



NOAA Business Report 2006

U.S. Department of Commerce
National Oceanic and Atmospheric Administration



NOAA—Protecting Lives and Livelihoods



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*Conrad C. Lautenbacher Jr.
Vice Admiral U.S. Navy (Ret.)
Under Secretary of Commerce for
Oceans and Atmosphere and
NOAA Administrator*

NOAA: Protecting Lives and Livelihoods

The National Oceanic and Atmospheric Administration (NOAA) is a key component of the U.S. Department of Commerce. NOAA's work touches the daily lives of every person in the United States and in much of the world. From weather forecasts to fisheries management, safe navigation to coastal services, and remote sensing to climate research and ocean exploration, NOAA's products and services contribute to the foundation of a healthy economy and affect approximately one-third of the Nation's gross domestic product. Over the last two years we have witnessed natural disasters on an unprecedented scale, including a tsunami in south Asia, earthquakes in Pakistan, and hurricanes, volcanic activity, drought and wildfires here in the United States. As a Nation, we labored to rebuild the nations and lives destroyed by the tsunami in South Asia. This catastrophic event focused the spotlight on the threat tsunamis pose to all coastal communities. We recovered from the most active hurricane season in history with Hurricanes Katrina, Rita, and Wilma battering the Gulf Coast and Florida, resulting in devastation unlike anything the Nation had witnessed before. Never in our Nation's history has the need to understand the weather and our environmental resources been so great, and never before has NOAA stood better poised to face the challenges ahead. NOAA's Web site at www.noaa.gov provides a wealth of knowledge to schools and people across the Nation, including those involved in industry and scientific enterprises.

In FY 2006, NOAA continued to apply its scientific and technological expertise to a wide range of issues that serve to expand our knowledge of the world around us and strengthen our economic prosperity. Major FY 2006 accomplishments included the following:

- NOAA Fisheries Service worked closely with Gulf State partners to ensure restoration and recovery of Gulf Coast fisheries following Hurricanes Katrina and Rita. Cooperative agreements totaling \$128 million were awarded to the five Gulf States to assist in the restoration of oyster beds and shrimp grounds rehabilitation, as well as monitoring recovery of Gulf fisheries.
- The Northwestern Hawaiian Islands Marine National Monument was created by executive order on June 15, 2006, encompassing nearly 140,000 square miles of U.S. waters, including 4,500 square miles of relatively undisturbed coral reef habitat that is home to more than 7,000 species.
- NOAA and NASA officials successfully launched the newest geostationary operational environmental satellite, GOES-N, on May 24, 2006. GOES-N is designed to provide measurements for improving hurricane track forecasts and enhance monitoring capability for other severe weather impacting the nation.

- On July 25, 2006, NOAA received delivery of the HENRY B. BIGELOW, the second of four new Fisheries Survey Vessels (FSV). The BIGELOW's high-tech capabilities make it one of the world's most advanced fisheries research ships. As NOAA's newest group of research ships, FSVs will have the ability to perform hydro-acoustic fish surveys and conduct bottom and mid-water trawls while running physical and biological-oceanographic sampling during a single deployment. This type of combined capability is unavailable in the private sector and will enable research and assessment to be conducted with greater accuracy, while improving cost efficiency.
- On September 13, 2006, NOAA issued an El Niño Forecast Advisory, noting that El Niño conditions have developed in the tropical Pacific and are likely to continue until early 2007. El Niño forecasting required collation and analysis of cross-ocean sea-surface temperature readings.
- NOAA achieved a record Tornado Warning and Hurricane track forecast through June 2006, providing an average leadtime of 13 minutes. This is an improvement of 3 minutes over Fiscal Year 2001, where lead time was only 10 minutes.
- In April 2006, NOAA, in cooperation with the Climate Change Science Program (CCSP), released "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences." The report answers a set of key questions related to ongoing observations of the Earth's temperature and is part of the CCSP's series of 21 scientific synthesis and assessment reports to support informed discussion and decision making regarding climate variability and change.
- During FY 06, in response to its mandate to improve tsunami mitigation and preparedness activities, NOAA continued development of the U.S. Tsunami Warning System. In FY 2006, NOAA deployed 19 of the 39 stations planned for the Deep-ocean Assessment and Reporting of Tsunamis (DART) network.
- The Hurricane Katrina Service Assessment Report found that the NWS effectively performed its mission before, during, and after the devastating storm. The products and services provided by NWS offices during Katrina were particularly accurate and timely, and they contributed significantly to critical customer decision-making. Senator Jim DeMint (SC), Chairman of Commerce

Committee's Disaster Prediction and Prevention Subcommittee, recognized the National Weather Service for its accurate forecast of Hurricane Katrina and emphasized the continued human suffering from the disaster. "After reviewing the actions taken by the National Weather Service, I am convinced that this was one of the most accurate hurricane predictions we have ever seen," said Senator DeMint.

- Over 400 people participated in the Safe Seas 2006 oil spill response exercise, held in August off the coast of San Francisco, CA. The drill was led by NOAA's National Marine Sanctuary Program and the Office of Response and Restoration. More than 150 NOAA participants from various line offices were involved, as well as others from the US Coast Guard, the State of California Department of Fish and Game Office of Spill Prevention and Response, the Department of the Interior and Harley Marine Services.
- Starting on September 13-16, 2005 and until the spring of 2006, NOAA conducted several surveys of Gulf seafood to determine whether there were harmful contaminant levels. Analyses on white shrimp sampled from near-shore areas of the northern Gulf of Mexico over a period of seven months following Hurricane Katrina were consistently below levels associated with substantive human health concerns. Through this sampling, NOAA was able to provide consumers with information about the safety of their seafood and ensure confidence in Gulf fisheries.

The work NOAA accomplished in 2006 impacted every U.S. citizen. We will build on our successes from last year, and stand ready to meet the challenges that will surface in FY 2007 and beyond. NOAA is dedicated to enhancing economic security and national safety through research and accurate prediction of weather and climate-related events, and to providing environmental stewardship of our Nation's coastal and marine resources.



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Under Secretary of Commerce for
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NOAA
HIGHLIGHTS



Brig. Gen. Jack Kelly, USAF (Ret.)
Deputy Under Secretary for
Oceans and Atmosphere



Scott Rayder
Chief of Staff to NOAA Under
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Management Priorities

Expecting NOAA to Perform Well,
and Better Every Year

To respond to an ever-changing world, NOAA must continuously calibrate its programmatic and managerial priorities to determine where to direct finite resources. While some issues and priorities evolve gradually and are best managed over the long term, others are properly addressed with shorter-term adjustments. In all cases, strategic planning and management of NOAA's activities work best when those who benefit from these activities and those who provide NOAA's services can contribute to the process. Only by involving stakeholders, employees, and partners can NOAA fulfill its vision and mission.

The *NOAA Strategic Plan* articulates NOAA's long-term corporate vision and mission, four long-term goals for realizing that mission, tangible outcomes marking progress toward each goal, and strategies for employing the Agency's capabilities to achieve each outcome. During FY 2006, NOAA reviewed its strategic direction and re-formulated its priorities for FY 2009–13, reaffirming NOAA as a reliable Federal agency for both its cooperative efforts and commitment to serve the public.

To foster short-term responsiveness, NOAA's annual planning cycle provides an opportunity to re-evaluate progress, accommodate new developments within and outside NOAA, and adjust programmatic focus areas to ensure progress toward our strategic goals. For this year's planning cycle, NOAA employed new and more systematic methods for gathering and synthesizing stakeholder views on NOAA's priorities. With the new methods and changes in the planning timeline, we generated higher levels of collaboration with stakeholders and fostered greater corporate alignment of NOAA-wide programs on high-impact mission areas.

The current *Annual Guidance Memorandum (AGM)* identifies the most urgent and compelling programmatic and managerial priorities for FY 2009–13, reflecting the views of NOAA's stakeholders, internal analyses of mission requirements, external trends and drivers, program capabilities, and alternative solutions to achieving NOAA's strategic goals. The following programmatic priorities and focus areas are featured in the AGM for FY 2009–13.

Observations, data management and modeling systems are required to develop new monitoring capabilities, produce more effective management practices, and improve prediction capabilities including NOAA's own capabilities for providing environmental information and ecosystem management. NOAA's priorities and focus areas here are:

- Global ocean and atmosphere observations and data management
- Capable and reliable observation infrastructure
- Ocean and Earth system modeling

Environmental data and information services are essential for public safety, resource stewardship, and long-term community planning on a national and international scale. NOAA strives to balance improvements to existing information services with the development of new capabilities in response to changes in customer demand and societal needs. The priorities and focus areas are:

- Forecast accuracy for high-impact weather
- Science-based climate information service
- Water information services
- Information services for aviation, marine, and surface transportation systems

Ocean and coastal ecosystem management requires productive observing systems and interdisciplinary analyses of regionally-specific ecosystem management problems. Emphasis on marine ecosystem modeling will serve as a basis for complex decision-making for ecosystem management and help optimize the observing system. The priorities and focus areas are:

- Regional, science-based approaches to ecosystem assessments and management
- Climate variability and ecosystem predictions
- Environmental information on oceans and human health

Organizational priorities determine NOAA's ability to pursue its programmatic priorities. NOAA must develop new organizational approaches and technology-driven service delivery improvements to maximize the value of the public's investment in NOAA. The priorities and focus areas are:

- Improving service delivery excellence and value to customers
- Strategic use of information technology
- Modernized, safe, high-quality facilities
- Strategic workforce management

Additionally, a key criterion used in the decision matrix for setting NOAA's programmatic priorities is the cross-cutting strategic imperative of "building hazard-resilient communities." This criterion recognizes NOAA's dedication to enhancing economic security and national safety by mitigating the escalating economic, societal, and environmental costs associated with environmental hazards.

NOAA International Affairs

Building Global Alliances

International affairs is one of NOAA's core capabilities, essential to the support of the agency's overarching mission goals. NOAA Leadership serve as the U.S. representatives to the Group on Earth Observations (GEO); Intergovernmental Oceanographic Commission (IOC); World Meteorological Organization (WMO); International Hydrographic Organization (IHO); International Whaling Commission (IWC); International Commission for the Conservation of Atlantic Tuna (ICCAT), among others. For this reason, exercising international leadership is designed in NOAA's Strategic Plan as one of its six crosscutting priorities for the 21st century. To advance NOAA's mission, the Deputy Assistant Secretary (DAS) for International Affairs provides policy advice and support with respect to negotiations, partnerships, and other NOAA international interests and activities. The DAS chairs the International Affairs Council, using matrix management principles to ensure coordination of, and communication on, NOAA's international activities.

ACCOMPLISHMENTS

NOAA Lead in Implementing the U.S. Indian Ocean Tsunami Warning System Program

NOAA participates in the U.S. Indian Ocean Tsunami Warning System Program, a \$16.6 million U.S. Government initiative put into operation in response to the tragic December 2004 tsunami event. This program is the United States' direct contribution to the ongoing international efforts to develop the regional system under the leadership of the United Nations Educational, Scientific, and Cultural Organization's (UNESCO) Intergovernmental Oceanographic Commission (IOC). NOAA's extensive, cross-line office participation in the Program is led by the agency's International Tsunami Leadership Team (chaired by the Deputy Assistant Secretary for International Affairs) and carried out by the agency's International Tsunami Project Team. NOAA has made key contributions in all aspects of the end-to-end warning system that cover all stages of early warning, from initial hazard detection to community-level response. On December 1, NOAA had the pleasure of providing the first Deep-ocean Assessment and Reporting of Tsunami, or DART, buoy for the Indian Ocean, working in partnership with Thailand on its deployment and future operations and maintenance. Earlier in the year, NOAA formulated the conceptual design for locating and deploying tsunami detection buoys in the Indian Ocean with the intent of providing the greatest amount of warning time to the most vulnerable populations. The agency was instrumental in upgrading sea-level stations and telecommunications linkages,



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as well as providing technical assistance concerning the warning system operations. Also, NOAA is part of the effort to strengthen community preparedness and economic, environmental and social resilience to multiple hazards. NOAA works towards these goals both at the regional level and with individual countries such as Indonesia, Thailand, the Maldives, India, and Sri Lanka. In March, 2006, NOAA signed a Memorandum of Agreement with Australia to expand regional capacity for technology transfer and exchange for Indian Ocean tsunami activities. NOAA continues to monitor earthquake and tsunami activities for the Indian Ocean on a 24/7 basis and has provided bulletins to national focal points for major events.

Group on Earth Observations (GEO)

The Group on Earth Observations (GEO) continues to promote and establish global Earth observations capabilities. Vice Admiral Conrad C. Lautenbacher, Jr. continues to lead an international organization of 67 members and 43 participating organizations to establish a Global Earth Observation System of Systems (GEOSS). This initiative promises to make people and economies around the globe healthier, safer, and better-equipped to manage basic daily needs. The aim is to make 21st century technology as interrelated as the planet it observes, predicts and protects, providing the science on which sound policy and decision-making must be built.



In 2006, GEO implemented the GEOSS 10-Year Implementation Plan as endorsed by the Third Earth Observation Summit. GEO program activities include 96 tasks carried out as part of nine societal benefit areas and five transverse areas identified in the 10-Year Plan. Vice Admiral Lautenbacher and all of NOAA's leadership made GEO and GEOSS a priority in each of their international engagements during FY 2006. U.S. GEO Co-Chair Lautenbacher chaired the second official GEO meeting in Geneva, Switzerland, on December 14-15, 2005, and has since participated in several GEO Executive Committee meetings.

Earth Observations and Public Health

Vice Admiral Lautenbacher and Assistant Administrator Rick Spinrad addressed the 8th Brazilian Congress of Collective Health and the 11th World Congress of Public Health in Rio de Janeiro. This was the first presentation of the importance of Earth Observations to the Public Health professional community, and was extremely well received. Public Health is one of the benefit areas identified for the Global Earth Observing System of Systems, and yet,

the community is under-represented at GEO. NOAA's participation in these meetings was an important first step in building a bridge between the two professional communities. It also helped to launch internal U.S. efforts to explore the linkages between Earth observations and public health.

Intergovernmental Oceanographic Commission (IOC) Executive Council

The annual Intergovernmental Oceanographic Commission (IOC) meeting, held June 21-28, 2006, in Paris, focused on several high-priority NOAA topics such as tsunamis, global Earth observations, marine ecosystem assessments, and activities undertaken by a number of international institutions that seek to improve our collective efforts to facilitate work on these issues. Vice Admiral Lautenbacher presented the Global Earth Observation System of Systems (GEOSS) and its relationship to the IOC community with direct implications for tsunami and all-hazards coordination. NOAA Assistant Administrator for Research Dr. Richard Spinrad serves as the U.S. Representative to the IOC and is responsible for

overseeing U.S. participation in IOC programs. The U.S. delegation, under the leadership of Dr. Spinrad, successfully promoted NOAA policies and objectives at this meeting.

XXIX Antarctic Treaty Consultative Meeting

The United Kingdom hosted the 29th meeting of the Antarctic Treaty Parties, and the ninth meeting of the Committee on Environmental Protection to the Antarctic Treaty. The meeting, held in Edinburgh on June 12-23, 2006, discussed regular matters, including the operations of the Antarctic Treaty parties, and the review and establishment of protected areas, as well as designation of specially protected species and protection of marine areas. The meeting also included a day devoted to the upcoming International Polar Year (IPY) 2008-2009. Under the NOAA International Affairs Council, Deputy Directory Tom Laughlin is leading a NOAA Polar Committee, which is charged with coordinating NOAA's engagement on polar matters, including the IPY.

First Intergovernmental Meeting on Establishment of a New Mechanism for Management of High Seas Bottom Trawling in the Northwestern Pacific Ocean

The first intergovernmental meeting on establishment of a new mechanism for management of high seas bottom trawling in the northwestern Pacific Ocean was held August 22-24, 2006, in Tokyo, Japan. The meeting was designed to provide for exchange and discuss actions to ensure sustainable fisheries in the northwestern Pacific Ocean, the need for a new mechanism for international management of high seas bottom trawling in the northwestern Pacific Ocean, and the possible framework of such a mechanism. Possible interim measures and the time frame toward the possible agreement on the new mechanism were also deliberated. The purpose of the meeting was to discuss necessary actions to ensure sustainable fisheries and protection of vulnerable marine ecosystems in the northwestern Pacific Ocean. The Second Intergovernmental Meeting will be held January 20-February 2, 2007 in Busan, Korea.

Global Conference on Oceans, Coasts, and Islands

Other NOAA representatives were also in attendance. Deputy Assistant Secretary William J. Brennan and Deputy Director Tom Laughlin represented NOAA at the Third Global Conference on Oceans, Coasts and Islands held in Paris under the auspices of the United Nations Education, Science and Cultural Organization (UNESCO), January 23-28. This event was aimed at reviewing "progress achieved and obstacles faced in the implementation of international targets on oceans, coasts, and small island developing States." At the conference, Dr. Brennan co-chaired a high-level panel on the tsunami disaster. Tom Laughlin co-chaired a workshop to solicit multi-stakeholder input for the 2nd Intergovernmental Review of the United Nations Global Programme of Action. Ralph Cantral of the National Ocean Service chaired a session on capacity development for ocean and coastal management. Other NOAA representatives were also in attendance.





The 30th Annual Conference of the Center for Oceans Law and Policy

Deputy Assistant Secretary William J. Brennan gave remarks at the 30th Annual Conference of the Center for Oceans Law and Policy, held at Dublin Castle, Ireland. He outlined the state of U.S. accession to the United Nations Convention on the Law of the Sea and the importance of the Convention to the conduct of NOAA's mission.

Review Conference on United Nations Fish Stock Agreement

NOAA was represented at a Review Conference for the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stock Agreement or UNFSA).

The Conference assessed the effectiveness of UNFSA in securing the conservation and management of straddling fish stocks and highly migratory fish stocks, and considered progress in implementing its provisions. Significant discussion was focused on addressing overcapacity of the world's fishing

fleets and strengthening and coordinating international efforts to deter Illegal, Unreported and Unregulated (IUU) fishing. Increasing the understanding and implementation of ecosystem approaches to management within fisheries governance was also a topic for keen debate. In the end, the Conference proposed means for strengthening implementation that would better address continuing problems.

NOAA and the Asia-Pacific Economic Cooperation Marine Resources Conservation Working Group Address Priorities

The Asia-Pacific Economic Cooperation (APEC) Marine Resources Conservation Working Group (MRCWG) has supported two timely projects in the region forwarded by NOAA. One aims to increase tsunami preparedness and resilience through use of the Sea Grant model. The second focuses on marine ecosystem identification and mapping in the Asia-Pacific region using principles of the Large Marine Ecosystem approach. These and additional MRCWG projects on marine debris, aquaculture and other topics are in direct response to the Bali Plan of Action that Vice Admiral Lautenbacher and other ministers approved at the 2nd APEC Ocean-Related Ministerial Meeting in September, 2005.

World Water Forum

NOAA was represented at the fourth international World Water Forum in Mexico City, March 16-22, 2006. The biennial event elevates the global awareness of water issues and “seeks to enable multi-stakeholder participation and dialogue to influence water policy making at a global level.” At the conference, representatives from NOAA’s National Ocean Service convened a session with the United Nations Environment Programme’s Global Programme of Action to present the development of National Programs of Actions and their ability to help reduce the threat of land-based sources of marine pollution. NOAA staff also participated in additional sessions related to Integrated Water Resource Management and other freshwater-to-coast linkages.

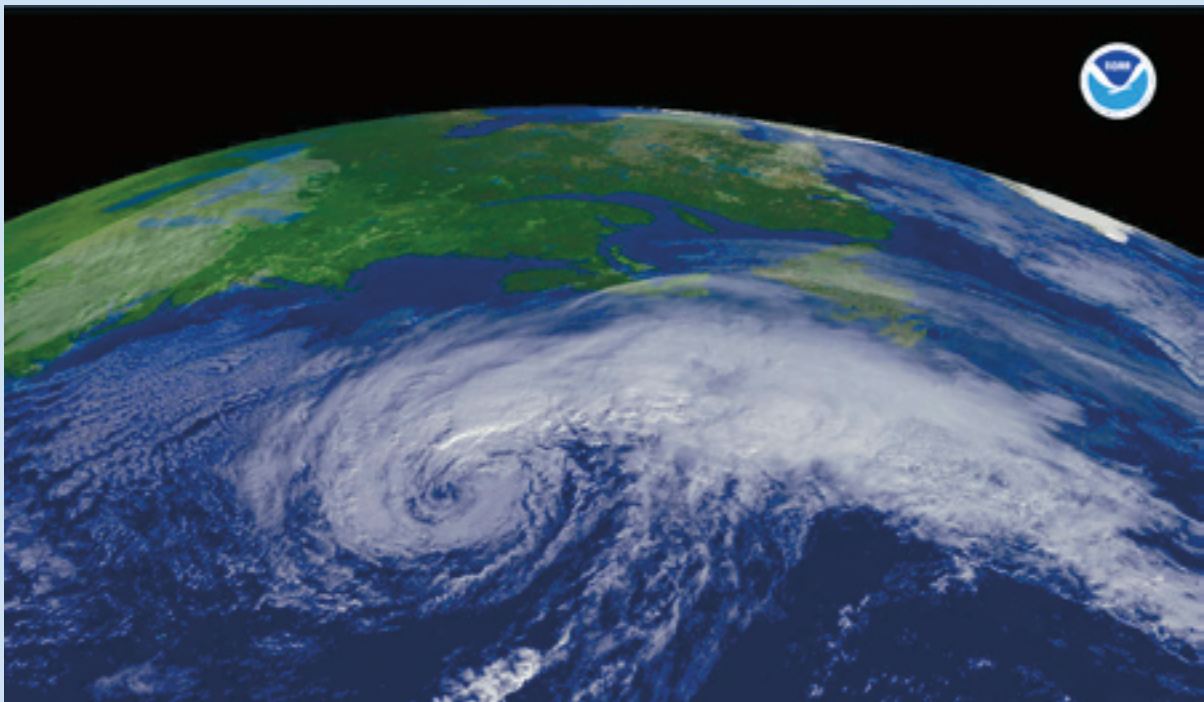
Convention on Biological Diversity (CBD)

NOAA was represented by Elizabeth McLanahan on the U.S. delegation to the Convention on Biological Diversity (CBD). The convention held its 8th Conference of the Parties (COP) meeting in Curitiba, Brazil, March 20-31. Action items were recommended

related to integrated marine and coastal area management, high seas marine protected areas, invasive species, and island biodiversity. A highlight of the event was the launch of the “Micronesia Challenge,” which included commitments by the Republic of the Marshall Islands, the Federated States of Micronesia, Palau as well as Guam and the Commonwealth of the Northern Marianas Islands to effectively conserve 30 percent of near shore marine resources and 20 percent of forest resources by 2020.

All-Hazards Preparedness in the Caribbean

NOAA’s National Weather Service held a key meeting with Caribbean meteorological officials on all-hazards preparedness during the week of February 13, 2006, in Miami. NOAA presented details of \$450K awarded to the agency from the Department of State’s Third Border Initiative for all-hazards preparedness; and the officials identified priority observational and communications components to be pursued. The officials also discussed the development of a protocol for cooperation and coordination among National Meteorological Services that would provide for backups during emergency situations.



NOAA Office of Education

NOAA's Office of Education (OEd) provides advice and counsel to the Under Secretary in matters pertaining to education. The OEd, in conjunction with the Education Council, coordinates education activities across NOAA and oversees the implementation of NOAA's Education Plan and Policy. These efforts help to ensure that NOAA's education programs and activities are based on NOAA science and support the agency's crosscutting priority of promoting environmental literacy. OEd also works with external partners to promote environmental literacy efforts that directly benefit the NOAA mission.

OEd strives to improve the efficiency and effectiveness of NOAA's collective education efforts by providing the crucial coordination. A key to this coordination is chairing and supplying staff support for NOAA's Education Council, which develops corporate policy and provides strategic direction.

In addition to providing coordination, OEd implements and manages projects aimed at advancing key educational goals, represents NOAA in external and internal education activities, runs an internal mini-grant program, and maintains an education website. These projects are "One NOAA" in approach and national in scope, or nationally scalable with regional implementation.

ACCOMPLISHMENTS

K-12 Education

AMS DataStreme is one of the external partners that NOAA supports with grant money. DataStreme is a national professional development program for ocean and atmospheric sciences for K-12 teachers. The program aims to build a cadre of Earth system educators by training teachers to upgrade their own teaching and to act as resource persons and peer trainers for colleagues and schools.

The National Ocean Science Bowl (NOSB) is an academic competition that challenges high school students on ocean and environmental science topics. In 2006, NOSB included 400 high schools and 2000 students. NOAA's partner for NOSB is the Consortium for Oceanic Research and Education (CORE), a non-profit organization representing 83 of the nation's leading oceanographic institutions and industry leaders.

As part of the 2006 Intel International Science and Engineering Fair in Indianapolis in May, OEd presented special awards to three



Louisa Koch
Director of Education



Einstein Fellow leading activity for students from Congressional Schools of Fairfax during NOAA Heritage week. Photo Credit: Beth Jewell



NOSB teams tide pooling in Pacific Grove, CA with staff from Marine Advanced Technology Center. Photo Credit: Laure Dippold

students whose outstanding projects further our understanding of Earth's systems. The "Taking the Pulse of the Planet" awards were designed to recognize the importance of the U.S.-led initiative to develop a global Earth Observation System.

For the third year, NOAA's OEd hosted Albert Einstein Distinguished Educator Fellows—selected master science teachers who work with NOAA and other federal agencies to help inform educational policy.

Informal Education

NOAA also supports its partners in many informal education projects through its grants programs. Science on a Sphere, developed by NOAA, is a 68-inch-diameter globe that shows the atmosphere, oceans and land in a realistic manner, and can be used to demonstrate real-time data, giving it a "wow factor." The OEd

funds the installation of Science on a Sphere in museums and science centers and associated educational programming. In FY 2006, we funded four new installations, bringing the total to ten.

NOAA science was heard over 21 million times in 2006 on the Earth and Sky international science-news radio program. Earth & Sky's NOAA Observing Earth project created 11 NOAA radio shows in only eight months. All NOAA Observing Earth programs were broadcast by Earth & Sky's over 1000 public and commercial radio affiliates, and by the XM and Sirius satellite radio networks. Through the Observing Earth project, and the Earth & Sky reportage, both the human face and the scientific achievements of NOAA will continue to be celebrated.

The Office of Education worked to increase the use of NOAA weather satellite data through



Portsmouth group with Science On A Sphere. Photo Credit: Courtesy of Hampton University

a grant to the American Museum of Natural History. The data, updated every half-hour, will be used to create visualizations which will be used there and at 30 other science museums throughout the United States.

Post Secondary Formal Education

As of September 2006, the Educational Partnership Program with Minority Serving Institutions (EPP/MSI) Cooperative Science Center had more than doubled the number of African American PhDs produced nationally in atmospheric and environmental science. 2006 EPP funding resulted in five additional environmental science PhDs. The Cooperative Science Center program component produced 49 graduates (10 Doctorates, 12 Masters and 27 Bachelors) in 2006.

The Cooperative Remote Sensing Science and Technology Center at The City College of The City University of New York five-member

National Ocean Science Bowl team placed third (out of 20 participating schools within the Northeast zones) in the Bay Scallop Bowl regional competition held at the Marine Research Center, Stony Brook on March 4, 2006.

In October 2006, the Fourth EPP Education and Science Forum was hosted by the Environmental Cooperative Science Center at Florida A&M University in Tallahassee, Florida. The Education & Science Forum had over 380 registered participants from 42 educational institutions and 24 states and Puerto Rico. Approximately, 50 percent of all registered participants were students, and 40 percent of these were undergraduates.

The 2006 Cooperative Science Center national cooperative science center competition resulted in five Cooperative Science Center grant awards:

- NOAA Cooperative Remote Sensing Science and Technology Center (CREST) - The City College of The City University of New York
- NOAA Environmental Cooperative Science Center (ECSC) - Florida Agricultural & Mechanical University
- NOAA Interdisciplinary Scientific Environmental Technology Cooperative Science Center (ISETCSC) - North Carolina Agricultural & Technical State University
- NOAA Living Marine Resources Cooperative Science Center (LMRCSC) - University of Maryland Eastern Shore
- NOAA Center for Atmospheric Sciences (NCAS) - Howard University
One hundred twenty-four students became NOAA scholars, creating the next generation of NOAA scientists and educators.
- EPP/MSI Graduate Sciences Program
Six students composed the Class of 2006 Graduate Scientists.
- Dr. Nancy Foster Scholarship Program
Two students composed the Class of 2006 Nancy Foster Scholars.

- EPP/MSI Undergraduate Scholars Program
Fifteen students composed the Class of 2006 Undergraduate Scholars.
- Ernest F. Hollings Undergraduate Scholarship Program
One hundred one students composed the Class of 2006 Ernest Hollings Undergraduate Scholars.

Regional

NOAA OEd mini-grants are an internal grants program dedicated to projects encouraging environmental literacy and open to NOAA employees. The NOAA Education Mini Grant (EdMG) program provides funding to support the NOAA cross-cutting priority of environmental literacy. In FY 2006, eight grants were funded for projects in Fisheries, Marine Sanctuaries, and other areas.

OEd played an integral part in lifting the mission of the Gulf of Mexico Alliance (GoMA) by providing the means to fund one of their five priority areas—environmental education. The Gulf of Mexico Alliance, created as an outcome of President Bush’s 2004 U.S. Ocean Action



NOAA Educational Partnership Students Credit: Education Partnership Program



NOAA Educational Partnership Program students. Photo Credit: EPP office

Plan, joins the Gulf States in one vision toward an ecologically and economically healthy and resilient Gulf of Mexico coast. In 2006, GoMA was able to take the first step toward this vision by hiring a Gulf of Mexico Alliance Environmental Education Network Coordinator. OEd support for this project has set the stage for success in the Gulf States' Governors' Action Plan.

In June, NOAA was the major sponsor for CoOL, the Conference on Ocean Literacy. This gathering brought together high-level representatives from government, media, education and conservation to discuss current and future goals for supporting the environmental literacy components of the U.S. Ocean Action Plan. This two-day event included 300 participants in Washington, DC, four regional webcast locations, and a live satellite feed to Greece. It was coordinated by the National Marine Sanctuaries

Foundation, in partnership with the White House Council on Environmental Quality and White House Office of Science and Technology Policy. NOAA's Director of Education gave the closing remarks to this landmark event.

OEd supported several education projects related to the Integrated Ocean Observing System (IOOS), conducted by the National Estuarine Research Reserves, National Marine Sanctuaries Program, and the National Oceanographic Data Center. One project involved developing guidelines for how to develop future IOOS education products based on the input from K-12 teachers. The other project has laid the groundwork to develop an education portal to NOAA's ocean observing system data.

OEd supported workshops for National Science Teachers Association to create NSTA Symposia

on ocean literacy—four-hour workshops at regional and national NSTA conferences followed by webcasts. “The Ocean’s Role in Weather and Climate” was presented in Baltimore, with another on International Polar Year to be presented in St. Louis. In addition, SciGuides and SciObjects have been developed to disseminate information and lesson plans to teachers nationwide.

Outreach

Ship-naming contests have been very popular for schoolchildren. A team of five seventh-grade students and their teacher from Sacred Heart School in Southaven, MS, won the “Name NOAA’s New Ship” contest for the NOAA ship PISCES. The contest was open to NOAA employees in the region and to middle schools in Mississippi. The winning team produced an essay that supported their selection of a ship name. The students, their teacher and principal attended the keel laying ceremony in June as guests of NOAA.

PRODUCTS AND SERVICES

- EPP/MSI Cooperative Science Center – provides funding to eligible minority-serving institutions on a competitive basis to educate and train students in NOAA sciences: atmospheric, oceanic, environmental, living marine resources, remote sensing, and scientific environmental technology. The program's goal is to increase the number of students who are trained and graduate in sciences directly related to NOAA's mission.
- EPP/MSI Graduate Sciences Program – provides opportunities for students in NOAA- related fields to pursue research and educational training in atmospheric, environmental, and oceanic sciences, and remote sensing technology at Minority Serving Institutions, when possible. Overall, the objective of the Graduate Sciences Program is to increase the number of students who undertake course work and graduate with post-graduate degrees in the targeted areas integral to NOAA's mission.



Winning students with dignitaries at keel-laying ceremony. Photo Credit: Ray Broussard

- Dr. Nancy Foster Scholarship Program – provides support for outstanding scholarship and encourages independent graduate-level research in oceanography, marine biology, or maritime archaeology, particularly by women and members of minority groups.
- EPP/MSI Undergraduate Scholars Program – provides support for students who study and graduate with degrees in the targeted areas integral to NOAA's mission. This program targets students who have completed their sophomore or junior year, and are attending minority-serving institutions. Scholars are placed at NOAA offices and sites for 10-week paid summer internships.
- Ernest F. Hollings Undergraduate Scholarship Program – provides support for undergraduate student training in oceanic and atmospheric science, improving environmental literacy and recruitment of students for public service careers with NOAA. Awards include academic assistance for full-time study during an academic year; a 10-week, full-time internship position during the summer at a NOAA facility; and, if reappointed, academic assistance for full-time study during a second academic year.
- Environmental Literacy Grants – a highly competitive grants program that builds partnerships for NOAA with formal and informal education centers. Funding is provided for a variety of programs that support environmental literacy in support of ocean literacy.
- Mini-grants – support projects that increase NOAA's education capacity, either through catalyzing coordination of new programs or by expanding existing education activities.
- EPP/MSI Environmental Entrepreneurship Program (EEP) – provides funding to eligible minority-serving institutions (MSIs) on a competitive basis to engage students to pursue advanced academic study and entrepreneurship opportunities in the NOAA-related sciences. NOAA's EEP supports student training and experiential learning opportunities for the purpose of stimulating job-creation, business development, and revitalizing local communities. The EEP's objective is to increase the number of students at MSIs proficient in environmental business enterprises.



NOAA EPP students participating in oyster restoration. Photo Credit: Stephanie Hunt



NOSB team field trip in Mississippi Salt Marsh. Photo Credit: Chris Snyder, JL Scott Aquarium

- Taking the Pulse of the Planet Award – part of the Intel International Science and Engineering Fair. This award recognizes students whose outstanding projects further our understanding of Earth’s systems. The award is intended to recognize the importance of the U.S.-led initiative to develop a global Earth Observation System.

FUTURE OUTLOOK

The best way to ensure NOAA’s scientific leadership and global expertise in oceanic and atmospheric research, observations, and forecasting, and environmental and ocean health, is to have the best and the brightest students, from a diversity of backgrounds, become fascinated with science education and the environment in which we live.

The U.S. Commission on Ocean Policy devoted a chapter to ocean education that specifically addressed the need to involve federal science agencies in education and the importance of NOAA’s contributions. The report states that “Collaboration between the research and education communities must be improved if ocean-based information, including ocean data and new discoveries, is to be transformed into exciting and accessible materials to stimulate student achievement and enhance public awareness” (p. 134).

In order to provide critical support for its mission and to strive toward its vision, NOAA must exploit its expertise in ocean and atmospheric science to train and attract future workforce and promote environmental literacy among the public. This will happen through a strategically-directed education program capable of harnessing the power of NOAA science and targeting it at accomplishing these goals.



Excellence in NOAA's Leadership

Presidential Rank Awards

The following NOAA leaders received the Presidential Rank Awards, the most prestigious recognition bestowed on career senior executives and scientists. Very few people are honored in the "meritorious" category. Honorees are recognized as "strong leaders who achieve results and consistently demonstrate strength, integrity, industry and a relentless commitment to excellence in public service," all hallmarks of NOAA's core values.

2006 Presidential Rank Awards for Distinguished Executive

Dr. Daniel Albritton, Director Aeronomy Laboratory, NOAA Research,

Louisa Koch, Director, Chair NOAA Education Council

Dr. Louis W. Uccellini, Director of the National Weather Service, NOAA Centers for Environmental Prediction



2006 Presidential Rank Awards for Meritorious Executive

Gary M. Carter, Director, Office of Hydrologic Development, NOAA Weather Service

Dr. Ronald Baird, Director, National Sea Grant Program

2005 Presidential Rank Awards for Distinguished Executive

Dr. James F. (Jeff) Kimpel, Director, NOAA National Severe Storms Laboratory, NOAA Research

Dr. Stephen J. Lord, Director, NOAA Environmental Modeling Center (EMC), National Centers for Environmental Prediction, NOAA Weather Service

Britt M. Mayfield, Director, NOAA Tropical Prediction Center/ National Hurricane Center, National Centers for Environmental Prediction, NOAA Weather Service

Dr. Venkatachala Ramswamy, Senior Scientist, NOAA Geophysical Fluid Dynamics Laboratory, NOAA Research

Dr. Petrus P. Tans, NOAA Climate Modeling and Diagnostics Laboratory, NOAA Research

2005 Presidential Early Career Awards

Arlene Fiore, Research Physical Scientist
NOAA Geophysical Fluid Dynamics Laboratory

Kathi Lefebvre, Research Biologist
NOAA Northwest Fisheries Science Center

Department of Commerce Awards Gold and Silver Awards



Four individuals, 17 groups and 25 organizations in NOAA received Department of Commerce Gold and Silver Medals. The awards were presented at the 57th annual Honor Awards ceremony on December 6, 2005. These awards annually recognize extraordinary achievements that support the Department's mission. The Secretary awards the Gold Medal, the Commerce Department's highest honorary award, for distinguished performance characterized by extraordinary, notable, or prestigious contributions to the Department and/or one of its operating units. The Silver Medal is awarded for exceptional performance characterized by noteworthy or superlative contributions.

NOAA Honor Awards

The NOAA Under Secretary presented the Bronze Medal Award to 13 individuals, 45 groups, and 29 NOAA organizations. He also honored 15 NOAA employees with the Distinguished Career Award. These awards were presented at a ceremony held in Washington, DC on March 17, 2006. The Bronze Medal is the highest form of honorary recognition that can be bestowed by the NOAA Under Secretary, and it recognizes discrete accomplishments that have advanced the NOAA mission. The Distinguished Career Award recognizes long-term achievement in advancing NOAA goals.

NOAA Awards

Individuals and groups received the following NOAA awards during a ceremony held October 13, 2006:



- 92 Administrator Awards recognizing employees or groups who have made significant contributions to NOAA
- One Technology Transfer Award, recognizing innovation



Recipients of the 2005 Presidential Early Career Awards for Scientists and Engineers with the President in the Indian Treaty Room of the Eisenhower Executive Office Building in Washington, D.C. on July 26, 2006. Photo Credit: White House

Office of Legislative Affairs

Significant Congressional Events



*Eric Webster, Director
Office of Legislative Affairs*

Maryland Congressional Delegation Leadership Attends Groundbreaking for NOAA Center for Weather and Climate Prediction. On March 13, The General Services Administration, in partnership with NOAA and Opus East, L.L.C., broke ground for the NOAA Center for Weather and Climate Prediction. “I’m so proud of NOAA and the Weather Service—they work every day to save lives and livelihoods,” said Sen. Barbara Mikulski (D-MD). NOAA employees “deserve a world-class work environment,” she said. Sen. Paul Sarbanes (D-MD) and House Minority Whip Steny Hoyer (D-MD) also spoke at the event.

Rep. Serrano Compliments NOAA for Helping Revive the Bronx River. On March 21, Rep. Jose Serrano (D-NY) helped release 200 alewife herring into the lower Bronx River in New York City, calling it “a historic moment.” “This is the first time in more than a generation that the Bronx River, which has been long neglected and abused, has been able to support this sort of wildlife,” said Rep. Serrano, a member of the House Science, State, Justice, and Commerce Appropriations Subcommittee. In 2004, NOAA awarded \$916,000 to the Wildlife Conservation Society to fund hands-on habitat restoration activities and environmental education along the lower Bronx River.

Frequent Congressional Visits to Weather Forecast Offices. Four senators, five representatives and one governor visited and toured Weather Forecast Offices (WFOs) in their states and districts. Key staff members continued to call upon WFOs on a regular basis as well, and the National Weather Service hosted visitors from at least 10 Congressional offices in FY 2006. The NOAA Office of Legislative Affairs works with the National Weather Service to extend Member and staff invitations to tour the 122 local WFOs and 24 national centers across the country.

Rep. Ros-Lehtinen Dedicates New Key West Weather Forecast Office. On March 20, Rep. Ileana Ros-Lehtinen (R-FL) dedicated a new, hurricane-resistant weather forecast office in Key West. “Hurricanes last year [2005] shattered nearly every record set in previous seasons,” she said. “This new facility helps ensure our National Weather Service staff is able to continue providing critical services to our citizens in the Keys and our marine community during the worst weather conditions,” Rep. Ros-Lehtinen said.



Dr. Shelby Participates in NOAA Ship Keel Laying. On June 23, a traditional keel-laying ceremony took place in Moss Point, MS. The ceremony was conducted for the NOAA ship PISCES. Dr. Annette Nevin Shelby, wife of Sen. Richard Shelby (R-AL), is the sponsor of the ship. She attended the ceremony and engraved her name on the keel plate, which will then be incorporated into the ship during construction. Representing NOAA was the Under Secretary for Oceans and Atmosphere VADM Conrad C. Lautenbacher, USN (Ret.) and NOAA Corps and Office of Marine and Aviation Operations Director RADM Sam DeBow. A contest to name the ship was open to NOAA employees in the region and to Mississippi middle school students. A team of five seventh-grade students won the contest with the name PISCES. The students and their teacher also attended the ceremony.

Rep. Hoekstra Tours Green Ship. Rep. Peter Hoekstra (R-MI), chairman of the House Intelligence Committee, toured one of NOAA's award-winning petroleum-free biodiesel "green ships." He saw the ship on August 10 during a visit to the Great Lakes Environmental Research Laboratory (GLERL) Lake Michigan Field Station in Muskegon, MI. These ships run on 100 percent biodiesel made from American soybeans and engine oils and lubricants made from rapeseed oil and canola oil. The NOAA project won an award from the Department of Energy. GLERL Director Stephen Brandt represented NOAA.

Rhode Island Members Participate in Lobster Restoration Event. On August 10, Sen. Jack Reed (D-RI) and Rhode Island Governor Donald Cacrieri (R) attended the North Cape Lobster Restoration "Last Lobster" event. The program celebrated the restoration of the lobster population injured by the 1996 North Cape oil spill off Moonstone Beach, RI. Deputy Assistant Secretary for Oceans and Atmosphere Tim Keeney represented NOAA. The event was sponsored by NOAA, U.S. Fish and Wildlife Service, Ocean Technology Foundation, and the Rhode Island Department of Environmental Management.

Earth System Research Laboratory Dedication. On August 23 and 24, Sen. Wayne Allard (R-CO) and Rep. Mark Udall (D-CO) helped dedicate the Earth System Research Laboratory (ESRL) in Boulder, CO. Both complimented NOAA researchers for their excellent work. Representing NOAA was the Deputy Under Secretary for Oceans and Atmosphere BG Jack Kelly, USAF (Ret.). The ESRL represents a strategic repositioning of NOAA's broad climate and weather capabilities into four major divisions: global monitoring, physical sciences, chemical sciences, and global systems.

Groundbreaking Ceremony for Pacific Region Center. Sen. Daniel Inouye (D-HI) participated on August 28 in the groundbreaking ceremony for the new NOAA Pacific Region Center. The Under Secretary for Oceans and Atmosphere VADM Conrad Lautenbacher, USN (Ret.) said: "I would like to thank Sen. Inouye for his leadership in developing a new Pacific Regional Center on Oahu and for his continued support of NOAA." Once completed, the NOAA Pacific Region Center campus will occupy 30 acres on federally owned (Navy) property on Ford Island, Pearl Harbor, Hawaii.

Rep. Shays Participates in NOAA Weather Radio Schools Event. Rep. Chris Shays (R-CT) participated in a ceremony on September 26 marking the delivery of a NOAA Weather All Hazards Radio (NWR) to a Norwalk, CT, elementary school. NOAA Deputy Assistant Secretary for Oceans and Atmosphere Tim Keeney presented the radio to Naramake Elementary School Principal Bob Henry. The radio was among the 80,000 NWR radios being sent to every American public school (K-12) by NOAA this year. (16,000 were delivered last year as part of a pilot project.) Distribution will occur through the shared efforts of the Departments of Commerce, Homeland Security and Education.

Legislative Affairs (Congressional Hearings)



Date	Congressional Committee	Subject	NOAA Witness
September 29, 2006	House Science Committee	GAO GOES-R Report	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
August 17, 2006	Senate Commerce Disaster Prevention and Prediction Subcommittee	Hurricane Season and the Risk for South Carolina	John E. Jones, Jr., Deputy Director, NOAA Weather Service
August 3, 2006	Senate Commerce National Ocean Policy Study Subcommittee (Chairman John Sununu, R-NH)	Ocean Governance	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
July 27, 2006	House Resources Fisheries and Oceans Subcommittee	Proposals to open the Exclusive Economic Zone to Atlantic striped bass	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries Service

Date	Congressional Committee	Subject	NOAA Witness
July 27, 2006	House Science Committee	Ocean Exploration and Research	Dr. Richard Spinrad, Assistant Administrator, NOAA Research
July 20, 2006	House Government Reform Committee	Introduction to Climate Change	Dr. Thomas R. Karl, Director, National Climatic Data Center NOAA Satellite and Information Services
July 19, 2006	House Energy and Commerce Subcommittee on Oversight and Investigations	Climate Change "Hockey Stick"	Dr. Thomas R. Karl, Director, National Climatic Data Center NOAA Satellite and Information Services
July 13, 2006	Senate Commerce, Science, and Transportation Committee	Unmanned Aerial Systems	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
July 11, 2006	House Transportation and Infrastructure Coast Guard and Maritime Transportation Subcommittee	Draft Ballast Water Management Legislation	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere
June 21, 2006	House Armed Services Strategic Forces Subcommittee	The Economic Effect of Space	Edward Morris, Director, Office of Space Commercialization NOAA Satellite and Information Services
June 8, 2006	House Science Committee	Results of the Nunn-McCurdy Certification Review of the National Polar-orbiting Operational Environmental Satellite System (NPOESS),	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
June 8, 2006	Senate Commerce National Ocean Policy Study Subcommittee	Offshore Aquaculture	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere

Date	Congressional Committee	Subject	NOAA Witness
June 7, 2006	House Governmental Reform Energy and Resources Subcommittee	Hurricane Preparedness	Brigadier General D.L. Johnson, U.S. Air Force (Ret.), Assistant Administrator, NOAA Weather Service
June 7, 2006	Senate Appropriations Commerce, Justice and Science Subcommittee	2006 Hurricane Season	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator and Dr. Louis W. Uccellini, Director National Weather Service, NOAA Centers for Environmental Prediction (NCEP)
May 24, 2006	Senate Commerce Emergency Prevention and Prediction Subcommittee	2006 Hurricane Forecast and At-Risk Cities	Max Mayfield, Director, Hurricane Center, National Weather Service and Dennis McCarthy, Director, Climate, Water, and Weather Services
May 11, 2006	House Science Committee	Department of Commerce Inspector General Identifies Ongoing Problems with Management of NOAA's Weather Satellites	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.) Under Secretary for Oceans and Atmosphere and NOAA Administrator
May 4, 2006	House Resources Fisheries and Oceans Subcommittee	National Ocean Exploration Program Act	Dr. Richard Spinrad, Assistant Administrator, NOAA Research
May 4, 2006	House Science Environment, Technology, and Standards Subcommittee	HR 5136, A Bill to Create a Comprehensive Drought System	Dr. Chester J. Koblinsky, Director, Office of Climate Programs, Office of Oceanic and Atmospheric Research
May 3, 2006	House Resources Committee	Magnuson-Stevens Fishery Management bill, HR 5051 and HR 1431	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries

Date	Congressional Committee	Subject	NOAA Witness
May 3, 2006	Senate Appropriations Commerce, Justice, Science Subcommittee	FY 2007 Department of Commerce Budget Request	Carlos Gutierrez, Secretary, Department of Commerce
April 27, 2006	Senate Commerce Disaster Prevention and Prediction Subcommittee	National Integrated Drought Information System	Dr. Chester J. Koblinsky, Director, Office of Climate Programs, Office of Oceanic and Atmospheric Research
April 27, 2006	House Transportation and Infrastructure Guard and Maritime Transportation Subcommittee	Implementation of the Oil Pollution Act	David Kennedy, Director, Office of Response and Restoration, NOAA Ocean Service
April 26, 2006	Senate Commerce Global Climate Change and Impacts Subcommittee	Projected and Past Effects of Climate Change: A Focus on Marine and Terrestrial Systems	Dr. Steve Murawski, Acting Ecosystems Goal Team Lead and National Marine Fisheries Service Director of Scientific Programs and Chief Science Advisor
April 25, 2006	House Resources Committee	Magnuson- Stevens Reauthorization bills, HR 5051 and HR 4940	Dr. Steve Murawski, Acting Ecosystems Goal Team Lead and NOAA Fisheries Service Director of Scientific Programs and Chief Science Advisor
April 21, 2006	House Science Environment, Technology and Standards Subcommittee	NOAA's Role in Great Lakes Regional Collaboration	Dr. Stephen Brandt, Acting Deputy Assistant Administrator for Oceanic and Atmospheric Research and Director, Great Lakes Environmental Research Laboratory
April 6, 2006	Senate Commerce National Ocean Policy Study Subcommittee	Offshore Aquaculture	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries Service
April 5, 2006	House Appropriations Science, State, Justice, Commerce, and Related Agencies Subcommittee	President's Budget Request for Economic, Scientific, Technological and Environmental Programs at Department of Commerce	Carlos Gutierrez, Secretary, Department of Commerce

Date	Congressional Committee	Subject	NOAA Witness
March 30, 2006	Senate Commerce Disaster Prevention and Prediction Subcommittee	National Polar Orbiting Operational Environment Satellite System Program	Gregory W. Withee, Assistant Administrator for Satellite and Information Services
March 30, 2006	House Science Committee	K-12 Science and Math Education Across the Federal Agencies	Brigadier General John "Jack" Kelly, U.S. Air Force (Ret.), Deputy Under Secretary of Commerce for Oceans and Atmosphere
March 21, 2006	House Resources Fisheries and Oceans Subcommittee	Gulf of Mexico Fishing Disaster	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
March 9, 2006	House Resources Fisheries and Oceans Subcommittee	FY 2007 NOAA Budget Request	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
March 8, 2006	House Transportation and Infrastructure Water Resources and Environment Subcommittee	FY 2007 NOAA Budget Request	John H. Dunnigan, Assistant Administrator for Ocean Services and Coastal Zone Management
March 8, 2006	House Appropriations Science, State, Justice, Commerce and Related Agencies Subcommittee	FY 2007 NOAA Budget Request	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
March 1, 2006	Senate Commerce, Science and Transportation Subcommittee on Disaster Prevention and Prediction	Severe Winter Weather	Dr. Louis W. Uccellini, Director, National Weather Service, National Centers for Environmental Prediction (NCEP)
February 16, 2006	House Resources Fisheries and Oceans Subcommittee	HR 4686, the Multi-State and International Fisheries and Conservation Act of 2006	Dr. James Balsiger, Acting Deputy Assistant Administrator, NOAA Fisheries Service

Date	Congressional Committee	Subject	NOAA Witness
February 15, 2006	House Science Committee	Review of the Administration's Proposed Research and Development Budget for FY 2007	Dr. David Sampson, Deputy Secretary, Department of Commerce
December 15, 2005	House Resources Fisheries and Oceans Subcommittee	Effects of Hurricanes Katrina and Rita on the Fishing Industry and Fishing Communities in the Gulf of Mexico	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries Service
November 16, 2005	House Science Committee	NOAA Weather Satellite Program	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
November 16, 2005	Senate Commerce, Science, and Transportation Committee	Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act	John H. Dunnigan, Director, Office of Sustainable Fisheries, NOAA Fisheries Service
October 18, 2005	Senate Banking, Housing and Urban Affairs Committee	Future of the Federal Flood Insurance Program	Dr. Christopher Landsea, National Hurricane Center Science and Operations Officer, NOAA Weather Service
October 7, 2005	House Science Committee	Hurricane Forecasting	Brigadier General D.L. Johnson, U.S. Air Force (Ret.), Assistant Administrator, and Max Mayfield, Director, National Hurricane Center, NOAA Weather Service

Date	Congressional Committee	Subject	NOAA Witness
September 29, 2005	Joint hearing of the House Committee on Resources, Subcommittee on fisheries Conservation, Wildlife, and Oceans and the Transportation and Infrastructure Coast Guard and Maritime Transportation Subcommittee	S 362, the Marine Debris Research, Prevention and Reduction Act,	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere
September 26, 2006	Senate Commerce Committee	International Polar Year	NOAA Statement for the Record
September 22, 2005	Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina	OAA Hurricane Forecasting	Brigadier General D.L. Johnson, U.S. Air Force (Ret.), Assistant Administrator, NOAA Weather Service
September 20, 2005	Senate Commerce Disaster Prevention and Prediction Subcommittee	The Lifesaving Role of Accurate Hurricane Prediction	Max Mayfield, Director, National Hurricane Center
September 19, 2005	Special <i>ad hoc</i> committee chaired by Rep. Mark Kirk (R-IL) on Great Lakes Restoration Efforts	Great Lakes Restoration Efforts,	Pat Montanio, Chief Damage Assessment Center
September 9, 2005	House Government Reform Regulatory Affairs Subcommittee	NOAA's Current Invasive Species Research Priorities, New Baltimore, MI	Stephen Brandt, Director, Great Lakes Environmental Research Laboratory
August 1, 2005	Senate Commerce Fisheries and Coast Guard Subcommittees	Implementation of the Oil Pollution Act in Washington	Douglas Helton, Incident Operations Coordinator, NOAA Office of Response and Restoration
July 27, 2005	Senate Commerce Disaster Prevention and Prediction Subcommittee	All Hazards Alert Systems	Mark Paese, Director, Maintenance, Logistics, and Acquisition Division, NOAA Weather Service

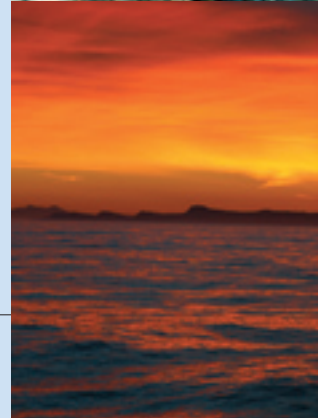
Date	Congressional Committee	Subject	NOAA Witness
July 20, 2005	Senate Commerce Global Climate Change and Impacts Subcommittee	United States Climate Policy and \$5 billion Budget Request for Climate-Related Science and Technology in FY 2006	James R. Mahoney, Assistant Secretary of Commerce for Oceans and Atmosphere
July 6 and 8, 2005	House Resources Fisheries and Oceans Subcommittee	Fisheries Management Successes in Alaska and Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act	Sue Salveson, Assistant Alaska Regional Administrator for Sustainable Fisheries, NOAA Fisheries Service
June 29, 2005	Senate Commerce Disaster Prediction and Prevention Subcommittee	NOAA's Severe Weather Programs	Max Mayfield, Director, National Hurricane Center, National Weather Service, and Dennis McCarthy, Director, Climate, Water, and Weather Services
June 15, 2005	Senate Commerce Ocean Policy Study Subcommittee	Ballast Water Invasive Species Management and Threats to Coral Reefs	Timothy Keeney, Deputy Assistant Secretary for Oceans and Atmosphere
June 8, 2005	House Resources Fisheries and Oceans Subcommittee	Scientific Review of Ocean Systems	Steve Murowski, Chief Science Advisor and Director of Scientific Programs, NOAA Fisheries Service
June 8, 2005	Senate Commerce Disaster Prediction and Prevention Subcommittee	NOAA's Homeland Security Mission	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator

Date	Congressional Committee	Subject	NOAA Witness
May 26, 2005	Senate Appropriations Commerce, Justice and Science Subcommittee	FY 2006 Commerce Department Budget Request, including NOAA	Carlos Gutierrez, Secretary, Department of Commerce
May 25, 2005	Senate Commerce, Science, and Transportation Committee	S 360, a bill Reauthorize the Coastal Zone Management Act	Thomas Kitsos, Associate Deputy Assistant Administrator for the NOAA Fisheries Service
May 24, 2005	House Resources Fisheries and Oceans Subcommittee	NOAA's Role with Federal Fish Hatcheries	D. Robert Lohn, Northwest Regional Administrator, NOAA Fisheries Service
May 19, 2005	Senate Environment and Public Works Fisheries, Wildlife, and Water Subcommittee	Endangered Species Act	James Lecky, Senior Advisor for Intergovernmental Programs, NOAA Fisheries Service
May 19, 2005	House Resources Fisheries and Oceans Subcommittee	HR 50, the NOAA Administration Act	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
May 17, 2005	House Government Reform Federal Workforce and Agency Organization Subcommittee	Federal Food Inspection Programs	Richard Cano, Acting Director, Service Seafood Inspection Program, NOAA Fisheries Service
April 26, 2005	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	HR 1428, the National Fish and Wildlife Foundation Reauthorization Act	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere

Date	Congressional Committee	Subject	NOAA Witness
April 19, 2005	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	HR 1489, the Coastal Ocean Observing System Integration, and HR 1489, the Coastal Ocean Observing System Integration and Implementation Act	Dr. Richard Spinrad, Assistant Administrator, NOAA Ocean Service
April 14, 2005	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Reauthorization of the Magnuson-Stevens Act and the National Environmental Policy Act	Dr. William T. Hogarth, Assistant Administrator, NOAA Fisheries
March 9, 2005	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	FY '06 NOAA Budget Request	Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary for Oceans and Atmosphere and NOAA Administrator
February 24, 2005	Alaskan State Legislature House State Affairs Committee	Proposed Changes to the Alaska Coastal Management Program	Eldon Hout, Director, Office of Ocean and Coastal Resources Management
February 16, 2005	House Transportation and Infrastructure Water Resources and the Environment Subcommittee	FY 2006 NOAA Budget Request for Programs that Protect and Restore Coastal and Marine Resources	Dr. Richard Spinrad, Assistant Administrator, NOAA Ocean Service
February 3, 2005	Senate Commerce, Science, and Transportation Committee	Tsunamis	Brigadier General John "Jack" Kelly, U.S. Air Force (Ret.), Deputy Under Secretary for Oceans and Atmosphere
January 26, 2005	House Science Committee	Tsunami Warnings	Brigadier General D.L. Johnson, U.S. Air Force (Ret.), Assistant Administrator, NOAA Weather Service



NOAA
**OPERATIONS,
PRODUCTS,
AND SERVICES**



National Ocean Service

Managing and Conserving Coastal Resources



*John H. Dunnigan
Assistant Administrator*

The coastal environment is one of our Nation's most valuable assets. It provides food for people and essential habitat for thousands of species of marine animals and plants. A healthy coast is vital to the U.S. economy. Such industries as marine transportation, commercial and recreational fishing, tourism and recreation, and homebuilding all depend on a vibrant coastal environment. However, an ever-increasing, more concentrated population stresses the coast in many ways. The coast and its uses face threats from erosion, loss of wetlands, limited access, pollution, overdevelopment, and fierce storms. The challenge to the Nation and to the National Ocean Service (NOS) is to balance our use of coastal and ocean resources today with the need to protect, preserve, and restore these priceless realms for future generations.

ACCOMPLISHMENTS

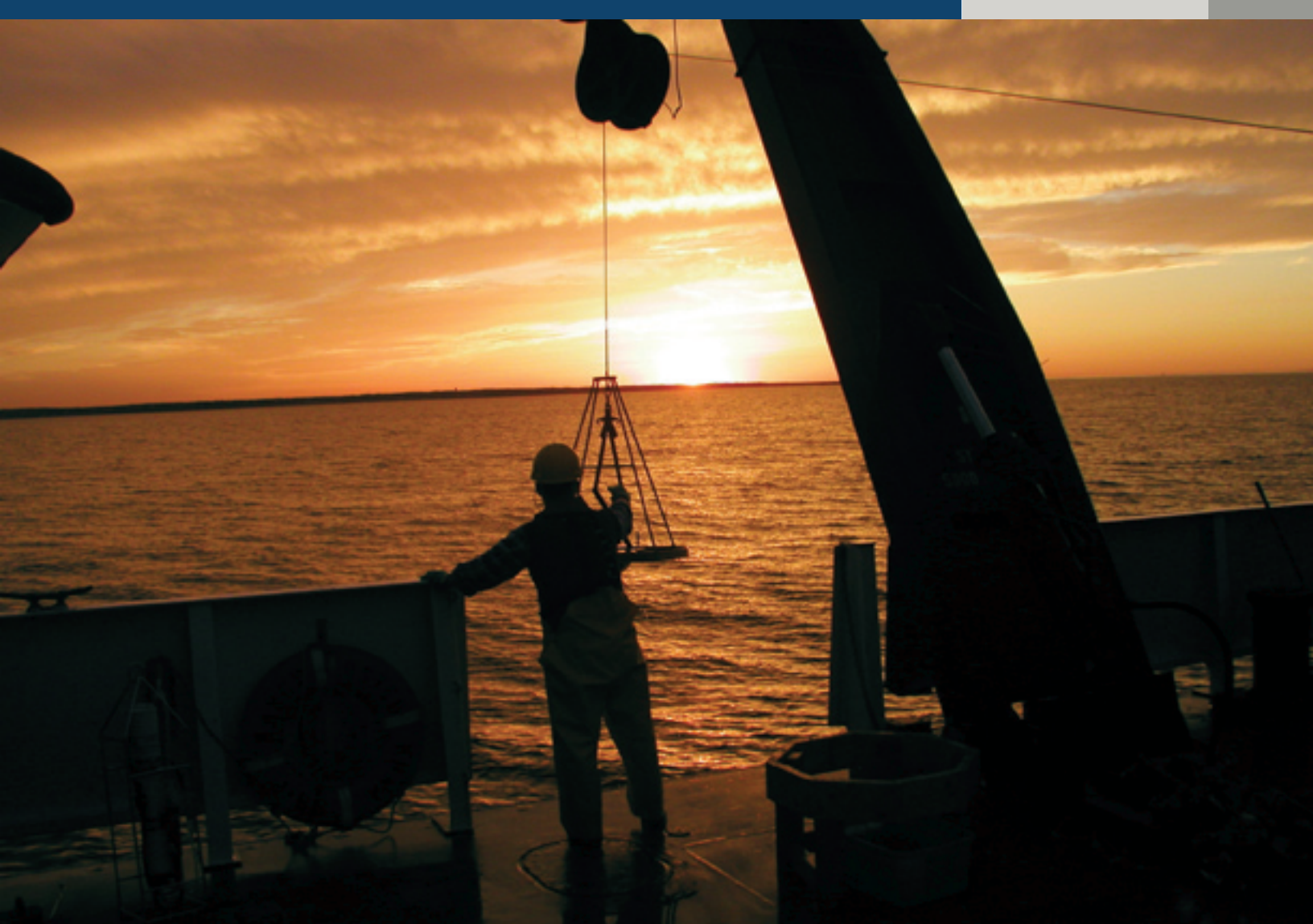
Sea Level Gauge Network Upgraded to Better Predict Tsunamis

NOS continued to monitor sea height through a network of buoys and tide gauges, collecting information critical to understanding the time of arrival and the height of tsunami waves. In 2006, NOS completed the installation of eight new National Water Level Observation Network (NWLON) stations to fill gaps in the detection network, bringing the two-year total to 15 stations, installed in California, Oregon, Washington, Alaska, Puerto Rico, and the Virgin Islands. These and other new stations will bring the NWLON to 200 stations by the end of calendar year 2006. NOAA continued to upgrade the entire NWLON to real-time status by replacing more than 50 data-collection platforms.

Airport Survey Program Improves Airspace Safety

NOS's Airport Survey Program improved the Nation's airspace safety by delivering airport obstruction charts in a new digital format. Constructed from field and photogrammetric surveys, these geospatial products provide a mechanism for the Federal Aviation Administration (FAA) and its private-sector partners to populate databases and distribute obstruction information over the Internet. This year, NOS also implemented quality assurance/quality control services for third-party contractor survey data for the FAA, completed photogrammetric evaluations for 150 Area Navigation Approach-Localizer Performance with Vertical Guidance approaches, and completed 35 photogrammetric evaluations for Aeronautical Obstruction Charts.





New Vertical Datum Models Contribute to Navigation Safety

This year, NOS completed VDatum models for Long Island Sound, NY, and for the Gulf Coast from Pensacola, FL, to Mobile Bay, AL, continuing its work with the Coast Survey Development Lab and providing critical information to coastal managers, emergency response planners, and port authorities. NOS also implemented updates to VDatum that improved its usability and processing efficiency. VDatum is a software tool capable of transforming coastal bathymetry and land topographic elevations between 28 different vertical datums. Elevations that are referenced to inconsistent vertical datums can cause artificial discontinuities in maps and nautical charts, a particularly acute problem in coastal areas.

NOS Completes Great Lakes Operational Coastal Forecast Systems

NOS launched three new operational coastal forecast systems for the Great Lakes this year to complete the Great Lakes Operational Forecast System (GLOFS). These new systems cover Lakes Superior, Huron, and Ontario and provide lake carriers, mariners, port managers, emergency response teams, and recreational boaters with present and future conditions of water levels, water currents, and water temperatures. The GLOFS also includes the operational systems for Lakes Erie and Michigan launched in 2005. NOS keeps the GLOFS operational 24 hours a day, seven days a week.



Integrated Ocean Observing System Shares Data Via Web

NOS launched the Integrated Ocean Observing System (IOOS)-oriented Web portal in 2006 through a partnership with the National Data Buoy Center (NDBC). The Web site was created to provide access to NDBC and NOS's observational oceanographic data. The site provides users with improved methods for observational data retrieval, information concerning IOOS meetings, useful IOOS links, and related information. Learn more at <http://tidesandcurrents.noaa.gov/opendap.html>.

New National Park System to be Developed in the Bahamas

In January, the Bahamas National Trust (BNT) and the Bahamas Country Program of The Nature Conservancy (TNC) invited NOS to lead the first management-planning workshop

for five marine and terrestrial protected areas toward the development of a national park system for the Bahamas. NOS representatives participated with more than 50 governmental, non-governmental, and local community representatives and led the participatory process to begin developing management plans for five new and soon-to-be designated national parks. U.S. Ambassador John D. Rood praised NOAA's collaboration and presented awards on behalf of the U.S. Government to the BNT and TNC in recognition of this first national park system planning effort.

New Estuarine Reserve Designated, Program Expands

NOS continued to expand its estuarine reserve program's reach with the official designation of Mission-Aransas system in Texas as the 27th reserve. These reserves around the country will be guided over the next five years by a newly

adopted strategic plan focusing on coastal and estuarine stewardship grounded in research and education. While celebrating the first 10 years of the system-wide monitoring plan, the reserve system also adopted a new research and monitoring plan to focus and integrate system-wide activities. The NERRS also conducted a teacher needs assessment that will guide the development of education products based on water quality and weather data generated in the reserve system.

Wetland Restoration Project Receives White House Award

NOS received a certificate from the White House Conference on Cooperative Conservation for participation in the Barren Island Shoreline Protection and Wetland Restoration Project. This multi-agency partnership addresses the issues of dredge material placement, island erosion, resource protection, and innovative shoreline protection in the Maryland tidal marsh/island restoration project. Accurate water-level and elevation information are critical in ensuring that wetland ecosystems are successfully restored in a sustainable fashion. Long-term analysis ensures that any sea-level rise is considered in extended planning phases and helps determine where to plant various wetland grasses.

White House Designates World's Largest Marine Protected Area and National Monument

In June, President George W. Bush designated the Northwestern Hawaiian Islands as a marine national monument, providing protection to a dynamic coral reef ecosystem and its 7,000 species. Northwest of the principal Hawaii islands, the monument stretches approximately 1,200 nautical miles to include coral islands, seamounts, banks, and shoals. At nearly 140,000 square miles, the Northwestern Hawaiian Islands Marine National Monument becomes the largest single conservation area in the United States and the largest marine protected area in the world.

For the first time in its history, NOAA will play a leading role in protecting a national monument. While the U.S. Fish and Wildlife Service will continue to manage the two existing refuges and the State of Hawaii will manage state-controlled waters, NOS's National Marine Sanctuary Program will manage all marine areas.

NOAA Leads Multi-Agency Response Effort

In August, the Safe Seas exercise tested oil spill response preparedness in the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries in the waters near San Francisco, CA. NOAA led the exercise in collaboration with the U.S. Coast Guard, California Office of Spill Prevention and Response, Harley Marine Services, and the U.S. Department of the Interior. It highlighted the partners' capabilities to deliver data, observations, forecasts, and expertise to protect life, commerce, and the environment during an emergency.

Vessels and aircraft from NOAA, USCG, U.S. Air Force Reserve, Marine Spill Response Corporation, Alameda County Sheriff's Department and Bodega Marine Laboratory participated in the exercise. Additionally, the Central and Northern California Ocean Observing System activated new surface current mapping radar in support of the drill's data requirements. More than 300 people participated in training, field operations, oceanographic surveys, and command post activities.

Post-Hurricane Imagery Assists Recovery Efforts

In September 2006, NOS collected aerial damage assessment imagery following the landfall of Hurricane Ernesto, including 1,131 images over northeastern North Carolina, an area damaged by extensive flooding. The State of North Carolina requested the imagery for assessment and recovery efforts, and it is posted on the NOS Web site for public and private-sector use. The high-resolution imagery collected during the response effort, together with images taken following hurricanes Rita

and Wilma in fall 2005, is critical to national and local response efforts and to the timely assessment of personal and property damages sought both by the public and the insurance industry. The photos can be seen online at <http://ngs.woc.noaa.gov/ernesto/>

Hazard-related Needs of Pacific and Indian Ocean Islands Addressed

This year, NOS focused on helping island communities prepare for potential environmental hazards, such as tsunamis and floods. NOS introduced a new computer system that allows users to type in an address and quickly get site-specific information about the potential hazards for that location. New homeowners, developers, and city and state policymakers have access to this system, which is greatly increasing awareness in the Pacific Islands about the risks involved when living by the sea. For more information, visit http://www.csc.noaa.gov/t_hat.

NOS Supports the Gulf of Mexico Alliance Action Plan

NOS provided direct support for the Gulf of Mexico Alliance's *Governors' Action Plan for Healthy and Resilient Coasts*, a targeted statement of action endorsed and signed by all five U.S. Gulf State Governors and the Chairman of the Council on Environmental Quality. The plan, released in March 2006, provides a dynamic starting point for effective regional ecosystem collaboration. Since 2005, representatives from 13 Federal agencies have supported the Gulf of Mexico Alliance, a partnership by the states of Alabama, Florida, Louisiana, Mississippi, and Texas. The Alliance was created with the goal of significantly increasing regional collaboration to enhance the environmental and economic health of the Gulf of Mexico.

NOS, serving as co-chair of the Gulf of Mexico Regional Partnership Federal Workgroup together with the U.S. Environmental Protection Agency, continues to coordinate an integrated Federal response to priority regional issues identified by the Alliance, including water quality for healthy beaches and shellfish beds; coastal wetland restoration and conservation; environmental education, identification and

characterization of Gulf habitats; and reduction of nutrient inputs to coastal ecosystems.

Red Tide Monitoring Protects Human Health and Coastal Economies in New England

In the wake of the 2005 New England red tide crisis that forced the closure of most shellfisheries in the region, NOS provided additional emergency funding in 2006 to provide timely and critical information to state managers and to build upon long-term research supported by its Ecology and Oceanography of Harmful Algal Bloom and Monitoring, and Event Response for Harmful Algal Bloom programs at the Woods Hole Oceanographic Institution, as well as other partner institutions.

In the spring of 2006, NOS-sponsored monitoring cruises detected low levels of cells until weather conditions similar to 2005 occurred. These led to a rapid escalation of the bloom and, by May, to shellfishery closures in Massachusetts, New Hampshire, and Maine. NOS funding supported modeling to predict the course of the bloom, based on coupled physical-biological models developed with earlier funding, and a listserv and Web site to facilitate communication and instant access to data and model results. All of these efforts allowed New England managers to make more strategic sampling and shellfish bed closures and openings to protect human health and minimize the economic impacts of harmful algal blooms.

NOS Helps Quileute Tribe Continue Traditional Shellfish Harvests

NOS scientists working with the Quileute Tribe and the Quinault Indian Nation on a project to monitor and respond to harmful algal blooms developed a rapid-detection assay for the algal toxin domoic acid, which can accumulate in shellfish and may cause amnesic shellfish poisoning in people who consume it.

The new method takes only four hours for tribal labs to accurately determine levels of contamination, expediting shellfish harvesting decisions that previously had to be delayed until the Washington State Health Department in



Seattle could analyze samples. The new method allows resource managers and tribal members to screen the shellfish themselves and focus on samples that need to be tested for regulatory purposes.

Harmful Algal Bloom Forecast System in Texas Provides Advance Warning to Coastal Communities

A new NOS ecological forecast system was established in 2006 to provide information on the status of the harmful algal bloom *Karenia brevis* to coastal community managers in Texas. *Karenia brevis* blooms are known to cause fish kills, shellfish toxicity, water discoloration, and respiratory distress in people. Because of the blooms, shellfish beds and fisheries have

closed, tourism and service industry revenues have been affected, and bloom-related illnesses have been reported. The forecasting system relies on the integration of data collected from satellite imagery, field observations, and buoys. The integrated data is then assessed to determine bloom location and movement.

Marine Debris Removal Project Gathers Information on Main Hawaiian Islands

The Main Hawaiian Island Marine Debris Aerial Survey and Removal project, the first comprehensive project to gather information on marine debris in the main Hawaiian Islands, was completed in February 2006. Trained personnel from NOAA's Pacific Island Fisheries



Science Center took aerial surveys to spot marine debris around the coastlines of Kauai and the Big Island of Hawaii, obtaining global positioning system data, photos, and other information that will be used to map the distribution and abundance of debris. NOS is partnering with State and county agencies and local businesses, using the information from the project to prioritize cleanup areas and identify sites for monitoring.

NOAA Finalizes Coastal Zone Management Act Federal Consistency Rule

In January, NOS published in the *Federal Register* the Final Rule revising NOAA's Coastal Zone Management Act (CZMA) Federal consistency regulations, marking a major accomplishment for NOS, NOAA, and the U.S. Department of the Interior.

The Final Rule is the result of a three-and-a-half-year effort to respond to the Vice President's *Report of the National Energy Policy Development Group*, as well as the Energy Policy Act of 2005. The Final Rule contains improvements to CZMA Federal consistency regulations that continue to balance the State-Federal-private interests embodied in the CZMA, while allowing for more efficient approval of both energy and non-energy projects by providing greater clarity, transparency, and predictability in the regulatory process. The Final Rule fully maintains the authority of coastal States to review proposed Federal actions that have reasonably foreseeable effects on a State's coastal uses or resources, as provided for in the CZMA and NOAA's implementing regulations, as revised in 2000.

NOS Discovery Center Grows

Education efforts at the online NOS Discovery Center have focused on creating innovative products that enlighten students and educators

about the breadth of scientific research, technology, and activities conducted by NOS in the areas of oceans, coasts, and charting and navigation. New materials posted on the popular Web site include online tutorials for high school about ocean currents and nonpoint source pollution, and more than 15 inquiry-based lesson plans on major areas of NOS-focused science, including natural hazards assessment, estuarine science, global positioning, habitat restoration, and marine navigation. The Discovery Center is online at <http://oceanservice.noaa.gov/education/>

NOS Furthers Cooperation with China under Science and Technology Agreement

In February, NOS hosted a delegation from China's State Oceanic Administration to develop a work plan for 2006–2008. The plan includes NOAA's participation in a United Nations-sponsored project for marine biodiversity conservation in southern China, a U.N. Global Environmental Facility program on the Yellow Sea large marine ecosystem (led by the National Marine Fisheries Service), a research study to detect harmful algal blooms, and other coastal management-related activities. NOS coordinates NOAA's formal bilateral cooperation with China in coastal management issues under the Integrated Coastal and Ocean Resources Program.

NOS Receives Special Achievement in GIS Award

In August, the Environmental Systems Research Institute (ESRI) awarded NOS the Special Achievement in Geographic Information System (GIS) award for outstanding work in the GIS field. This award recognizes NOS's extraordinary contributions to the global society and precedent-setting work throughout the GIS community. NOS was selected to receive the award from over 100,000 GIS user sites worldwide.

GIS is a computer-based mapping tool that takes database information about a location, including streets, buildings, water features and terrain, and turns it into visual layers. The ability to see and analyze geographic features on a

map gives users a better understanding of a particular location, enabling planners, analysts, and others to make informed decisions about their communities, the environment, and commerce. ESRI is the world leader in GIS modeling and mapping software and technology.

Web Portal Extends Ocean's Reach

This year, NOAA and Immersion Presents launched OceansLive, a marine science portal that offers live video and special content to educate people of all ages about the ocean, including the U.S. national marine sanctuaries. Immersion Presents is an after-school science education program founded by world-renowned ocean explorer Robert Ballard. In addition to watching live video from research expeditions, visitors to the portal can learn more about oceanography, marine life, conservation and preservation, marine research technologies, and the Nation's maritime heritage. To complement the video broadcasts, the portal offers lesson plans, videos, puzzles, and games based on the marine environment. For more information, visit www.oceanslive.org.

Promoting Ocean Science through School Campaign in St. Louis

NOS rolled out a pilot outreach and education effort for K-12 students in St. Louis, MO, by placing ocean science awareness messages on the side panels of school milk cartons. The test took place in 450 schools and reached approximately 240,000 students during the six-week period. The milk cartons were complemented by NOS posters distributed to the schools during the same time period. The cartons' side panels directed students to the NOAA website, where they could access pages geared toward their age group. The goal was to foster interest in how the oceans and atmosphere contribute to people's daily lives.

NOAA and NOS Participate in Coast Day Celebrations

NOS outreach specialists worked with representatives from across NOAA to coordinate the Agency's participation at the annual Coast Day celebrations in Lewes, DE,

and Long Beach Island and Cape May, NJ. NOAA outreach and education experts led hands-on activities to encourage the public's interest in NOAA-related topics and issues, including local marine and coastal ecosystems, safe boating and navigation, Remotely Operated Vehicles, maritime heritage, weather prediction, SARSat, local sea shells, the importance of navigation response, ocean prediction and modeling, horseshoe crabs, and sharks. The three events attracted over 25,000 people.

FUTURE OUTLOOK

For the future, NOS envisions America as a place that fosters people enjoying and sustaining productive oceans and coasts, for ecology, heritage, and economy. To achieve this vision, NOS will continue to:

- Implement the U.S. Ocean Action Plan and encourage an ecosystems approach in coastal and marine resources management.
- Strengthen State and Federal partnerships for managing America's coasts.
- Promote a safe and efficient marine transportation system that supports America's economic and environmental security.
- Lead the development and implementation of an Integrated Ocean Observing System.
- Protect special places in our oceans and along our coasts that are an essential piece of the fabric of America's heritage and culture.
- Execute hazardous spill responses, natural resource damage assessments, and ecological forecasts.
- Lead the nation in coral reef conservation, management of marine protected areas, integrated ocean and coastal management and strategic ocean governance.
- Deliver products and services from our core capabilities in observing systems; data acquisitions, assimilation and application; mapping and charting; marine transportation; and geodetic positioning services.

NOS will achieve its vision by leveraging resources in partnerships with other Federal agencies; state, regional, and tribal institutions; public, private, and international organizations; and others.

PRODUCTS AND SERVICES

Nautical Charts

NOS produces the Nation's nautical charts in paper and electronic formats. These charts are indispensable to safe, efficient marine transportation and national security.

Shoreline Mapping

NOS periodically surveys 95,000 nautical miles of U.S. coastline to provide an accurate and official delineation of the national shoreline for nautical chart production and coastal resource management. The growth and sustainability of U.S. shipping, manufacturing, exports, and coastal development depend on accurate shoreline mapping.

Decision-making Support

NOS provides a wealth of science, training, and tools to help coastal communities make decisions about such concerns as land use, waterfront development and revitalization, habitat conservation and restoration, and water quality and quantity. For example, Geographic Information System maps of coastal habitats and information about storms and other risks help coastal managers mitigate a range of potential hazards.

Real-time Data

By providing real-time information about water levels, tides and currents, salinity, and weather conditions in ports, Physical Oceanographic Real-Time Systems (PORTS®) mitigate coastal hazards and minimize delays in marine transportation. Recreational boaters also use PORTS to avoid groundings and collisions during inclement weather.

Unique Ocean and Coastal Areas

NOS manages a system of 13 National Marine Sanctuaries, the Northwest Hawaiian Islands Marine National Monument and 27 National Estuarine Research Reserves. These unique areas foster scientific research, public education and recreation, and environmental stewardship through Federal, state, local, and private partnerships. They also contribute jobs and dollars to local economies.



Coastal Ecosystem Monitoring

By measuring water quality, containments, sources of pollution, biodiversity, and changes in the use of coastal land and waters, NOS helps states and communities to sustainably use and protect their valuable resources.

Emergency Response

NOS responds to more than 100 marine oil and chemical spills every year, providing information to the U.S. Coast Guard for containing and cleaning up spills. NOS also works closely with the U.S. Environmental Protection Agency and other partners to protect and restore coastal resources damaged by releases of hazardous materials.

Pinpoint Positioning

NOS maintains the National Spatial Reference System, which serves as a baseline for all types of highly accurate navigation, survey, and positioning work. For example, the system enables ships to pinpoint their location within three to five meters at all times and in all weather, and is used as the basis for all global positioning system data.

Coastal Research

NOS conducts and supports research on a variety of issues that threaten coastal waters, habitats, and ecosystem and human health, including pollutants, harmful alga blooms, invasive species, and changes in land use and climate.



*William T. Hogarth, Ph.D.
Assistant Administrator*

National Marine Fisheries Service

Sustaining, Protecting, and Rebuilding Our
Nation's Living Oceans

NOAA's National Marine Fisheries Service (NOAA Fisheries Service) is dedicated to the stewardship of our Nation's living marine resources and their habitats through scientific research, fisheries management, law enforcement, and habitat conservation. NOAA Fisheries Service is a world leader in fisheries research, providing a sound scientific foundation for the stewardship of living marine resources. NOAA Fisheries Service is also a leading voice for commercial and recreational fisheries from the Atlantic Ocean to the Gulf of Mexico to the Pacific Ocean. We couple our interdisciplinary expertise in biological, physical, and social sciences with our talents in information technology to monitor, assess, and predict the status and trends of marine stocks, their natural environment, and the socioeconomic benefits they provide. We will continue to focus on conservation, management, and sustainable development as we face new challenges in the 21st century.

NOAA To Lead ICCAT and IWC

Dr. William Hogarth, NOAA's Assistant Administrator for Fisheries, was elected Chairman of the International Commission for the Conservation of Atlantic Tunas (ICCAT) at the 2005 Annual Meeting in Seville, Spain. As Chairman for the 2006-07 term, Dr. Hogarth is leading ICCAT's efforts to sustainably manage fisheries for Atlantic tunas, swordfish and billfish and to increase the transparency and inclusiveness of the organization. In November 2006, ICCAT agreed to a number of important management measures, in particular for Atlantic swordfish, marlins, and bluefin tuna. These measures represented continued progress in the conservation of these species, although further reductions in the Eastern Atlantic and Mediterranean bluefin tuna quota will be necessary to prevent collapse of that stock. The United States will, therefore, continue to press for more stringent catch limits for this stock in the future.

Dr. Hogarth was also elected Chairman of the International Whaling Commission (IWC) at the 2006 Annual Meeting in St. Kitts and Nevis. As Chairman for the 2007-08 term, Dr. Hogarth will lead IWC's efforts to develop a revised management scheme and to address scientific research programs. The United States will host the next IWC Annual Meeting in Anchorage, Alaska.

Taking these leadership positions in such key multilateral forums allows NOAA to pursue the international cooperation necessary for successful marine stewardship.



Response to Hurricane Katrina

NOAA mounted a multi-pronged effort to address fishery-related impacts in the Gulf of Mexico after the 2005 hurricane season. The Agency acted to survey damage, restore habitat, and rebuild fisheries. In the months following the hurricanes, NOAA completed a survey of damage to industry-related infrastructure in Gulf states. The Fisheries Service lab in Pascagoula, Mississippi, was destroyed by Hurricane Katrina. Through Congressionally appropriated funds, NOAA initiated a redesign of the lab this year.

Post-hurricane marine debris removal activities focused on protecting fishing grounds. In August, NOAA awarded \$128 million, the largest grant in its history, to the Gulf States Marine Fisheries Commission to reseed and restore oyster beds and to conduct fisheries monitoring in the Gulf. NOAA also conducted research surveys and monitored the seafood coming from the Gulf to ensure it was free from contamination by PCBs, pesticides, and fossil fuels.

Aquaculture 10-Year Plan

It is clear that momentum is building for the United States to become more self-sufficient in the production of seafood from aquaculture to meet growing consumer demand for safe, sustainable seafood. As the Nation's oceans agency, NOAA embraces this challenge while remaining fully committed to seeing aquaculture develop in a predictable, environmentally compatible, and sustainable manner as a complement to the Nation's wild fisheries harvest.

NOAA's approach to aquaculture ensures the protection of the marine environment, other uses of marine resources, and human health and safety. This year, the agency drafted a *10-Year Plan for the NOAA Aquaculture Program*, which maps out NOAA's aquaculture goals and challenges over the next decade. The Agency plans to finalize and adopt the plan in 2007.





Energy Policy Act

At the end of FY 2005 Congress passed the Energy Policy Act, imposing far-reaching obligations for the Departments of Commerce, Interior, and Agriculture. The three agencies continued to work together to implement new programmatic activities.

This year, NOAA successfully implemented one key provision of the Energy Policy Act for high-profile hydropower dam projects: the Klamath project in California/Oregon and Santee Cooper project in South Carolina. Fish passage past the Klamath project will restore access to more than 400 miles of historic habitat in the Klamath Basin for salmon, lamprey, and resident trout. Historically, the Klamath Basin has been the third most productive salmon river system on the West Coast. Fish passage past the Santee Cooper Project will restore access to over 300 miles of historic habitat in the Santee River Basin for species such as American shad, river herring, striped bass, and the endangered shortnose sturgeon.

Habitat Restoration

This year, NOAA was responsible for restoring 200 miles of rivers and streams to fish passage, largely through the work of NOAA's hydropower program and the Community-based Restoration Program. In addition, NOAA's Habitat Program supported the restoration of 7,598 acres of habitat in 2006. A significant portion of this restoration was accomplished through NOAA's Community-based Restoration Program through partnerships with state, local, tribal, and non-governmental organizations. These partnerships leverage funds, often three to five times the NOAA contribution. Celebrating its 10-year anniversary this year, the Community-based Restoration Program has implemented more than 1,300 coastal projects restoring over 30,000 acres and 900 river miles with the contribution of more than 740,000 hours of community participation.

Protecting Essential Fish Habitat

NOAA made important strides in designating and protecting essential fish habitat this year by establishing the 279,114-square-nautical-mile Aleutian Islands Habitat Conservation Area and designating 150,000 square miles of Pacific marine waters from Canada to Mexico



as essential fish habitat. The Aleutian Islands Habitat Conservation Area—an area of the Alaskan sea floor approximately the size of Texas and Colorado combined—was closed to bottom-contact fishing gear to protect sensitive habitats, including vulnerable coral gardens first discovered by NOAA scientists in 2002. The essential fish habitat designations in the Pacific, and the accompanying bottom gear restrictions, will serve to replenish stocks of Pacific Coast groundfish and protect deep sea coral habitat.

Completion of the Consolidated Atlantic Highly Migratory Species Fishery Management Plan

NOAA Fisheries Service completed the Consolidated Atlantic Highly Migratory Species Fishery Management plan in 2006. This rulemaking addresses phase 1 of the five-year essential fish habitat review, workshops, time/area closures, overfishing of finetooth sharks, rebuilding of northern albacore tuna, bluefin tuna effort controls and in-season actions, fishing years, authorized gears, billfish mortality, and some regulatory housekeeping issues.

Advancing Ecosystem Approaches to Management

In 2006, NOAA scientists continued developing and implementing ecologically broad models to assess living marine resources in the context of the entire ecosystems in which they exist. These ecosystem assessments and forecasts are a key component of reaching NOAA's strategic goal of implementing an ecosystem approach to management. The first of these assessments focused on the Bering Sea, the Gulf of Alaska,

and the Gulf of Maine-Georges Bank-Middle Atlantic Bight ecosystems. Future ecosystem assessments will include sub-regions within the California Current, Pacific Islands Complex, South Atlantic, Gulf of Mexico, Caribbean, and Antarctic Large Regional Marine Areas.

NOAA also led a collaborative effort to develop *Fisheries Ecosystem Planning for Chesapeake Bay*. Published by the American Fisheries Society in fall 2006, it is a guide to ecosystem-based resource management—a conceptual framework that promotes the incorporation of established ecosystem principles into both fisheries and nonfisheries management. Revisions to existing Bay-wide fisheries management plans are underway to begin the transition from traditional single-species plans, to multispecies plans, and finally to true ecosystem-based fisheries management plans.

NOAA Demonstrates Progress in Rebuilding Overfished Stocks in 2005

In May, NOAA reported on the status of U.S. marine fisheries for 2005. The annual report shows progress in rebuilding overfished



species. The report also indicates that fisheries managers are acting to slow fishing rates for species that were found to have above-target harvests.

On behalf of NOAA, the Secretary of Commerce committed to ending overfishing and rebuilding stocks. The Agency is working with Congress to strengthen related statutory requirements. In addition, NOAA is emphasizing ending overfishing as a priority in all of its communications with regional fishery management councils.

Each year, NOAA announces the state of U.S. fisheries to inform Congress and the public of the Agency's progress in restoring fish stocks to sustainable population levels. The annual report tracks both population levels and harvest rates for species caught in Federal marine waters, between 3 and 200 miles off U.S. coasts. In 2005, NOAA scientists determined population levels for 206 fish stocks and multi-species groupings known as complexes. Of these, 152 (74 percent) were not overfished. NOAA scientists also determined the harvest rates for 237 stocks and found that 192 (81 percent) were not subject to overfishing.



Vessel Monitoring Systems

NOAA has used the Vessel Monitoring System (VMS) to monitor commercial fishing vessels and ensure compliance with fisheries regulations. In 2006, the VMS program expanded into several new geographic areas covering Essential Fish Habitat in Alaska and the Northwest Hawaiian Islands National Monument, as well as the Atlantic sea scallop (Framework 17) and Groundfish (Framework 42) Fisheries in the Northeast. Currently, the Office of Law Enforcement monitors over 4,100 vessels participating in 17 different fisheries. VMS has proven to be an extremely cost effective tool for enforcement, while enhancing communications capabilities of fishermen and protecting resources. NOAA has increased remote monitoring of fishing vessels through this program by working closely with the fishery management councils and providing financial support to qualified fishermen who operate VMS on their vessels.

The VMS Mobile Transmitter Unit and Enhanced Mobile Transmitter Unit Reimbursement Program was announced through the Federal Register on July 21. Through an agreement with the Pacific States Marine Fisheries Commission (PSMFC) of Portland, OR, NOAA established a program



to distribute funding to vessel owners and/or operators who purchased a Mobile Transmitter Unit or Enhanced-Mobile Transmitter Unit for the purpose of complying with fishery regulations requiring the use of VMS.

Dedicated Access Programs Progress

This year, NOAA Fisheries Service set a goal to double the number of dedicated access programs (DAPs) by 2010. NOAA Fisheries Service worked with the Regional Fishery Management Councils to develop and implement new DAPs. Three of these programs will begin in 2007.

In the Northeast Region, the Georges Bank Cod Fixed Gear Sector program will begin in New England. A sector program sets a Total Allowable Catch for the specified sector of a fishery, based on historic participation.

In the Southeast Region, the Red Snapper Individual Fishing Quota (IFQ) program will begin in the Gulf of Mexico. An IFQ program allocates a specific amount of fish to an individual, based upon historic participation in the fishery.

In the Alaska Region, the Central Gulf of Alaska Rockfish Pilot Program was established and fishing under the program will begin in 2007. This five-year pilot program was mandated by Congress, and is a forerunner of a larger, more inclusive Gulf of Alaska Groundfish Rationalization program. The rationalization programs, called Dedicated Access Privilege programs, allow a specific amount of fish to be harvested by an individual or group. The programs give fishermen flexibility in their business operations, and often increase economic benefits to the Nation.

Assessing Excess Fishing Capacity

Excess fishing capacity is a significant obstacle to sustainable fishing. In March 2006, NOAA completed the report, *Assessments of Excess Fishing Capacity in Select Federally-Managed Commercial Fisheries*. Overall, the assessments found evidence of significant excess capacity in the majority of fisheries and fleets analyzed.

NOAA published the final rule for the Longline Catcher Processor Non-pollock groundfish buyback in the *Federal Register* on September 29. The program will provide a loan of up to \$36 million in exchange for relinquishing non-interim Federal License Limitation Program groundfish licenses endorsed for Bering Sea or Aleutian Islands catcher processor activity, as well as any present or future claims of eligibility for any fishing privilege based on such permit. This project had an extremely ambitious time frame, which included completing the rulemaking process in less than six months.

Protecting Right Whales

The main sources of northern right whale mortality are ship strikes and fishing gear entanglement. On June 23, NOAA published a proposed rule describing regulations to reduce the risk of collisions between northern right whales and ocean-going vessels. The rule, negotiated with Federal agencies and the shipping industry, proposes a speed restriction of 10 knots or less in three major regions along the U.S. East Coast, based on seasonal occurrence of whales in each area, as well as commercial ship traffic patterns and navigational concerns. The right whale population numbers about 300 individuals, making it one of the most critically endangered species in the world. Existing conservation measures have not been sufficient to reduce right whale deaths and serious injuries associated with ship strikes. In addition, NOAA has proposed an ambitious plan to address all sources of gear entanglement.

NOAA's Large Whale Disentanglement Partnership Program

Over the last year, NOAA expanded its large whale disentanglement program to the Pacific through partnerships and training. The program proved successful in February, when Federal and state officials, teamed up with local volunteers to free a humpback whale from a life-threatening entanglement. Members of NOAA Fisheries Service, the Hawaiian Islands Humpback Whale National Marine Sanctuary, Hawaii Department of Land and Natural Resources, and a community-based



disentanglement network freed the humpback whale off the north side of the island of Lana'i.

The disentanglement network's experienced and trained personnel are authorized to safely cut large whales free of gear and marine debris using specially designed tools and techniques. The network in Hawaii is a partnership of Federal, state, and local members that includes staff from NOAA Fisheries Pacific Islands Regional Office and the Marine Mammal Health and Stranding Response Program. The nationwide disentanglement network has successfully freed more than 50 large whales over the years along the East Coast of the U.S. and Canada, the Caribbean, Alaska, and Hawaii without a single serious injury to a rescue worker.

Monk Seal Protection

During 2006, NOAA scientists in the Pacific Islands carried out population surveys and assessments of endangered Hawaiian monk seals in the recently designated Northwest Hawaiian Islands Marine National Monument. These assessments and other conservation efforts are part of an ongoing strategy to prevent extinction of this species. Monk seal numbers have declined to 1,200 individuals. Scientists are unsure why the species is declining. Without further understanding, monk seals are expected to fall to or below 1,000 individuals by 2011.

NOAA took twin female monk seal pups into captivity in early summer 2006 for rehabilitation and future release back to the wild. Twinning in monk seals is rare, and pup survival has been

low for more than 10 years. The primary cause of poor pup survival in the Northwest Hawaiian Islands is low weaning weights. Because Hawaiian monk seals are critically endangered, each individual represents a significant contribution to the population; therefore, these pups, which would have little chance of survival without human intervention, were removed for rehabilitation. The pups responded well to treatment and are scheduled for release back to the wild in 2007.

New Endangered Species Listing

NOAA listed four high-profile species under the Endangered Species Act during 2006. NOAA listed the Southern resident killer whale as endangered due to its decline in the Pacific Northwest. Staghorn and elkhorn corals were both classified as "threatened" due to precipitous declines throughout their ranges in the Bahamas, Florida, and the Caribbean. In addition, the Southern distinct population segment of North American green sturgeon received a "threatened" classification due to habitat degradation caused by dams on the West Coast.

FUTURE OUTLOOK

NOAA Fisheries Service has the stewardship responsibility for the largest Exclusive Economic Zone in the world. Healthy and productive coastal, marine, and Great Lakes ecosystems create billions of dollars of value in recreational and commercial activity each year. New legislation, evolving management philosophies,

and scientific advances have created new opportunities for managing the Nation's living marine resources.

An ecosystem approach to management has been identified and supported by the Administration's U.S. Ocean Action Plan that clearly states that an effective U.S. ocean policy must be grounded in an understanding and management of ecosystems. This ecosystem approach is the cornerstone of the management tools that will lead NOAA Fisheries to meet its immediate and long-term goals, including:

- Implementing the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006
- Doubling the number of Dedicated Access Programs by 2010
- Securing passage of an offshore aquaculture bill
- Ending overfishing
- Reducing bycatch and discards
- Providing effective conservation under the Endangered Species Act and the Marine Mammal Protection Act
- Ensuring effective science and management
- Strengthening environmental compliance for national defense and energy-related activities in our oceans and coastal areas
- Being an environmental leader domestically and internationally
- Promoting healthy coastal habitats in support of fisheries and environmentally and economically resilient coastal communities.

NOAA Fisheries will also work collaboratively on an ecosystem-based approach with other agencies and organizations to develop indicators of ecosystem status and trends, and joint strategies to address priority regional ecosystem issues.

NOAA Fisheries will continue to adopt the necessary tools to meet all of its goals well into the future and will apply fiscal and programmatic resources wisely to ensure the integrity of the Nation's marine ecosystems to sustain their socioeconomic and other benefits for all Americans.

PRODUCTS AND SERVICES

Annual Report on the Status of Fisheries

The annual Report to Congress on the Status of Fisheries of the United States reviews the status of 530 fishery stocks and stock complexes in the U.S. Exclusive Economic Zone and identifies stocks that are overfished or are approaching a condition of being overfished, under definitions mandated by the Magnuson-Stevens Act Fishery Conservation and Management Act.

Regional Stock Assessments

NOAA Fisheries Service stock assessment research provides a comprehensive understanding of marine systems and the scientific basis for a wide range of regional management options for preserving living marine resources, while meeting U.S. environmental, economic, and public safety needs.

Seafood Inspection Services

NOAA Fisheries Service provides a variety of professional inspection services to the fishing industry, to ensure compliance with all applicable Federal food regulations. Annual participants include more than 2,500 importers and exporters.

Law Enforcement

NOAA special agents and enforcement officers are charged with protecting the Nation's marine resources under a variety of Federal laws and regulations. Enforcement activities include: investigating criminal and civil violations; seizing contraband and illegal goods; implementing advanced technologies through a Vessel Monitoring System program to monitor and verify positions of fishing vessels using satellite-based tools; and applying "Community-Oriented Policing and Problem Solving" to promote voluntary compliance with the Magnuson-Stevens Fishery Conservation and Management Act.

National Weather Service

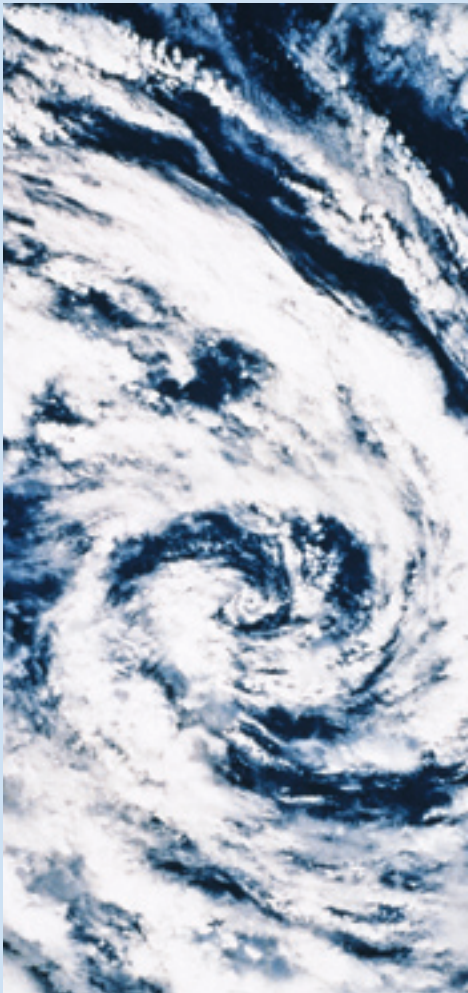
Science and Service for Protecting Lives,
Livelihoods, and Your Way of Life

The United States is the most severe-weather-prone country on Earth. Each year, Americans cope with an average of 10,000 thunderstorms, 5,000 floods, 1,000 tornadoes, and six deadly hurricanes. Some 90 percent of all presidentially-declared disasters are weather-related, causing approximately 500 deaths per year and \$14 billion in damage. Weather is directly linked to public safety, and about one-third of the U.S. economy (about \$3 trillion) is sensitive to weather. NOAA's National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure that can be used by other governmental agencies, the private sector, the public, and the global community.

Weather services cost each American about \$5 a year—roughly the cost of a fast-food meal. This investment allows NWS to issue climate, public, aviation, marine, fire weather, air quality, space weather, river, and flood forecasts and warnings every day. NWS has about 4,800 employees in 122 weather forecast offices, 13 river forecast centers, nine national centers, and other support offices around the country. The NWS annual budget of approximately \$848 million in 2006 supports a national infrastructure to gather and process data worldwide from the land, sea, and air. This infrastructure includes collecting data using technology, such as Doppler weather radars; satellites operated by NOAA's National Environmental Satellite, Data and Information Service; data buoys for marine observations; surface observing systems; and instruments for monitoring space weather and air quality. These data feed sophisticated computer models running on high-speed supercomputers. NWS's highly trained and skilled workforce uses powerful workstations to analyze all of these data and issue forecasts and warnings. High-speed communications tie this information infrastructure together and disseminate forecasts and warnings to the public. NWS staff also use trained community volunteers to enhance weather service operations. These observers collect weather data that become part of the Nation's climate records, and citizen storm spotters provide NWS with visual confirmation of severe weather events. As environmental information becomes more sophisticated, complete, and available to all, the environmental literacy of the public becomes more important. NWS outreach and education activities focus on making sure the public understands the information NWS provides and can use it effectively in the decisions they make.



*Brig. Gen. David L. Johnson
U.S. Air Force (Ret.)
Assistant Administrator*



ACCOMPLISHMENTS

Hurricane Katrina Service Assessment Report

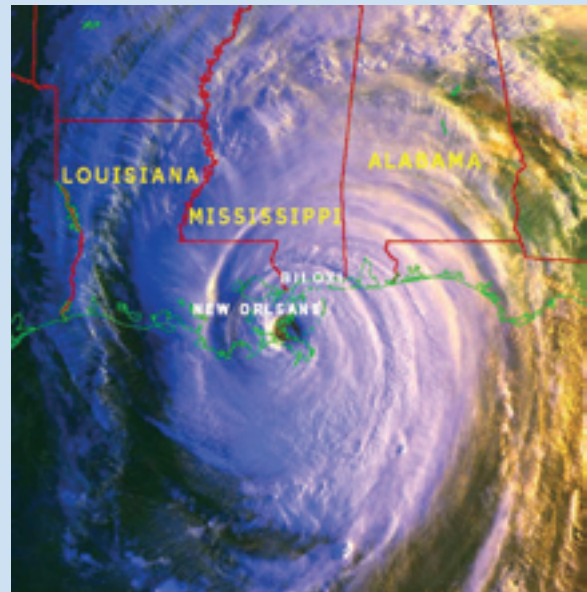
The Hurricane Katrina Service Assessment Report found that the NWS effectively performed its mission before, during, and after the devastating storm. Katrina was the costliest natural disaster in U.S. history, leaving a wake of destruction over southeast Louisiana and coastal Mississippi. The storm surge ravaged coastal Mississippi. The levee breaches and overtopping in New Orleans resulted in floodwaters of 15 to 20 feet covering about 80 percent of the city. The hurricane resulted in an estimated 1,353 direct fatalities, making Katrina one of the five deadliest hurricanes ever to strike the U.S. Some 275,000 homes were damaged or destroyed and total economic losses could be greater than \$120 billion.

The products and services provided by NWS offices during Katrina were particularly accurate and timely, and they contributed significantly to critical customer decision-making. Senator Jim DeMint (SC), Chairman of Commerce Committee's Disaster Prediction and Prevention Subcommittee, recognized the National Weather Service for its accurate forecast of Hurricane Katrina and emphasized the continued human suffering from the disaster. "After reviewing the actions taken by the National Weather Service, I am convinced that this was one of the most accurate hurricane predictions we have ever seen," said Senator DeMint.

The hurricane forecast track error was considerably better than average through the five-day forecast period. Lead times on hurricane watches and warnings for Louisiana, Mississippi, Alabama, and the Florida panhandle were provided well in advance of the storm (eight hours above average). A noteworthy moment for the NWS came when the Weather Forecast Office in New Orleans/Baton Rouge issued a statement one day before Katrina's landfall that emphasized the likely impacts of the hurricane on southeast Louisiana and coastal Mississippi. The unprecedented detail and foreboding language used in the statement helped reinforce the actions of emergency management officials as they coordinated one

of the largest evacuations in U.S. history. The NWS actions leading up to Katrina's landfall, along with the efforts of the NWS tropical cyclone outreach program over the last two decades, contributed to these high evacuation rates and undoubtedly saved many lives.

In the face of extremely difficult working conditions, the ingenuity, dedication, and sheer will of NWS employees enabled the delivery of products and services even as infrastructure and back-up systems failed. Incident Meteorologists played a vital role in the aftermath of Katrina by establishing portable communications systems and weather observing systems to mitigate critical outages. Most importantly, service backup operations were transparent to most users and partners as high-quality products and services were provided by designated service backup offices.



NOAA-15 satellite image of Hurricane Katrina at 7:47 a.m. Central Daylight Time, August 29, 2005, just east of New Orleans, Louisiana. Source: NWS Hurricane Katrina Service Assessment



The collapsed water tower in Buras, Louisiana, attests to the fury of Hurricane Katrina as she first made landfall in the lower Mississippi Delta. Photo: Lewis Kozlosky

NOAA Continues Expansion of the U.S. Tsunami Warning System

During FY06, in response to its mandate to improve tsunami mitigation and preparedness activities, NOAA continued development of the U.S. Tsunami Warning System. The most notable accomplishment was expanding its ability to detect tsunamis with the deployment of five Deep Ocean Assessment and Reporting of Tsunami (DART) buoy stations in the Atlantic, the Caribbean and the Gulf of Mexico, and the deployment of four additional DART buoys along the West Coast and the Aleutians. By the end of FY 2006, NOAA had deployed 19 of the 39 stations planned for the DART network.

NOAA has also embarked on an accelerated and expanded program to collect bathymetric data along vulnerable U.S. coastlines and develop detailed community-based tsunami inundation maps and tsunami inundation forecast models for the most at-risk U.S. coastal communities. In FY 2006, eight additional models were completed, for a total of 17. With sustained funding, nine more models will be added in FY 2007. A total of 75 models are planned and we project completion of this national effort during FY 2013.

NOAA expanded the tsunami hazard mitigation program with an increased emphasis on community participation via NOAA's TsunamiReady Program. To date, NOAA has increased the number of TsunamiReady communities or locations to 31, an 80 percent

increase over the number that existed in December 2004. During FY06, eight additional communities were recognized as TsunamiReady. These include Myrtle Beach, SC and Norfolk, VA, the first major east coast community to be designated TsunamiReady. Other areas include Guam, the first U.S. territory to be TsunamiReady, and Mayaguez, Puerto Rico, which was the first TsunamiReady area in the Caribbean region. The program also funded 16 TsunamiReady workshops in FY 2006. The workshops educate participants on the Tsunami hazard and lay the foundation for making our coastal communities TsunamiReady.

Also as part of the mitigation and preparedness effort, the Pacific Tsunami Warning Center began 24/7 operations in April.

NWSTG Replacement

In June 2006, the NWS's Telecommunications Operations Center (TOC) reached Initial Operational Capability for the NWS's Replacement Telecommunications Gateway (RTG) system. The NWSTG is the nation's communications hub for all weather, water, and climate data and information. Delivery of this information is critical for the protection of life and property, as well as the economic well being of the Nation. The replacement is projected to increase total message and associated weather prediction model throughput by 200%. This system can route more than 50 routine messages per second, within one minute, 99.9 percent of the time. Additionally, the system can route watches, warnings, and other perishable observation messages in 10 seconds. This directly supports dissemination systems supporting disaster management such as the Emergency Managers Weather Information Network, NWS offices, other government agencies, and the public. The modular system was designed to make better use of commercial off-the-shelf software to achieve scalability that has never before existed at the NWSTG. The design is directly applicable for use at the Backup Telecommunications Gateway, planned to come online later this year. As we progress, more and more of the NWSTG customers will receive the benefits of the additional capacity and performance of the RTG.

National Digital Forecast Database (NDFD) Expansion

As the foundation of Digital Services, the NDFD consists of digital forecasts of weather elements (e.g., cloud cover, maximum temperature) produced through a collaborative process, combined in a seamless mosaic, and made available through the Internet. The database aggregates digital forecasts and allows private sector and weather-sensitive businesses to create products and services useful to themselves and their customers. In FY 2006, NOAA's NWS upgraded four experimental elements (wind speed, wind direction, apparent temperature, and relative humidity) to operational status for the conterminous U.S. (CONUS) Puerto Rico/Virgin Islands, Hawaii, and Guam. Ten NDFD forecast elements have become operational since 2004.

Several new experimental elements were added to NDFD this year, including the first set of experimental elements for Alaska: maximum temperature, minimum temperature, 12-hour probability of precipitation, wind direction, wind speed, and significant wave height. Adding these elements for Alaska is a first step in fulfilling a strong demand for high-resolution gridded forecasts for Alaska from many national and local customers. Other new experimental

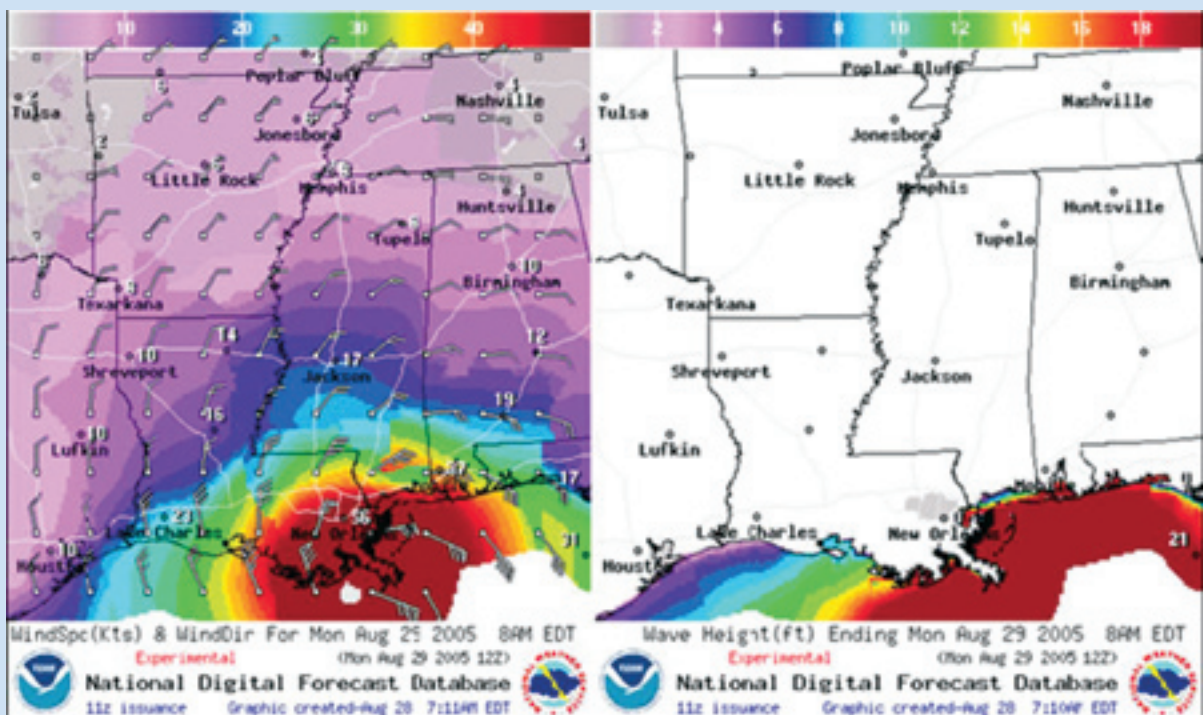
elements added were wind gust forecasts for CONUS, Puerto Rico/Virgin Islands, Hawaii, and Guam, and six tropical cyclone surface wind speed probability elements for the CONUS and adjacent coastal areas. In addition, changes were implemented to improve accessibility to the data in NDFD.

Several more additions are planned for NDFD-derived products and services in FY 2007:

- Experimental quantitative precipitation forecasts (QPF) for Hawaii
- Convective outlooks from the Storm Prediction Center
- Snow amount and QPF forecasts for CONUS
- Significant wave height forecasts

In FY 2007, the XML (extensible markup language) web service, which allows computer-to-computer access to NDFD, will become operational. The digital era has created new demands for weather data and NWS's NDFD provides a ready solution for the entire weather enterprise.

Snapshot of experimental NDFD gridded forecasts of (a) wind speed, wind direction, and (b) wave heights for the north Gulf coast region issued at 6 a.m., August 28, and valid at 7 a.m., August 29—about 24 hours prior to landfall. Source: NWS Hurricane Katrina Service Assessment



Hurricane Rita Customer Satisfaction Survey

Rita was an intense hurricane, reaching Category 5 strength (on the Saffir-Simpson Hurricane Scale) over the central Gulf of Mexico. Rita's lowest central pressure, 897 millibars, is the fourth-lowest on record in the Atlantic basin, behind Hurricane Wilma in 2005, Hurricane Gilbert in 1988 and the Labor Day Hurricane of 1935. Rita's maximum sustained winds peaked near 175 miles per hour, but it weakened to a Category 3 hurricane before making landfall near the Texas/Louisiana border on September 24, 2005. Rita produced significant storm surge that devastated coastal communities in southwestern Louisiana, and its winds, rain, and tornadoes caused a wide swath of damage from eastern Texas to Alabama. There were only two fatalities directly related to Rita.

A significant problem with Rita was the major traffic gridlock created by the large number of people evacuating the Houston metro area. The experience of Hurricane Katrina three weeks before contributed to the increased number of people who evacuated.

The National Weather Service (NWS) contracted with Claes Fornell International (CFI) Group to conduct a customer satisfaction survey in the areas affected by Hurricane Rita. The purpose of this survey was to measure customer satisfaction shortly after a significant hazardous weather event where the NWS has a leading role in providing potentially life-saving forecast and warning information.

The survey was conducted between November 10 and December 27, 2005, about two to three months after Hurricane Rita made landfall. This allowed time for most evacuees to return home after repairs had been made to utilities, communications infrastructure, and to some property damaged by the storm. The survey was conducted in the area directly affected by Hurricane Rita's landfall in southwestern Louisiana and southeast Texas, within WFO Houston and Lake Charles areas of responsibility.

To survey the general public, CFI used random telephone number dialing within the counties and parishes impacted by the hurricane. To

separately sample feedback to the same questions from NWS partners in emergency management and the media, the survey was also conducted via Internet. In all, 190 residents were surveyed by telephone, and there were 67 responses to the Internet survey for a total sample size of 257. The results show the NWS performed very well during this event.

The overall Customer Satisfaction Index (CSI) for the NWS during this event was 86. The CSI is a weighted average of three survey questions, which encompass overall satisfaction, a comparison to expectations, and a comparison to an ideal situation. According to CFI Group, this is a very strong score. In the words of Heather Reed of CFI, "This is very positive news! When weather information is most critical, the NWS delivers, and delivers well."

Expanding NOAA's Air Quality Forecast Capability.

The two most notable milestones achieved in FY 2006 for NOAA's Air Quality (AQ) Forecast Capability were expanding ozone forecast guidance experimentally to the CONUS, and expanding product coverage to include smoke forecasts.

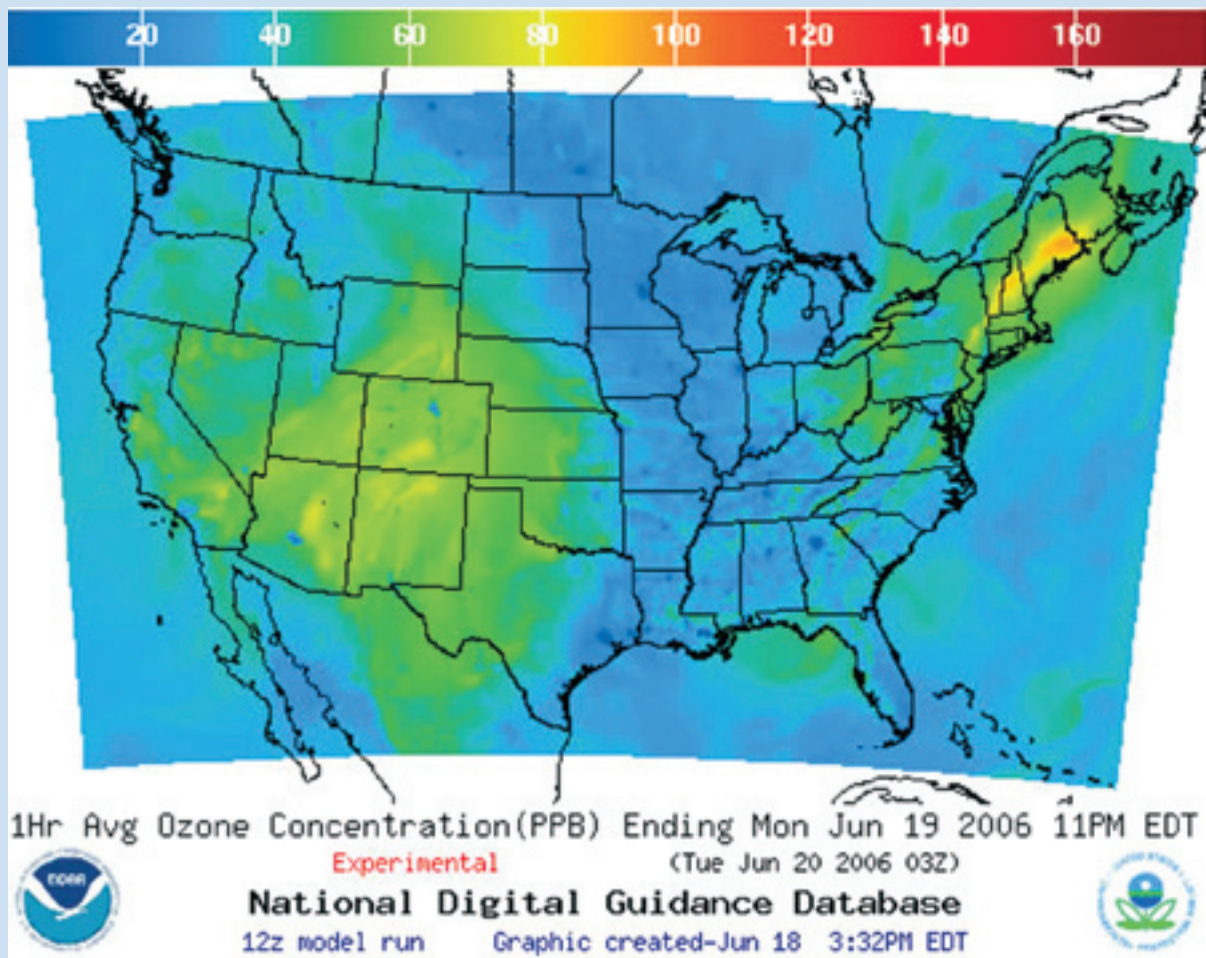
Experimental testing of expanded air quality forecast capability over CONUS. NOAA, in partnership with the Environmental Protection Agency (EPA), is building a national air quality forecast capability to improve the basis for AQ alerts and to provide AQ forecast information for people at risk. AQ alerts, usually next-day single-value worst-case AQ forecasts, are issued by state and local air quality forecasters for some 300 cities across the U.S.

Beginning June 1, 2006, NOAA's experimental next-day forecast guidance was expanded to cover the lower 48 states at 12-kilometer grid resolution, with hour-by-hour predicted concentrations of ozone throughout the following day. NOAA's guidance now provides detailed information about the onset, severity, and duration of poor AQ over cities, suburbs, and rural areas, for 90 million more people from coast to coast, allowing them to take steps to limit harmful effects of poor AQ.

A team consisting of NOAA's Office of Oceanic and Atmospheric Research (OAR), NWS, and EPA scientists has completed initial developmental testing of ozone predictions. This testing was based on a linked numerical forecast system. The National Center for Environmental Prediction's (NCEP) newly-operational Weather Research and Forecast (WRF) model was driving the reactive transport model for pollutants, known as the Community Multiscale Air Quality Model, developed by NOAA researchers at EPA. This linked air quality forecast system is run twice each day on NCEP's supercomputers. Gridded maps, posted on NWS's National Digital Guidance Database, display the experimental AQ predictions in terms of ozone concentrations, with loops, zoom-in, and tabular features for easy retrieval of forecast guidance (see www.weather.gov/aq-expr).

Experimental testing of smoke forecast tool. Smoke from large fires is an important component of fine-particle pollution, which is responsible for an estimated 40,000 premature deaths each year (40,000 each year; *Science*, 2000 and 2002). Smoke forecast guidance will help air quality forecasters and the public take steps to limit their exposure to airborne particulate matter.

A team of OAR, NWS, and NESDIS scientists completed the initial development required to begin the experimental testing of the smoke forecast tool, including integrating satellite information on location of wildfires with weather (North American mesoscale model) and smoke transport (HYSPLIT) models to produce daily a prediction of smoke transport. Hour-by-hour predictions at 12-kilometer grid resolution of smoke at the surface and in the column are provided each day by 13



Air Quality Ozone Forecast Graphic Covering Entire CONUS. Source: National Digital Guidance Database

Universal Time, extending through midnight next day. Predictions generated on NCEP's supercomputers are updated each day, sent through the NWS Telecommunications Operations Center, and posted on the National Digital Guidance Database, under <http://www.weather.gov/aq-expr/sectors/conus.php>.

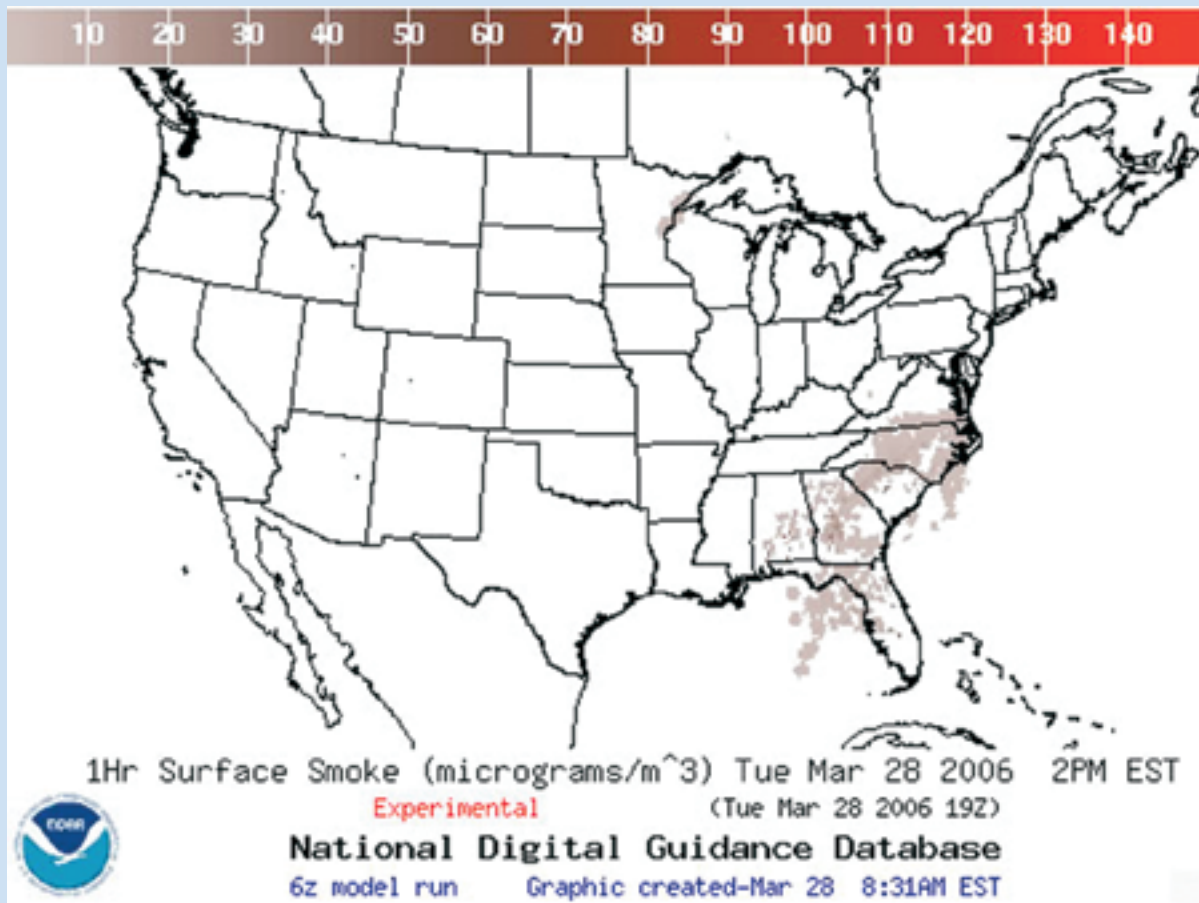
NWS Completed Open Radar Data Acquisition (ORDA) System Upgrade Installations

Deployment of the open-system radar acquisition upgrade of the Weather Surveillance Radar 1988 Doppler (WSR-88D) ORDA was completed on October 4, 2006, with successful installation of 158 systems. Deployment of the ORDA improved radar signal processing and computing, which enhances data quality and mitigates erroneous radar returns. Implementation of ORDA will enable the NWS to improve tornado warning lead times

from 11 to 15 minutes by 2008. In FY 2006, this upgrade saved \$2.4M from the total cost of the NEXRAD Product Improvement Program. Implementation of ORDA will double the range for detection of small tornadoes from 120 kilometers to 240 kilometers, and increase the coverage area for small tornadoes by 80 percent.

GSA, NOAA and OPUS Break Ground for NOAA Center for Weather and Climate Prediction

On March 13, 2006, the U.S. General Services Administration, in partnership with NOAA and Opus East, L.L.C., broke ground for the NOAA Center for Weather and Climate Prediction, the crown jewel in a new 50-acre section of the University of Maryland's M-Square Research and Technology Park. Opus East, L.L.C., of Rockville, MD, working with Hellmuth, Obata + Kassabaum, Inc. (HOK) as the lead design



Air Quality Surface Smoke Forecast Graphic Covering Entire CONUS. Source: National Digital Guidance Database



and interior architect, will design, construct and own the building and lease it to the GSA. Opus arranged a long-term ground lease with the University of Maryland for the development. The 268,762-square-foot office and research complex will become the new home for the NWS National Centers for Environmental Prediction, NOAA's Satellite and Information Service, and the Air Resources Laboratory. Approximately 800 people will work in the facility.

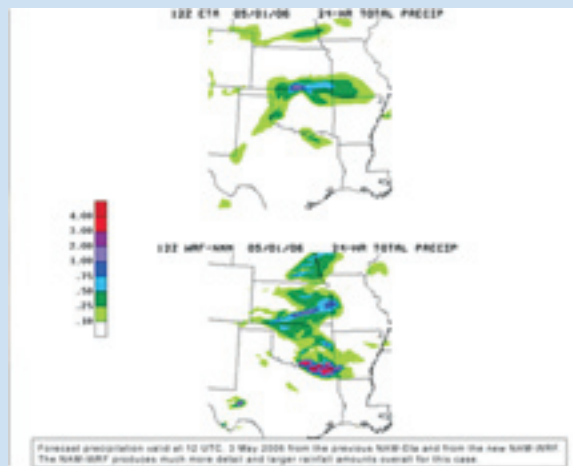
Speakers at the ceremony included Senators Paul S. Sarbanes (MD) and Barbara A. Mikulski (MD), Representative Steny H. Hoyer (MD), NOAA Administrator Conrad Lautenbacher, University of Maryland President C. D. Mote, and National Weather Service Director Brig. Gen. David L. Johnson, USAF (Ret.).

The structure has been designed to provide a state-of-the-art facility that reflects NOAA's mission to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs. It includes features that demonstrate environmental sensitivities, such as its "green" roof and rainwater waterfall, and both the site and building design will achieve the U.S. Green Building Council LEED Silver Certification.

NCEP's Environmental Modeling Center Unveils New National Forecast Model

NOAA's Environmental Modeling Center (EMC), one of the nine offices within the National Centers for Environmental Prediction, put the new Weather Research and Forecasting (WRF) system into operation on June 13, 2006. This is the first new national weather forecast system at NCEP since the creation of the Eta model more than a decade ago.

WRF produces forecasts with much greater detail than the Eta model, and will lead to accelerated forecast improvements in coming years. WRF forecast fields will provide improved



Forecast precipitation valid at 12 UTC, 3 May 2006 from the previous NAM-Eta and from the new NAM-WRF. The NAM-WRF produces much more detail and larger rainfall amounts overall for this case.



NCEP staff welcomes Senator Barbara Mikulski during her visit to NCEP Headquarters. Photo by Ronald Bell, Department of Commerce.

guidance for forecasters in populating the National Digital Forecast Database grids.

WRF was developed by a 20-member team at EMC. The model itself was developed by Dr. Zavisla Janjic, while the data assimilation system was developed by the EMC Data Assimilation Team. Parts of the WRF system were developed by the National Center for Atmospheric Research and NOAA's Earth System Research Laboratory, Global Systems Division.

Earlier versions of the WRF model have been available for limited weather applications, such as high-resolution severe weather and mesoscale ensemble forecasts, but now the WRF is producing operational forecasts of day-to-day weather for the entire U.S.

This model meets the needs of university researchers for a modern mesoscale forecast system. WRF features options that can be

configured for use by the U.S. research community and, for the first time, the model's code is being used by both the research and operational communities. This is a result of a major strategic initiative for the National Weather Service called community modeling, which will result in a streamlined process for transitioning research advancements into operational forecast systems.

NCEP Hosts Visit by Maryland Senator Mikulski on June 5, 2006

The NWS National Centers for Environmental Prediction hosted a visit on June 5, 2006, to NCEP Headquarters in Camp Springs, MD, by Senator Barbara A. Mikulski (MD), the senior Democrat on the Commerce, Justice, and Science Appropriations Subcommittee. During the senator's visit she received a demonstration of hurricane models and learned about the roles of the NWS and NCEP centers.

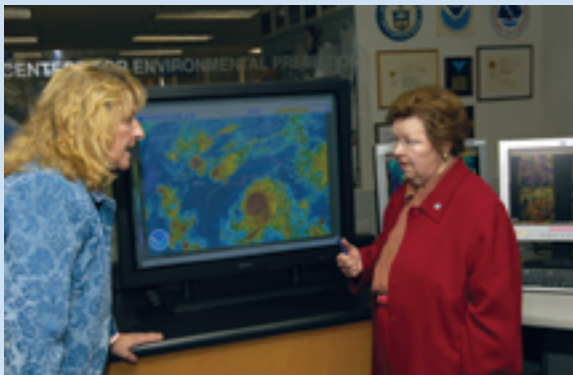
“I’m so proud of NOAA’s Weather Service, which is critical to protecting people, their homes and their property,” said Senator Mikulski. “The Nation depends on the Weather Service to help local weather forecasters get it right so our citizens can secure their property and get their families out of harms way.”

“Our industry and our economy depend on NOAA. One-third of our gross domestic product is weather sensitive—\$3 trillion. That’s why I’m fighting in the U.S. Senate to make sure NOAA is a priority in the Federal checkbook so we have the funding needed for the latest technology to keep improving our weather forecasts.”

Senator Mikulski voiced similar support during a Senate hearing on NOAA’s role in forecasting and warning about hurricanes.

NOAA’s New Hurricane Weather Research and Forecast (HWRF) System

Over the past two years, NOAA has received \$3 million in emergency hurricane supplemental funding to accelerate the implementation of the next-generation hurricane forecast system. The HWRF system has been run experimentally during the 2006 hurricane season, with operational implementation scheduled for the 2007 season. The HWRF replaces the current forecast model and serves as the primary hurricane forecasting model for NOAA, thereby providing an advanced modeling system for improved intensity and track forecasts. With the FY 2007 implementation of HWRF, NOAA is



Naomi Surgi/EMC provides a briefing to Senator Barbara Mikulski on the Hurricane Weather Research and Forecast (HWRF) system.

projecting (over a five-year period) a 15 percent improvement in forecasts of hurricane intensity and track.

The HWRF includes more sophisticated modeling techniques, e.g., a coupled wave model in addition to the current coupled atmosphere and ocean models. It will also utilize advanced observations from the NOAA G-IV aircraft to better define the initial structure of the hurricane core circulation and optimize the use of the large-scale advanced ocean and atmosphere observations. The HWRF provides a common platform for government forecasters and researchers, and it will be supported by NOAA for use by the hurricane research community.

NOAA/USGS Debris Flow Warning System

During the winter of 2005–06, NOAA’s National Weather Service (NWS) and the Office of Oceanic and Atmospheric Research (OAR) collaborated with the Water and Geology Disciplines of the U.S. Geological Survey (USGS) to issue debris-flow watches and warnings for recently burned areas in Southern California. The prototype project was implemented with existing resources of both agencies by adapting the flash flood watch and warning infrastructure in the Los Angeles and San Diego Weather Forecast Offices. Several Pacific storms warranted that the NWS issue relevant watches and/or warnings, especially for the Los Angeles County Warning Area. These watches and warnings were issued by combining USGS expertise on debris flow thresholds with NWS knowledge of real-time precipitation monitoring and analysis. As part of this system, a portion of the 2005 Harvard fire burn area near Burbank was designated as the “Intensive Research Area.” This area was heavily instrumented by USGS, OAR, and UCLA researchers in order to improve understanding of physical processes involved in precipitation caused debris flows for burned areas.

The project completed its first year of operation and is undergoing an evaluation of its overall performance. Both agencies have received requests for expansion of the prototype system to other parts of the country, under both burned and non-burned conditions.

StormReady Recognizes Two Heroes, Tops 1110 Sites

The count of the StormReady communities nationwide hit 1,110 in September, making gains throughout the continental United States. Those communities recognized as StormReady include Disney World and Disneyland. The StormReady program added its first site in Guam. The territory, which also earned TsunamiReady status, is subject to a broad range of weather problems ranging from typhoons and tsunamis to wildfires and flooding. In addition to Guam, NWS qualified its third government site, BWXT Pantex in Texas; its fourth Indian Reservation, Mille Lacs Band of Ojibway, MN; and its sixth military installation at Fort Sill, OK.

“StormReady Supporter” recognition is given to an entity (schools, businesses and other entities) that has established a severe weather safety plan and promotes severe weather safety awareness activities but does not have the resources to fulfill the rigorous requirements for a full StormReady recognition. Kampgrounds of America (KOA) campgrounds (with over 400 campgrounds in the U.S.) was recognized as a StormReady Supporter. NWS has a total of 19 StormReady Supporters.

NWS has awarded four StormReady Hero Awards in the program’s seven-year history, and in FY 2006, it gave two StormReady Hero recognitions. NWS presented a Hero Award to four citizens of Iowa City, IA, for their actions during a tornado outbreak last spring. The award was presented to Tom Hansen and Sue Faith of Johnson County Emergency Management Communications Dispatch, and Rev. Rudolph Juarez and Rev. Jerome Miller of St. Patrick’s Catholic Church. NWS Central Region Director Lynn P. Maximuk commented that the actions of these four people saved more than 50 lives when a tornado hit.

“Johnson County Emergency Management officials and dispatchers followed their procedures to perfection to relay advance warning of the approaching tornado,” Maximuk said. “Pastor Rudolph Juarez and Deacon Jerome Miller took quick action to protect their parishioners. These people are the epitome of StormReady Community Heroes.”

When the strong F2 tornado swept through the heart of Iowa City, its random path of destruction included the Johnson County Sheriff’s Office and St. Patrick’s Catholic Church.

On April 13, NWS forecasters issued the first tornado warning for Johnson County at 7:58 p.m. Just one minute later, following approved procedures, local officials activated the Indoor Warning System created to relay NWS warnings to occupants of buildings. Outdoor tornado sirens were activated at 8:00 p.m. The tornado warning was updated at 8:10 and 8:31. All updates were followed by activation of tornado warning sirens. At 8:20, Deacon Miller was leaving St. Patrick’s when he heard the tornado sirens. He immediately went back inside to notify Father Juarez, who was conducting a service. The service was stopped immediately and more than 50 parishioners took refuge in the basement of the nearby rectory.

Minutes later, the tornado slammed into the church, collapsing the steeple and southern portion of the roof, including the choir loft, directly onto where the parishioners had been moments before. The rectory building also sustained significant damage, but parishioners sheltering in the basement escaped unharmed.

The second 2006 Hero Award was given to the Caruthersville, MO, Emergency Manager and Fire Chief Charlie Jones for his courageous, lifesaving actions when a tornado ripped through the city on April 2.

“Our national Community Hero Award is intended to recognize individuals within a StormReady community who go above and beyond what would be expected of them and whose actions directly result in saving lives,” said NWS Director David L. Johnson. “Not only did Chief Jones take action to save lives that day, but he did so at great personal risk.”

Jones was storm-spotting at the edge of town when the NWS Memphis office issued a Tornado Warning for Pemiscot County at 6:49 p.m. Disseminated via the National Warning and Alert System, the warning noted Caruthersville was in imminent danger from the tornado. Jones immediately ordered the city’s sirens to be sounded and, in an unusual move, ordered them to be blown in repeated cycles,



thereby enhancing the public response. He also increased the public's sense of urgency by using the local fire communications frequency to further broadcast the warning, adding the phrase: "This is the real thing... Take cover now!"

By the time the F3 tornado struck the city at 7:07 p.m., most of its 6,700 citizens had already found shelter. Nearly two-thirds of the buildings, including 500 homes, were damaged, and an estimated 2,000 people would have been at great risk of injury or death if not for Jones's early and repeated warnings. While the tornado was part of a major outbreak that claimed more than two dozen lives in eight states, not one person died in Caruthersville.

"Although Jones's actions helped keep injuries to a minimum, ironically, he was one of the injured," said Bill Proenza, Director, NWS Southern Region. "Despite his injury, he persisted in his heroic actions during the tornado event and continued to coordinate recovery efforts afterward. By any standard, he was a community hero that night."

NWS is proud to play a part in these two heroic episodes by providing its StormReady and TsunamiReady program framework and support. For more information about these programs, go to www.stormready.noaa.gov.

Norman Forecasting Operations Complete Smooth Moves

The NWS/NCEP Storm Prediction Center (SPC) and the NWS Norman, OK, Forecast Office recently moved to facilities in the new National Weather Center in Norman. The 244,000 square-foot National Weather Center is a unique partnership of NOAA and the University of Oklahoma's (OU) weather research and operations programs. Construction began on the NWC in August 2003 and the building was dedicated in September. The NWC is an OU building with NOAA as the primary tenant. Three other NOAA organizations are also located in the building:

- OAR/National Severe Storms Laboratory (NSSL)
- NWS/Warning Decision Training Branch
- NWS/Applications Branch of the Radar Operations Center

Other occupants will include:

- NOAA/OU Joint Institute
- Cooperative Inst. for Mesoscale Meteorological Studies
- OU College of Atmospheric and Geographic Sciences
- OU School of Meteorology
- Center for Analysis and Prediction of Storms,
- Center for Spatial Analysis
- Center for Natural Hazard and Disaster Research
- Oklahoma Climatological Survey

SPC's move was accomplished one forecaster at a time to ensure services were never interrupted. Previously, the SPC was housed in cramped quarters with some staff in trailers.

The NWS Norman WFO moved earlier in the summer, transferring operations to NWS Tulsa for four days. Less than an hour after resuming operations, Norman forecasters issued a severe thunderstorm warning. The SPC and WFO are located a few steps from each other, separated by the NOAA Hazardous Weather Testbed, a space for forecasting experiments shared with NSSL.

FUTURE OUTLOOK

Looking to the future, the NWS of 2015 will provide greater value by being a flexible and efficient service organization that gives us the freedom at the local office to focus on high-impact events, collaborate with other NOAA components and external partners, and maximize the value of new science and technology.

The future NWS will maintain its role as the nation's preeminent environmental information services provider while expanding our capabilities to contend with a more diverse set of high-impact environmental events. We have a real opportunity to evolve our services to meet society's changing weather, water, and climate needs and become a NOAA integrated environmental information service provider. We also believe our future relevance requires us to act now. The Nation is demanding new services that we should provide. We need to catch up with and apply new technology that is changing the way our critical customers in public safety and our stakeholders in the Weather Enterprise do business. We are adapting now to meet future service needs.

An even more effective NWS producing increasingly valuable services for our customers will help us demonstrate our continued relevance in the Weather Enterprise and the safety of Americans.

We are actively working to create a future in which we can provide a broad set of NOAA environmental information services that are as highly valued and well known as our Hurricane warnings are today.

NOAA's NWS 2015:

- Providing superior, focused response for high-impact events
- Meeting the increasing demands for services in the digital age and beyond
- Stronger partnerships with all sectors
- Enhanced economic opportunities for private sector
- Accelerated Academic and NOAA Research to operations
- Accelerated science & technology infusion

Through Services Evolution, we aim to develop new high-impact decision support services that are customer focused to protect lives, livelihoods, and the standard of living Americans have come to expect.

PRODUCTS AND SERVICES

Local Warnings and Forecasts

NWS provides an integrated suite of warning and forecast products and services from its 122 weather forecast offices (WFO) located across the nation. NWS Forecasters at the WFOs integrate multiple sources of observational data from radars, surface observing systems, weather data buoys, and satellites along with centrally provided weather prediction model guidance using advanced processing systems to generate the following key products:

Public Weather – local forecasts and warnings of severe weather such as tornadoes, severe thunderstorms, flash floods, and extreme heat/cold.

Aviation Weather – airport terminal forecasts, in flight hazards warnings for turbulence, icing and convection

Marine – warning and forecast services for coastal waters, offshore, and Great Lakes.

Fire Weather – routine fire weather forecasts and “red-flag” warnings; spot forecasts for wildfires; on-site fire support

Tsunami watches and warnings – issued from two tsunami warning centers and are based on a strengthened tsunami warning system consisting of Deep Ocean Assessment and Reporting of Tsunamis (DART) systems, seismic sensors, tide gages, inundation mapping/modeling, and community awareness and education.

Environmental Modeling & Prediction

The NWS National Centers for Environmental Prediction (NCEP) support the local warning and forecast process through centralized processing of weather observations, followed by the application of high-resolution computer models of the atmosphere and oceans on NOAA supercomputers; and adjustment by NCEP forecasters. NCEP’s weather and climate prediction model output and forecast products are also used directly by the public, industry, and the commercial weather enterprise to improve decision making across a wide range of applications, all impacting the Nation’s economy. NCEP’s suite of forecast and prediction products range from minutes to one year in duration and include: national severe weather watches; space weather forecasts and warnings; hurricane advisories, watches, and warnings; precipitation forecasts; aviation area forecasts for the national airspace; seasonal outlooks and predictions; ocean predictions and high seas warnings.

Hydrologic Services

NWS provides river-flow and flood-forecast services using prediction models and databases at 13 River Forecast Centers (RFCs). This information is the basis for flash-flood and flood-warning programs implemented at WFOs. These services support emergency management and water resources activities. NWS is striving to provide water resource managers with localized water and soil condition forecasts via a national digital database incorporating all available hydrometeorological data and observations.

Air Quality Forecasting Services

NOAA provides operational production of air quality forecast guidance for ozone over the continental U.S. NOAA operates an end-to-end forecast system that provides timely, reliable forecast guidance to accurately predict the onset, severity and duration of poor air quality.



*Richard W. Spinrad, Ph.D.
Assistant Administrator*



Office of Oceanic and Atmospheric Research

Where Science Comes to Life

The Office of Oceanic and Atmospheric Research (OAR / NOAA Research) conducts preeminent research to provide value to society through improved weather forecasts, enhanced navigation and aviation safety, and improved ocean and coastal services. From remote sensing to climate research and ocean exploration, our world-class scientists conduct research that contributes to public health and safety, healthy ecosystems, and a robust economy. Today, NOAA's research team is working with partners in a culture of transparency to build concepts for Earth-system modeling that will help answer some of our most pressing questions about the planet.

NOAA Research studies the Earth system from the depths of the ocean to the upper reaches of the atmosphere. NOAA Research helps us understand and predict environmental changes on local to global scales and at time scales from days to centuries. NOAA Research is integrated across three central research themes: ocean, coastal, and Great Lakes resources; climate; and weather and air quality.

The NOAA Research network consists of seven internal research laboratories; an Office of Ocean Exploration that conducts both internal and extramural research; and extramural research at 30 National Sea Grant university programs, six undersea research centers, a research grants program through the Climate Program Office, and 13 cooperative institutes with academia.

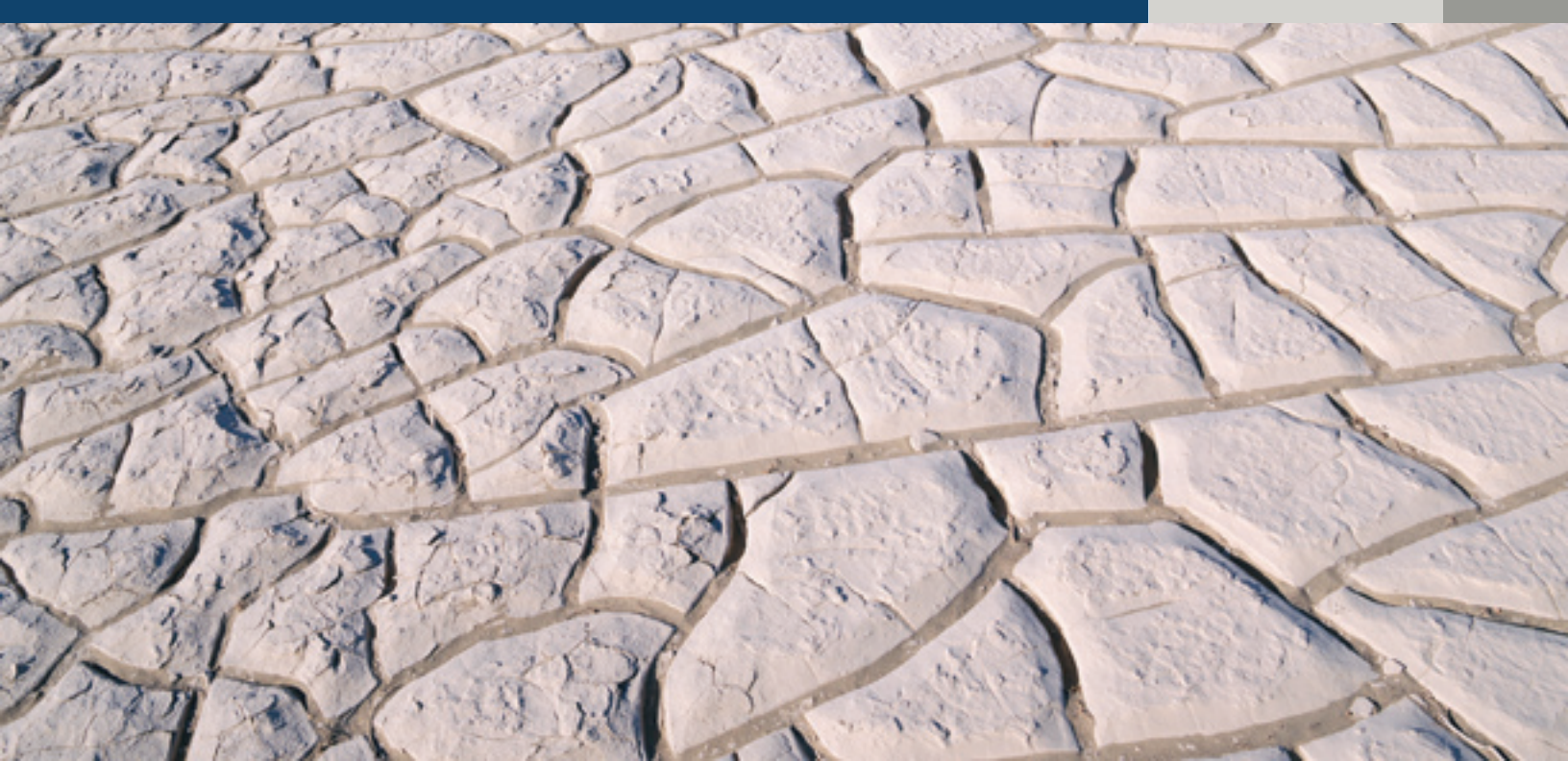
Ultimately, the information NOAA Research provides is used by decision makers at all levels to prevent the loss of human life and manage natural resources, while maintaining a strong economy.

ACCOMPLISHMENTS

National Integrated Drought Information System Office Established

In 2006, NOAA established the National Integrated Drought Information System (NIDIS) Office at the Earth System Research Laboratory in Boulder, CO, in response to requests from western state governors. Drought is estimated to result in average annual losses to all sectors of the economy of \$6-8 billion.

NIDIS aims to provide a real-time status report on the current levels and future risks of drought in any given location and



establish coordinated planning and preparedness measures for the Nation. Efforts include integrating existing independent monitoring activities, identifying monitoring gaps, and developing plans to close those gaps. The NIDIS office is the first step in the implementation of the system and will coordinate activities within NOAA, across Federal agencies, and with stakeholders.

NOAA Research Scientists Co-Authored Report on Carbon Dioxide Threats to Marine Life

A report co-authored by NOAA research scientists Richard Feely and Christopher L. Sabine at NOAA's Pacific Marine Environmental Laboratory in Seattle, WA, documents how carbon dioxide is dramatically altering ocean chemistry and threatening the health of marine organisms, including corals. The researchers also uncovered new evidence of ocean acidification in the North Pacific. Scientists observed measurable decreases in pH along with an increase in dissolved inorganic carbon, both signs of ocean acidification, which may be the result of the ocean's uptake of anthropogenic carbon dioxide. The increased acidity lowers the concentration of carbonate ions, a building block of the calcium carbonate that many marine organisms use to grow their skeletons and create coral reef structures. The

report stemmed from a workshop sponsored by NOAA, the National Science Foundation, and the U.S. Geological Survey. Feely and Sabine were among a group of NOAA researchers awarded the Commerce Department's gold medal for pioneering research leading to the discovery of increased acidification in the world's oceans.

NOAA Research Led the 2006 International Ozone Assessment

The 2006 International Ozone Assessment, led by NOAA Chemical Sciences Division in Boulder, CO, tracked the outcomes of the Montreal Protocol and indicated the protocol is working. For the first time, the assessment shows ozone-depleting substances in the atmosphere have decreased. This document represents a major contribution to NOAA's portfolio of climate science products.

NOAA Research Developed Climate Test Bed

NOAA formed the Climate Test Bed at the National Centers for Environmental Prediction in Camp Springs, MD, to accelerate the transfer of research and development into improved NOAA operational climate forecasts, products, and applications. Early benefits from Climate Test Bed prototyping are reflected in recent



Dr. Harold Brooks from the NOAA National Severe Storms Laboratory (holding the computer mouse) leads a map discussion during a recent forecasting experiment involving NSSL researchers and forecasters from the NOAA Storm Prediction Center. The cornerstone of the testbed is the SPC/NSSL Spring Program, a series of annual experiments that attracts 50 to 60 researchers and forecasters to Norman each year. The premise of each Spring Experiment is to provide forecasters with a first-hand look at the latest research concepts and products, while immersing research scientists in the challenges, needs, and constraints of front-line forecasters. In practice, this program gives forecasters direct access to the latest research developments while imparting scientists with the knowledge to formulate research strategies that will have practical benefits. The end result is not only better severe-weather forecasts, but important contributions to the scientific literature as well.

improvements of U.S. seasonal forecasts. NOAA Research partners in the Test Bed include the Geophysical Fluid Dynamics Laboratory and the Climate Program Office.

NOAA Tests Unmanned Aircraft System

NOAA Research has tested Unmanned Aircraft System (UAS) platforms and is looking at these platforms to provide cost-effective means of performing missions not easily or as safely performed by manned aircraft, including:

- Conducting research over areas that pose significant risks to pilots
- Validating satellite measurements
- Providing counts of marine mammal populations

- Monitoring atmospheric composition and climate
- Hovering above hurricanes to gather critical data for input into hurricane models.
- Conducting long-endurance flights for weather forecasting
- Enforcing regulations over NOAA's National Marine Sanctuaries

In February 2006, NOAA used a UAS to conduct flight operations over the Hawaiian Islands Humpback Whale National Marine Sanctuary. In March 2006, NOAA participated in an air quality study in the Indian Ocean led by Scripps Institution of Oceanography that used UASs to observe aerosol-radiation-cloud-climate interactions.



A “Manta” Unmanned Aircraft System is prepared for launching on a test mission. NOAA Research is looking at UAS to perform missions that cannot easily or as readily be performed by manned aircraft. UAS platforms could provide cost-effective means to conduct research over areas that pose significant risk for pilots, to validate satellite measurements, to provide counts of marine mammal populations, to monitor atmospheric composition and climate, to hover above hurricanes and gather critical data for input into hurricane models, to conduct long-endurance flights for weather, and to enforce regulations over NOAA’s National Marine Sanctuaries.

Great Lakes Operational Forecast System Successfully Transferred to National Ocean Service

The Great Lakes Operational Forecast System (GLOFS), developed by the Great Lakes Environmental Research Laboratory and Ohio State University, was transferred to the National Ocean Service (NOS). GLOFS provides lake carriers, mariners, port managers, emergency response teams, and recreational boaters with present and future conditions of water levels, water currents and water temperatures. The system combines two NOAA products: “nowcast” for present conditions and “forecast” guidance for future conditions. Both use information generated by a three-dimensional hydrodynamic model that includes real-time data and forecast guidance for winds, water levels and other meteorological parameters to predict water levels, currents and temperatures at thousands of locations throughout the five lakes. Key products include data plots and animated map plots of water levels, water currents, and water temperatures.



The Great Lakes Operational Forecast System, which was 15 years of solid research and research operations in the making, provides lake carriers, mariners, port managers, emergency response teams and recreational boaters with present and future conditions of water levels, water currents, and water temperatures.

NOAA Research Partnerships Enhance Global Climate Observation System

NOAA’s Earth System Research Laboratory (ESRL) in Boulder, CO, in conjunction with the Canadian Network for Detection of Arctic Change (CANDAC) program and the Meteorological Service of Canada, established a research site located in Eureka, Nunavut, on Ellesmere Island, to make long-term climate measurements of Arctic clouds and aerosols. The NOAA observatory is operated in Canada’s High Arctic by the NOAA Arctic Programs Office through ESRL as a contribution to the U.S. Studies of Environmental Arctic Change (SEARCH) program. A collection of state-of-the-art scientific equipment has been assembled at the site, including cloud radar, high-spectral-resolution LiDAR (Light Detection And Ranging) and spectral and narrow-band radiometers. This observatory supports NOAA’s activities for the 2007 International Polar Year.

Scientists Internationally Honored for Ozone-Depletion Research

Dan Albritton, Acting Earth Systems Research Laboratory (ESRL) Director (retired) and Susan Solomon, of the ESRL Chemical Sciences Division (CSD), earned the United Nations Environment Programme/World Meteorological Organization (UNEP/WMO) Vienna Convention Award for their contributions toward the protection of the ozone layer. Albritton is one of the world's foremost experts on atmospheric science and co-chair of the Protocol's Science Assessment Panel since its inception. Solomon has led scientific expeditions to both the Antarctic and Arctic to investigate polar ozone depletion, and her research identified the cause of the Antarctic ozone hole. The award was presented as part of the celebration of the 20th anniversary of the Vienna Convention for the Protection of the Ozone Layer. Through the Protocol and its subsequent Amendments and Adjustments, the production and use of ozone-depleting substances has plummeted worldwide.

Tsunami Warning System Improved

NOAA's Pacific Marine Environmental Laboratory in Seattle, WA, has designed easy-to-deploy Deep-ocean Assessment and Reporting of Tsunamis (DART)-II technology, which provides two-way communication capabilities, allowing engineers to troubleshoot these systems from the lab and repair the systems remotely when possible. The new capability minimizes system downtime, especially in the harsh winter conditions of the North Pacific. Moreover, remote repair is far more cost-effective than deploying a ship. The DART program also created tsunami impact forecast models for nine major coastal communities, providing much-needed information for inundation maps. Plans call for the U.S. Tsunami warning network to total 39 DART II buoy stations (32 in the Pacific and seven in the Atlantic Basin) by mid-summer 2008.



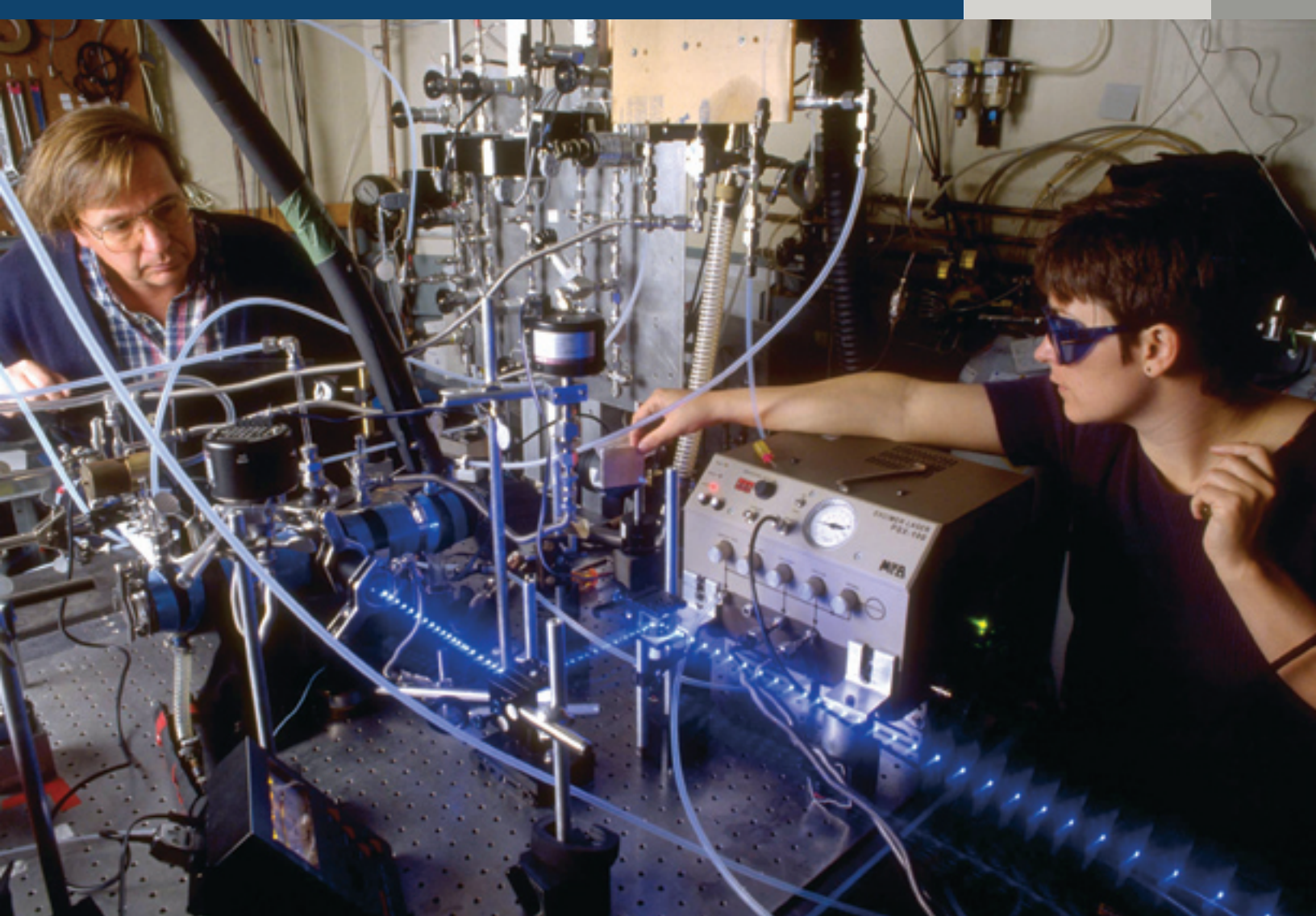
The Deep-Ocean Assessment and Reporting of Tsunami (DART) system was designed and built by NOAA to provide real-time tsunami detection as the waves travel across the open ocean. The newly installed stations are a more robust DART II, equipped with advanced two-way satellite communications that allow forecasters to receive and retrieve critical data. NOAA expects the network to total 39 DART II buoy stations by 2008 (32 in the Pacific and seven in the Atlantic Basin).

New Test for Red Tide and Fecal-Indicating Bacteria Could Assist Resource Managers

NOAA's Atlantic Oceanographic and Meteorological Laboratory in Miami, FL, developed techniques for red-tide and fecal-indicating bacteria markers indicative of human sources of fecal pollution, and a viral pathogen. The methods can be used to rapidly (in three to five hours) screen environmental water samples for the presence of microbial contaminants and work is underway to integrate them into semi-automated detection platforms. This tool could assist beach and resource managers in making more accurate and timely decisions regarding human health and safety.

New Test for Mercury Analysis Reduces Time and Costs of Analysis

Two Illinois-Indiana Sea Grant researchers have applied for a process patent on a mercury analysis technique that will make testing for methyl mercury, a highly toxic environmental contaminant, less expensive and faster. The main environmental risk to people and wildlife from mercury pollution comes via consuming methyl mercury that has accumulated in fish. To



In addition to intensive regional field studies, NOAA scientists conduct laboratory experiments to study chemical reactions that are important in air quality. Their quest for better understanding of processes that influence air quality is leading to development of models to forecast air-quality conditions. Photo by University of Colorado.

date, the number and scope of environmental studies of mercury have been limited due to the extreme cost of the testing. The new test promises to drastically reduce costs so scientists can increase monitoring and design better remediation strategies for contaminated sites.

Phased Array Radar Demonstrates Improved Scanning Speeds

The National Severe Storm Laboratory in Norman, OK, working with private-sector partners including Lockheed Martin, demonstrated that a complete volume scan around the Multi-functional Phased-Array Radar can be obtained in less than one minute. By comparison, the current NEXRAD radar

takes five to six minutes for such a scan. The development could increase lead times for severe weather warnings such as tornadoes.

New Global Model Shows Outstanding Ability to Simulate Past Climate and Increases Confidence in Future Projections

The new CM2.1 Global coupled climate model, developed by NOAA's Geophysical Fluid Dynamics Laboratory in Princeton, NJ, for climate research and prediction, was used for the current Intergovernmental Panel on Climate Change assessment of anthropogenic climate change. The model offers high credibility and was independently judged one of the world's best.



CM2.1 is used routinely for experimental seasonal forecasting, and provides greater credibility for projections of future climate change. Work is now underway to build an improved model (CM3) that will incorporate improved physics and use higher resolution. Moving to CM3 will improve NOAA's ability to simulate regional climate change, as well as changes in climate extremes. A crucial issue will be whether sufficient computing power will be available to support a higher-resolution model.

FUTURE OUTLOOK

In a world where changing demographics is causing a rising demand for scarce resources and putting more people in the path of natural hazards, NOAA Research strives to unlock the mysteries of variability in our oceanic and atmospheric systems at local, regional, and global levels, in support of NOAA's efforts to provide effective environmental service and stewardship to the Nation. This approach recognizes the importance of understanding the Earth system on time scales ranging from minutes to decades, and even longer, when investigating processes associated with climate, weather, water, and ecosystems. We are committed to providing the best available information and products to help decision makers plan for and respond to environmental challenges now and in the future.

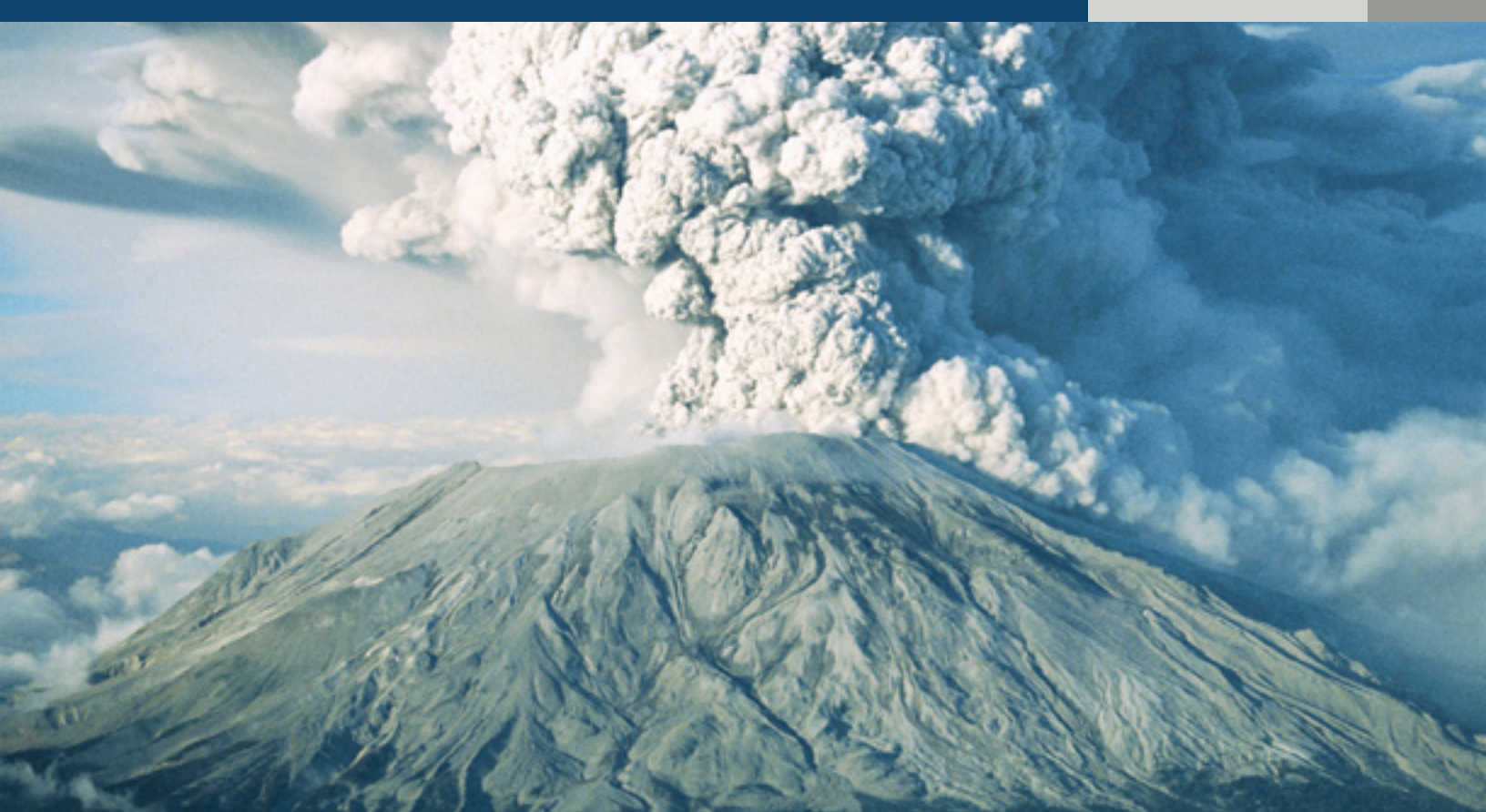
NOAA's science mission is challenging because of the complexity and interrelated character of the natural systems in which we work and live. NOAA scientists seek to explore and generate useful information regarding the complex interactions among our planet's air, water, land, and socio-economic systems. For example, each year we expand our knowledge of the ocean's role in influencing climate patterns; this insight contributes to our ability to understand the role of the dynamic climate system in weather phenomena around the world. The need for unbiased scientific information to support a multitude of decisions about environmental challenges has never been more critical.

NOAA Research creates a balance of near-term responsibility to enhance the operational and regulatory roles of NOAA and our stakeholders with a long-term commitment to conduct visionary, discovery-based research. This dual responsibility requires transfer of research to operations, as well as continued exploration and discovery in new areas that will expand the boundaries of our understanding of the Earth system and lay the foundation for the NOAA services of the future. NOAA Research also recognizes that new scientific ideas depend on the vast amount of data collected from observing systems and the management of that data, a cross-cutting priority of NOAA discussed in detail in the NOAA Strategic Plan. Through increased dialogue with constituents, we work to be more responsive to our customers' and partners' needs as we establish priorities and set new directions for research.

PRODUCTS AND SERVICES

Environmental Observation and Monitoring Networks

NOAA scientists collect air samples from all over the world, monitor ozone, record solar radiation, and observe the oceans to learn more about Earth's atmosphere and oceans. Much of these data are collected through global partnerships. The measurements have allowed NOAA scientists to resolve important questions regarding oceanic and atmospheric variability. In addition, long-term observations of physical, chemical, and biological parameters are used to



monitor current environmental conditions and provide a baseline for assessing future changes.

Interagency Field Experiments

NOAA Research scientists lead field experiments focused on the study of environmental phenomena. Fieldwork improves our ability to understand and predict the Earth's climate and atmosphere. Major efforts focus on: exploring the links between oceans and atmosphere in the eastern tropical Pacific; analyzing natural and anthropogenic climate change by aerosols; and tracking intercontinental movements of pollutants that result from human activity such as the increased concentrations of ozone particles, fine particles, and other chemically active "greenhouse" compounds. Increased levels of chlorine and bromine particles resulting from man-made uses, have increased the concentrations of ozone particles in the atmosphere. These experiments also monitor processes occurring in the ocean and atmosphere that are influenced by ocean currents.

Global Models

NOAA Research models of the atmosphere, ocean, and climate are becoming increasingly accurate and comprehensive in terms of predictive capabilities. More sophisticated prediction capabilities provide leaders in government and industry with better scientific information for decision making.

Scientific Assessments

NOAA Research plays a leading role in periodically assessing the state of scientific understanding on many environmental issues facing government and industry decision makers, including climate change, air quality, and ozone depletion.



Mary Kicza
Assistant Administrator

National Environmental Satellite, Data, and Information Service

The Nation's Eye on the Environment

NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) operates the Nation's civil operational environmental satellite system, taking constant observations of our Earth and its oceans and atmosphere. Satellite observations are turned into weather, climate, and other environmental products, services, and long-term recorded observations to benefit all people and all sectors of society. NOAA's satellites include Geostationary Operational Environmental Satellites (GOES) and Polar-orbiting Operational Environmental Satellites (POES). Together these two systems provide the U.S. space-based component of an operational global environmental monitoring system. On behalf of the Department of Defense, NESDIS also operates the Defense Meteorological Satellite Program (DMSP) spacecraft, part of the military's sixth generation of weather satellites. Additionally, on behalf of the Department of Commerce, NESDIS licenses the operation of commercial remote-sensing space systems.

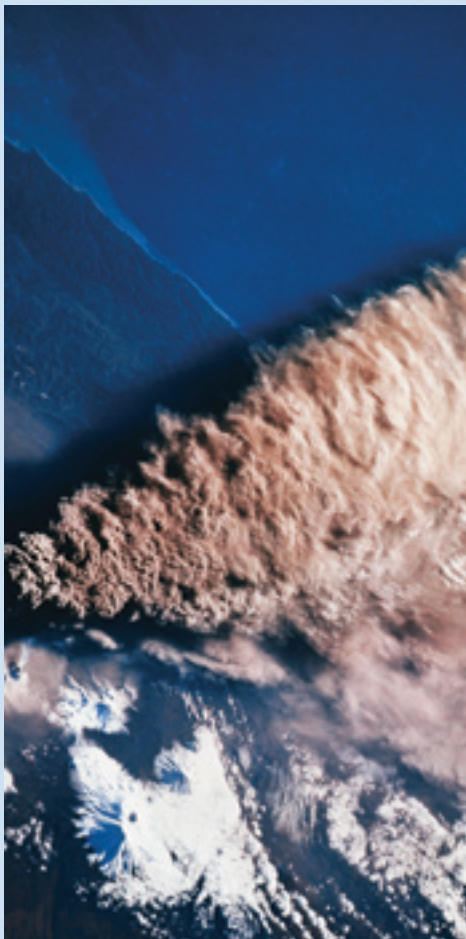
NESDIS also provides long-term stewardship of environmental data, managing the world's largest collection of atmospheric, geophysical, and oceanographic data derived from both *in-situ* and space-based systems. Environmental data directly impacts the national economy: Weather forecasts affect the tourism industry; solar weather information influences decisions on energy distribution. The data are used to monitor global food supplies and they play a key role in management of natural resources. NESDIS serves a broad spectrum of users from weather forecasters to climate scientists to coastal resource managers.

ACCOMPLISHMENTS

GOES-N Satellite Successfully Launched

On May 24, 2006, NOAA successfully launched the GOES-N satellite. Upon reaching final orbit, GOES-N was renamed GOES-13. This new satellite will supply data critical to fast, accurate forecasts and warnings for severe weather, including tornadoes, winter storms, and hurricanes. In addition, it will detect solar storm activity, relay distress signals from emergency beacons, monitor the oceans, and scan the landscape for drought and flood conditions.

GOES-13, the first spacecraft in the new GOES-N/O/P series, features a new satellite platform that will improve the performance and accuracy of the instruments. GOES-13 will



NOAA uses satellite observations in operational weather forecasts and a wide range of environmental applications.



On May 24, 2006, a Delta IV rocket carrying the GOES-N satellite successfully launched at Cape Canaveral, Florida. Upon reaching orbit, the satellite was renamed GOES-13. Photo by Carlton Bailie for Boeing.

expand measurements for the space and solar environment monitoring instruments. This satellite also features a new dedicated broadcast capability to be used by the Emergency Managers Weather Information Network and a new digital weather facsimile capability for higher-quality transmission of data and products. After successful satellite check-out, GOES-13 will be put into an on-orbit storage mode until it is needed to replace one of the two existing NOAA GOES spacecraft.

Future Geostationary Environmental Satellite Continuity

The GOES-R series, NOAA's next generation of geostationary satellites, promises significant technological advances in the quality and quantity of meteorological and environmental data NOAA provides its users. During FY 2006, the GOES-R program office awarded three Program Definition and Risk Reduction (PDRR) contracts. These contracts involve design efforts critical to defining the GOES-R program and developing options for moving forward with the program.

The GOES-R program office also successfully conducted the preliminary design review for the Advanced Baseline Imager (ABI), awarded the acquisition and operations contract for the Space Environmental In-situ Suite (SEISS), and awarded formulation contracts for the Geostationary Lightning Mapper (GLM), a first-ever capability that will greatly improve detection of lightning strikes.

Implementation of New Satellite Applications and Data Products

NESDIS operational systems regularly produced over 450 environmental satellite data applications and products during FY 2006. Fourteen experimental satellite products transitioned from the research stage into operational products, including the CoastWatch ocean color products used to facilitate coastal resource management. CoastWatch products are especially important for detecting harmful algal blooms. During FY 2006, NESDIS also assimilated data from the hyperspectral Atmospheric Infrared Sounder (AIRS)—an

NESDIS Provides Satellite Observations During Hurricane Season

NESDIS continues to provide critical, continuous satellite observations for use by hurricane forecasters throughout the hurricane season. The use of NOAA satellites for continuous geostationary observational coverage of the United States and the worldwide polar-orbiting coverage for long-range forecasts, enabled forecasters to predict the track and intensity of these severe weather events.

NOAA Satellite Operations Facility

During FY 2006, NESDIS employees began moving into the new NOAA Satellite Operations Facility (NSOF), in Suitland, MD. Staff and mission systems relocated from the outdated Federal Building 4 to this modern building that has garnered widespread acclaim, earning a Design Excellence citation and appearing in national publications. NSOF will house the NOAA satellite command and control functions and data and distribution activities that are central to the NESDIS mission. NSOF will also house the U.S. Mission Control Center for the Search and Rescue Satellite-aided Tracking program (SARSAT) and the National Ice Center (NIC), a joint NOAA/DoD mission to track ice floes and issue warnings to the Nation's maritime force. NESDIS will complete its move into the new building and become fully operational in FY 2007.

NPOESS

The joint NOAA, Air Force, NASA next-generation polar-orbiting satellite program, NPOESS, installed a new management team during FY 2006. The program underwent a Congressionally-mandated Nunn-McCurdy review due to program cost growth, which involved an evaluation of the program, its management, and costs. The result was a Nunn-McCurdy certification in June 2006 to Congress outlining a way forward for the program. The Nunn-McCurdy conclusion initiated steps to modify the program contract as well in order to reflect the new program. The first operational NPOESS satellite is expected

to launch in 2013, preceded by the NPOESS Preparatory Project (NPP), a risk-reduction satellite mission scheduled to launch in 2009.

COSPAS-SARSAT

During FY 2006, the international COSPAS-SARSAT program aided in the rescue of 264 people. SARSAT is the Search and Rescue Satellite-Aided Tracking system, while COSPAS is an acronym for the Russian words that translate to "Space System for the Search of Vessels in Distress." Of the FY 2006 rescues, 205 people were rescued at sea, 12 people were rescued from aviation events, and 47 people were rescued after setting off their Personal Locator Beacons (PLBs). Since the initiation of the program in 1982, over 20,300 people have been rescued worldwide. Of these, 5,334 were U.S. rescues.

FUTURE OUTLOOK

International events and technological progress have reshaped the global context in which NESDIS operates. Anticipating this rapid pace of change is vital to creating NESDIS's vision for the future. Future environmental observing capabilities, new information technology, and the growing needs and expectations of our numerous customers will present opportunities and challenges for delivering improved products and services to future customers.

Our national security, economy, and environment have become inextricably linked. No single environmental observing platform can fulfill all environmental remote-sensing requirements. Therefore, our customers need the best mix of observations from available and planned platforms and sensors. The upcoming expansion of advanced satellite instruments and data from such systems as NPOESS, the next generational geostationary satellites (GOES-R), and the European polar meteorological satellite program (MetOp) present a daunting challenge as we move toward the production of significantly better forecasts from numerical weather prediction models. We must use operational satellite observing systems comprehensively to extract the best-quality products as we plan for observing systems that serve both weather and climate system needs.

We must also realize the full potential of current and future satellite and ground-based data and provide timely environmental data relevant to current and future economic and environmental issues on the local, regional, national, and global scale.

Striving to be the source of the most comprehensive and easily-accessible satellite products, data, and environmental information and assessments in the world, NESDIS will continue to operate and develop the world's premier environmental satellite systems. It will lead efforts with other agencies and countries to establish a global observing system to meet the world's weather, climate, ocean, and hazards support information needs. NESDIS will also implement new technologies to archive and provide access to massive amounts of new data that describe our climate, fulfilling growing customer requirements for quality and timely state-of-the art products and services.

NESDIS PLATFORMS, PRODUCTS, AND SERVICES

Geostationary Operational Environmental Satellites

NESDIS operates a system of Geostationary Operational Environmental Satellites (GOES) that provide data for short-term weather warnings and forecasts. GOES orbit the Earth at 22,600 miles above the equator. Two GOES satellites remain operational at all times—one providing coverage of the eastern United States and most of the Atlantic Ocean and the other providing coverage of the western United States and the Pacific Ocean basin. There is one spare GOES in orbit ready to take over in the event an operational GOES fails.

GOES satellites provide images of the entire United States every 15 minutes and are capable of imaging as frequently as every minute to monitor the development of severe weather. NOAA's National Weather Service uses GOES temperature and water vapor data in powerful numerical prediction models to form the basis of local weather forecasts and warnings for severe weather events. GOES images are

seen every day on local and national television weather shows.

The next generation of geostationary satellites, the GOES-R program, will offer improved spacecraft and instrument technologies and will maintain geostationary satellite data continuity into the future. GOES-R sensor and system advancements will result in more timely and accurate weather forecasts and improve support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and, ultimately, economic health and development.

Polar-orbiting Satellite Systems

The NESDIS Polar-orbiting Operational Environmental Satellite (POES) system provides an uninterrupted flow of critical global information used in global numerical weather models. Continuous global temperature and humidity values from the POES system provide critical inputs for quality three- to five-day and long-range temperature, precipitation, and snow forecasts. The system also monitors global sea surface temperature, indicating the location, onset, and severity of events such as El Niño as early as possible. Earlier warnings of these impending events allow emergency and agricultural managers to activate plans to reduce the impacts of floods, landslides, and droughts.

The U.S. Government has traditionally maintained two polar weather satellite systems, one for civil purposes and one for military purposes. In 1994, a Presidential Decision Directive created the National Polar-orbiting Operational Environmental Satellite System (NPOESS) to converge these programs. NPOESS will provide a single, improved national system capable of satisfying both civil and national security requirements for real-time, space-based, remotely sensed environmental data. NOAA will also receive data from and share data with its European partner, the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), who launched its first MetOp satellite in October 2006.

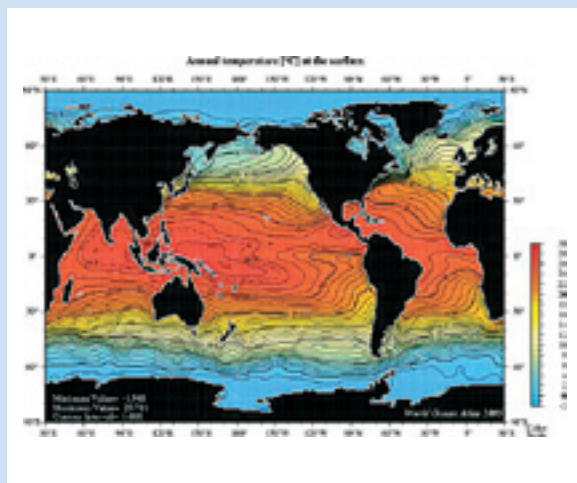
Coral Reef Information System (CoRis), and the Global Ocean Data Assimilation Experiment (GODAE) High Resolution Sea Surface Temperature Pilot Project.

NODC also operates the NOAA Library and Information System, which consists of the NOAA Central Library in Silver Spring, MD, and the Seattle, WA, and Miami, FL, Regional Libraries. The NOAA library data collection consists of more than 1.7 million volumes and thousands of visual images on topics related to NOAA's diverse missions. Access to the library collection and information services is available through the Web, which routinely handles more than 250,000 queries a month.

National Climatic Data Center (NCDC)

Located in Asheville, NC, NOAA's NCDC archives billions of meteorological observations, making it the largest climate data center in the world. NCDC receives, processes, archives, and disseminates surface, marine, upper air, radar, and solar radiation data and environmental observations.

NCDC serves a large and diverse community, responding to more than one million requests per year. It makes environmental data and information available through both the Internet and physical delivery of products and services.



NOAA's National Oceanographic Data Center (NODC) completed updates to the World Ocean Database and World Ocean Atlas in 2006. This figure from the World Ocean Atlas depicts global surface ocean temperature.

In response to the exponential growth of radar and satellite observations being archived—on the order of several petabytes—NOAA is implementing the Comprehensive Large Array-data Stewardship System (CLASS).

NCDC data benefits sectors such as energy development and conservation, power and food production, healthcare, construction planning and scheduling, air pollution control, and transportation. NCDC also performs climatic applications studies for other government agencies, including NASA, the Environmental Protection Agency, and the Departments of Defense and Energy.

National Coastal Data Development Center (NCDDC)

NOAA established NCDDC at the Stennis Space Center in Mississippi to archive and provide access to the long-term coastal data record. Coastal resource managers, the research community, coastal weather forecasters, fisheries managers, and others have demanded that marine data be made more accessible to help our Nation acquire a better understanding of the health of our coastal environment. NCDDC's goal is to improve the quality of and accessibility to marine data characteristics (such as chemistry, biology, and geology) and to physical parameters (such as water levels, bathymetry, winds, and waves). Working with Federal, state, and local agencies, academic institutions, nonprofit organizations, and the private sector, NCDDC will create a unified, long-term database of coastal data sets. It will also develop and maintain a catalog of available coastal data, ensure the quality of these data, and provide online access to the coastal user community. Additionally, NCDDC will produce retrospective analyses and trend information to help form the basis for environmental assessment and public policy.

National Geophysical Data Center (NGDC)

Located in Boulder, CO, NOAA's NGDC provides scientific stewardship, products, and services for geophysical data describing the solid earth, marine, and solar-terrestrial

environment, as well as Earth observations from space. NGDC's data holdings currently contain more than 400 digital and analog databases. Digital databases at NGDC include more than 20 million data records. As technology advances, so does the search for more efficient ways of preserving these data. NGDC works closely with contributors of scientific data

to prepare documented, reliable data sets and continually develops data management programs that reflect the changing world of geophysics. As an example of its work, NGDC is participating in NOAA's program to address the threat of tsunamis by producing tsunami inundation models.



Illustration of NOAA GOES-N/O/P series spacecraft. Source: NASA.



Navy rescue at sea aided by satellite. Source: U.S. Navy.

NOAA Search and Rescue Satellite Aided Tracking (SARSAT) System Saves Lives

COSPAS-SARSAT is an international search-and-rescue system that uses satellites to detect and locate emergency beacons carried by ships, aircraft, and individuals. The system consists of a network of satellites, ground stations, mission control centers, and rescue coordination centers. Here are some highlights of 34 SARSAT rescues that occurred in FY 2006.

On January 15, 2006, a 406 MHz distress beacon was detected 1300 nautical miles (nm) east of the Caribbean Islands in the middle of the Atlantic Ocean. The two people onboard the vessel, who were taking part in the Woodvale TransAtlantic Rowing Race, activated their Emergency Position Indicating Radio Beacon (EPIRB) after the vessel started taking on water. The boat, named the American Fire, capsized in heavy seas, and their lifeboat was lost, but they did manage to climb atop the overturned boat. The 180-foot two-masted sailing vessel the Stavros S. Niarchos sailed to the scene and rescued the two rowers.

On February 27, 2006, the COSPAS-SARSAT system detected a 406 MHz distress beacon located 52 nm south of Wainwright, AK, where a beacon was activated when the victim's snowmobile broke down. North Slope Borough Search and Rescue dispatched a two-man search team, because the weather was too severe for helicopter launch. The victim was rescued 14 hours later by the rescue team.

On May 20, 2006, a 406 MHz distress signal was detected 10 nm south of Pensacola Pass, FL. The crew of the pleasure craft Cisco Kid activated their EPIRB when the vessel capsized.

Using the point-of-contact information in the registration data, Coast Guard District Eight determined that the vessel was underway. Using the location data provided in the SARSAT alert messages, Coast Guard Station Pensacola launched a 41-foot utility boat which rescued the five people from the vessel's life raft.

On June 2, 2006, the COSPAS-SARSAT system detected a 406 MHz distress beacon on Montaque Island, AK. Coast Guard District 17 launched a HH-60 from Air Station Kodiak. On arrival, the helicopter located a crashed Cessna 182. The helicopter picked up the pilot and his dog and transported them to Valdez, AK.

On July 19, 2006, the COSPAS-SARSAT system detected a 121.5 MHz distress beacon 42 nm northwest of Bettles, AK. This signal came from within the gates of Artic National Park. A couple rafting on the Wild River activated their beacon after the raft overturned. The National Park Service arranged for a helicopter to recover the distressed rafters.

On July 24, 2006, Coast Guard Division 17 received a request for assistance from the 654-foot Singapore flagged, automobile carrier COUGAR ACE as the vessel was listing approximately 80 degrees with 23 persons aboard. Because of several conflicting position reports, the Coast Guard directed the crew of the COUGAR ACE to activate their 406 MHz EPIRB. The COSPAS-SARSAT system detected a 406 MHz distress signal 240 nm south of Adak, AK. The Coast Guard then launched an HH-60 Jayhawk rescue helicopter and crew from Air Station Kodiak. They worked with two Air National Guard Pavehawk helicopters with rescue crews from Kulis Air National Guard Base and successfully hoisted the 23 crewmembers of the COUGAR ACE to safety.





Coast Guard responds to distress signal detected by COSPAS-SARSAT system. Source: U.S. Coast Guard.



*Rear Admiral Samuel P. DeBow, Jr.
Director, Office of Marine and Aviation
Operations and NOAA Corps*

NOAA Marine and Aviation Operations

On the Sea and in the Air

The mission of NOAA Marine and Aviation Operations (NMAO) is to manage, operate, and maintain the Nation's largest domestic fleet of research and survey ships and aircraft, which collect data for NOAA's varied environmental programs. NMAO also manages NOAA's Diving Program and the NOAA Commissioned Officer Corps (NOAA Corps), one of the Nation's seven uniformed services. NMAO employees are General Schedule (GS), wage grade, and wage marine civilians, as well as commissioned officers.

NOAA ships operate world wide, supporting a wide range of common and unique oceanic and atmospheric activities, including fisheries and coastal research, nautical charting, and long-term ocean and climate studies. The ships are equipped and designed to support scientific programs, and have data collection capabilities generally not found in the commercial fleet. For example, NOAA fisheries vessels can conduct joint operations of fishery stock assessments and oceanography, giving scientists a complete picture of a fish species, its habitat, and the physical oceanographic properties of its surrounding environment.

NOAA aircraft operate throughout the world, collecting data for national programs ranging from hurricane prediction and winter storm research, to snow-pack surveys for flood prediction and water resource management, coastline mapping for erosion studies, and marine mammal surveys. NOAA's aircraft are unique, being continually reconfigured to carry instruments needed to support scientific missions.

The NOAA Corps operates and manages NOAA ships and aircraft, and brings its operational expertise and knowledge of platform capabilities to land-based assignments throughout NOAA. NOAA Corps officers work in locations as diverse as NOAA's mission, serving in management and technical positions throughout all Line Offices of NOAA. They can be readily assigned to any area in the agency or Nation as needed. In addition, a NOAA Corps officer is director of NOAA's Homeland Security Program Office. NOAA Corps officers are in the vanguard of those advancing NOAA's Homeland Security efforts—specifically, keeping the agency up and running in the event of an emergency. Along with other Line Office representatives, rotating NOAA Corps watch officers bring a broad understanding of NOAA, integrating NOAA's assets and services into national Homeland Security operations at the Department of Homeland Security Operations Center. These officers help staff the Center round-the-clock during significant events such as hurricanes, earthquakes, and tsunamis.





NOAA will replace RUDE with a new coastal mapping vessel. Shown is an artist's rendering of the newly designed Small Waterplane Area Twin Hull (SWATH) vessel.

ACCOMPLISHMENTS

Ship Modernization Moves Forward

This was another milestone year for NOAA's fleet modernization. NMAO celebrated two major construction milestones in June. VT Halter Marine, Inc. began construction of the last of four new fisheries survey vessels (FSV) of the same class. FSV 4 will be home-ported on the West Coast and will be operational in FY 2009. Also in June was the keel-laying ceremony for FSV 3, PISCES, which will be home-ported in Pascagoula, MS, starting in FY 2008. NOAA Ship PISCES was named by a team of students from Sacred Heart School in Mississippi through a NOAA ship-naming contest. In July, NOAA accepted delivery of FSV 2, HENRY B. BIGELOW, which will be home-ported in New England. The ship will be commissioned in the spring of 2007.

NMAO also exercised an option with VT Halter Marine in September to complete the final design and construction of a new Small

Waterplane Area Twin Hull (SWATH) Coastal Mapping Vessel to be operational in FY08.



Dr. Annette Nevin Shelby, PISCES ship sponsor and wife of Senator Richard Shelby of Alabama, welds initials on keel plate during the keel laying ceremony.



A Doppler radar will be installed on NOAA's Gulfstream-IV hurricane surveillance jet, helping forecasters more accurately predict hurricane intensity.

NOAA Acquires a Third P-3 Orion Aircraft

The Navy transferred a “retired” P-3 aircraft to NOAA in response to the hurricane supplemental bill attached to the FY 2006 Defense appropriations legislation. Rehabilitation of the P-3 is expected to be completed by the start of the 2008 hurricane season. The first milestone was reached in September with the successful flight of the aircraft from the Navy’s aircraft storage facility in Arizona to Halifax, Nova Scotia, where the primary rehabilitation work will be done.

Gulfstream-IV Doppler Radar Contract Option Exercised

NMAO exercised a contract option with King Aerospace, Inc., of Addison, TX, for the construction, integration, and system testing for a tail Doppler radar (TDR) to be installed on the G-IV hurricane surveillance jet. The TDR system will enable the G-IV to acquire three-dimensional hurricane core wind field data for improved hurricane intensity forecasts.

NOAA Platforms and Charters Advance Data Acquisition and Global Observations

NMAO employs a mix of NOAA platforms and charters to fulfill NOAA’s data acquisition needs. The data supports such varied missions as climate change research, nautical charting, flood forecasting, fisheries management, and ocean exploration. Data acquired aboard NOAA ships and aircraft across the globe will become an important component of the emerging Global Earth Observation System of Systems (GEOSS), through which NOAA is working with its Federal partners and over 60 countries to develop a global earth observation network.

During FY 2006, NOAA aircraft logged 3,035 mission flight hours and NOAA ships accomplished 3,884 operating days in support of NOAA’s programs. NOAA programs outsourced 3,005 mission flight hours. NMAO also accomplished 354 outsourced ship operating days to meet additional program needs. Another 1,620 outsourced operating days were accomplished by NOAA using Line Office program funds.



Senior NOAA leaders take a mandatory aviation survival skills course in preparation for new aviation safety requirements for flying over water.

NOAA Aviation Safety Policy Signed

VADM Conrad Lautenbacher signed NOAA Administrative Order (NAO) 209-124, establishing a NOAA Aviation Safety Policy, making aviation safety the number one priority for all aviation operations. The NAO also establishes a corporate Aviation Safety Program and an Aviation Safety Board responsible for administering this program and developing the necessary policies, procedures, tools, and training to promote aviation safety in NOAA. The NAO became effective on October 1, 2006.

NMAO Publishes First *Teacher in the Air* Book

NOAA's Teacher at Sea program, managed by NMAO, published its first *Teacher in the Air* book in April. The book was co-authored by a former Teacher at Sea, Diane Stanitski, associate professor in the Geography-Earth Science Department at Shippensburg University, and Lieutenant Commander John Adler, NOAA Corps, a NOAA P-3 aircraft navigator. The book was illustrated by Bruce Cowden, chief boatswain of the NOAA Ship RONALD H. BROWN. The book, aimed at middle school students, is a fictionalized account of a teacher's experiences aboard the NOAA P-3 Orion Hurricane Hunter from Bangor, ME, to Baltimore, MD, during the 2005 Hurricane Awareness Tour. The book was unveiled at the National Science Teachers

Association conference in April. It has been widely disseminated to teachers and students across the nation and has received outstanding reviews.

Marine Operations Center-Atlantic Gets Top Recognition in Elizabeth River Project

The Marine Operations Center-Atlantic (MOC-A) in Norfolk, VA, was recognized for its efforts to improve the quality of the Elizabeth River through energy savings, pollution prevention, and habitat restoration. MOC-A was approved as a Model (highest) level River Star within the Elizabeth River Project (ERP). River Stars are groups or businesses recognized in the community for their environmental stewardship and leadership. Since the inception of the ERP in 1996, more than 70 organizations have been recognized as River Stars, but this is the first time in ERP history that an organization has been inducted at the Model level.



NMAO published its first *Teacher in the Air* children's book. This original illustration was used on the cover of the book.

Two NOAA Corps Basic Officer Training Classes Graduate

Thirty-two officers successfully completed the three-month NOAA Corps Basic Officer Training Classes (BOTC) during FY 2006. This intense training encompasses ship management, bridge operations, radar plotting, navigation, firefighting, service protocol, and other skills at the U.S. Merchant Marine Academy in Kings Point, NY. With the induction of BOTC 110 in fall 2006, the NOAA Corps reached its authorized strength of 299 officers.

NOAA Transfers McARTHUR to Utrok Atoll

NOAA signed a Memorandum of Agreement to transfer the decommissioned NOAA Ship McARTHUR to the local government of Utrok Atoll, part of the Republic of the Marshall Islands. The transfer was authorized by Congress. Utrok will sell the vessel to a third party based in Seattle, subject to remediation of onboard hazardous materials, and use the funds for “activities in support of rehabilitation, radiological monitoring, and resettlement of the people of Utrok.”



FUTURE OUTLOOK

Emerging mission requirements such as homeland security, ocean exploration, and habitat mapping will place additional demands for ship and aircraft data acquisition. NMAO will face the challenges of providing multi-mission-capable platforms, up-to-date technology, and highly skilled NOAA Corps officers and civilian personnel to support its five mission goals:

- Improve the efficiency of existing NOAA platforms
- Modernize or replace aging platforms with platforms that have the capabilities to serve more than one Line Office
- Incorporate into the fleet emerging technologies such as unmanned aircraft systems and autonomous underwater vehicles
- Recruit and retain a motivated and technically competent workforce
- Achieve a proper mix of in-house and contracted work to meet these needs

PRODUCTS AND SERVICES

NOAA Commissioned Officer Corps

The NOAA Commissioned Officer Corps operates and manages NOAA ships and aircraft, while bringing operational expertise and knowledge to land-based NOAA programs through rotational assignments. Officers work under a personnel system similar to that of the U.S. Armed Forces, giving them the flexibility to move rapidly into disaster-response situations. NOAA Corps officers work closely with other uniformed services: They coordinated many of NOAA’s hurricane response activities with the U.S. Coast Guard, Army Corps of Engineers, and Navy following Hurricanes Katrina and Rita and flew remote-sensing missions over the collapsed World Trade Center and Pentagon after September 11, 2001, at the request of the Army. NOAA Corps officers, with their flexibility and broad-based experience, leadership, and operational and management skills, are a valued resource used by all NOAA Line Offices to achieve mission goals.

Data Collection and Global Observations

NOAA ships and aircraft have sophisticated data collection capabilities, such as Doppler radar on the RONALD H. BROWN, state-of-the-art acoustic technology aboard the new fisheries survey vessels, and Stepped Frequency Microwave Radiometers on the WP-3D Orion hurricane research aircraft. Most ships are equipped with an NMAO-developed Scientific Computer System, which integrates data from ship-board and deployed sensors into one central system, enabling scientists to make research decisions based on real-time data access and visualization.

The Fisheries Scientific Computer System addresses the specific needs of fisheries data collection. Additionally, NMAO has developed capabilities that enable ships at sea to connect to the Internet on a limited basis to transmit research data, real-time images of ship personnel and scientists at work, and other valuable products and services. The data collected from sensors on NOAA platforms make these platforms an essential component of the Global Earth Observation System of Systems (GEOSS).

Outsourcing Support

NMAO provides guidance and staff support to NOAA programs interested in obtaining chartered ships and aircraft. NMAO recommends chartering options to NOAA programs and ensures that platforms are safe and outfitted to meet program requirements.

Aviation Safety Program and Small Boat Safety Program

To promote safe use of small boats and aircraft, NMAO manages two safety programs.

The NOAA Small Boat Safety Program provides support to ensure that NOAA offices that use small boats to meet their mission requirements have properly trained personnel, appropriate equipment, and safety standards. The safety program provides standardized operator training and safety equipment, assistance with boat acquisition and alterations, and routine safety inspections.

When fully implemented, the NOAA Aviation Safety Program will provide support to ensure that NOAA personnel who use commercial aviation services or NOAA aircraft to meet their mission requirements are properly trained in basic safety and provided with aviation life support equipment. The program ensures that contracted aircraft meet NOAA airworthiness and operational safety standards and that these standards are incorporated in aviation services procurement documents.

NOAA Diving Program

The NOAA Diving Program (NDP) oversees and manages NOAA diving personnel, equipment, and activities to ensure that all diving operations are performed safely and efficiently. The program provides beginner and specialty dive training to NOAA employees and outside agencies, including the Federal Bureau of Investigation, the U.S. Environmental Protection Agency, the U.S. Secret Service, the U.S. Fish and Wildlife Service, and local law enforcement. Averaging more than 15,000 dives per year, the NDP has consistently maintained an excellent diving safety record (99.97% safe dive statistic).

NOAA Teacher at Sea and Teacher in the Air Programs

Now in its 16th year, the NOAA Teacher at Sea Program has enabled more than 450 educators to gain hands-on NOAA research experience at sea. Each year, approximately 30 kindergarten through college-level educators spend time aboard NOAA hydrographic, oceanographic, and fisheries survey and research vessels.

Teachers become a part of the NOAA research team and crew by living and working side-by-side with the scientists. This unique opportunity provides the teachers with a new understanding of NOAA science and shipboard life, enriching their lives, as well as their curricula. While onboard, teachers write daily logs, take photos, and interview scientists and crew. Some teachers use the Internet to communicate their experiences to students back home.

NOAA's successful Teacher at Sea program has led to the creation of an offshoot-NOAA Teacher in the Air—where teachers fly with NOAA on airborne missions.



Mary M. Glackin
Assistant Administrator

NOAA Office of Program Planning and Integration

Guiding NOAA Strategically

The NOAA Office of Program Planning and Integration (PPI) helps NOAA fulfill its vision and mission through strategic planning, corporate leadership and the application of matrix management principles to major NOAA programs. PPI is driven toward the ideal of one NOAA working together, guided by a clear strategic vision for planning, programming, and execution to achieve its mission goals and mandates. Strategic planning and management of NOAA's activities work best when those who benefit from these activities and those who provide NOAA's services contribute to the process. As such, PPI works with stakeholders, employees, and domestic and international partners to ensure every initiative—existing or new—arises from a collaborative effort. PPI believes that more-developed and better-executed NOAA programs foster richer, more productive partnerships with the public, private, and academic sectors and improved outcomes for the nation.

PPI defines NOAA's high-impact missions and focuses Agency-wide attention on them through the formal *Strategic Planning and Performance Evaluation*. PPI develops the *NOAA Strategic Plan*, which articulates NOAA's long-range vision and path for the future. PPI also develops the *Annual Guidance Memorandum*, which provides annual adjustments to the direction of NOAA program priorities. Both products demand yearly assessment of emerging challenges and opportunities and yearly evaluation of NOAA's priorities and progress. PPI strives to improve the efficiency and effectiveness of NOAA's strategic planning processes, using research and economic evaluations as the basis for identifying the changing national needs in NOAA mission areas.

PPI not only creates NOAA's strategy and updates it annually, but also continually maintains NOAA's internal strategic alignment through *Program and Policy Integration*. It provides corporate management to coordinate NOAA's many lines of service with the nation's many needs for environmental information and stewardship. It ensures that Agency investments and actions are guided by the *Strategic Plan* and *Annual Guidance Memorandum*; are based on sound social and economic analysis; adhere to executive branch and legislative branch science, technology and environmental policy; and integrate the full breadth of NOAA's resources, knowledge and talent to meet its stated mission goals.





ACCOMPLISHMENTS

PPI Provides Leadership for Policy Integration Efforts

Through internal leadership and effective interaction with NOAA's interagency partners, PPI improved NOAA's responsiveness to Administration policy priorities related to the U.S. Climate Change Science Program (CCSP) and the U.S. Ocean Action Plan (OAP). The CCSP held a well-attended workshop for congressional, Federal, state, and local policy-makers as well as academia and non-governmental organizations to address the capability of climate science to inform decision-making. Topics included a discussion of decision-maker needs for scientific information on climate variability and change and other activities necessary for resource management, planning and policy formulation. The CCSP also issued the first of 21 Synthesis and Assessment

Products with an important revision to improve understanding of climate change and human influences on temperature trends. The OAP designates NOAA as lead or co-lead of 45 activities. PPI has played a significant role in NOAA's implementation of 27 of these activities in FY 2005-06.

PPI Assistant Administrator Mary Glackin co-chairs the 19-member interagency Subcommittee on Integrated Management of Ocean Resources (SIMOR). In FY 2006, SIMOR focused near-term actions on 21 activities in four priority areas, including support for regional collaboration in the Gulf of Mexico, the Northeast, and Alaska.

Changes to Planning Process Instituted

PPI's *Annual Guidance Memorandum (AGM)* articulates NOAA's highest programmatic and



organizational priorities and frames the efforts of NOAA's Goal Teams and Program Managers for strategic planning. The AGM for FY 2009–13 employed new and more systematic methods for gathering and synthesizing stakeholder views on NOAA's priorities within the planning process. Using these new methods, and by changing the planning timeline, PPI generated higher levels of collaboration with stakeholders and fostered greater corporate alignment of NOAA-wide programs on high-impact mission areas and requirements.

PPI Is Instrumental in Establishing Requirements Management Policy

NOAA established and implemented a Requirements Management policy (NOAA Administrative Order, NAO 216-108) to achieve our strategic goals, execute our responsibilities to our customers, improve resource utilization, anticipate future opportunities and challenges, and strengthen the implementation of enterprise-wide solutions. Requirements Management includes using program charters, defining and tracking major projects, and ensuring effective and efficient transition of research to applications and NOAA Program outcomes.

Significant progress was made on each of these tasks in FY 2006, including creation of program charters, establishment of a management council to review major projects, and adoption of implementation procedures that provide a generic framework for NOAA's 45 transition projects.

NEPA Coordination Keeps Pace with Growth

In 2006, to keep up with the 20 to 25 percent growth in environmental review documents over the past two years, PPI revised and created a series of important National Environmental Policy Act (NEPA) products. Products include a revised NOAA NEPA Handbook, Regional Environmental Resource Tools, and creation of the NOAA NEPA Intranet to widely distribute NOAA NEPA policies, guidance, and tools to NOAA NEPA staff.

PPI represented NOAA and the Department of Commerce and contributed to three Council on Environmental Quality (CEQ) NEPA Modernization working groups focusing on collaboration, adaptive management, and training.

Regional Policy Solutions to Environmental Problems

In 2002 and 2003, the NOAA Administrator established five Regional Coordination pilot programs with the charge to improve coordination across Line Offices and enhance NOAA's corporate image. PPI is now leading NOAA's efforts to expand this concept of regional coordination to regional collaboration—building our existing “One NOAA” outreach capabilities and improving our products and services by integrating NOAA's efforts to solve environmental problems that are important at both the national and regional scale.

For this effort, three programmatic priority areas where NOAA can take immediate action with current capabilities and have been identified: Integrated Ecosystem Assessments, Integrated Water Resource Services, and NOAA contributions to Hazard Resilient Coastal Communities. These priority areas are consistent with the FY 2009-13 *Annual Guidance Memorandum*, and combined with a systematic approach to outreach, integration of NOAA's work in these areas will support and advance NOAA's strategic priorities and improve relationships with partners, stakeholders, and customers on a regional basis.

SERVICES

Strategic Planning. PPI is responsible for managing the NOAA-wide planning cycle and for producing its outputs. These include annual updates to the NOAA *Strategic Plan* and release of the *Annual Guidance Memorandum*, which articulates yearly investment priorities. PPI designs planning guidance for NOAA programs, oversees their planning processes, and monitors and evaluates program implementation. It also manages the interface with NOAA stakeholders and acquires, synthesizes and responds to their inputs. The strategic planning element employs PPI's expertise in social, economic, and policy analysis to understand and evaluate the societal impact of NOAA programs.

Performance Evaluation. PPI leads NOAA's development of performance measurements, both at the program and the corporate level.

It refines their content over time and ensures their consistent and appropriate use across diverse management and reporting processes. PPI is the interface to NOAA's budget office regarding metrics and performance reports to the Department of Commerce, the Office of Management and Budget, and to Congress.

Program Integration. PPI provides oversight of the direction, integrity, and performance of NOAA programs and program structure. NOAA has adopted a matrix organizational structure to ensure that its functions meet its mission goals. PPI develops the capacity and integrity of programs within the matrix. This includes the integration of social science research and analysis capabilities. PPI improves the efficiency and effectiveness of the Planning, Programming, Budgeting and Execution System (PPBES) across the Agency. It provides communications and outreach to programs, NOAA Goal Teams, and Councils to strengthen the PPBES process.

Policy Integration. PPI represents NOAA in interagency forums, including its compliance with the National Environmental Policy Act and the U.S. Ocean Action Plan. PPI catalyzes, launches and monitors the implementation of new internal policies that are needed to advance program integration and improve program performance. It guides and monitors the progress of policies on such issues as the transition of research to applications, NOAA's partnerships with the private and academic sectors, and its use of social science to measure performance and prioritize activities.

National Environmental Policy Act Responsibilities. Successfully meeting the requirements of NEPA is an essential element of achieving program and NOAA-wide outcomes. The NOAA NEPA Coordinator in PPI ensures NEPA compliance in NOAA by reviewing and clearing all NEPA documents and other elements of NEPA compliance in NOAA, and by developing and training NOAA and Department of Commerce staff on national NEPA policy and guidance. PPI also provides a liaison to the U.S. Environmental Protection Agency and the Council on Environmental Quality.



NOAA

FINANCIAL OVERVIEW



Maureen E. Wylie
Chief Financial Officer

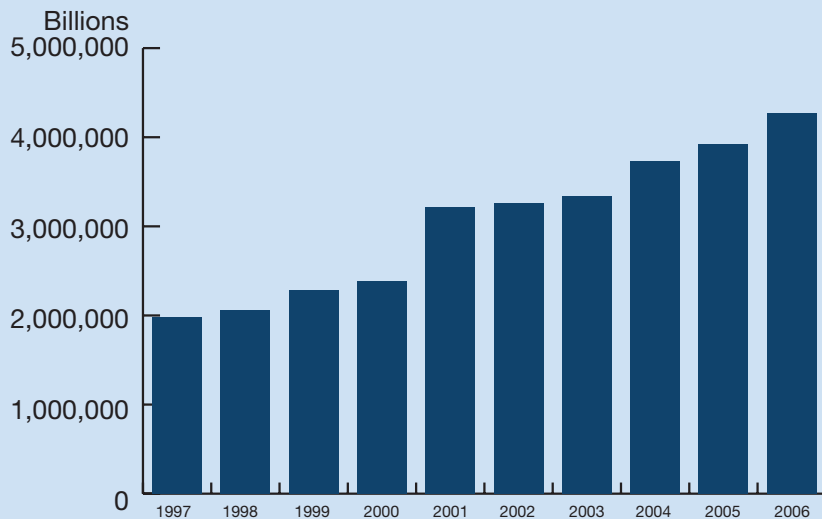


Budget Overview

NOAA's total budget appropriation was \$4.27 billion for Fiscal Year 2006. These funds were directed toward fulfilling NOAA's statutory and legal obligations, as well as Congressional responsibilities. NOAA conducts research and gathers data about the global oceans, atmosphere, space, and solar activities, and applies this knowledge to science and services that touch the lives of all Americans. NOAA warns of dangerous weather, charts our seas and skies, guides us in the wise use of ocean and coastal resources, and conducts research to improve our understanding and stewardship of the environment that sustains us all. Over the last 10 years, NOAA's appropriated funding level has grown by 54 percent.

NOAA's budget is composed of several appropriations and special fund accounts. NOAA's two main appropriations are Operations, Research and Facilities (ORF) and Procurement, Acquisition and Construction (PAC). The ORF account funds core NOAA operations, such as advanced, short-term forecast and warning services; fisheries and protected species management; and coastal ecosystems health responsibilities. NOAA's PAC account was created in FY 1999 in response to requirements of the Federal Acquisition Streamlining Act of 1996. This account captures funding for multi-year capital projects and seeks advanced appropriations for projects that are in the acquisition stage. NOAA's other accounts, aggregated in the Non-ORF total Budget authority, include the Damage Assessment and Restoration Revolving Fund, the Coastal Zone Management Fund, and various fisheries funds.

NOAA Budget Growth (in billions)



NOAA resources fund programs that enhance our scientific understanding of the oceans and atmosphere in order to sustain America's environmental health and economic vitality. From weather forecasting to fisheries management, from safe navigation to coastal services, from remote sensing to climate research and ocean exploration, NOAA is at the forefront of many of this Nation's most critical issues. NOAA's resources are used to develop the science necessary to improve weather, water and ecosystem forecasts of the future, as well as give policy makers the data they need to make important decisions related to climate change.

Resources by Line Office

(FY 2006)	Amount
NOAA Ocean Service	\$613,439,000
National Marine Fisheries Service	\$956,705,000
NOAA Office of Oceanic and Atmospheric Research	\$379,610,000
National Weather Service	\$854,043,000
National Environmental Satellite, Data and Information Service	\$952,220,000
Office of Marine and Aviation Operations	\$240,560,000
Program Support	\$269,843,000

FY 2006 Strategic Plan Goals

The 21st century poses complex challenges for the National Oceanic and Atmospheric Administration. Every aspect of NOAA's mission—ranging from managing coastal and marine resources to predicting changes in the Earth's environment—faces a new urgency, given intensifying national needs related to the economy, the environment, and public safety. As the new century unfolds, new priorities for NOAA action are emerging in the areas of climate change, freshwater supply, ecosystem management, and homeland security. The Nation and world depend upon the skill, efficiency, and productivity of NOAA's workforce and its ability to develop and distribute vital information, conduct essential research, and provide services needed by society.

Resources by Mission Goals

	Amount
1. Ecosystem	\$1,352,813
2. Climate	\$236,248
3. Weather and Water	\$930,464
4. Commerce and Transportation	\$204,259
5. Mission Support	\$1,542,636

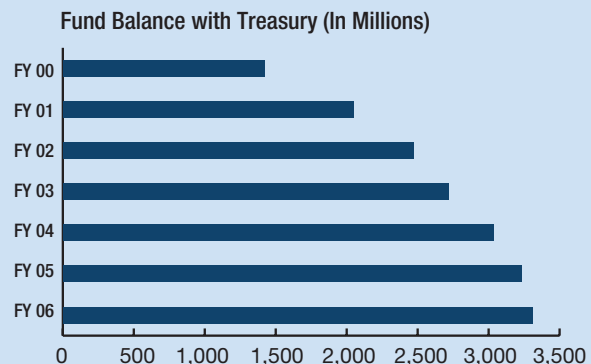
Financial Analysis

CONSOLIDATED BALANCE SHEET

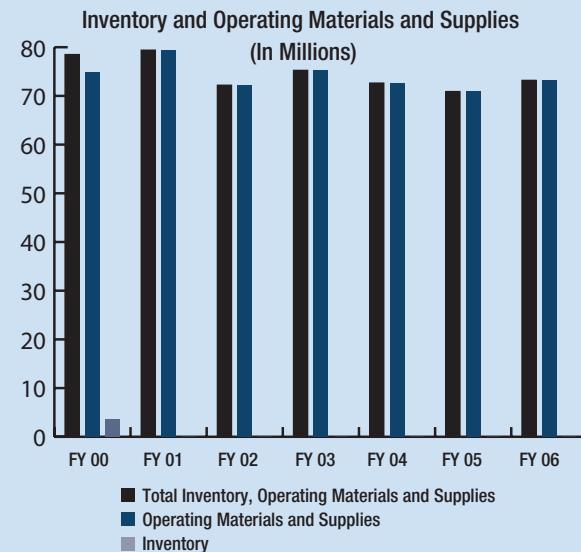
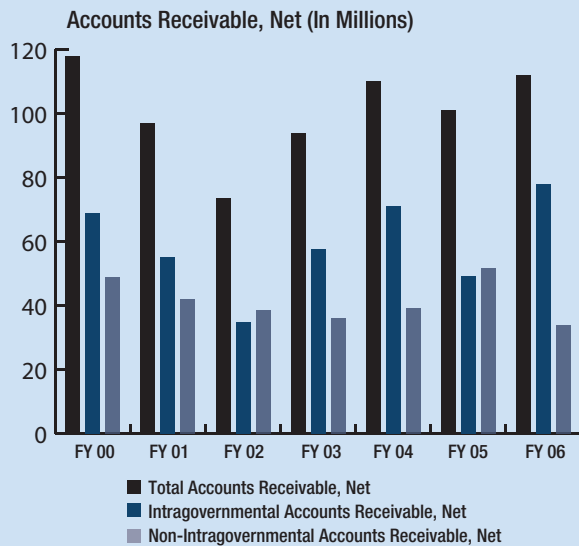
ASSETS

The FY 2006 Consolidated Balance Sheet reflects total assets of \$8.5 billion and primarily consists of the following:

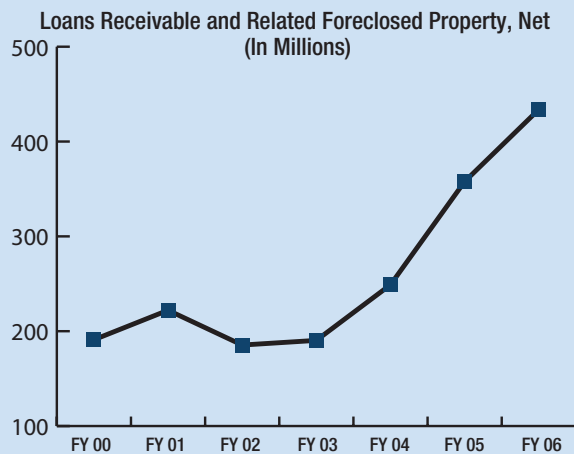
Fund Balance with Treasury of \$3.3 billion primarily consists of appropriated funds to pay current liabilities and finance authorized purchase commitments.



Accounts Receivable, Net of \$112.0 million consists of intragovernmental (Federal agencies) accounts receivable of \$78.0 million and non-intragovernmental accounts receivable of \$34.0 million. Outstanding billed and unbilled reimbursable services provided to other Federal agencies compose the majority of NOAA's accounts receivable. Accounts receivable are established to receive payments for direct and indirect costs of services provided to another Federal agency or non-intragovernmental entity.



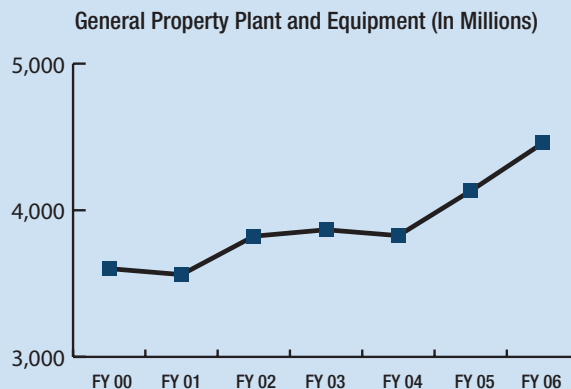
Loans Receivable and Related Foreclosed Property, Net of \$433.8 million consists of monies disbursed by the Fisheries Finance Program to private lenders for guaranteed loans in default, and monies disbursed as direct loans to finance various National Marine Fisheries Service loans totaling \$11.2 million and \$422.6 million, respectively.



Inventory and Related Property of \$73.2 million consist solely of operating materials and supplies. Operating materials and supplies consist of tangible personal property to be consumed in normal operations. The majority of operating materials and supplies are located at the National Logistics Support Center (NLSC) and are used mainly by the National Weather Service. NOAA's inventory, composed primarily of maps and charts, was transferred to the

Federal Aviation Administration during FY 2001.

General Property, Plant, and Equipment is stated at net book value of \$4.5 billion and consist mainly of construction work-in-progress, satellites and weather systems, structures and facilities, and other personal property with net book values of \$3.4 billion, \$0.6 billion, \$0.2 billion, and \$0.3 billion, respectively. Satellite and launch services are generally procured under long-term, multi-satellite contracts which provide for payments by NOAA over the

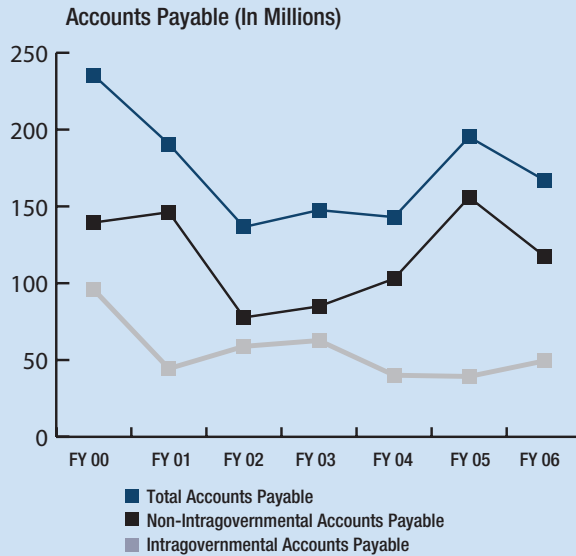


contract periods.

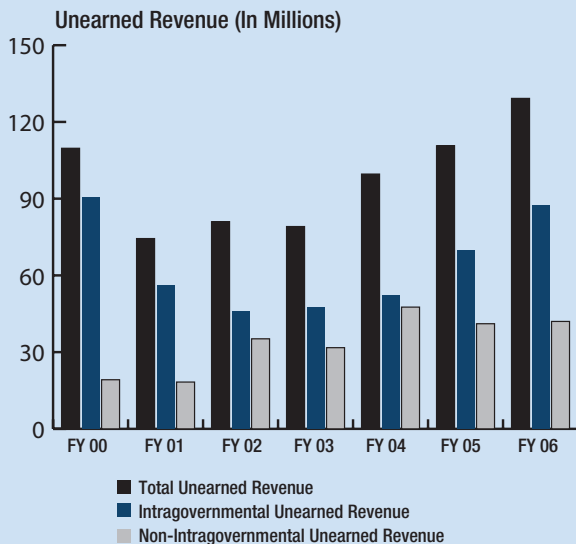
LIABILITIES

The FY 2006 Consolidated Balance Sheet reflects NOAA liabilities totaling \$1.5 billion. The following significant liabilities represent monies owed for goods and services that have been received but for which payment has not yet been made.

Accounts Payable of \$167.1 million consists of \$49.4 million of intragovernmental accounts payable and \$117.7 million of non-intragovernmental accounts payable.

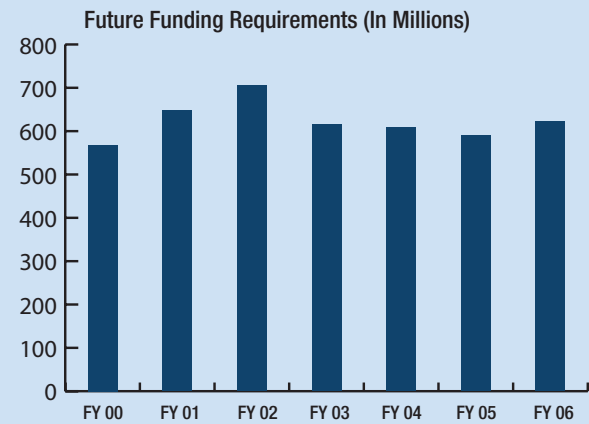


Unearned Revenues of \$129.2 million consist of intragovernmental and non-intragovernmental unearned revenue of \$87.2 million and \$42.0 million, respectively. The majority of NOAA's unearned revenue consists of amounts advanced to NOAA by other Federal entities, (such as the Department of Transportation and the Department of Defense), and non-intragovernmental entities, for goods and services to be furnished.



Future Funding Requirements of \$622.0 million represent liabilities not funded by budgetary resources including NOAA Corps pension liability of \$370.6 million, NOAA Corps retirement health benefits of \$49.2 million, accrued leave balances of \$97.0 million, FECA Actuarial and Accrued liability of \$76.8 million, environmental cleanup costs of \$27.4 million, and contingent liabilities of \$1.0 million.

Liabilities not covered by budgetary resources result from the receipt of goods or services in the current or prior periods, or the occurrence of eligible events in the current or prior periods, for which appropriations, revenues, or other financing sources of funds necessary to pay the liabilities have not been made available through Congressional appropriations or current earnings of NOAA. The total amount of liabilities classified as unfunded exceeds the amount of available unobligated appropriations of \$280.0 million, by \$342.0 million as of September 30, 2006. These liabilities are presented as unfunded rather than allocating portions of each of these liabilities to appropriated funds.



NOAA Corps Pension Liabilities of \$419.8 million, as mentioned above, represent non-intragovernmental liabilities not covered by budgetary resources relating to the NOAA Corps Retirement System. The NOAA Corps Retirement System is a non-contributory, defined benefit plan covering all active duty officers, retiree annuitants, and surviving families totaling 675 as of September 30, 2006. During FY 2006, NOAA contributed \$20.4 million to the NOAA Corps Retirement System.

Fluctuation Analysis

The following balance sheet fluctuations were noted between FY 2005 and FY 2006 financial statements:

ASSETS

NOAA's total assets increased by approximately \$524.0 million from September 30, 2005 to September 30, 2006. The majority of the increase in total assets is attributable to increases in Property, Plant & Equipment of \$325.0 million, Fund Balance with Treasury of \$78.5 million, and Loans Receivable and Related Foreclosed Property of \$76.0 million.

LIABILITIES

NOAA's total liabilities increased by approximately \$107.4 million from September 30, 2005 to September 30, 2006. This was mainly due to an increase in Debt to Treasury of \$61.3 million, Federal Employee Benefits of \$26.0 million, and Accrued Grants of \$19.7 million.

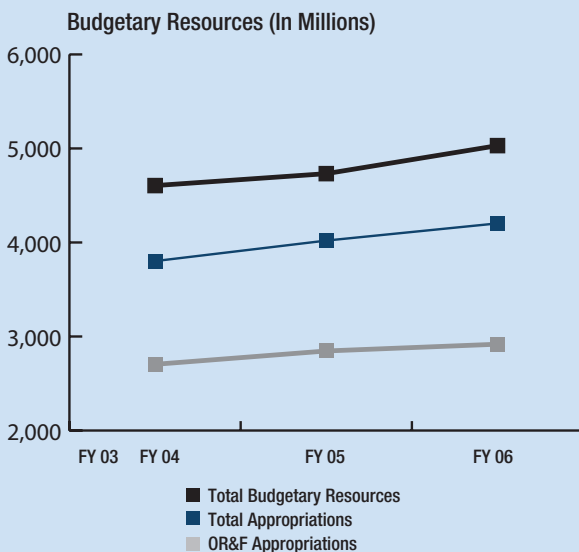
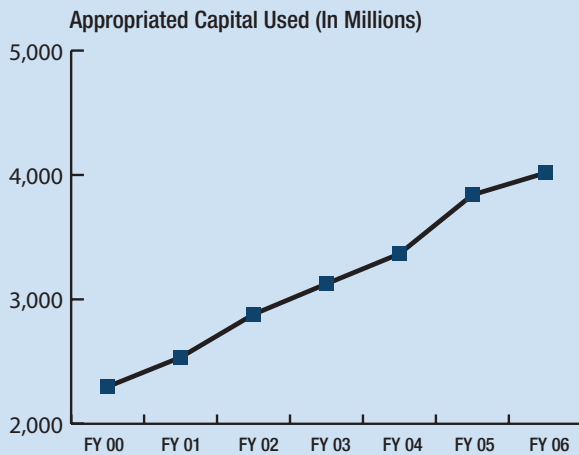
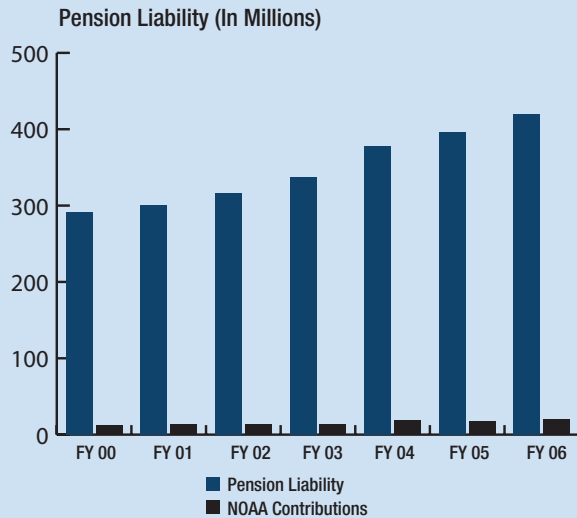
EQUITY

NOAA's Net Position increased by approximately \$416.6 million from FY 2005 to FY 2006. The \$7.0 billion of net position consists of \$3.0 billion of Unexpended Appropriations and \$4.0 billion from Cumulative Results of Operations.

CONSOLIDATED STATEMENT OF CHANGES IN NET POSITION

The FY 2006 Statement of Changes in Net Position reports the beginning net position, the items which caused net position to change during the year ended, and the ending net position. The majority of the activity in this statement involves two components of net position B net cost of operations and appropriations used (revenues), totaling \$3.9 billion and \$4.0 billion, respectively.

Appropriated capital used represents revenue or a financing source to NOAA made available through Congressional appropriations. Appropriations are recognized as financing sources at the time the related expenses



are incurred and the assets are consumed in operations.

COMBINED STATEMENT OF BUDGETARY RESOURCES

The FY 2006 Statement of Budgetary Resources details how budgetary resources were made available as well as their status at the end of the period. NOAA received approximately 84%, or \$4.2 billion, of its budgetary resources of \$5.0 billion through appropriations. Of the \$4.2 billion, NOAA's OR&F appropriation received \$2.9 billion. Other major sources of budgetary resources include unobligated balances carried over from FY 2005 and spending authority from

offsetting collections, totaling \$260.7 million and \$312.7 million, respectively. Of the total budgetary resources of \$5.0 billion, \$4.7 billion were obligated during FY 2006.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Consolidated Balance Sheets As of September 30, 2006 and 2005 (In thousands)

ASSETS		
	2006	2005
Intragovernmental Assets:		
Fund Balance with Treasury	\$3,308,451	\$3,229,954
Accounts Receivable, Net	77,997	49,263
Advances and Prepayments	56,166	41,809
Total Intragovernmental Assets	3,442,614	3,321,026
Non-Intragovernmental Assets:		
Cash and Other Monetary Assets	490	641
Accounts Receivable, Net	33,945	51,718
Loans Receivable and Related Foreclosed Property, Net	433,844	357,844
Inventory, Materials and Supplies	73,244	70,914
General Property, Plant and Equipment, Net	4,458,906	4,133,867
Advances and Prepayments	94,692	76,366
Other	1,843	3,237
Total Non-Intragovernmental Assets	5,096,964	4,694,587
TOTAL ASSETS	\$8,539,578	\$8,015,613

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Consolidated Balance Sheets As of September 30, 2006 and 2005 (In thousands)

LIABILITIES		
	2006	2005
Intragovernmental Liabilities:		
Accounts Payable	49,436	\$39,289
Debt to Treasury	418,840	357,581
Resources Payable to Treasury	1,846	3,196
Unearned Revenue	87,229	69,663
Other	39,217	39,329
Total Intragovernmental Liabilities	596,568	509,058
Non-Intragovernmental Liabilities:		
Accounts Payable	117,724	155,948
Accrued Payroll and Annual Leave	135,892	128,696
Actuarial FECA Liability	63,858	61,712
NOAA Corps=Pension	370,600	350,300
NOAA Corps=Retirement Health Benefits	49,200	45,400
Accrued Grants	74,336	54,655
Environmental and Disposal Liabilities	27,441	29,952
Capital Leases	16,310	17,868
Unearned Revenue	41,976	41,082
Other Liabilities	18,277	10,154
Total Non-Intragovernmental Liabilities	915,614	895,767
TOTAL LIABILITIES	1,512,182	1,404,825
NET POSITION		
Unexpended Appropriations	3,013,906	2,909,502
Cumulative Results of Operations	4,013,490	3,701,286
TOTAL NET POSITION	7,027,396	6,610,788
TOTAL LIABILITIES AND NET POSITION	\$8,539,578	\$8,015,613



National Ocean Service
www.oceanservice.noaa.gov

National Marine Fisheries Service
www.nmfs.noaa.gov

Office of Oceanic and Atmospheric Research
www.research.noaa.gov

National Weather Service
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National Environmental Satellite, Data and
Information Service
www.nesdis.noaa.gov

Office of Marine and Aviation Operations
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