Wai`anae's terrestrial and marine environment, weather and climate, socioeconomic characteristics, and historic and cultural traditions.

Improving the Coastal Leaders of Tomorrow

The Coastal Management Fellowship program matches post graduate students with regulatory programs in the coastal zone to work for two years on a variety of projects. The state programs get fresh minds to help implement important initiatives, and the top students in the field get an important real life introduction to coastal zone management. Since its inception in 1996, the fellowship program has matched fifty-two post graduate students with nineteen state programs. See *www.csc.noaa.gov/cms/fellows.html* for additional information.

Training Coastal Managers

State and local coastal managers are this nation's front line defense when it comes to managing this nation's coastal resources. NOAA therefore offers several training courses to help these professional expand their skills. Classes include technical courses for remote sensing and geographic information systems, as well as management courses that explore the impacts of visitor use on coastal resources and how to effectively run a public hearing. In 2005, 1,554 people in 23 of the nation's states and territories took advantage of this opportunity. Visit *www.csc.noaa.gov/training/* to see the entire curriculum. ■



Organization and Outreach

NOS Uses Buoy Technology to Learn About and Protect Special Shipwrecks

This year, Thunder Bay National Marine Sanctuary and Underwater Preserve installed buoys to better monitor and ensure the protection of the treasured shipwrecks resting on the sanctuary floor. One buoy pulls double duty as a source for meteorological data and as a way for archeologists to monitor the environmental conditions of the shipwreck *Montana*. Other buoys were installed near popular shipwrecks in the sanctuary to provide a mooring site to which divers can tie their vessels. This will reduce the frequency of dropped anchors onto fragile shipwrecks below.

NOS Employee Given Key to City of New Bedford, Massachusetts

Mayor Frederick M. Kalisz of New Bedford, Mass., presented an NOS employee with a key to the city in recognition of the support NOS provided to the city as a Federal Brownfields Showcase Community and Portfields Demonstration Pilot. NOS has supported the Brownfields cleanup and reuse, and navigational dredging of New Bedford Harbor to improve the capacity of the port. As a participant of the Portfields Pilot program, New Bedford and NOS worked with federal, state, and local stakeholders to expedite the dredging project.

NOAA Staff Recognized for Puget Sound Restoration Efforts

This year, the Shared Strategy for Puget Sound recognized NOS and other NOAA staff for their contributions to restoring salmon in Puget Sound. Shared Strategy is a collaborative initiative by Puget Sound communities to protect and restore salmon runs across the Sound. It engages local citizens, tribes, technical experts, and policymakers to build a practical, cost-effective recovery plan endorsed by the people living and working in the region's watersheds. At a recognition dinner, NOAA staff members were honored with an award for their restoration efforts. At the dinner, Shared Strategy noted that "restoration in an urban setting is challenging; the groups working together through the natural resource damage assessment process have demonstrated creativity, innovation, technical skill, and dedication to the cause."

New Caribbean Coral Reef Institute Established

NOS worked with the University of Puerto Rico to establish the Caribbean Coral Reef Institute at the university's Department of Marine Sciences Magueyes Island Research Laboratory. This program serves as a major hub for applied coral reef research in the Caribbean. The Institute is modeled after the highly successful Hawaii Coral Reef Initiative Research Program and will focus exclusively on the acute problems of Caribbean coral reefs.

Technology to Monitor Harmful Algal Blooms Shared with Korean Scientists

NOS worked with the Korean Ministry of Maritime Affairs and Fisheries to develop a rapid, diagnostic test for the most problematic harmful algal bloom (HAB) species that plague Korea. NOS then provided the technology to Korea in an exchange program. Korean coastal managers will use the automated, molecular test to implement mitigation techniques and reduce the potentially devastating economic impacts of HABs, which can approach $95 million a year.

Teachers and Students Gain Hands-on Learning Experience in Sanctuary Waters

This year, the Monterey Bay Watershed Education and Training (B-WET) program funded more than $1.2 million in grants to provide teachers and students with hands-on, in-the-field watershed experiences. Now in its second year, the Monterey B-WET program has reached more than 7,000 teachers and 200 students.

Down Under, Out Yonder Celebrates 10 Years of Education

In June, the Flower Garden Banks National Marine Sanctuary staff held the 10th annual Down Under, Out Yonder Education Workshop and Expedition for teachers. Participants learned about the National Marine Sanctuary System, the history and biology of the Flower Garden Banks sanctuary, coral reef biology, how human and natural factors impact coral reef ecosystems, current sanctuary research activities, and how to identify reef fish. This event, sponsored by the Gulf of Mexico Foundation in partnership with the sanctuary program, is a model for inspiring teachers to incorporate marine biology into classrooms.

The encyclopedia is part of a continuing NOAA effort to enhance public awareness, understanding and appreciation of the ocean environment

Commemorative Marker Program Flourishes

This year, NOS, in partnership with state and federal agencies, continued to set commemorative markers along Lewis and Clark's expedition route across the United States. They also mark state "centers of population" (as defined by the U.S. Census Bureau) and recognize other significant events or areas. The markers' positions are incorporated into the National Spatial Reference System.

Promoting Cooperative Natural Resource Damage Assessments

In April, NOS held the first of several regional cooperative natural resource damage assessment (NRDA) workshops in Savannah, Georgia. The workshop was part of NOS's efforts to encourage productive dialogue among stakeholders about damage assessments and response strategies, and build trust among parties so that damaged natural resources can be restored faster. The workshop brought together 70 regional

Organization *and* Outreach *(Continued)*

representatives from federal and state trustee agencies and industry to explore ways to improve efficiency and coordination in NRDA. Future similar workshops are planned for the Great Lakes and Northeast regions.

Unique Web Site for Watershed Restoration Project Launched

This year, NOS has worked to coordinate a Watershed Project for restoring the Elizabeth River watershed on the Chesapeake Bay. The project includes a watershed-based approach for assessing and managing contaminants and restoring and protecting the habitat. In addition, an easy, Web-based mapping system has been designed for the project. For the first time, regional stakeholders, communities, and the public will have access to data and information on the health and contamination of the Elizabeth River on the Web site. This site makes available a unique compilation of results which were formerly not available in a consistent, comparable form or from a single source. The Web site is available at *http://mapping.orr.noaa.gov/website/portal/elizriver/index.html.*

Training Programs Increase Effectiveness of Local Reef Management

This year, NOAA's Coral Reef Conservation Program (CRCP), an interagency matrix program coordinated by NOS, conducted numerous training and capacity-building initiatives to improve local resource management and engage the public in conservation efforts. CRCP worked with the University of Miami to conduct a workshop to connect more than 40 south Florida teachers with leading coral reef researchers to bring the latest coral reef information into classrooms. CRCP also worked with American Samoa to conduct workshops for fishermen and the public about how to manage diminishing local coastal fisheries. CRCP also worked with the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S. Coast Guard and the U.S. Department of Justice to conduct an environmental enforcement workshop for American Samoans. Finally, CRCP also hosted two regional workshops for more than 50 NOAA offices and state and territory agency divisions to improve planning, execution and evaluation of coral reef outreach, education, and stakeholder involvement initiatives.

NOS Digitizes Civil War-era Coast Pilots

NOS released digital versions of its Civil War-era *Coast Pilots* navigation tools. The "Notes on the Coast of the United States" are a series of eight memoirs written in 1861 by the Blockade Strategy Board, which conducted Coast Survey work during the Civil War. Information in the "Notes" includes sailing directions and detailed geographic information for the Southeast and Gulf Coasts. The documents were instrumental to Union Army and Navy operations because officers planned blockade strategies using field correspondence from the Board. The "Notes" are available at *http://nauticalcharts.noaa.gov/nsd/notes.htm.*

Jones Awards Honor Leaders in Coastal Stewardship

In March, NOS honored the 13 winners of the Walter B. Jones Memorial and NOAA Excellence Awards at a standing-room only awards ceremony in Washington, D.C. The awards recognize individuals, graduate students, state and local governments, businesses, and non-governmental organizations for their outstanding contributions to coastal stewardship. The awards were created to honor the late North Carolina Congressman Walter B. Jones, who chaired the House Merchant Marine and Fisheries Committee. Three award categories are named in honor of Congressman Jones—Coastal Steward of the Year, Excellence in Local Government, and Excellence in Coastal and Marine Graduate Study. NOAA added five categories of Excellence Awards to recognize exceptional work in other areas important to the success of coastal and ocean resource management.

Estuary Reserve Participates in EstuaryLive, Despite Hurricane Katrina

In the wake of Hurricane Katrina, the Grand Bay National Estuarine Research Reserve (NERR) still proceeded with its EstuaryLive broadcast, with the help of the U.S. Environmental Protection Agency's (EPA's) Mobile Bay Estuary Program. The Grand Bay NERR and Mobile Bay segment of the national EstuaryLive event allowed students to learn what a hurricane is, how the NERR was affected, how birds and other animals responded to the storm, and how it impacted shellfisheries. EstuaryLive is an interactive "field trip" for K-12 students, available via live Webcasts from NOAA's NERR sites and EPA's National Estuarine Program sites. In 2005, more than 29,000 students from around the country participated in the EstuaryLive broadcasts, more than twice the number from the previous year.

Disaster Recovery Information Shared in Wake of Hurricane Katrina

Within days after the catastrophic Hurricane Katrina ravaged the Gulf Coast in September 2005, the Weeks Bay National Estuarine Research Reserve in Alabama hosted a national Web-based teleconference on Disaster Recovery, organized by the American Planning Association. The Web conference gave participants, including local and regional government officials, researchers and nongovernmental organizations, a chance to discuss disaster recovery best practices in the context of community planning. The conference focused on emergency permitting, envisioning the next steps, rebuilding local businesses, historic preservation, and long-term recovery planning. The conference is an example of how the National Estuarine Research Reserve System can share scientifically sound information with coastal decisionmakers in response to an urgent need.

New Online Marine Life Field Guide Launched

This year, NOS launched the online Encyclopedia of the Sanctuaries, which highlights the diverse marine life of America's ocean and Great Lakes treasures. The Encyclopedia is part of a continuing NOAA effort to enhance public awareness, understanding and appreciation of the ocean environment. This online field guide provides photos, streaming video and important biological information for more than 100 marine species from each of the national marine sanctuaries in the United States. This is a fantastic resource for formal and informal educators, students of all ages, zoos and aquariums, science and technology centers, and natural history museums. The Web site is available at: *http://marinelife.noaa.gov/.*

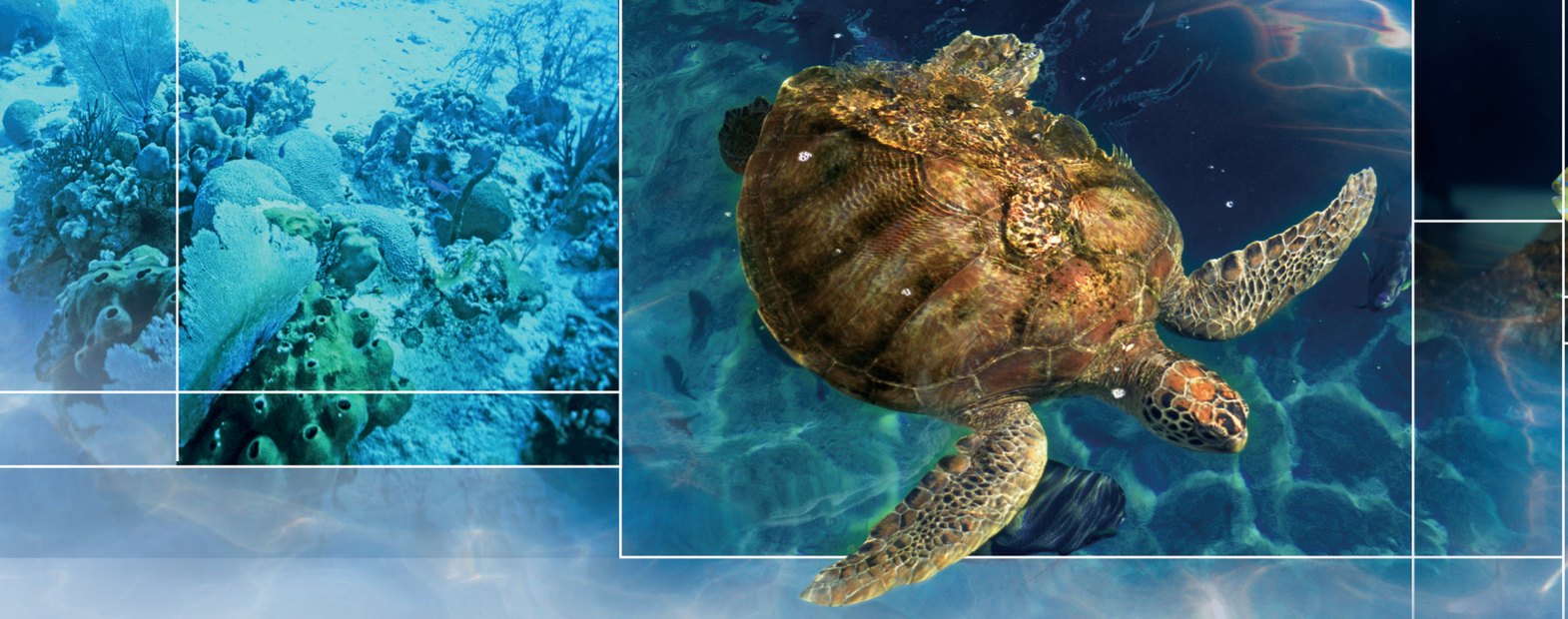
Ocean Service Raises Ocean Awareness in China

NOAA exhibited at the "600th Anniversary of Zheng He Voyages to the West Ocean Exposition" in Shanghai, China July 6-14. Over 150,000 Chinese attended the exhibit during the eight-day expo. NOAA and NOS personnel were on hand to share information on NOAA's tsunami research and deployment, ocean exploration, fisheries management, safe navigation, climate observations, and coastal and ocean remote sensing. During the expo, NOAA and NOS also participated in an international two-day Ocean Policy Forum to share science, technology, and policy information.

NOAA and NOS at Coast Day in Lewes, DE

NOS coordinated the NOAA participation in the annual Coast Day event in Lewes, DE. Participants from across NOAA and NOS led activities to test the public's knowledge on weather issues through Weather Jeopardy, led kids on an adventure to excavate shipwrecks, make fish prints, and even try on a real NOAA survival suit. The annual festival attracted over 18,000 people. ■

Thank you to all the NOAA Ocean Service employees, family and friends who contributed their pictures to this publication. NOS photo contributors include: Jacqueline Babcock, Demian Bailey, Susan Baker, Nir Barnea, John Christensen, Randy Clark, Chris Jeffrey, Doug Helton, Helen Hillman, Gennady Kachook, Alan Mearns, Gary Ott, Robert Warner, David B. Winandy, DanaWusinich-Mendez, Ian Zelo, members of the Navigation Response Team, and numerous other people not listed here. And, thank you to Les Adams from NOAA Public Affairs, Roger Fay from TDI Brooks International, Inc., and Elizabeth Fairey from the National Marine Fisheries Service for their contributions.



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
1305 East West Highway
Silver Spring, Maryland 20910
(301) 713-3074

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

State coastal resource management programs don't always have the information, tools, technical capacity, or expertise needed to fulfill their mandates. Answering this need is the role of the NOAA Coastal Services Center. Remote sensing, geographic information systems (GIS), information integration and sharing, hazards mitigation, habitat characterization, training, and coastal observing systems represent the Center's primary areas of expertise. The Center's efforts in these areas have produced hundreds of projects, including a helpful inventory of state dock and pier policies, satellite data sets used to document and predict coastal growth trends, and information that helps communities protect themselves from coastal storms. This assistance gives coastal managers the tools they need to effectively manage and protect the nation's coastal communities.

Center for Operational Oceanographic Products and Services
(301) 713-2981
http://tidesandcurrents.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 grounding 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

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. In addition to the Centers based in Silver Spring, MD, there are facilities in Charleston, SC; Beaufort, NC; Oxford, MD; and Kasitsna Bay, AL.

Office of Coast Survey

(301) 713-2770

http://nauticalcharts.noaa.gov

Navigating ships and boats safely in and out of ports and along our coasts requires accurate nautical charts. The Office of Coast Survey (OCS) manages the NOAA nautical charting program to help protect life and property, support economic growth and development, and protect the environment in support of the overall mission for safe and efficient navigation. OCS is responsible for surveying and charting U.S. and territorial waters to the limits of the Exclusive Economic Zone, an area of about 3.4 million square nautical miles.

National Geodetic Survey

(301) 713-3242

www.ngs.noaa.gov

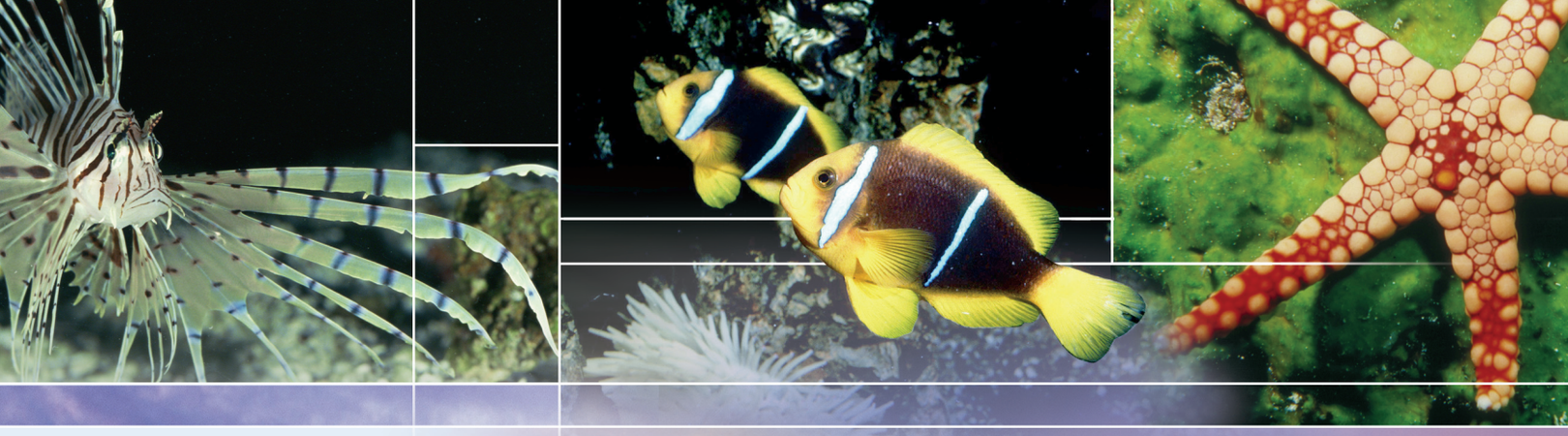
The National Geodetic Survey (NGS) defines and manages the National Spatial Reference System - the nationwide framework latitude, longitude, and elevation. NGS surveys promote safe navigation and enhanced economics by delineating the national shoreline and locating features needed to construct nautical charts. NGS also identifies obstructions and aids to air navigation at the nation's airports, supporting security and preparedness.

Office of Ocean and Coastal Resource Management

(301) 713-3155

www.ocrm.nos.noaa.gov

Managing our nation's 95,000 miles 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. In cooperation with the Department of Interior, NOAA established the National Marine Protected Areas Center to provide science, technology, training, and information for the planning, management, and evaluation of the nation's system of marine protected areas.



NOAA National Ocean Service at a Glance
(Continued)

Office of Response and Restoration

(301) 713-2989

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, and environmental damage assessment. OR&R tackles environmental threats from catastrophic emergencies, such as oil and chemical spills, chronic toxic releases from Superfund waste sites, and vessel grounding 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 material; and pursue restoration from those responsible for the harm.

Coral Reef Conservation Program

(301) 713-2989

www.coris.noaa.gov* or *www.coralreef.noaa.gov

NOAA's Coral Reef Conservation Program (CRCP) supports effective management and sound science to preserve, sustain and restore valuable coral reef ecosystems. From mapping and monitoring to managing reef resources and removing harmful debris, the CRCP addresses the priorities laid out in both the National Action Plan to Conserve Coral Reefs and the National Coral Reef Action Strategy, and helps fulfill NOAA's requirements under a number of mandates, including the Coral Reef Conservation Act of 2000. The CRCP is a partnership between the NOAA Line Offices working on coral reef issues, including NOAA Oceans and Coasts, NOAA Fisheries, NOAA Research, and NOAA Satellites and Information, and is headquartered in the NOAA Ocean Service Office of Response and Restoration. The CRCP facilitates and supports partnerships with scientific, private, government and nongovernmental groups at local, state, federal and international levels.

National Marine Sanctuary Program

(301) 713-3125

www.sancturies.noaa.gov

Marine sanctuaries, or underwater 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 and one coral reef ecosystem reserve in the national system.

Staff Office for International Programs

(301) 713-3078

http://international.nos.noaa.gov

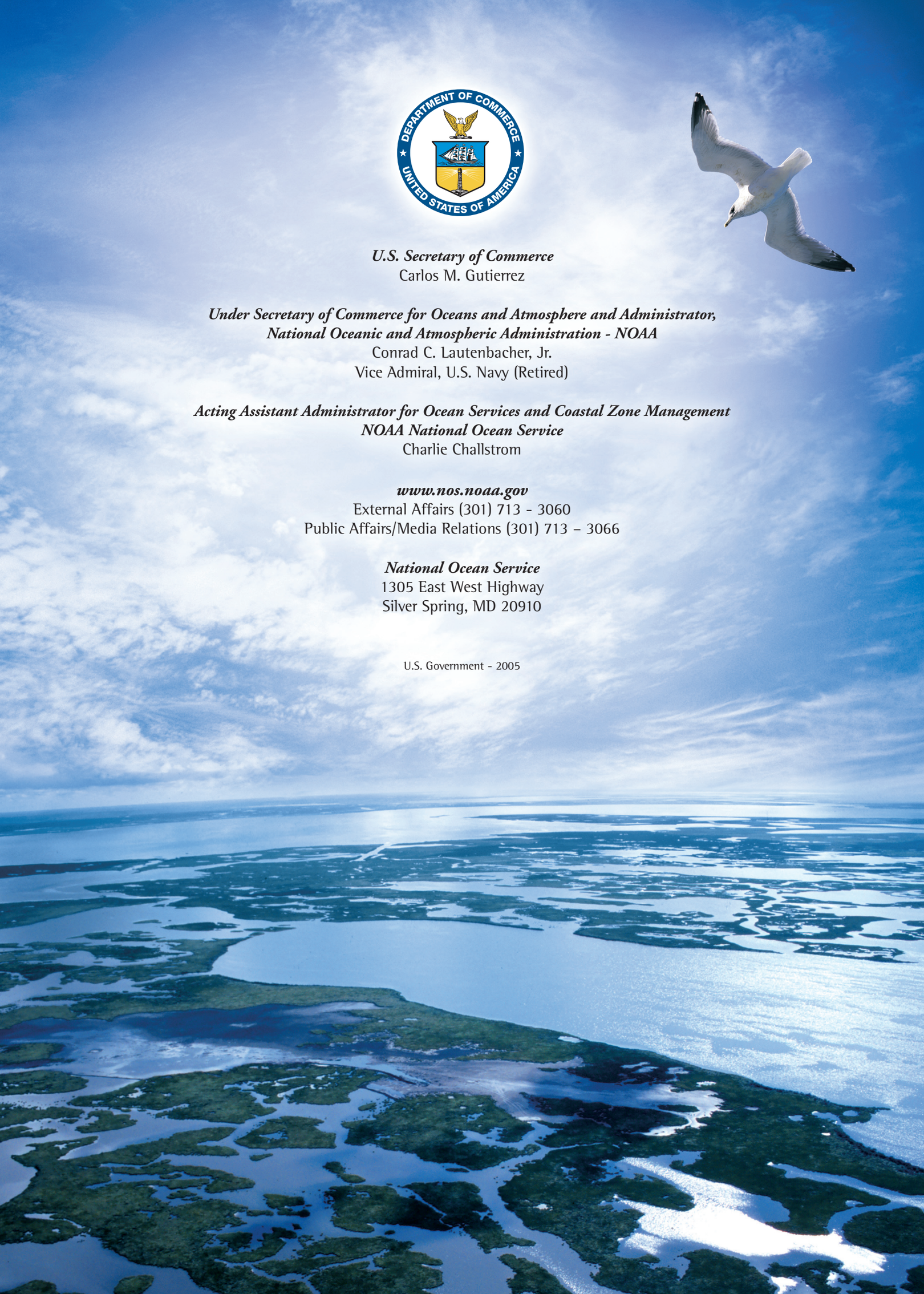
Recognizing that the challenges to our nation's coastal environment are global problems too, the Staff Office for International Program works to build partnerships with other countries to share information and lessons learned in coastal management.

Management and Budget Office

(301) 713-3056

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 guidance and development expertise for highly technical and scientific special projects.



U.S. Secretary of Commerce
Carlos M. Gutierrez

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www.nos.noaa.gov
External Affairs (301) 713 - 3060
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