

The Bush Administration is Advancing our Ocean and Coastal Knowledge

An Integrated Global Observing System

- The Administration hosted the first ever Earth Observation Summit, at which 34 nations and 20 Governmental Organizations agreed to develop a 10-year implementation plan for the establishment of a comprehensive, coordinated, and sustained Earth Observing System.
- In 2003, NOAA, in partnership with other agencies and organizations, began improving coordination and integration of hundreds of existing observation systems along the West Coast as part of a Pacific Coast Observation System (PACOS). The proposed observing system will support management of all federally managed species in the Nation's waters and their ecosystem.
- In 2003, NOAA implemented the Global Argo Data Repository, a critical component of the Global Ocean Observing System. This repository makes near real-time ocean temperature and salinity data from Argo buoys available from a network of over 1000 floats worldwide.
- Ocean.US, the National Office for Integrated and Sustained Ocean Observations, is facilitating the creation of ten Regional Associations for ocean observing within two years, an effort that will involve regional stakeholders (i.e. data providers and users from private and public sectors) in the design and implementation of regional ocean observing systems that are "user-driven" and encompass a continuum of research, operational, educational and outreach activities.
- In 2004, at the second Earth Observing Summit in Tokyo, ministers of 47 nations and the European Commission agreed to the framework of a comprehensive Global Earth Observation System of Systems. The summit in Tokyo fulfills a commitment made last year by President Bush and other G-8 Leaders. It builds on the first Earth Observation Summit hosted by the United States in July 2003.

Mapping the Ocean Floor

- Since 2001, in partnership with members of the U.S. Coral Reef Task Force (including NASA and USGS) NOAA has led an effort to map and characterize over 55 percent of all shallow U.S. coral reef habitats.
- From 2001 to 2003, NOAA worked in cooperation with USGS, MMS, the Gulf of Mexico Fishery Management Council, the University of New Hampshire and the University of Southern Florida to map over 4,000 square kilometers of the northwestern Florida Gulf continental shelf, including Madison Swanson and Steamboat Lumps Marine Protected Areas. These efforts have provided habitat maps, GIS data layers and ecological characterizations for resource managers.
- Between 2001 and 2003, NOAA mapped over 5,100 square kilometers of critical fishing grounds in the Gulf of Alaska and central Aleutian Islands and conducted extensive submersible operations to define and identify essential fish habitat off Alaskan waters.
- In 2002, NOAA developed a new meter scale resolution map of the Galapagos Rift using multibeam sonar which assisted in the mapping of 1,069 square nautical miles in the region.
- In 2002, NOAA supported the mapping of 6,600 square nautical miles of the Hudson Canyon with water samples analyzed by New York University at Stony Brook in a search for evidence of methane vents and gas hydrates.
- In 2002, more than 11,000 square nautical miles of ocean floor was mapped, with NOAA support, in the remote Northwestern Hawaiian Islands. On the same expedition, species were observed at depths and on habitats not previously seen, and satellite tracking of endangered monk seals was used to locate dive sites to explore deep-sea corals.
- In 2002, NOAA supported creation of a new and highly detailed map of more than 550 square nautical miles of ocean floor including details of a never-before-seen submerged ancient shoreline southwest of Newport, Oregon.
- In 2003, NOAA and its partners completed the mapping of the Puerto Rico Trench, the deepest part of the Atlantic Ocean, where the discovery of large submarine slides suggests the Trench bottom has recently deepened. Also discovered were a fault as large as San Andreas in California and a volcano 26,000 feet deep spewing saturated mud more than 11 miles.

- In 2003, NOAA participated in a 10-day mission to the Arctic that mapped 1,500 nautical miles along the 2,500 meter curve of the slope of Alaska—data that could help support possible future extensions of the U.S. Exclusive Economic Zone (EEZ) in that area. Other possible extensions of the EEZ beyond the current 200 nautical miles could include areas with potential resources valued at \$1.3 trillion.
- In 2003, NOAA's "Ring of Fire" ocean exploration expedition in the Western Pacific Ocean mapped more than 36,000 square kilometers of seafloor and surveyed more than 50 submarine volcanoes, including 10 having active hydrothermal systems.
- In 2003, more than 50,000 square nautical miles of previously uncharted ocean bottom was mapped by NOAA supported missions.

Ocean Exploration

- NSF, in partnership with the Woods Hole Oceanographic Institute, is funding the \$21.6 million construction of a deep-sea manned submersible. When completed in 2008, it will be the most capable deep-sea research vehicle in the world.
- Over a five-month period in 2001, NOAA provided assistance to the U.S. Navy to raise the steam engine from the innovative Civil War iron clad, the *USS Monitor*. In 2002, NOAA and the U.S. Navy again successfully completed a joint expedition to raise the revolving gun turret of the *Monitor*.
- In August of 2002, NOAA emergency training dives led to the discovery of a historically significant Japanese Midget sub (the first Japanese casualty from U.S. WWII efforts in the Pacific) several miles off of Pearl Harbor in 1,200 feet of water.
- In 2002, the Sustainable Seas Expedition, co-sponsored by NOAA and the National Geographic Society, concluded a five-year voyage to explore deep-water coral and hard-bottom communities from the west coast of Florida to Louisiana.
- In 2002, NOAA confirmed the location of the 19th century wreck of the steamship *Portland* within the boundaries of the Stellwagen Bank National Marine Sanctuary in Massachusetts. The ship sank in 1898 during an infamous storm, resulting in the loss of all 192 passengers and crew.
- In 2002, NOAA supported work with Dr. Robert Ballard's Institute for Exploration, and Thunder Bay National Marine Sanctuary in Michigan to video nearly two dozen shipwrecks. In addition, sinkholes and other geologic features were searched for evidence of human habitation prior to the refilling of the Great Lake following the last ice age.
- In 2003, the National Science Foundation, with help from the Office and Naval Research and NOAA, funded the development of a novel light-tethered remotely operated vehicle (ROV) capable of collecting sediment and water samples at bottom depths of 11,000 meters (nearly 7 miles deep), and transmitting real time data and images to scientists on board the research vessel.
- In October 2003, the National Science Foundation, the Japanese Science Ministry, and European research partners commenced the Integrated Ocean Drilling Program (IODP), continuing a 20-year-plus international scientific ocean drilling program to explore the history and structure of the deep ocean through scientific ocean drilling.
- In 2003, in the deep, cold waters of Alaska's Aleutian islands, NOAA scientists discovered a unique coral habitat consisting of high-density "gardens" of corals and sponges.

Ocean Science and Research

- In 2001, NASA launched Jason, a satellite that continues a 12-year time series of critical measurements of ocean surface height, commonly referred to as "sea level." This information is critical to the study of global climate change, weather, tides, shoreline changes and to the management and protection of ocean fisheries.
- In 2002, NOAA and the Monterey Bay Aquarium Research Institute documented the unusual biological communities on and around the Davidson Seamount, a massive underwater mountain located near the Monterey Bay National Marine Sanctuary.
- In June 2002, NASA launched the Aqua platform, an enhanced ocean color remote sensing project which enhanced and expanded a 25-year-plus time series of ocean color data gathered via NASA satellites. By

monitoring changes in ocean color, scientists can predict plankton growth rates and identify Harmful Algal Blooms (e.g., red-tides) in near-real-time.

- In 2002, NOAA launched NOAA-17, a Polar-orbiting Operational Environmental Satellite (POES) that will measure sea-surface temperature among other environmental parameters.
- In 2002, NOAA completed construction on the Hollings Marine Laboratory, a modern research facility located in Charleston, S.C. The lab is a cooperative project between NOAA, the National Institute of Standards and Technology and the State of South Carolina.
- In 2003, NOAA demonstrated improvements in hurricane tracking as a result of continued research and model improvements. Verification of Hurricane Isabel was much better than the 10-year average – the average 480 hour track error for Isabel was only 60 nautical miles and the 5-day hurricane forecast was introduced providing advance notice to public safety officials and the general public.
- In 2003, NOAA's GOES-12, or Geostationary Operational Environmental Satellite, became operational and will monitor severe weather, such as hurricanes, over the U.S. and adjacent oceans.
- In 2003, the Maritime Administration (MARAD), with assistance from its partners, initiated a study to compile a current emission inventory of commercial vessels, and initiated research on large diesel engine retrofitting technologies. In 2004, MARAD also began an initial design to test fuel cell technologies and is planning to further develop a hydrogen fuel cell-based system on Academy grounds in King's Point, NY.
- In 2003, NOAA used underwater robots off Florida's coast to help forecast and monitor toxic plankton blooms.
- Since 2002, the Department of the Interior is using remote sensing to assess the vulnerability of 25 coastal National Parks to sea-level rise which will help to identify threats from coastal erosion and other potential impacts on Park resources.
- Starting in 2004, the National Science Foundation and the National Institute of Environmental Health Sciences funded (at \$5 million per year for 5 years) four joint Centers for Oceans and Human Health located at the University of Washington, University of Hawaii, Woods Hole Oceanographic Institution and the University of Miami. The centers will bring together experts in biomedical and oceanographic sciences for the first time to study the effects of harmful algal blooms, marine pathogens and the oceans' vast potential for drug discovery.
- The March 4, 2004 issue of *Science* featured the work of Department of Energy-supported researchers who determined the genetic sequences of all the microorganisms occurring in a natural microbial community collected from the Sargasso Sea in the North Atlantic and identified more than 1.2 million new genes. Their results illustrate the genetic diversity in the ocean and could lead to the development of innovative solutions to address national energy needs and other societal benefits.
- In 2004, NOAA developed a chlorophyll climatology time series at a 1 km scale for sea surface temperature and chlorophyll concentration in the U.S. coastal waters. The on-going time series, from 1986 to present, will allow NOAA to examine the effects of climate variation on algal production in the U.S. coastal zone and develop water quality forecasts.

Education and Outreach

- Since March 2001, USDA has been providing outreach leadership in the lower reaches of the Mississippi River to demonstrate that agricultural profitability and environmental stewardship are not mutually exclusive.
- Over the last four years, the National Park Service advanced ocean literacy and science-based management by engaging students, educators and the scientific community in ongoing field studies at five coastal research learning centers in the National Parks.
- In 2001, NOAA launched the Dr. Nancy Foster Scholarship Program which recognizes outstanding scholarship and encourages independent graduate-level research, particularly by female and minority students.
- Since 2001, NOAA has conducted more than 90 training sessions and workshops for coastal managers, and produced more than 25 tools and technical guidance products. These tools improve coastal managers' capabilities to respond to oil and hazardous material spills, hazardous waste sites, and to restore degraded natural resources.
- Since 2001, the Multicultural Education for Resource Issues Threatening Oceans (MERITO) program, a partnership between NOAA's Monterey Bay National Marine Sanctuary and Hispanic communities in Central California, has been providing bilingual outreach and education about marine and coastal environments and their

conservation to youth, teachers, adults and families. In 2003, MERITO reached over 5,500 Spanish-speaking citizens and participated in nine multicultural events that drew more than 100,000 people.

- Between 2001 and 2002, NOAA's Ocean Explorer Web site was launched and grew from an average of 1,400 visitors per day to 4,000 visitors per day, and from 1,600 to 3,500 ocean exploration related pages, including 71 new educational products. In 2003 the Ocean Explorer Web site was awarded the Science/Technology award by Scientific American magazine as one of the top five "Earth and Environment" web offerings.
- In 2002, NOAA partnered with the Marine Advanced Technology Education Center (MATE) and the Remotely Operated Vehicle (ROV) Committee of the Marine Technology Society to host the first annual national student competition to build and operate underwater ROVs.
- In 2003, more than one million people celebrated National Estuaries Day, which promoted the need to conserve and protect our Nation's estuaries. As part of this event, NOAA and EPA partnered to produce "Estuary Live," an interactive web-based field trip to an estuary that reached students of all ages across the U.S.
- In 2003, NOAA produced 60 new lesson plans, which meet national science education standards, for the Ocean Explorer Web site bringing the total to more than 150 expedition-related lessons. NOAA also developed OceanAGE, a video-based interactive career component of the website for students seeking information about careers in marine science.
- In 2003, NOAA sponsored "Our Ocean World" a 90-second daily radio program that reached a half million U.S. listeners daily with ocean messages designed to raise the ocean literacy of Americans.
- In January 2004, Coastal America, a partnership of 15 Federal agencies, coordinated the National Student Summit on Ocean Issues. The 100 high school students from across the country produced 29 Commitments to Action related to the sustainable use of the ocean and coastal areas.