

NOAA—Where Science Adds Value



NOAA BUSINESS REPORT 2005

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



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NOAA—Where Science Adds Value

Understanding and Predicting Changes, Conserving and Sustaining Resources



*Conrad C. Lautenbacher, Jr.
Under Secretary of Commerce for
Oceans and Atmosphere*

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, from safe navigation to coastal services, from 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. In addition to using science and technology to create jobs and improve economic prosperity, NOAA is directing resources toward disaster prevention, to improve understanding of disasters and minimize the loss of life and property from them. NOAA's Web site at www.noaa.gov provides a wealth of knowledge to schools and people across the Nation, as well as to industry and scientific enterprises.

MAJOR FY 2005 ACCOMPLISHMENTS

During FY 2005, NOAA continued its record of success toward providing more accurate predictions of severe weather, enhancing understanding of long-term climate and environmental trends, sustaining healthy coastal and marine habitats and ecosystems, and addressing safety and compliance issues. Major FY 2005 accomplishments included the following:

- NOAA-N, a polar-orbiting operational environmental satellite, was successfully launched from Vandenberg Air Force Base on May 20, 2005. The launch of this satellite will enable NOAA to continue to share satellite instrument data and products with our partners.
- Following Florida's hurricanes, Congressional approval of the FY 2005 Emergency Supplemental provided additional resources that allowed NOAA to launch seven new weather data buoy stations to expand marine observations.
- NOAA facilitated international progress on the Global Earth Observation System of Systems (GEOSS). The intergovernmental Group on Earth Observations (GEO) endorsed the 10-year implementation plan in February 2005 at the Third Global Earth Observation Summit.
- NOAA developed a plan to expand U.S. tsunami detection and warning capabilities as part of the GEOSS, the international effort to develop a comprehensive, sustained, and

integrated Earth observation system. The plan, which commits \$37.5 million over the next two years, will enable enhanced monitoring, detection, warning, and communication designed to protect lives and property in the United States and a significant part of the world. The United States has been a leader in the GEOSS effort since 2003, when the G-8 called for establishing a global observation system. The GEO now has 60 participating nations, including India, Indonesia, and Thailand.

- One formerly overfished stock—Pacific whiting—was fully rebuilt. In addition, six stocks are no longer considered to be overfished (black sea bass (mid-Atlantic), lingcod, golden tilefish, king mackerel (Gulf group), Pacific Ocean perch, and Pacific whiting), and overfishing has been eliminated on three stocks (black sea bass (mid-Atlantic), Pacific whiting, and red drum).
- NOAA has received an “unqualified opinion” on its financial statements each year since 1998—a good indication of effective internal controls and accurate financial systems.

Reducing the Vulnerability of Coastal Communities

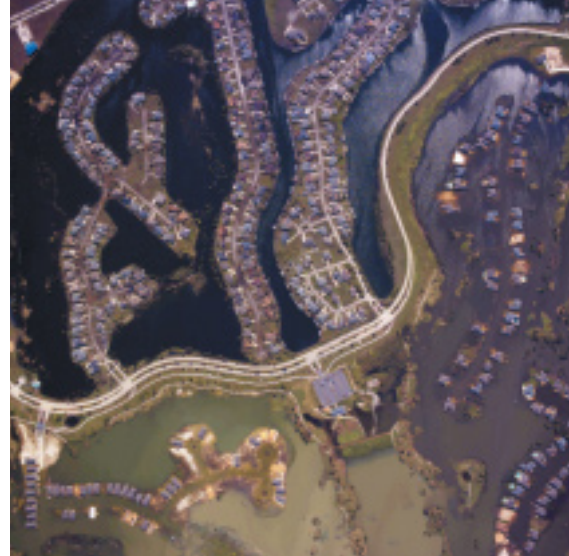
The 2005 Atlantic hurricane season was one of the busiest in recorded

Hurricane Katrina was the costliest economic, environmental, and public health disaster on record in the Gulf Coast region.

Photo: National Geodetic Survey

history. Hurricane Katrina was the costliest economic, environmental, and public health disaster on record in the Gulf Coast region. NOAA played integral roles in preparedness, response, and recovery efforts in the region. Activities included conducting aerial surveys over the affected areas, navigational surveys in hurricane-affected waterways, and ecological assessments of affected resources; helping officials identify evacuation routes; and maintaining valuable tidal information.

NOAA’s work to protect the public’s safety is continuing long after the end of the hurricane season. Katrina won’t be the last major hurricane to hit a vulnerable area, and New Orleans isn’t the only location vulnerable to a large disaster from a land-falling hurricane. Houston/Galveston, Tampa Bay, southwest Florida, the Florida Keys, southeast Florida, New York City/Long Island, and New England are all especially vulnerable to a large disaster from a land-falling hurricane. Besides focusing on post-storm redevelopment strategies for communities hard-hit by Katrina and other storms, we are working with our partners to reduce the vulnerability of coastal communities to major storms by helping



them manage and anticipate these extreme events.

It is critical that we work to protect and restore natural features along the Gulf and other coastal areas, such as dunes, wetlands, and other vegetated areas that offer protection against coastal flooding and erosion. And we will continue to improve our hurricane tracking, intensity, and storm surge forecasting capabilities, as well as provide technical tools and planning expertise to state and local governments.

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

NOAA'S VISION

An informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions.

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.

NOAA'S CORE VALUES

People, Integrity, Excellence,
Teamwork, and Ingenuity
Science, Service, and Stewardship



NOAA HIGHLIGHTS





Management Improvements

Focusing on Strategic Priorities



*James R. Mahoney, Ph.D.
Assistant Secretary for Oceans
and Atmosphere*



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



*Scott Rayder
Chief of Staff to NOAA Under
Secretary of Commerce*



*Timothy R.E. Keeney
Deputy Assistant Secretary for
Oceans and Atmosphere*

As an agency with responsibilities for maintaining and improving the viability of marine and coastal ecosystems, for delivering valuable weather, climate, and water information and services, for understanding the science and consequences of climate change, and for supporting the global commerce and transportation upon which we all depend, NOAA must remain current and responsive in an ever-changing world.

The NOAA Strategic Plan clearly articulates our vision and path for the future. Every year we re-evaluate our progress and priorities, look for efficiencies, and take advantage of new opportunities to improve our information, products, and services. Strategic planning and management of NOAA's activities work best when those who benefit from these activities and those who provide NOAA products and

services are able to contribute to the process. Only by involving stakeholders, employees, and partners can NOAA fulfill its vision and mission.

MAJOR ACCOMPLISHMENTS

NOAA Updates Strategic Outlook

Significant events of FY 2005—the extent and ferocity of the 2004 and 2005 hurricane seasons, the devastating Indian Ocean tsunami, and the prolonged drought in the western United States—all underscore the importance of NOAA's mission to the Nation and the world. To maximize societal benefits, NOAA must continuously calibrate its programmatic and managerial priorities, taking into account new and emerging events to determine where to direct additional resources. Updates to strengthen near-term priorities are reflected in the budget. Long-term updates and guidance are incorporated through issuance of the Annual Guidance Memorandum, which is available at www.ppi.noaa.gov. During FY 2005, NOAA



identified the following strategic priorities:

- *People and Infrastructure*—Focus on the operations and maintenance of NOAA vessels, critical enhancements to marine safety, and end-to-end resource management.
- *Integrated Global Observing System*—Build an integrated Global Earth Observation System of Systems (GEOSS) that includes observing platforms in space, the atmosphere, the oceans, and on land, as well as components for data management and calibration.
- *Ecosystem Approaches to Resource Management*—Expand assessments of fish stocks and protected species, restore vital fisheries habitats, reduce vulnerability to coastal hazards, improve management of watersheds and marine resource areas, expand research to include the development of aquaculture and ecological forecast modeling, and build local capacity to protect coral reefs.
- *Climate Services*—Continue to make observations of the carbon cycle, research the role of aerosols on global climate, and investigate how society can cope with drought conditions resulting from changes in climate.
- *Weather and Water Information*—Strengthen NOAA's ability to warn against extreme weather events by collecting more data with buoy systems, new aircraft instrumentation, and the NOAA Profiler Network; continue to distribute hydrometeorological information through the National Weather Service Telecommunications Gateway.
- *Commerce and Transportation*—Expand NOAA's ability to collect



NOAA is working to restore vital fisheries habitats and to build local capacity to protect coral reefs.
Photo: NOAA Photo Library

water vapor and oceanographic observations to improve the safety of aviation and marine navigation; achieve greater transportation efficiencies with electronic navigational charts and the VDatum geodesy tool.

- *Facilities Construction*—Modernize existing facilities; construct the Pacific Region Center in Honolulu and NOAA's Center for Weather and Climate Prediction in College Park, Maryland.

NOAA Leads implementation of U.S. Ocean Action Plan

NOAA has been designated a lead agency in implementing the *U.S. Ocean Action Plan*, the Administra-

tion's response to the 2004 report of the U.S. Commission on Ocean Policy. The plan identifies steps to be undertaken to ensure continued conservation of coastal and marine habitats and living marine resources, and at the same time guarantee that the public can continue to derive benefits from those resources.

NOAA Guides Global Efforts to Integrate Earth Observations

In a major development at the third Earth Observation Summit

NOAA STRATEGIC GOALS

- Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management.
- Understand climate variability and change to enhance society's ability to plan and respond.
- Serve society's needs for weather and water information.
- Support the Nation's commerce with information for safe, efficient, and environmentally sound transportation.
- Provide critical support for NOAA's mission.



NOAA researchers recover current meters and floats. NOAA scientists understand and describe how natural systems work together through investigation and interpretation of information.
Photo: NOAA Photo Library



NOAA's P-3 hurricane hunter gathers data in the eyewall of Hurricane Katrina. A strategic NOAA priority is to enhance the agency's ability to warn against extreme weather events by collecting more data with buoy systems and new aircraft instrumentation.
Photo: NOAA Photo Library

during FY 2005, nearly 60 countries and more than 40 international organizations agreed to a 10-year implementation plan for integrating Earth observations worldwide. As a key member of the U.S. Group on Earth Observations, NOAA has revised its FY 2005 Strategic Plan to reflect these and other drivers toward achieving this goal, while maintaining a commitment to continue to serve society with NOAA's long-standing products and services.

NOAA Publishes Short- and Long-Term Corporate Research Plans

To make the best decisions about managing and sustaining marine and coastal resources and protecting the public against extreme weather events, policymakers need a comprehensive understanding of the role of the oceans, coasts, and atmosphere in creating these events. Research provides the foundation for that understanding.

NOAA has completed its first corporate *Five-Year Research Plan* and *20-Year Research Vision*. Developed by the NOAA Research Council, a committee of senior scientists from across NOAA, these two planning documents will guide the direction of NOAA's long- and short-term research, and will ensure that research supports NOAA's mission goals. The plans address growing challenges, as well as the need to integrate NOAA's research across the agency.

The *Five-Year Research Plan* focuses on short-term outcomes, such as creating an Earth system model, developing the Global Earth Observation System of Systems, studying ocean phenomena, and improving climate predictions and projections. It supports the four mission goal areas identified in the NOAA Strategic Plan—Ecosystems, Climate, Weather and Water, and Commerce and Transportation—while underscoring the importance of research that cuts across traditional disciplinary boundaries.

The *20-Year Research Vision* anticipates NOAA's future research direction. By 2025, the world will depend on NOAA's reliable information products and services to make optimal decisions to respond rapidly to a range of key issues affecting societies and economies.

NOAA Finalizes Grants Online System

During FY 2005, the NOAA Grants Online system became operational. Grants Online is the premier Federal solution for managing and processing full life-cycle grants. In addition to requiring user authentication through user names and passwords, the system uses a combination of role-based

and office-based access. Grants Online allows flexibility for internal access—e.g., a Program Officer can view all requests for grant applications. Regarding external access, in FY 2006, the system will allow current grant recipients to view information about their grants; submit post-award action requests, progress reports, and financial reports; and correspond with NOAA program officers and grant specialists. NOAA staff generates funding notices, reviews grant applications, selects applications for awards, processes selected applications and awards, manages grants, and corresponds with grant recipients.

Business Process Reengineering Completed for Budget and Grants

The vision for an efficient and effective financial and administrative services program was the driving force behind the assembly of the Transition Management Team (TMT) in late FY 2004. NOAA charged the TMT with completing an assessment of how financial and administrative service programs are performed within NOAA's program offices.

There are four phases to the Business Process Reengineering (BPR) effort: tailored training, "As-Is" assessment of eight functional areas, design of "To-Be" processes, and implementation of BPR.

The BPR for the Budget and Grants functional areas is complete. Phase III activities for the workforce management functional area analyzed current business processes, created new business processes, and developed the implementation plan for BPR in the Budget formulation and execution processes and the Grants planning, management, and award processes. Other administrative

areas will also be re-engineered. The timeline for these has yet to be determined.

As part of this assessment, the TMT has provided recommendations for moving forward in each selected process. These recommendations identify the degree and scope of change deemed necessary to improve the efficiency and effectiveness of NOAA's financial and administrative services. This effort requires the buy-in and support of NOAA management, Functional Managers, and Line Offices. NOAA management will determine the scope and breadth of change to be implemented in each of the selected processes. During FY 2005, NOAA adopted a functional management model to deliver administrative and financial services. This change will establish direct lines of accountability from headquarters business line managers to all NOAA financial and administrative staff located in the field. This action will improve consistency in decisions,

optimize resource allocation NOAA-wide, and promote more effective customer service.

FUTURE OUTLOOK

On the front lines as always, NOAA will provide the public with easy-to-use, seamless, integrated information products and services that will revolutionize the way Americans lead their daily lives. NOAA will dramatically improve severe event warnings and air quality forecasts, and will offer increasingly confident decadal predictions of climate. Improvements will be made in the management of fisheries, estuaries, and protected resources based on ecosystem-level scientific information.

A strategic NOAA priority is to focus on the operations and maintenance of NOAA vessels, such as the FAIRWEATHER, which was recently reactivated in Ketchikan, Alaska.
Photo: NOAA Photo Library



Excellence in NOAA's Leadership

PRESIDENTIAL RANK AWARDS—2004

John L. Hayes, former Deputy Assistant Administrator for Ocean and Coastal Zone Management, National Ocean Service



Issac Held, Senior Scientist, Geophysical Fluid Dynamics Laboratory, Office of Oceanic and Atmospheric Research

Michael McPhaden, Senior Research Scientist, Office of Oceanic and Atmospheric Research

Alan Neuschatz, Associate Assistant Administrator for Management and Chief Financial Officer/Chief Administrative Officer, National Ocean Service

A.R. Ravishankara, Senior Scientist, Aeronomy Laboratory, Office of Oceanic and Atmospheric Research

Dusan Zrnica, Senior Scientist, National Severe Storms Laboratory, Office of Oceanic and Atmospheric Research

DEPARTMENT OF COMMERCE AWARDS

Gold and Silver Medals—2005

Six individuals, 11 groups, and 15 organizations in NOAA received the Department of Commerce Gold and Silver Medals. 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 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.

Bronze Medals—2005

The Under Secretary presented the Department's Bronze Award to 17 individuals, 42 groups, and 22 NOAA organizations. This medal is the highest form of honorary recognition for superior service to NOAA.

NOAA AWARDS

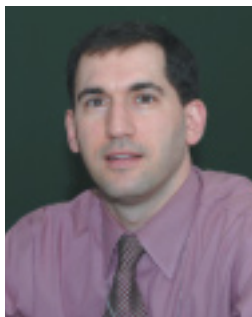
Individuals and groups received the following NOAA awards during a ceremony held May 13, 2005:



- Administrator Awards recognizing employees or groups who have made significant contributions to NOAA;
- Diversity Spectrum Awards, recognizing those who have made a special effort to enhance the NOAA workplace;
- Technology Transfer Awards, recognizing innovation; and
- Career Awards, recognizing long-term achievements in advancing NOAA's goals.



Key Congressional Hearings Highlights



*Eric Webster, Director
Office of Legislative Affairs*

Tsunamis Warnings

Brig. Gen. David L. Johnson, Assistant Administrator for the National Weather Service, testified before

the House Committee on Science that tsunamis are natural disasters that can form in all of the world's oceans and inland seas, and in any large body of water near seismic activity. Each region of the world appears to have its own cycle of frequency and pattern for generating tsunamis that range in size from small events presenting no hazards to large, highly destructive events. Eighty-five percent of tsunamis occur in the Pacific Ocean and its marginal seas. This is not surprising, as the Pacific Basin covers more than one-third of the Earth's surface and is surrounded by a series of mountain chains, deep-ocean trenches, and island arcs called the "ring of fire." The Bush Administration has a plan to upgrade the current U.S. tsunami warning system. NOAA's contribution to this plan includes upgrading and expanding the DART network to 32 new Pacific stations and 7 new Atlantic stations.

NOAA aircraft logged more than 800 flight hours, covered more than 100,000 nautical miles of track lines, and deployed more than 1,900 dropsondes into storms during the 2004 hurricane season. Photo: Office of Marine and Aviation Operations

Successful Team Approach to Hurricane Season

In testimony before the House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans, Vice Admiral Lautenbacher noted that NOAA forecasters accurately predicted an above-average hurricane season. The record-setting four hurricanes that hit Florida in the summer and early fall of 2005 presented NOAA with the challenge of providing vital information about where the storms would strike and aiding recovery efforts once the storms were over. NOAA received praise from many directions, including letters addressed to Vice Admiral Lautenbacher from citizens affected by the storms. NOAA aircraft logged more than 800 flight hours, covered more than 100,000 nautical miles of track lines, and deployed more than 1,900 dropsondes into storms during the 2004 hurricane season. These instruments, which are dropped into storms from reconnaissance aircraft, are helping forecasters to make great strides in understanding and predicting hurricane behavior.



Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act

John H. Dunnigan, former Director of the Office of Sustainable Fisheries, testified before the Committee on Commerce, Science, and Transportation on the reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act. He stated that fishery management regulations require industry compliance to be effective. Compliance is achieved through voluntary behavior, effective fisheries law enforcement, and effective financial and penal sanctions. To discourage particularly serious violations of the Magnuson-Stevens Act, NOAA must be able to use sanctions that have significant consequences. When fisheries regulations are ignored, it is not only the resource that pays a price, but also the fishers who obey the regulations. Increasing the level of fines and penalties, as well as expanding the types of offenses that can be criminalized under the Magnuson-Stevens Act will help to ensure that sanctions are not simply accepted by violators as the cost of doing business.

Key Congressional Hearings—FY 2005

Date	Congressional Committee	Subject	NOAA Witness
January 26	House Committee on Science	Tsunami warnings	Brig. Gen. David L. Johnson, U.S. Air Force (Ret.), Assistant Administrator, National Weather Service
February 3	Senate Committee on Commerce, Science, and Transportation	Tsunamis	Brig. Gen. John (Jack) Kelly, Jr., U.S. Air Force (Ret.), Deputy Under Secretary of Commerce for Oceans and Atmosphere
February 16	House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and the Environment	FY 2006 NOAA budget request for programs that protect and restore coastal and marine resources	Dr. Richard Spinrad, Assistant Administrator, National Ocean Service
February 24	Alaska State Legislature, House Committee on State Affairs	Proposed changes to the Alaska Coastal Management Program	Eldon Hout, Director, Office of Ocean and Coastal Resources Management, National Ocean Service
March 1	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Coral Conservation Act	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere
March 9	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	Global Earth Observation System of Systems (GEOSS)	VADM Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
April 14	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, National Marine Fisheries Service
April 19	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	H.R. 1489, Coastal Ocean Observing System Integration and Implementation Act	Dr. Richard Spinrad, Assistant Administrator, National Ocean Service
April 26	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	H.R. 1428, National Fish and Wildlife Foundation Reauthorization Act	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere
May 17	House Committee on Government Reform, Subcommittee on Federal Workforce and Agency Organization	Federal Food Inspection Programs	Richard Cano, Acting Director, Seafood Inspection Program, National Marine Fisheries Service
May 19	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	H.R. 50, NOAA Administration Act	VADM Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
May 19	Senate Committee on Environment and Public Works, Subcommittee on Fisheries, Wildlife, and Water	Endangered Species Act	James Lecky, Senior Advisor for Intergovernmental Programs, National Marine Fisheries Service
May 24	House Committee on Resources, Subcommittee on Fisheries Conservation, Wildlife, and Oceans	NOAA's role with the federal fish hatcheries	D. Robert Lohn, Northwest Regional Administrator, National Marine Fisheries Service
May 25	Senate Committee on Commerce, Science, and Transportation	S. 360, a bill reauthorizing the Coastal Zone Management Act	Thomas Kitsos, Associate Deputy Assistant Administrator, National Marine Fisheries Service
May 26	Senate Commerce on Appropriations, Subcommittee on Justice and Science	FY 2006 Commerce Department budget request, including NOAA	Carlos Gutierrez, Secretary, U.S. Department of Commerce
June 8	Senate Commerce Disaster Prediction and Prevention Subcommittee	NOAA's homeland security mission	VADM Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.), Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
June 8	House Resources Fisheries and Oceans Subcommittee	Scientific review of ocean systems	Dr. Steve Murawski, Chief Science Advisor, Director of Scientific Programs, National Marine Fisheries Service
June 15	Senate Commerce Ocean Policy Study Subcommittee	Management of invasive species in ballast water and threats to coral reefs	Timothy R.E. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere

Date	Congressional Committee	Subject	NOAA Witness
June 29	Senate Commerce Disaster Prediction and Prevention Subcommittee	NOAA's severe weather programs	Max Mayfield, Director, National Hurricane Center, National Weather Service; Dennis McCarthy, Director, Climate, Water, and Weather Services, National Weather Service
July 6 and 8	House Resources Fisheries and Oceans Subcommittee	Fisheries management successes in Alaska and Reauthorization of the Magnuson–Stevens Fishery Conservation and Management Act	Susan J. Salveson, Assistant Alaska Regional Administrator for Sustainable Fisheries, National Marine Fisheries Service
July 20	Senate Commerce Global Climate Change and Impacts Subcommittee	U.S. climate policy and the \$5 billion budget request for climate-related science and technology in FY 2006	Dr. James R. Mahoney, Assistant Secretary for Oceans and Atmosphere
July 27	Senate Commerce Disaster Prevention and Prediction Subcommittee	All Hazards Alert Systems Logistics, and Acquisition Division	Mark Paese, Director, Maintenance, National Weather Service
August 1	Senate Commerce Fisheries and Coast Guard Subcommittees	Implementation of the Oil Pollution Act in Washington State	Douglas Helton, Incident Operations Coordinator, NOAA Office of Response and Restoration
September 9	House Government Reform Regulatory Affairs Subcommittee	NOAA's current research priorities for invasive species, New Baltimore, Michigan	Dr. Stephen Brandt, Director, Great Lakes Environmental Research Laboratory
September 19	Special <i>ad hoc</i> committee chaired	Great Lakes restoration efforts, Chicago, Illinois	Patricia Montanio, Chief, Damage Assessment Center
September 20	Senate Commerce Disaster Prevention and Prediction Subcommittee	Lifesaving role of accurate hurricane prediction	Max Mayfield, Director, National Hurricane Center, National Weather Service
September 22	Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina	NOAA hurricane forecasting	Brig. Gen. David L. Johnson, U.S. Air Force (Ret.), Assistant Administrator, National Weather Service; Max Mayfield, Director, National Hurricane Center, National Weather Service
September 29	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, Marine Debris Research, Prevention and Reduction Act	Timothy R.E. Keeney, Deputy Assistant Secretary of Commerce for Oceans and Atmosphere

FY 2005 KEY EVENTS

October 4–9, 2004

Physical Scientist Dr. Thomas Peterson, of NOAA's National Climatic Data Center, participated as an invited expert to the joint International Research Programme on Climate Variability and Predictability workshop to develop regional climate indices in Southwest Asia, Alanya, and Turkey. The Regional Climate Change Workshop brought together people and data from all areas of Southwest Asia, including Yemen, Oman, Iran, Turkey, Georgia, and Azerbaijan.

October 5, 2004

Vice Admiral Lautenbacher met with the President's Council of Advisors on Science and Technology in Washing-

ton, D.C. As a panelist addressing the "Future of Transatlantic Science Collaborations—Success Stories and Trends," and as NOAA's Administrator, Lautenbacher discussed the Global Earth Observation System in the context of international partnerships.

October 5–6, 2004

NOAA Climate Diagnostics Center (CDC) scientists Drs. Henry Diaz and Martin Hoerling joined other climatologists from the United States and Europe in Bologna, Italy, to assess the nature of changes in the climate of the Mediterranean region for the past few centuries. Dr. Diaz, a senior scientist with the Office of Oceanic and Atmospheric Research (NOAA Research), was one of the organizers of

this effort to compare the different patterns of change with the Mediterranean climate regions of the western United States. The meeting was held in connection with the United States–Italy Bilateral Agreement on Cooperation in Climate Change Research and Technology. Attendees evaluated possible causes of climate changes and provided a long historical perspective of recent climatic episodes, including the severe droughts in southern Europe and the western United States, and the western European extreme heat wave of 2003, which may have caused approximately 20,000 deaths.

October 7, 2004

Vice Admiral Lautenbacher delivered the keynote address at the National

Space Club Luncheon in Washington, D.C., discussing the ongoing national and international efforts regarding Earth observation and offering a perspective on the future of NOAA satellites.

October 15–17, 2004

NOAA's Assistant Administrator Dr. William Hogarth led the U.S. delegation in a trilateral meeting with Canada and Japan and a quadrilateral meeting with the European Community in Vancouver, British Columbia. The meetings were planned to identify and discuss common objectives and approaches for addressing highly migratory species issues, in preparation for the November annual meeting of the International Commission for the Conservation of Atlantic Tunas.

October 27–28, 2004

NOAA participated in the International Symposium on Climate Change in Beijing, China, as an appointed member of the Scientific Steering Committee. NOAA presented a paper and provided feedback on several topics pertaining to climate change.

October 29–30

NOAA participated in the U.S. Department of Energy–People's Republic of China Science Team meeting.

November 4–6, 2004

The New England Fishery Management Council met to select management measures that will substantially reduce fishing mortality on many stocks of groundfish. The amendment to the Northeast Multispecies Fishery Management Plan was highly controversial due to the relatively large fishing mortality reductions proposed, industry concerns regarding the potential economic and social impacts of further restrictions, as well as disagreement about the underlying science and the fact that the amendment is mandated by a court order.

November 10–14, 2004

A U.S. delegation, comprised primarily of NOAA representatives, attended the 31st annual meeting of the Coordin-

ation Group for Meteorological Satellites (CGMS) in Ascona, Switzerland. CGMS is an informal international group gathered to coordinate the global system of operational meteorological satellites, a series of independent national or regional systems. Membership of the CGMS is restricted to the operators of meteorological satellites and to the World Meteorological Organization (WMO) in its capacity as a major user organization. Membership includes China, EUMETSAT (for Europe), India, Japan, Russia, the United States, and the WMO.

November 13, 2004

The National Weather Service (NWS) Weather Forecast Office in Little Rock, Arkansas, presented the John Campanius Holm Award to veteran weather observer Brother Anselm Allen, a monk at the Benedictine Abbey in Subiaco, Arkansas. Brother Anselm has been an NWS cooperative observer since 1965, but monks at the abbey have been taking weather observations for the last 105 years. The NWS Cooperative Observer Program (COOP) is the Nation's weather and climate observing network of, by, and for the people. More than 11,000 volunteers take observations on farms, in urban and suburban areas, national parks, seashores, and mountaintops. The data are truly representative of where people live, work, and play. The John Campanius Holm Award is given to 25 COOP observers annually, and is one of the highest awards an observer can receive.

November 13–15, 2004

NOAA's National Marine Fisheries Service and the eight regional fishery management councils co-hosted the inaugural fisheries management conference in Washington, D.C. "Managing Our Nation's Marine Fisheries—Past, Present, and Future" aimed to educate the public, policy-makers, and the media on the fishery management process, highlight successful management by region and current management and research initiatives, help bridge the gap between perception and reality regarding fisheries management, and provide a

forum for information exchange and solicit a wide range of perspectives on future management and marine research directions.

November 15–24, 2004

Dr. William Hogarth, Assistant Administrator for Fisheries and U.S. Commissioner to the International Commission for the Conservation of Atlantic Tunas (ICCAT), led a U.S. delegation to the Commission's annual meeting in Dublin, Ireland. The 37 Contracting Parties to ICCAT met to discuss ways to increase compliance; expand measures that address illegal, unregulated, and unreported fishing (including trade restrictive measures); and improve data collection, reporting, monitoring, and control. The parties are also holding a special workshop on the integrated management of bluefin tuna.

December 10, 2004

NWS, along with representatives from NOAA Research and the U.S. Environmental Protection Agency (EPA), hosted an air quality constituent group meeting in Washington, D.C. This meeting provided opportunities for public- and private-sector stakeholders in air quality forecasting to hear more about progress and plans for launching the NOAA–EPA air quality forecasting capability next summer, as well as to provide input to NOAA on the planned operational capabilities for air quality forecasting.

December 11–12, 2004

NOAA's Air Resources Laboratory and the Mississippi–Alabama Sea Grant Consortium convened a special meeting in Biloxi, Mississippi, to discuss collaborative efforts in mercury research, education, and outreach in the Gulf of Mexico. The discussion identified mercury-related issues that needed to be addressed with additional research. Information from the meeting was used to develop a "life cycle of mercury" program that will follow mercury from its sources to its eventual bioaccumulation in living tissue. There is strong scientific disagreement as to whether the impact of mercury emissions is concentrated in local areas or spread more widely.

February 3, 2005

Vice Admiral Lautenbacher presented Maryland Gov. Robert L. Ehrlich, Jr., and Lt. Gov. Michael S. Steele a satellite image of Hurricane Isabel in Annapolis, Maryland. Isabel caused major damage in much of Maryland, with extensive flooding in Baltimore and Annapolis. The NOAA offices of Satellite Operations and Satellite Data Processing and Distribution where the images were acquired and processed are located in Suitland, Maryland.

February 3, 2005

NWS hosted a meeting with national fire management agencies in Boise, Idaho. Participants reviewed the 2003 fire weather season in light of the 2003 "Interagency Agreement for Meteorological Services between the Wildland Fire Agencies and the NWS" and discussed lessons learned during the season and ways to improve this partnership. Fire weather representatives from the U.S. Forest Service, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, U.S. Bureau of Indian Affairs, and the National Association of State Foresters attended the meeting.

February 18, 2005

Vice Admiral Lautenbacher delivered welcoming remarks at the Space at the Crossroads Conference, hosted by the United States Space Foundation in association with the Department of Commerce, the Satellite Industries Association, the National Space Society, and the Washington Space Business Roundtable. Lautenbacher spoke on the value of Earth observations and NOAA's satellite programs, and underscored the importance of industry partnerships in these endeavors. A number of aerospace companies, including Boeing and Northrop Grumman, attended the conference in Washington, D.C.

March 23, 2005

Assistant Administrator Dr. William Hogarth met with key seafood buyers for the WalMart Corporation at its headquarters in Bentonville, Arkansas, to discuss the U.S. supply of shrimp

and other seafood products. This meeting was an effort by NOAA to broker a partnership between WalMart and the U.S. shrimp industry to relieve the economic impacts on the industry that have resulted from increased imports of shrimp into the U.S. market.

May 31, 2005

Vice Admiral Lautenbacher visited and congratulated students at Woodstock High School in Woodstock, Illinois. A team of Woodstock students submitted the winning name for NOAA's new ocean exploration ship. The winning name, *OKEANOS EXPLORER*, combines the ancient Greek term for ocean with the word meaning "desire to find." Woodstock High School will receive a recognition plaque, and the *OKEANOS EXPLORER* will carry a plaque with information about the winning school and team.

June 1, 2005

NWS hosted federal, state, and local officials from North Carolina to discuss developments in tropical storm forecasting, with a special emphasis on inland flooding. NOAA updated local forecasters on the new tools developed and deployed to improve forecasts and warnings for tropical cyclones and inland flooding. Special attention was paid to the use of NOAA's Advanced Hydrologic Prediction Service. NOAA's partnership with the State of North Carolina is addressing the authorized activities in the Inland Flood Forecasting and Warning System Act of 2002. Researchers and local meteorologists provided feedback on what progress still needs to be made, as well as updates on their own innovations.

June 1-3, 2005

Vice Admiral Lautenbacher presided over the second meeting of the Executive Committee of the Group on Earth Observations (GEO) at the World Meteorological Organization headquarters in Geneva, Switzerland. The United States is one of four co-chairs of the GEO Executive Committee, along with the European Commission,

South Africa, and China. The GEO Executive Committee began implementing the Ten-Year Implementation Plan for the Global Earth Observation System of Systems adopted by ministers at the third Earth Observation Summit in Brussels in February 2005.

July 20, 2005

Vice Admiral Lautenbacher signed a memorandum of understanding (MOU) with Department of Transportation Federal Highway Administration (FHWA) Administrator Mary Peters. The MOU allows NOAA and FHWA to work closely together to address surface weather transportation issues. Each year, 7,000 deaths, 1.4 million automobile accidents, and \$42 billion in economic loss are attributed to adverse weather on the Nation's roads and highways. Most states have surface observation networks to support transportation safety, but the observations are not generally available to NWS or the weather enterprise as a whole. The initial focus of NOAA's Surface Weather Program is to integrate these weather observations to better serve the surface transportation enterprise.

August 18, 2005

Vice Admiral Lautenbacher released *The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005*. This significant new report establishes a quantitative baseline of the conditions of U.S. shallow coral reef ecosystems for the first time. This compilation of information from more than 160 scientists and resource managers was coordinated, edited, and published by NOAA's National Centers for Coastal Ocean Science as a project of the Coral Reef Conservation Program. Each jurisdictional chapter provides the geographic extent of reef ecosystems; current monitoring and management activities; information on water quality, benthic habitats, associated biological communities, and key threats to ecosystem health; and recommendations for future research and management actions.



OPERATIONS, PRODUCTS, AND SERVICES







National Ocean Service

Managing and Conserving Coastal Resources



*Richard W. Spinrad, Ph.D.
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 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

Navigation and Commerce

Emergency Hydrographic Surveys Find Hurricane-Related Obstructions

The 2005 Atlantic hurricane season was one of the busiest in recorded history. The Gulf Coast was hit especially hard when Hurricanes Katrina and Rita struck. NOS Navigation Response Teams conducted emergency hydrographic surveys in the ports affected by the hurricanes. These surveys were critical because of the major oil production and maritime import/export traffic in the region. Local port activity was limited until the surveys were completed and obstructed waterways were cleared. The data collected will also update NOAA's navigation products, including electronic navigational, print-on-demand, and raster nautical charts.

Hardened Tide Stations Withstand Hurricanes' Fury

Hurricanes Katrina and Rita destroyed eight of the 32 tide stations NOS maintains in the Gulf region, and communication with several others was temporarily lost. But two "hardened" stations—those with elevated, strengthened support platforms—along the Gulf Coast operated successfully through both storms, transmitting valuable storm data to meteorologists. In addition, the Galveston Bay Operational Forecast System operated successfully throughout Hurricane Rita. Short-term stations are compensating for the lost



stations in the area, and most communications with other stations in the region have been restored.

New PORTS® Station Installed

A new Physical Oceanographic Real-Time System (PORTS®) station was installed in the Columbia River—the 13th major U.S. waterway to have the system. In port areas, water levels and currents frequently differ from predictions because of wind changes and water runoff. PORTS® provides accurate, real-time oceanographic and meteorological data via the telephone or the Internet, informing vessel operators of water depths and currents so they can move the greatest amount of cargo safely and efficiently. Users of PORTS® information include port authorities, vessel pilots, shipping companies, the U.S. Coast Guard, the U.S. Navy, recreational boaters, fishermen, coastal managers, environmental organizations, academia, and surfers.

GPS Data Enhance NOAA Weather Models

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

Online Operational Forecast Systems Launched

In September, NOS launched three new Operational Forecast System



Immediately following Hurricane Katrina, NOS collected more than 10,000 aerial images of the hurricane-damaged areas along the coasts of Alabama, Mississippi, and Louisiana. Photo: National Geodetic Survey

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

Ecosystems

NOS Conducts Aerial Surveys of Hurricane-Damaged Areas

Immediately following Hurricane Katrina, NOS collected more than 10,000 aerial images of the hurricane-damaged areas along the coasts of Alabama, Mississippi, and Louisiana. The Federal Emergency Management Agency, the U.S. Coast Guard, the U.S. Department of Defense, and several state agencies used the critical data to determine response efforts. NOS also provided to the U.S. Geological Survey and others pre-Katrina imagery, digital elevation data, and maps depicting ecological impacts, debris assessment, and wetland losses, to help them determine short-, mid-, and long-term recovery efforts. In addition,



Staff members from the Office of Response and Restoration conduct a shoreline assessment off the shore of Alaska. Photo: Office of Response and Restoration

such companies as Google Earth and GlobeXplorer used the imagery (available on <http://ngs.woc.noaa.gov/katrina/>) on their Web sites, and the insurance industry used the images to expedite disbursement of claims.

New Tide and Water Quality Monitoring Station Includes Multiple Features

In August, NOS installed a tide and water quality monitoring station at the Wells National Estuarine Research Reserve (NERR) in Wells, Maine. The station, which is the first of its kind installed at a NERR, combines the capabilities of the National Water Level Observation Network (NWLON) and the System-wide Monitoring Network. It includes primary and backup water level sensors, a suite of meteorological sensors, and a water quality sensor that measures several parameters. The NWLON technology allows Wells

NERR staff to access water level, weather, and water quality data from the same platform at the same time. Products generated from these data will benefit short-term applications (such as habitat restoration) and long-term applications (such as sea level trends), as well as research and education objectives.

NOAA Supports Restoration of Blackwater National Wildlife Refuge

NOS and the National Marine Fisheries Service are working with the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Aquarium in Baltimore, and others to restore 8,000 acres of wetlands at the Blackwater National Wildlife Refuge in eastern Maryland. Following common observing and data management principles of the U.S. Integrated Ocean Observing System, the partners are collecting water level data so that NOAA can process and analyze the data to apply to the restoration project. The refuge also hosted a workshop on the impor-

tance of geodetic control for tidal analysis and applications. After the workshop, a GPS survey was conducted to connect NOAA's and USGS's water level stations and USGS's surface elevation tables to the same geodetic network.

SPLASH Research Cruise Surveys Humpback Whales

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

Coral Reef Bleaching Satellite Monitoring System Launched

In 2005, NOAA launched a Coral Reef Watch Satellite Bleaching Alert system to track thermal stress on corals. When temperature conditions are detected that can lead to coral bleaching, the new system generates automated e-mail alerts. Available for 24 coral reefs around the world, the system allows coral reef managers and scientists to predict coral bleaching outbreaks weeks before they occur, potentially improving prevention and response. To complement NOAA's satellite-

based monitoring, Coral Reef Conservation Program scientists installed the first near-real-time (hourly) monitoring system in the waters near Lee Stocking Island, Bahamas. Part of the Coral Reef Early Warning System (CREWS) of monitoring stations, these new instruments will track “fluorescent yield,” a direct measurement of coral reef health. After evaluating this new product, researchers plan to deploy similar instruments in the Great Barrier Reef and in Puerto Rico’s waters.

NOAA Awards \$10 Million in Coral Reef Conservation Grants

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

toring and management, coral reef ecosystem research, improvements to fishery management plans, and national and international conservation efforts.

Major Research Expedition Characterizes Hawaiian Coral Reef Ecosystem

The RV *HI‘IALAKAI* completed a 35-day research expedition in the Northwest Hawaiian Islands (NWHI) Coral Reef Ecosystem Reserve and adjacent waters. During the cruise, researchers conducted nearly 500 scuba dives to sample and document the condition of the reefs, which were affected by a major coral bleaching event in 2002. They also deployed oceanographic buoys to allow remote, long-term monitoring of oceanographic and environmental conditions affecting NWHI coral reef ecosystems, and found that an unidentified syndrome discovered last year had spread to two additional reefs. This research will pro-

vide valuable characterization of the biology and oceanography of the NWHI, which will serve as a foundation for managing the ecosystem’s resources.

Surveys Indicate Invasive Lionfish Is Spreading

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

New Digital Mapping Product Developed for Pacific Islands

During FY 2005, NOS published *Shallow-water Benthic Habitats of American Samoa, Guam, and the Commonwealth of the Northern*

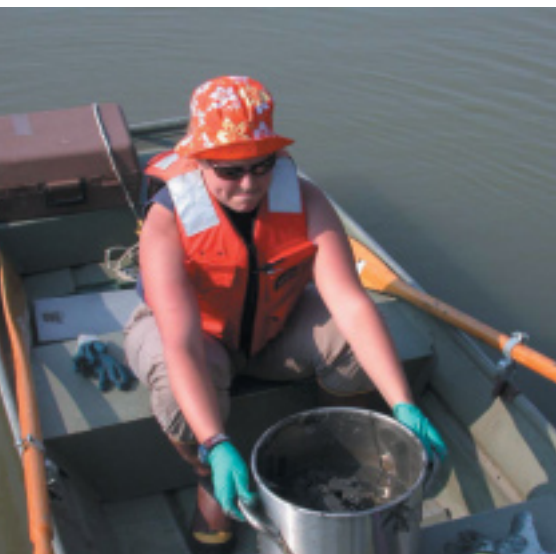
In recent surveys of the Indo-Pacific lionfish from North Carolina to Cape Fear, NOS scientists found that this invasive species is becoming widespread and increasing in density, and will have a significant impact on the ecosystems within Atlantic coastal waters. Photo: Scripps Institution of Oceanography



Mariana Islands. Available on CD-ROM and on the Web, this digital product includes 34 detailed digital maps depicting the location and distribution of shallow-water seafloor habitats, satellite imagery, and a detailed mapping methodology. It is the first comprehensive assessment of shallow-water benthic habitats for these Pacific Island ecosystems. The maps and associated data products, coupled with a robust archive of marine biological data, serve as valuable tools for



Two scientists test sediment for toxicity during a research cruise off the central California coast. Photo: National Centers for Coastal Ocean Science



A biologist from the Office of Response and Restoration tests coastal sediment as part of a local assessment. Photo: Office of Response and Restoration

evaluating and delineating potential marine protected areas and for developing coral ecosystem monitoring strategies.

Coastal Hazards

Hydrographic Surveyors Discover Uncharted Navigation Hazard

During hydrographic survey operations in April, the *THOMAS JEFFERSON* discovered a previously uncharted obstruction in eastern Long Island Sound. Using side-scan sonar, the crew detected the 60-foot-long object, later identified as a crane that was swept into the water during a storm about 25 years ago. The discovery has been identified as a danger to navigation and noted in the U.S. Coast Guard's "Notice to Mariners."

Oil Spill Drill Enhances Safety of Sanctuary Waters

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

A marine biologist from the National Centers for Coastal Ocean Science conducts critical coral reef monitoring and assessment in the Caribbean. Photo: National Centers for Coastal Ocean Science

NOS Continues to Assess Damages in Delaware River Oil Spill

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

NOS Provides Natural Resource Damage Assessment for Alaska Oil Spill

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



PRODUCTS AND SERVICES

Nautical Charts

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

Shoreline Mapping

NOS surveys 95,000 nautical miles of U.S. coastline periodically 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 and 25 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, contaminants, sources of pollution, biodiversity, and changes in the use of coastal land and waters, NOS helps states and communities 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 algal blooms, invasive species, and changes in land use and climate.



NOS provided damage assessments and prioritized cleanup activities in response to a December 2004 ship grounding and oil spill in Alaska's Bering Sea. Photo: Office of Response and Restoration

planned for the draft restoration plan and environmental assessment report.

Coastal Communities

New Sea Center Focuses on Marine Conservation

In April, the Ty Warner Sea Center opened in Santa Barbara, California, featuring an exhibit about NOAA's weather and national marine sanctuary missions. Owned and managed by the Santa Barbara Museum of Natural History, the center is an education and research facility focused on marine conservation within the Channel Islands National Marine Sanctuary region. The facility welcomes all ages, but its exhibits and programs are targeted to elementary school children. The new NOAA exhibit includes a

multimedia, interactive information kiosk about NOAA weather products; updated information on Channel Islands National Marine Sanctuary research, education, outreach, and resource protection programs; and extensive information on sanctuary species, habitats, and trends.

NOS Supports Cleanup of Vieques, Puerto Rico

NOS is providing scientific support to the U.S. Navy and the U.S. Environmental Protection Agency (EPA) on the investigation and cleanup of Vieques, Puerto Rico. This small island east of Puerto Rico was formerly used by the Navy for military training operations. NOS is helping to assess contamination levels; identifying risks to humans and the environment; and developing strategies to assess, clean up, and restore natural resources.

In addition to technical assistance, NOS conducted a study to determine whether contamination is

present in crabs on Vieques. The data will help determine whether certain areas can be re-opened to the public for land crab harvesting, and will be useful in the investigation and cleanup of Vieques.

American Samoa Celebrates 25 Years in the Coastal Zone Management Program

This year, American Samoa celebrated 25 years in the Coastal Zone Management Program. This Pacific island, which has 126 miles of coastline, received federal approval for its coastal zone management program in September 1980. Today, American Samoa is a leader in protecting its coastal resources and serves as a model for the coastal management programs of other Pacific islands.

Organization and Outreach

Teachers and Students Gain Hands-on Learning Experience

In 2005, the Monterey Bay Watershed Education and Training (B-WET) program funded more than \$1.2 million in grants to provide teachers and students with hands-on, in-the-field experiences in sanctuary waters. Now in its second year, the Monterey B-WET program has reached more than 7,000 teachers and 200 students.

Estuary Reserve Participates in EstuaryLive

Despite the destruction wrought by Hurricane Katrina, Mississippi's Grand Bay NERR proceeded with its EstuaryLive broadcast, with the help of EPA's Mobile Bay Estuary Program. The Grand Bay NERR and Mobile Bay segment of the national EstuaryLive event allowed students to learn what a hurricane is, how Katrina affected the NERR, how birds and other animals

responded to the storm, and how it affected shellfisheries. EstuaryLive is an interactive “field trip” for K-12 students, available via live Webcasts from NOAA’s NERR sites and EPA’s National Estuary Program sites. In 2005, more than 29,000 students from around the country participated in the EstuaryLive broadcasts—more than twice the number of the previous year.

FUTURE OUTLOOK

NOS intends to be the global leader in the integrated management of the ocean. By positioning products and processes for the decades ahead, NOS will continue to ensure that the Nation’s coastal and marine resources remain safe, healthy, and productive to meet ever-increasing food, energy, security, environmental, and economic challenges. Specific priorities include:

People—Because people are the foundation of NOS’s success, NOS will continue to invest in training and career enhancement, offering opportunities for NOS staff to lead at all levels of the organization.

Observations—NOS will be a global leader in designing and implementing an integrated ocean observing system. This effort will include incorporating both *in situ* and remotely sensed measurements, which will provide valuable information for protecting and managing ocean and coastal resources.

Modeling—NOS will be a global leader in applying existing and developing new models to forecast future ocean and coastal conditions to meet

During a research vessel open house and tour, an NOS scientist explains to children how underwater data and samples are collected.
Photo: Office of Response and Restoration

the needs of coastal managers and commercial and recreational users.

Watersheds—NOS will be a global leader in applying a watershed approach to managing ocean and coastal resources, acknowledging that the ocean ecosystem is inclusive of white water, brown water, blue water, and the atmosphere.

Partnerships—NOS will be a global leader in forging partnerships across all sectors of society, to maximize the impact of individual efforts and ensure that resource management decisions are made in an integrated manner.

Technology—NOS will be a global leader in identifying and applying existing technologies and in supporting the development of new technologies that will enhance our ability to understand and more effectively manage ocean and coastal ecosystems.

Mission—NOS will continue to assess opportunities for integrating critical ocean and coastal management activities.



An NOS volunteer helps children make fish prints at a community festival in Delaware.
Photo: Communication and Education Division





National Marine Fisheries Service

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



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

NOAA's National Marine Fisheries Service (NOAA Fisheries Service) is dedicated to protecting and preserving 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 the 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 and Gulf of Mexico to the Pacific Ocean. We use our interdisciplinary expertise in the biological, physical, and social sciences and 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 our efforts on conservation, management, and sustainable development as we face new challenges in the 21st century.

ACCOMPLISHMENTS

Fish Stocks Rebuilt

The NOAA Fisheries Service *2004 Report to Congress* announced that Pacific whiting has been fully rebuilt since it was first reported as overfished in the 2002 report. As a result of the Commerce Department's efforts to conserve and manage the Nation's fishery resources, six stocks are no longer overfished, and overfishing has been eliminated in three stocks. Additionally, NOAA Fisheries Service made overfished and/or overfishing determinations for 20 stocks whose status was previously unknown. The percentage of stocks with a known population status that are not overfished increased from 64 to 72 percent, while the percentage of stocks with a known fishing rate that are not subject to overfishing has increased from 79 to 81 percent. Overfishing is determined to be occurring for those stocks for which the fishing mortality rate exceeds the level required to produce the maximum sustainable yield (MSY) on a continuing basis. Overfished stocks are those whose biomass is below the minimum stock size required to produce the MSY on a continuing basis.

National Offshore Aquaculture Act Package Submitted to Congress

NOAA Fisheries Service submitted the National Offshore Aquaculture Act to Congress in June 2005. If enacted by Congress, this bill will establish a regulatory system for aquaculture in the U.S. Exclusive Economic Zone (EEZ), allowing for the development of a domestic offshore aquaculture industry with the necessary environmental safeguards. The bill meets an Administration commitment made in the December 2004 *U.S. Ocean Action Plan* to grant the Secretary of Commerce new authority to issue permits for offshore aquaculture in Federal ocean waters.

Magnuson–Stevens Act Reauthorization Submitted to Congress

During FY 2005, NOAA Fisheries Service developed a comprehensive package of amendments to reauthorize the Magnuson–Stevens Fishery Conservation and Management Act. The proposed amendments would implement the requirements of the Administration's *U.S. Ocean Action Plan* related to dedicated-access privilege programs and representation on the Regional Fishery Management Councils. The draft legislation also contains several other key revisions to improve NOAA Fisheries Service's ability to end overfishing, rebuild stocks, and manage healthy U.S. marine fish stocks; ensure the use of information collected through state-of-the-art scientific methods; and improve compliance with fishing regulations.

Guidelines Proposed for Magnuson–Stevens Act National Standard 1

NOAA Fisheries Service proposed improved guidelines to help fishery managers implement National Standard 1 of the Magnuson–



NOAA scientists depart in a skiff on a marine mammal study. Photo: John Bortniak, NOAA Corps

Stevens Act, which requires fishery managers to prevent overfishing and rebuild stocks while achieving the optimum yield from each fishery. Under the guidelines, Regional Fishery Management Councils would end overfishing within the first year of a rebuilding plan, except under certain conditions specified in the Act. The Councils would set a more conservation-oriented mid-point as the target time to rebuild, instead of the current common practice of using the maximum allowable rebuilding timeframe. Also, fish stocks for which there is little known scientific information would be grouped into stock assemblages for assessment and management purposes.

Data Collected on Marine Recreational Fishery

NOAA Fisheries Service conducted or administered marine recreational fishery data collections on all coasts, Hawaii, and Puerto Rico in 2005. The recreational fishery harvest, effort, and participation statistics are vital to fish stock assessments, fishery management, and the stewardship of our living marine resources.



NOAA Fisheries Service has proposed improved guidelines to help fishery managers prevent overfishing and rebuild stocks while achieving the optimum yield from each fishery. Photo: NOAA Photo Library



NOAA Fisheries Service conducted or administered marine recreational fishery data collections on all coasts and in Puerto Rico in 2005. Photo: William B. Folsom, NOAA Fisheries Service

Work Begun on National Commercial Fishing Permit System

During 2005, NOAA Fisheries Service began work on developing a national permit system. This component of the Fishery Information System will provide NOAA Fisheries Service a nonduplicative standardized database of permit information. In the future, this system will provide the fishing industry the means to purchase and renew commercial permits electronically via the Internet.

Atlantic Large Whale Take Reduction Plan Revised

In 2005, NOAA Fisheries Service published a proposed rule to further reduce entanglements of large whales in commercial fishing gear along the U.S. East Coast. The rule would revise the Agency's current regulations under the Atlantic Large Whale Take Reduction Plan and require fisheries to use modified gear and expand gear-marking require-

ments to reduce entanglements. The Agency also proposes to revise boundaries and seasons for management areas and exempted waters.

Impacts of Ocean Acoustics Assessed

NOAA Fisheries Service is investigating all aspects of marine animal acoustic communication and the effects of sound on behavior and hearing in protected marine species. As part of this investigation, In FY 2006, NOAA Fisheries Service will prepare an Acoustics Environmental Impact Statement (EIS) to analyze the potential impacts of applying noise exposure criteria in guidelines to determine what constitutes "take" of a marine mammal under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). In particular, the EIS will identify the potential impacts on marine mammals of human activities that occur in oceanic waters, such as dredging, fishing, shipping, geological exploration, military operations, construction, and acoustic and oceanographic research.

FSV HENRY B. BIGELOW Launched

In 2005, NOAA launched the *HENRY B. BIGELOW*, the second of four planned fisheries survey vessels. This ship—the most technologically advanced fisheries survey vessel in the world—will be placed in operation in late 2006. NOAA Fisheries Service designed the *BIGELOW* to meet specific data collection requirements for fishery surveys and tough standards for a low acoustic signature set by the International Council for Exploration of the Seas. This feature will allow the ship to study fish quietly without altering their behavior.

Performance Measures Published for Pacific Salmon Recovery

In July 2005, NOAA Fisheries Service published performance measures for recovering Pacific salmon and reported results in the *2005 Pacific Coastal Salmon Recovery Fund Report to Congress*. With the performance measures in place, the program will be better able to demonstrate success in completing high-priority activities and recovering Pacific salmon to sustainable levels. The report includes a chapter on the status of ESA-listed Pacific salmon and efforts being taken to protect and recover them. Through 2004, the program had funded the restoration of 637 instream miles and 1,355 miles of streambank habitat, removal of 3,566 barriers to fish migration, opening access to 1,520 miles of streams, and protection of more than 51,520 acres of habitat.

ESA Listings and Critical Habitat Designations Finalized

On June 16, 2005, NOAA Fisheries Service published final listing determinations for 16 Evolutionarily Significant Units (ESUs) of Pacific salmon. On September 2, it pub-

lished critical habitat designations for 19 ESUs of salmon and steelhead listed as threatened and endangered under the ESA. The listing determinations and habitat designations, which represent a significant amount of work for NOAA Fisheries Service over the past two years, will help protect and recover salmon and their ecosystems in Oregon, California, Washington, and Idaho.

Restoration Monitoring Information Published for Coastal Habitats

Collaborating with the National Ocean Service, NOAA Fisheries Service compiled key restoration monitoring information applicable to coastal habitats nationwide and published it as a two-volume set. Volume One of *Science-Based Restoration Monitoring of Coastal Habitats* outlines the steps necessary to craft a monitoring plan. Volume Two, designed for practitioners with limited experience in coastal ecology, provides tools for developing and implementing a monitoring plan.

Thousands of Acres of Habitat and Stream Miles Restored

NOAA Fisheries Service, in collaboration with national and regional agencies, as well as its alliances with more than 330 community groups, restored 8,333 acres of habitat in 2005. Since 2001, NOAA has restored 24,916 habitat acres and opened 628 stream miles. Over the next five years, NOAA Fisheries Service aims to restore an additional 22,800 acres and open 3,750 stream miles.

Since 2001, NOAA has restored 24,916 habitat acres and opened 628 stream miles.

Photo: Joni Packard, NOAA Fisheries Service

First ESA Listing of Corals Proposed

In 2005, NOAA Fisheries Service proposed listing staghorn coral (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*) as threatened under the ESA. This would be the first ESA listing of any coral species. Found in shallow water on reefs throughout the Bahamas, Florida, and the Caribbean, these formerly abundant branching corals have remained at low levels without noticeable recovery and, in cases where NOAA Fisheries Service has targeted monitoring data, they continue to decline. Threats to these species include physical damage from human activities and hurricanes, as well as disease and temperature-induced bleaching. NOAA Fisheries Service will publish a final rule to list these species once public comments have been reviewed.



*In 2005, NOAA Fisheries Service proposed listing staghorn coral (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*) as threatened under the Endangered Species Act.*
Photo: NOAA Photo Library



Regulations Finalized for North Pacific Crab Rationalization Program

NOAA Fisheries Service finalized regulations for the North Pacific crab rationalization program in March 2005. This new program allocates Bering Sea and Aleutian Islands king and Tanner crab fisheries resources not only to fishermen, but also to processors and communities. The new program encourages crab-harvesting cooperatives that can fish individual fishing quotas collectively and cooperatively. The value of Bering Sea and Aleutian Islands crab is expected to increase under the rationalization program. Other rationalization programs, such as the American Fisheries Act pollock cooperatives and the halibut/sablefish individual fishing quota program, have resulted in more valuable, better managed, and safer North Pacific fisheries.

Regional Ecosystems Delineated and Follow-up Workshop Held

Following a major workshop involving 11 Federal agencies, states, academic institutions,

councils, commissions, the Coastal States Organization, and nongovernmental organizations, the NOAA Executive Panel approved a set of 10 Regional Ecosystems in November 2004. The Regional Ecosystems include the Arctic Seas (Beaufort Sea and Chukchi Seas combined), East Bering Sea, Gulf of Alaska (which combine to form the Alaskan Ecosystem Complex), California Current, Pacific Islands Ecosystem Complex, Gulf of Mexico, Caribbean, Southeast (Atlantic) Shelf, Northeast (Atlantic) Shelf, and Great Lakes.

As a follow-up to the delineation of Regional Ecosystems, NOAA Fisheries Service provided financial support to the Ecosystem Goal Team, which collaborated with other NOAA Line Offices to hold its first Regional Ecosystem Workshop in the Southeast Shelf Ecosystem in Charleston, South Carolina. The major collaborators in the August workshop included NOAA, The Nature Conservancy, the South Atlantic Fishery Management Council, and several state and nongovernmental organizations in

the Southeast. This workshop's purpose was to begin a dialog on potential regional collaboration for ecosystem approaches to resource management, ecosystem indicators, and ecosystem boundary issues.

Economic Surveys of Harvest Activities Initiated

In 2005, NOAA Fisheries Service initiated new economic surveys of harvest activities in five fisheries: Southeast coastal migratory pelagics, Gulf of Mexico reef fish, Alaska crab, and West Coast offshore and near-shore groundfish fleets. Ongoing economic data collection programs continued in the South Atlantic snapper-grouper fishery, all Northeast observed fisheries, Hawaii long-line and bottomfish fisheries, and all Southwest observed fisheries. NOAA Fisheries Service's collection of economic data on commercial fishing activities improves estimates of harvest, bycatch, fishing capacity, and ecosystem benefits and helps assess the economic impacts of proposed management options on fishermen.

In addition, NOAA Fisheries Service fielded a national seafood consumption survey in 2005. The first national survey to be conducted in over 20 years, this survey will run for a full year to capture seasonal variation in household demand for seafood.

Observer Coverage Provided for Fisheries

In 2005, NOAA Fisheries Service provided adequate or near-adequate observer coverage for 26 fisheries, with another 16 fisheries having baseline or pilot levels of coverage. A



The new NOAA Fisheries Service program encourages crab-harvesting cooperatives that can fish individual fishing quotas collectively and cooperatively. Photo: Pacific Islands Fishery Science Center

total of about 63,000 days at sea are targeted for observer coverage across all 42 fisheries.

Vessel Monitoring Increased via Satellite Technology

NOAA Fisheries Service is currently providing near-real-time tracking of more than 2,689 fishing vessels in 15 fisheries via a satellite-based vessel monitoring program—a 19 percent increase over 2004. The program has resulted in near-perfect compliance with open and closed seasons, closed areas, and international boundaries and management areas. It also provides critical information to the U.S. Coast Guard in support of its search-and-rescue mission (assisting two rescues in 2005), and a real-time communications link for transmitting daily catch and effort information to NOAA for use in quota management.

Capacity Reduction Program Completed for Bering Sea Crab Fisheries

Reducing overcapacity is essential to rebuilding and sustaining fisheries. During FY 2005, NOAA Fisheries Service completed a \$97.4 million program to reduce fishing capacity in



Laysan albatross. Photo: Pacific Islands Fishery Science Center

the Bering Sea crab fisheries. A reduction loan, repayable by post-reduction crab landing fees, financed 100 percent of the program's cost. The program permanently removed 25 crab vessels from worldwide fishing and revoked 25 crab permits, 15 groundfish permits, 20 Federal fishery vessel permits, one high-seas permit, and one halibut individual fishing quota allocation.

NOAA Fisheries Service proposed and adopted a fee regulation for repaying the \$36 million loan that financed more than 78 percent of the cost of the completed program for

reducing fishing capacity in the Pacific Coast groundfish fleet. Fee payment in the seven fisheries involved began on September 8, 2005. In addition, NOAA Fisheries Service worked extensively with the Gulf of Mexico grouper industry and with Southeast Alaska purse seine fisheries to prepare business plans for prospective fishing capacity reduction programs in those fisheries.

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 909 fishery stocks 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 reauthorized Magnuson–Stevens Fishery Conservation and Management Act.

Regional Stock Assessments

NOAA Fisheries Service stock assessment research offers 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 are charged with protecting the Nation's living 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 through public awareness and education.



NOAA divers remove fishing gear from coral.
Photo: NOAA Photo Library

FSV OSCAR DYSON Commissioned

In 2005, NOAA commissioned its newly constructed fisheries survey vessel *OSCAR DYSON* at the ship's home port in Kodiak, Alaska. This is NOAA Fisheries Service's first newly constructed fisheries survey vessel in more than 25 years. The ship is named for the late Alaskan fishing industry leader Oscar Dyson, whose numerous private and public contributions have improved the industry for many Alaskans who make their living at sea. *OSCAR DYSON*'s primary mission will be to monitor the Bering Sea and Gulf of Alaska ecosystems, particularly Alaskan pollock—the nation's largest fishery. Its state-of-the-art technology and unique research attributes will help ensure the sustainability of Alaska's fisheries populations and a healthy fishing industry. The ship is also an important link in the developing Global Earth Observing System of Systems, where countries throughout the world will share data to take the pulse of the planet.

Efficiencies Gained Through Regulatory Streamlining

Under its Regulatory Streamlining and Improvement Program, NOAA Fisheries Service is making the regulatory process more efficient and effective for its constituents, while ensuring that marine fish stocks are managed sustainably. The Agency has issued new draft operational guidelines outlining processes and procedures for the development of fisheries management actions by eight Regional Fishery Management Councils. While not mandatory, the draft guidelines serve as a blueprint for simplifying processes and document requirements.

NOAA Fisheries Service continues to use advanced information technology to collect public comments electronically, and additional e-rulemaking features are in place for notices, constituent comments, and *Federal Register* filings. These efficiencies shorten regulatory review and analysis cycle times and make it easier to create an administrative record of policy decisions. In addition, delegations of authority to regional managers have helped simplify the decision process.

Constituent and Stakeholder Relationships Expanded

In 2005, NOAA Fisheries Service continued to build relationships with constituents, stakeholders, and the public through improved communications. One of the major ways the Agency communicates is through Web-based products, such as news releases and *FishNews*, which reaches almost 5,000 constituents weekly with updates on NOAA Fisheries Service regulations and other actions taken. NOAA Fisheries Service also continues to update its Web sites, informing the public about protected resources, sustainable fishing,

and ecosystem approaches to management.

NOAA Fisheries Service co-sponsored three major regional meetings with recreational fishing stakeholders, in support of its implementation of the new NOAA Recreational Fishing Strategic Plan throughout the United States. In addition, recreational fishing team staff promoted the strategic plan at various stakeholder meetings, trade shows, and tournaments.

The agency also continued to work closely with environmental groups. NOAA Fisheries Service met with State Marine Fisheries Directors in April 2005 to discuss the *U.S. Ocean Action Plan*, marine protected areas, aquaculture, ecosystem approaches to resource management, and funding issues. NOAA Fisheries Service will continue to work with the states and the commissions to ensure funding is being used as efficiently as possible.

The agency also promoted the health benefits of eating seafood through its support of The Great American Seafood Cook-Off for the second consecutive year.

FY 2005 a Good Year for Magnuson–Stevens Act Cases

The Agency continues to be successful in court, winning all four Magnuson–Stevens Act cases having final decisions in 2005. This is a significant improvement over the period immediately following passage of the Sustainable Fisheries Act amendments, when NOAA prevailed in just 45 percent of cases.

Work Begun on Ted Stevens Marine Research Institute

Major site work on the new Ted Stevens Marine Research Institute was substantially completed during the summer of 2005. The Institute

will serve as a critical addition to NOAA Fisheries Service facilities in Alaska. This new facility will allow NOAA Fisheries Service to increase its critical scientific research programs in Alaska, which provides about half of the value and tonnage of groundfish landed annually in the U.S. EEZ. The continental shelf off Alaska constitutes 70 percent of the U.S. continental shelf, and for the past 30 years has consistently produced nearly 5 billion pounds of commercial fish harvested each year.

Pacific Coast Stocks Assessed

In 2005, NOAA Fisheries Service completed assessments of four stocks: Pacific Coast starry flounder, Pacific Coast blackgill rockfish, gopher rockfish, and California scorpion-fish. NOAA Fisheries Service stock assessment research provides a comprehensive understanding of marine systems to meet U.S. environmental, economic, and public safety needs.

Marine Mammal Reauthorization Package Sent to Congress

On June 16, 2005, NOAA transmitted its MMPA reauthorization bill to Congress. NOAA Fisheries Service worked with the U.S. Fish and Wildlife Service, Marine Mammal Commission, Department of Defense, and other partners to develop a legislative proposal on behalf of the Administration to reauthorize the MMPA. Among other proposals, the bill includes amendments to clarify the definition of harassment, strengthen marine mammal bycatch reduction initiatives, and enhance the MMPA's enforcement capabilities.

On June 16, 2005, NOAA transmitted its Marine Mammal Protection Act reauthorization bill to Congress, which includes amendments to strengthen marine mammal bycatch reduction initiatives. Photo: NOAA Photo Library

FUTURE OUTLOOK

NOAA Fisheries Service bears stewardship responsibility for the largest EEZ in the world. Healthy and productive coastal, marine, and Great Lake ecosystems create billions of dollars of value in recreational and commercial activity. New legislation, evolving management philosophies, and scientific advances have created new opportunities for managing the Nation's living marine resources.

The need for an ecosystem approach to management has been identified and supported by the U.S. Commission on Ocean Policy (USCOP) in its 2004 report, *An Ocean Blueprint for the 21st Century*, and by the Administration's response to that report, the *U.S. Ocean Action Plan*. Both the USCOP and the *Action Plan* clearly state an effective U.S. ocean policy must be grounded

in an understanding and management of ecosystems that account for and address complex interrelationships among the ocean, land, air, and living resources (including humans) and their activities.

NOAA will continue to adopt the necessary tools and apply fiscal and programmatic resources to ensure the integrity of our marine ecosystems, and to sustain their socioeconomic and intangible benefits for all Americans. We will increase our efforts to work collaboratively on an ecosystem-based approach with other Federal agencies, states, councils, commissions, industry, academia, and nongovernmental groups. And we will further extend these collaborative efforts as we develop indicators of ecosystem status and trends and joint strategies to address priority regional ecosystem issues.





Office of Oceanic and Atmospheric Research

Where Science Comes to Life



*Richard D. Rosen, Ph.D.
Assistant Administrator*

NOAA's primary research and development organization, the Office of Oceanic and Atmospheric Research (NOAA Research), studies the Earth system from the deep ocean to the upper reaches of the atmosphere. NOAA Research delivers the products and services that help us to understand and predict environmental changes on local to global scales and at time scales from days to centuries.

The NOAA Research network consists of 11 internal research laboratories; an Ocean Exploration Program that conducts both internal and extramural research; and extramural research at 30 National Sea Grant university programs, 6 undersea research centers, a research grants program through the Office of Global Programs, and 13 cooperative institutes with academia.

Ultimately, the information that NOAA Research provides is used by decision makers at all levels to prevent the loss of human life and conserve and manage natural resources while maintaining a strong economy. NOAA Research is integrated across three central research themes: ocean, coastal, and Great Lakes resources; climate; and weather and air quality.

ACCOMPLISHMENTS

NOAA Research Publishes Long- and Short-term Corporate Visions

Documents to guide the long- and short-term direction of NOAA's research enterprise were developed and widely distributed through an extensive stakeholder outreach campaign. The *20-Year Research Vision* adopts a longer-term perspective of ecological challenges and the scientific advances we can expect to help meet those challenges, while the *Five-Year Research Plan* includes milestones for NOAA's research that are aimed at improving our products and information services in the near term. The documents were developed by the NOAA Research Council, a committee of senior scientists from across NOAA chaired and staffed by NOAA Research.

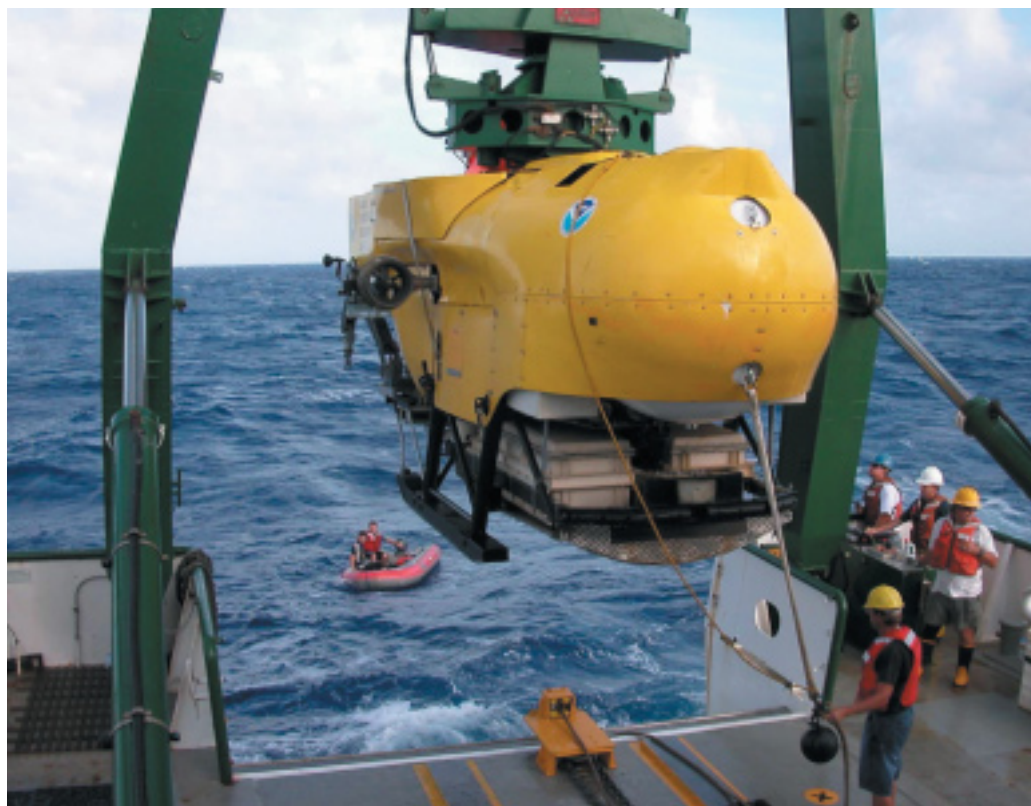
The Hawaii Undersea Research Laboratory (HURL) and Ocean Exploration completed the longest and most challenging ocean expedition in HURL's 25-year history. The NOAA RV KA'IMIKAI-O-KANALOA traveled 10,000 nautical miles, and the PISCES IV and V submersibles made 67 dives—one as deep as 1,820 meters on Brothers undersea volcano. Photo: William Chadwick, Oregon State University/NOAA

Expedition Sets Records for NOAA Undersea Research and Exploration

The Hawaii Undersea Research Laboratory (HURL) and Ocean Exploration completed the longest and most challenging ocean expedition in HURL's 25-year history. The NOAA RV *KA'IMIKAI-O-KANALOA* traveled 10,000 nautical miles, and the *PISCES IV* and *V* submersibles made 67 dives—one as deep as 1,820 meters on Brothers undersea volcano. The nearly five-month-long international expedition to explore the South Pacific produced many discoveries, including numerous suspected new species, new ranges for known species, measurements of the diversity of marine life, more data about undersea volcanoes, and the rare interface between sunlight and chemosynthetic organisms.

New Tool Provides Better Weather “Now-casts” for Airplanes

NOAA's short-term weather forecasts, called “now-casts,” are especially critical for aviation and severe-weather forecasting. NOAA's now-casts are generated from a 13-kilometer version of NOAA's Rapid Update Cycle (RUC13) model, which became operational in June. This new tool is the result of a major collaborative effort among NOAA's Forecast Systems Laboratory, the National Centers for Environmental Prediction, and the



National Center for Atmospheric Research. This partnership was further strengthened by contributions from NOAA's National Weather Service, other NOAA laboratories, NOAA base funds, and the Federal Aviation Administration's Aviation Weather Research Program.

Kuroshio Extension Observatory Buoy Has Stunning First Year

Outstanding buoy performance drives improved ocean models that underpin our understanding of the role of the oceans in climate. The moored buoy in the Kuroshio current in the north Pacific returned 100 percent of surface data—including winds, air temperature, relative humidity, rain rate, downwelling solar and longwave radiation, sea surface temperature, and salinity. The buoy also returned 90 percent of subsurface temperature



The moored buoy in the Kuroshio current in the north Pacific returned 100 percent of surface data. Measurements from the Kuroshio Extension Observatory will contribute to climate studies of the role of the Kuroshio jet and its recirculation gyre. Photo: Japan Agency for Marine Earth Sciences and Technology



NOAA's prototype Tsunami Forecasting System demonstrates the potential for improving the speed, accuracy, and reliability of tsunami warnings.

Photo: National Ocean Service

and salinity data. The mooring is located in international waters, where the currents can be strong and deep, winds high, and the sea state rough. The buoy survived the record 2004 typhoon season and a full season of winter storms, providing unprecedented data for analyzing air-sea interaction in the western boundary region of the north Pacific. The mooring is one of NOAA's most recent contributions to the global network of Ocean SITES (Sustained Interdisciplinary Timeseries Environment observation System) reference stations.

NOAA Launches Hurricane Intensity Forecasting Experiment

This summer, NOAA's Hurricane Research Division (within the Atlantic Oceanographic and Meteorological Laboratory in Miami, Florida) initiated the multi-year Intensity Forecasting Experiment (IFEX). As part of this experiment, NOAA aircraft flew into hurricanes to take observations at different stages in their life cycle, from formation and early organization to peak intensity and subsequent landfall or decay over open water. Developed in partnership with the NOAA Aircraft Operations Center and the National Weather Service's Environmental Modeling Center and National Hurricane Center, IFEX is intended to enhance current operational models and the development of the Hurricane Weather Research and Forecasting model—the next-generation operational hurricane model.

NOAA Laboratory Accurately Predicts Tsunami

NOAA's Pacific Marine Environment Laboratory's (PMEL's) prototype Tsunami Forecasting System combines Deep-ocean Assessment and Reporting of Tsunamis (DART) "tsunameter" network measurements with state-of-the-art numerical modeling technology to predict the impact of tsunamis on coastal communities. As evidenced by the following activities on June 15, 2005, both the measurement and the modeling are essential to a successful forecast.

- 7:51 p.m.—An approximately 7.2-magnitude earthquake struck off the northern California coast.
- 7:56 p.m.—NOAA's Alaska Tsunami Warning Center issued a tsunami warning.
- Shortly thereafter—PMEL predicted a DART tsunameter system off the Oregon coast would measure the formation of a 1-centimeter tsunami.
- Approximately 20 minutes later—As forecast, the DART station in Oregon registered a 1-centimeter tsunami.
- 20 minutes later —The Alaska Tsunami Warning Center cancelled the warning because the tsunami was only 1 centimeter.

This event demonstrates the value of a Tsunami Forecasting System for improving the speed, accuracy, and reliability of tsunami warnings and thereby reducing the loss of life and property in U.S. coastal communities. Accurate forecasts will also help reduce false alarms, the resulting high economic cost of unnecessary evacuations, and the physical risk to the population during evacuations and will increase public confidence in warnings.

Doppler weather radars have significantly improved the quality of tornado warnings issued by National Weather Service forecasters and have lowered the number of tornado casualties nationwide.

NOAA and EPA Launch Air Quality Awareness Campaign

NOAA and the U.S. Environmental Protection Agency (EPA) launched a “Be Air Aware” campaign, urging Americans to pay close attention to air quality forecasts. State and local next-day air quality predictions for more than 300 communities across the United States are based on guidance from NOAA and EPA. NOAA’s forecast guidance, which is available through midnight of the following day, indicates the onset, severity, and duration of unhealthy ground-level ozone levels, particularly during the summer. This year, NOAA expanded its forecast guidance from the northeastern United States to the South and much of the Plains, now covering more than half of the U.S. population. To help all Americans make important health decisions, NOAA will expand this capability over the next several years to provide nationwide coverage on air quality, including particulate pollution, which is a major cause of illness and death.

Weather Surveillance Radar Helps NOAA Save Lives

The June 2005 issue of the American Meteorological Society’s *Weather and Forecasting* included a study concluding that tornado warnings have improved significantly since NOAA’s National Weather Service (NWS) installed a network of Doppler weather radars a decade ago. Researchers examined the impact of Weather Surveillance Radar-1988 Doppler (also known as NEXRAD),

which was developed through many years of research by OAR scientists and installed nationally in the 1990s during the NWS’s \$4.5 billion modernization. The researchers’ analysis, which controlled for the characteristics of a tornado and its path, found the radars have significantly improved the quality of tornado warnings issued by NWS forecasters and have lowered the number of tornado casualties nationwide. The percentage of tornado warnings almost doubled—from 35 percent before NEXRAD’s installation to 60 percent after its installation. In addition, the mean lead time of NWS warnings increased from 5.3 to 9.5 minutes. The researchers’ analysis also found that expected casualties were significantly lower for tornadoes occurring during the day or early evening when people are awake, than late at night when they’re sleeping.

GLERL Helps Lead Lake Erie Research Partnership

The Great Lakes Environmental Research Laboratory (GLERL), in collaboration with researchers in



Crew members work with a portable observatory buoy from the Great Lakes Environmental Research Laboratory.
Photo: NOAA Photo Library

the United States and Canada, is leading one of the largest, most comprehensive Lake Erie research field programs. Entitled International Field Years on Lake Erie, the two-year project, started in May 2005, includes a series of ship cruises involving up to 10 research vessels, as well as field and laboratory work. Fourteen observation moorings will be deployed in the lake to continuously collect data.



GFDL Provides Data for Intergovernmental Panel on Climate Change Report

The NOAA Geophysical Fluid Dynamic Laboratory's (GFDL's) new state-of-the-art coupled climate model (CM²) provided massive amounts of data to the world's research communities for the Intergovernmental Panel on Climate Change's (IPCC's) Fourth Assessment Report on Climate Change (2007). At the IPCC Workshop on Analyses of Climate Model Simulations, modeling groups from around the world presented results from more than 100 independent comparisons and analyses of climate models. When compared to other models, in many of these studies, GFDL's model was determined to be one of the best in the world by a variety of measures. This accomplishment represents the

culmination of an intensive effort by GFDL scientists over the last several years to construct this climate model.

The experiment was begun using two initial conditions: one representing present-day climate and one from 1860. To assess the effects of global warming, two scenarios were created. The first scenario ran increasing atmospheric carbon dioxide (CO₂) concentrations of one percent per year, until concentrations were twice the current level of CO₂. The second scenario also ran increasing atmospheric CO₂ concentrations of one percent per year, but continued until it reached four times present-day concentrations. GFDL is the first organization to ship nearly 500 gigabytes of model data from a state-of-the-art coupled climate model.

NOAA scientists collect air samples from all over the world to learn more about the composition of the atmosphere. Photo: NOAA Photo Library

PRODUCTS AND SERVICES

Global Models

NOAA Research models of the atmosphere, ocean, and climate have increasingly sophisticated predictive capabilities, giving leaders in government and industry a greater understanding of the range of possible future outcomes of today's decisions.

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.

Environmental Observation and Monitoring Networks

NOAA scientists collect air samples from all over the world to learn more

about the composition of the atmosphere by monitoring ozone, recording solar radiation, and observing the 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 to provide a baseline for assessing future changes.

Interagency Field Experiments

NOAA Research scientists lead field experiments focused on the study of exciting environmental phenomena. Fieldwork improves our ability to understand and predict the Earth's climate and atmosphere. Major campaign foci include exploring the links

between oceans and atmosphere in the eastern tropical Pacific; natural and anthropogenic climate change by aerosols; intercontinental transport of manmade pollutants, such as ozone, fine particles, and other chemically active "greenhouse" compounds; and physical processes that occur in the ocean and atmosphere that are influenced by ocean waves.

Operational Products

NOAA Research supports a variety of operational products, including:

- providing the Nation's official source of space weather alerts and warnings, and
- collecting real-time data from moored ocean buoys for improved detection, understanding, and prediction of El Niño and La Niña events.

NOAA Sea Grant Helps Prevent Spread of Non-native Species

Invasive species have become a major concern for natural resource managers in North America. In 2005, NOAA Sea Grant partnered with the Pet Industry Joint Advisory Council, the U.S. Fish and Wildlife Service, and the Great Lakes Sea Grant Network on a new public education and outreach effort to help consumers prevent the release and escape of non-native plants and animals. Launched at the Super Zoo trade show in Las Vegas, Nevada, Habitattitude™ encourages aquarium owners and water gardeners to avoid unwanted introductions of non-native species by adopting simple prevention steps when faced with an unwanted aquatic plant or fish. Habitattitude™ materials will be displayed in aquarium stores, aquatic retail outlets, hobby magazines, and nursery and landscape businesses across the country, as well as on the packaging of related products.

NOAA Sea Grant Researchers Develop Means to Predict Risk of Dioxin in Fish

Dioxin is so pervasive in the environment that it is almost certainly embedded in the bodies of every fish on the planet. In the species studied to date, even small amounts in body tissues can wreak havoc with fishes' ability to reproduce, endangering entire populations. The precise toxicity of dioxin varies from species to species, making it prohibitively labor-intensive and expensive to conduct separate laboratory studies on each of the estimated 20,000 species of freshwater fish to determine the risk dioxin poses to each.

University of Washington Sea Grant scientists are revealing the intricate molecular mechanisms by which dioxin (and similar compounds like



The NOAA RV KA'IMIKAI-O-KANALOA retrieves the PISCES V submersible.
Photo: NOAA Photo Library

polychlorinated biphenyls) derails normal processes in the cells of developing fish. With a detailed understanding of these mechanisms, toxicologists will be able to predict the danger a given species faces from dioxin by conducting a relatively simple analysis of that species' cellular biochemistry, and then describing how dioxin will corrupt it.

NOAA Research Scientist Receives Presidential Award

Daniel Cziczo, currently a research scientist at the Institute for Atmospheric and Climate Science at the Swiss Federal Institute of Technology, and formerly a research scientist at NOAA's Aeronomy Lab and the Cooperative Institute for Research in Environmental Sciences, was awarded a 2004 Presidential Early Career Award for Scientists and Engineers. Dr. Cziczo received the Nation's highest award for young scientists for his pioneering research and leadership in climate studies, which resulted in the first

unambiguous identification of the atmospheric particle types that are effective seeds for cloud formation in the atmosphere.

FUTURE OUTLOOK

NOAA Research strives to balance its near-term responsibility to address the needs of its primary customers both inside and outside of NOAA with its long-term commitment to conduct visionary research that will be critical for managing future environmental and societal threats. This dual responsibility requires us to perform research that leads to the transfer of information and new technologies, as well as to explore the unknown and develop important new concepts. Through increased dialogue with our constituents, we are working to be more responsible to our customers' and partners' needs as we set new directions for research.



National Weather Service

Working Together to Save Lives



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

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 6 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 4,700 employees in 122 weather forecast offices, 13 river forecast centers, 9 national centers, and other support offices around the country. The NWS annual budget of approximately \$783 million in 2005 supports a national infrastructure to gather and process data worldwide from the land, sea, and air. This infrastructure includes collecting data from 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. Cooperative 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.

ACCOMPLISHMENTS

NWS Accurately Forecasts Most Active Atlantic Hurricane Season in History

The 2005 Atlantic hurricane season was the busiest on record and extended the active hurricane cycle that began in 1995—a trend likely to continue for years to come. In all, there were 27 named storms, including 15 hurricanes of which seven were major (Category 3 or higher). Six hurricanes (Cindy, Dennis, Katrina, Ophelia, Rita, and Wilma) and two tropical storms (Arlene and Tammy) directly struck the United States. NOAA scientists predicted that 2005 would be an extremely active hurricane season, forecasting near-record activity when the hurricane season outlook was updated in early August. As Hurricane Wilma exhausted the original list of 21 names, letters of the Greek alphabet were used to name the other six storms for the first time since storms began acquiring names in 1953. The Atlantic Basin is in the active phase of a multi-decadal cycle in which optimal conditions in the ocean and atmosphere—including warmer-than-average sea surface temperatures and low wind shear—enhance hurricane activity. This increase in the number and intensity of tropical storms and hurricanes can span multiple decades (approximately 20 to 30 years).

National Digital Forecast Database Adds Forecast Elements

Two new experimental elements, relative humidity and apparent temperature, were added to the

National Digital Forecast Database (NDFD) for the lower 48 states, Puerto Rico, Hawaii, and Guam. Representing the first expansion of the NDFD, NWS added the elements in response to land and emergency management needs, and public health officials' requests to add relative humidity, wind chill, and heat indices to the digital database. NWS also upgraded six experimental elements to operational status for Puerto Rico and Hawaii on June 21: maximum temperature, temperature, minimum temperature, dew point, 12-hour probability of precipitation, and weather.

These six forecast elements are already operational for the lower 48 states and Guam. NOAA customers continue to be excited about these products and are using the NDFD in their decision making.

NWS Rates High in Customer Satisfaction

In December 2004, the University of Michigan released its annual American Customer Satisfaction Index (ACSI) for the Federal

Chief Scientist Station on NOAA WP-3D Orion hurricane hunter aircraft. Photo: NOAA Photo Library



NOAA P-3 aircraft collects data in the eye of a hurricane. Note the accurate rain bands below the aircraft. Photo: NOAA Photo Library

government, which is produced by the university's School of Business, the American Society for Quality, and the Claes Fornell International Group (CFI). Based on 10,000 respondents grading 39 services provided by 25 departments and agencies, the survey measures how

well Federal agencies serve the public. NWS's service to hydrologic data users was one of the services included in the rating. The overall score for the Federal government was 72.1 on ACSI's 100-point scale, up from 70.9 in 2003. NWS was given a rating of 77. The

report said that for the studied agencies as a whole, courtesy and professionalism, the key components of customer service, "are at all time highs."

Also in 2005, the latest survey of an NWS customer base, this time the general public, yielded an 84 (out of 100) for customer satisfaction—the highest score of the seven NWS "service" surveys completed so far. CFI conducted the survey from February 15 through March 8, 2005. The satisfaction rating is 12 points higher than the average score of the Federal government and 10 points higher than the average score of the public and private sectors combined. The survey was conducted using a range of options to encourage maximum participa-



NWS Warning Coordination Meteorologist Gary Garnet of the Cleveland Weather Forecast Office interprets computer model output on the Advanced Weather Interactive Processing System. Photo: Phil Masturzo, The Akron Beacon Journal

PRODUCTS AND SERVICES

Next-generation Radar (NEXRAD)

NWS forecasters use NEXRAD to detect and acquire information about tornados, severe thunderstorms (containing damaging winds, hail, turbulence, and lightning), and heavy precipitation (leading to flash flooding and heavy snow). NEXRAD is a tri-agency program of NWS, the Federal Aviation Administration (FAA), and the U.S. Air Force (USAF).

Automated Surface-Observing System (ASOS)

Getting more information on the atmosphere, more frequently, and

from more locations is the key to improving forecasts and warnings. ASOS, the Nation's primary surface weather-observing network, observes, formats, archives, and transmits observations automatically. The ASOS network is designed to support weather forecast activities and aviation operations, along with the needs of the meteorological, hydrological, and climatological research communities. ASOS routinely and automatically provides computer-generated voice observations directly to aircraft in the vicinity of airports, using FAA ground-to-air radio. These messages are also available via a telephone dial-in port. ASOS transmits special reports when conditions exceed pre-selected weather element thresholds. The

ASOS program is a joint effort of NWS, the FAA, and the Department of Defense.

IBM SP Supercomputer

The IBM SP supercomputer runs complex numerical weather models that generate products that NWS and private-sector meteorologists use as the basis for their forecasts. The supercomputer's added capabilities and speed allow forecasters to predict extreme weather several days in advance.

Advanced Weather Interactive Processing System (AWIPS)

AWIPS is the central nervous system of NWS forecast operations and the information technology network that carries

tion of NWS customers. This widespread effort resulted in well over 10,000 completed surveys and more than 1,300 pages of comments and suggested improvements to NWS warnings and services. Respondents indicated a high confidence (89 of 100) in NWS and an even higher likelihood to take action (91 of 100) when NWS issues hazardous weather warnings.

NOAA Transfers Space Environment Center to NWS

NOAA's Space Environment Center (SEC) provides operational space weather forecasts, warnings, and watches of space weather events 24 hour a day, 7 days a week, and performs applied research to improve its products. On January 9, 2005, NOAA transferred SEC from the Office of Oceanic and Atmospheric Research to NWS, officially making it one of the nine National Centers for Environmental Prediction (NCEP). Adding space weather to NCEP strengthens the NWS operational environmental modeling and predic-

tion mission by supporting its efforts to protect life, property, and the national economy from climate and weather hazards. It also ensures the delivery of weather/ocean/climate products to a diverse and increasingly sophisticated user community that includes the power industry and the National Aeronautics and Space Administration (NASA).

Spaceflight Meteorology Group Supports Space Shuttle *Discovery* Launch

The July 26, 2005, launch of the space shuttle *Discovery* reflected several changes and improvements instituted by NWS's Spaceflight Meteorology Group at NASA's Johnson Space Center in Houston. A primary change was the use of high-fidelity "weather-centric" simulations for launch and landing, which has bolstered training for both meteorologists and flight controllers involved in weather-related landing decisions. NOAA's Houston crew also implemented a



Electronic Technician Martin Lee (left) and Electronic Systems Analyst Don Price of the Weather Forecast Office in Duluth, Minnesota, de-ice Automated Surface Observing System equipment. A December 2004 ice storm left nearly an inch-thick coating of ice on the wind equipment. Photo: Ed Shimon, NWS

new Weather Users' Forum to promote discussion and information sharing between NOAA meteorologists and NASA flight control team members.

observations, data, and forecast models to NWS forecasters. With AWIPS, forecasters integrate all the data from the observing systems and numerical weather prediction models onto one platform. AWIPS enables rapid diagnosis of weather systems and the generation of timely, accurate warnings of severe weather.

NWS Telecommunications Gateway (NWSTG)

NWSTG is the Nation's telecommunications hub for collecting, processing, and distributing weather data and information. NWSTG provides national and global data exchange services using automated communication resources, transmitting a wide variety of environmental data. It operates around the

clock to acquire and process observations; construct messages and disseminate messages and files of observations, analyses, and forecast products. Customers worldwide use data processed by NWSTG, affecting a wide range of economic and emergency management decisions.

National Data Buoy Center (NDBC)

The NDBC is the focal point for data buoy and associated automated meteorological monitoring system technology. It provides operational, marine data from about 88 moored buoy stations in the Atlantic and Pacific oceans, the Gulf of Mexico, and the Great Lakes, and operates about 56 C-MAN (Coastal-Marine Automated Network) stations.

NOAA Weather Radio All Hazards (NWR)

At the end of FY 2005, 939 NWR transmitters had been installed covering the 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. Working with the Federal Communications Commission's Emergency Alert System, NWR is the single source for the most comprehensive weather and emergency information available to the public. NWR also broadcasts warning and post-event information for all types of hazards—both natural (such as earthquake and volcano activity) and environmental (such as chemical releases and oil spills).



Gabe Garcia, a snow safety official at Alta Ski Area, unveils a 105-millimeter recoilless gun used for avalanche control in Little Cottonwood Canyon to Meteorologist-in-Charge Larry Dunn, of the Weather Forecast Office (WFO) in Salt Lake City, Utah. Officials from the ski areas and Utah Department of Transportation work closely with the WFO, the Forecast Service Utah Avalanche Center, and local communities to help keep recreationers in the canyon safe. Snow accumulations approaching 700 inches in parts of the canyon made 2004–2005 an especially challenging season. Photo: Kevin Barjenbruch, WFO Salt Lake City

The Spaceflight Meteorology Group monitors such conditions as cloud ceiling height, visibility, cross-wind speed, and location of thunderstorms near all potential landing sites, which include the Kennedy Space Center in Florida and possible landing sites in New Mexico, California, Spain, and France.

During the 1980s and much of the 1990s, when most missions weren't docking with a space station, experts could set a launch window during a summer morning if the mission's science objectives allowed, knowing that thunderstorms are less likely in

Florida at that time of day. But with restrictions imposed as a result of “in-plane” time (the point when the plane of the International Space Station's orbit is over the Kennedy Space Center launch site), launch windows have been reduced to just 5 or 10 minutes a day. These rendezvous missions make weather—the actual, real-time conditions at launch and landing sites—vitaly important.

Alaska Region Teams with NOAA and Coast Guard in Recovery Operation

During December 2004, Chris Maier (NWS) and John Whitney and Demian Bailey (NOAA Office

of Response and Recovery) worked in Dutch Harbor, Alaska, and the surrounding area on Unalaska Island to support the rescue, cleanup, and salvage operations for a cargo ship that grounded in the Eastern Aleutians on December 8, 2004. The M/V *Selendang Ayu*, a 738-foot Malaysian freighter, experienced engine trouble during a gale, and was in tow to sheltered waters when the tow line broke. Attempts to keep the freighter from drifting toward shore failed due to strong currents and severe weather. The vessel broke in half and began leaking fuel.

Maier, an incident meteorologist from the Juneau Weather Forecast Office (WFO), assumed all weather briefing responsibilities at the Incident Command Center in Dutch Harbor. The Anchorage WFO and the Alaska Aviation Weather Unit produced a combined marine and aviation forecast product to support Maier. Electronics technicians from Anchorage, aided by Bailey, installed a meteorological sensor package near the wreck site, to provide real-time hourly weather observations. Port meteorological officers in Anchorage and Kodiak, and the marine focal point at the Cold Bay Weather Service Office, worked with ships in the area to solicit *in situ* marine observations. The weather in the Bering Sea region is notorious for its major winter storms. The incident meteorologist's main objective is to forecast lulls in the weather when the operations team can safely conduct business. The information that Maier and NWS provided allowed responders to take advantage of breaks in the weather to assess damage and accomplish other work.

NOAA Begins Expansion of U.S. Tsunami Warning Program

In response to the December 26, 2004, Indian Ocean tsunami, NOAA has taken actions to expand the U.S. Tsunami Warning Program to protect U.S. lives and property along all coasts: Pacific, Gulf of Mexico, Atlantic, and Caribbean. After receiving supplemental funding

in FY 2005, NOAA developed a multi-year implementation plan for an improved Tsunami Warning and Mitigation System. The plan focused on the following activities: deploy 39 advanced technology DART-II (Deep-ocean Assessment and Reporting of Tsunamis) buoy stations by mid-2007; expand the real-time sea level monitoring network; provide 24-hour-a-day, 7-day-a-week (24/7) operations at NOAA Tsunami Warning Centers; enhance seismic monitoring; and improve community preparedness.

In 2005, the TsunamiReady program was expanded to include 22 TsunamiReady communities. Two DART-II buoys were deployed in September. In 2006 NOAA will accelerate the U.S. coastal community inundation mapping efforts, provide 24/7 warning coverage at the Pacific and Alaska Tsunami Warning Centers, and will continue the TsunamiReady program to improve community preparedness.



Dennis McCarthy and Central Illinois Weather Forecast Office (WFO) meteorologists present the NWS StormReady Community Hero Award to Bob Parsons. The Parsons Company's safety plan, combined with warnings by the WFO and NOAA Weather Radio broadcasts, saved more than 100 lives when the manufacturing plant was demolished by a July 2004 tornado. From left to right: Dennis McCarthy, Director, NWS Office of Climate, Weather, and Water Services; Bob Parsons; Chris Miller, Warning Coordination Meteorologist; and Ernie Goetsch, Meteorologist-in-Charge. Photo: Courtesy of The Pantograph, Steve Smedley



Hawaii County Mayor Harry Kim (left) and WFO Honolulu Meteorologist-in-Charge Jim Weyman (right) participate in a July 2005 ceremony recognizing Hawaii County as TsunamiReady and StormReady. All Hawaii counties are now TsunamiReady and StormReady. Photo: Delores Clark



NOAA Corps Ensign Tony Perry uses a cloud chart to identify current cloud conditions aboard the GORDON GUNTER. Several NOAA ships gather routine but vital weather observations at sea as part of the NOAA/NWS Voluntary Observing Ships program. Photo: Commander Jim Meigs, GORDON GUNTER

This multi-year implementation plan will enable enhanced tsunami monitoring, detection, warning, and communications.

Tornado Outbreak Rakes Mississippi and Louisiana

On the morning of April 6, 2005, a line of powerful thunderstorms moved through south central Mississippi and southeast Louisiana, spawning 29 tornadoes. The average lead time issued by NWS for the outbreak was 25 minutes. The first tornado touchdown occurred in Rankin County, near Brandon, Mississippi, causing extensive damage and injuries. At least six people were injured, one critically, when the tor-

nado destroyed a mobile home park. No deaths were reported.

Another tornado damaged walls and blew the roof off Mize High School in Smith County. Bryan Henry, journeyman forecaster at the Jackson WFO, said the tornado warning for Smith County was issued at 8:32 a.m., and he received a phone call from one of the students about 20 minutes later. "I told him the tornado was heading toward the school from the southwest and they needed to take shelter immediately and follow their emergency procedures for tornadoes." By the time the tornado struck the school, administrators had moved all of the students to the building's first-floor hallways. None of the 650 students and faculty in the school sustained injuries because of the early warning from NWS and quick action by school administrators.

NWS Debuts New Heat/Health Watch Warning System

In the spring of 2005, the NWS office in Seattle implemented a new Heat/Health Watch Warning System that provides guidance for issuing heat advisories and excessive heat watches and warnings. Part of a national focus addressing the special hazards of excessive heat in urban centers, the system measures oppressive air affecting health. When unseasonably hot conditions arise, the Seattle NWS office issues a Heat/Health Watch Warning System message, alerting people in the region to take precautions against the heat.

"Based on National Weather Service data from 1994 to 2003, excessive heat is the top weather-related killer, causing more fatalities per year than floods, lightning, tornadoes, hurricanes, winter storms,

or extreme cold,” said NWS Assistant Administrator David Johnson. “The excessive heat program that started in Philadelphia in 1995 is proving to be a model for the rest of the country.”

Seattle joins 14 other metropolitan areas using the Heat/Health Watch Warning System: Dallas/Fort Worth, Texas; Phoenix/Yuma, Arizona; Los Angeles/Oxnard, California; Washington, D.C.; Philadelphia, Pennsylvania; Chicago, Illinois; St. Louis, Missouri; Cincinnati/Dayton, Ohio; New Orleans, Shreveport, and Lake Charles, Louisiana; Little Rock, Arkansas; Memphis, Tennessee; and Jackson, Mississippi.

NOAA Weather Radio All Hazards Warning Helps Save Kids

Charles F. Johnson Elementary School in Endicott, New York, recently reaped the benefits of NOAA’s efforts to equip schools with NOAA Weather Radio All Hazards receivers and safety plans. On June 6, 2005, a severe thunderstorm with winds estimated at up to 70 miles per hour ripped through Endicott, tearing the roof off of the kindergarten wing and devastating the building.

Detecting the severe thunderstorm with Doppler radar technology, the Binghamton, New York, WFO issue a severe thunderstorm warning 22 minutes before the storm arrived at the school. The warning activated the alarm on the school’s NOAA Weather Radio All Hazards receiver and gave the school enough time to evacuate 340 students, faculty, and staff to designated “storm-safe” areas.

Along with promoting the use of NOAA Weather Radio All Hazards, WFO Binghamton also developed a strong working partnership with

the local emergency management agency. Broome County Office of Emergency Services Director Mike Aswad notified the schools and other critical facilities in his county of the NWS warning. “This partnership proved very effective in warning the public of the severe storms that were approaching,” said David Nicosia, Warning Coordination Meteorologist at WFO Binghamton. “National Weather Service warnings no doubt prevented injuries and potentially saved lives,” Aswad noted. “This was a fast-moving, dangerous storm, and there were no reported injuries or deaths in Broome County.”

NOAA Deploys Seven New Hurricane Buoys

Following the active 2004 Atlantic hurricane season, the National Data Buoy Center received \$1.8 million in supplemental funding from Congress for seven new weather data buoy stations. Six new stations designed to enhance hurricane monitoring and forecasting were deployed in the late spring in key locations in the Caribbean, Gulf of Mexico, and Atlantic Ocean. The center also launched a seventh buoy

off the coast of Pensacola, Florida, re-establishing a former station.

Wind, wave, barometric pressure, and temperature data from the new stations will help the Tropical Prediction Center/National Hurricane Center more accurately determine the formation or dissipation, extent of wind circulation, maximum intensity, and center location of tropical cyclones. The buoys will also measure the direction, height, and distribution of ocean waves generated by hurricane activity. Beyond their measurements of tropical cyclones, the buoys are expected to provide year-round data for analysis and forecasts of other marine disturbances. Data from the buoys, some as large as 12 meters wide, will also be used to help verify the quality of measurements and estimates obtained from remote-sensing reconnaissance aircraft and satellites, and NWS forecasts.

During an August 2005 open house at the Weather Forecast Office in Buffalo, New York, former NOAA employee Bob Gilbert portrays Gen. Albert J. Myer, the first director of the U.S. Weather Bureau, which was the precursor to NWS. Photo: Ronald J. Collier, The Buffalo News





A NOAA Gulfstream IV supports a winter storms project in Alaska. Photo: NOAA Photo Library

NOAA and EPA Extend Reach of Air Quality Forecasts

In June 2005, air quality forecasts produced by NWS and the U.S. Environmental Protection Agency were enhanced and expanded to serve more regions of the United States. Forecast information for ground-level ozone that was only available for the northeastern United States now includes areas from just east of the Rocky Mountains to the Atlantic and Gulf coasts. Hour-by-hour forecasts, through midnight the following day, are available online, providing information about the onset, severity, and duration of poor air quality to more than 180 million people.

Poor air quality is a concern to people living in both urban and rural areas, because pollutants can come from nearby sources or travel many miles. Better ozone air quality forecasts can make a difference in people's lives, especially children and people with asthma or other respi-

ratory problems. "State and local air quality forecasters use this information as another tool in issuing next-day alerts for poor air quality to more than 300 communities," said Paula Davidson, NWS program manager for air quality forecasting. "The new experimental guidance for the South and Plains will enable state and local agencies from 13 additional states to issue enhanced and more geographically specific ozone-based air quality warnings to the public."

New to these air quality forecasts are enhancements in output data availability and updated pollutant emissions data, as well as improved forecast algorithms. The capability provides information for urban and rural communities, with a 12-kilometer-grid resolution. Forecast guidance for states in the South and Plains will be available as experimental products for several months during real-time testing and evaluation

before being added to the full suite of NWS operational products. Air quality forecasts for the northeastern United States were deployed in September 2004. These expanded forecasts are the next step toward providing air quality forecast information nationwide.

NOAA's Central Computer System Runs with Full Backup

On January 25, 2005, NCEP computer operations were moved to the new IBM Phase II computer. The planned system upgrade under the \$180 million, nine-year Central Computer System (CCS) contract with the IBM Corporation provides approximately 3.3 times the computational power of the previous system. The upgrade also provides the necessary computational power to operate higher-resolution numerical weather prediction models, coupled ocean-atmosphere models, operational climate models, and improved ensemble models.

For the first time, the new CCS is comprised of two, identical, geographically separate systems, which will provide full backup capability for the entire suite of more than 5 million numerical guidance products. Virtually all the meteorological data collected over the globe arrive at NCEP, where environmental scientists analyze this information and generate a wide variety of environmental guidance. The switch to the new system was accomplished with no delay or loss of guidance products and was completely transparent to the end-user community.

FUTURE OUTLOOK

As more of America's population moves into harm's way and national and global economies become more complex and interdependent, weather-related disruptions anywhere can lead to costs and delays in other parts of the Nation or the world. Our advancing economy and heightened security concerns drive emerging service needs undreamed of by our 19th-century founders, such as ecosystem, air quality, and space weather prediction.

In a world of rapidly expanding technology, scientific capabilities, and expectations, NWS faces the challenge of providing more reliable and specific weather, water, and cli-

mate information to citizens, public officials, and private companies in a form they can easily understand for use in key decision making. To achieve this goal, NWS will work closely with its partners in all aspects of the forecast process—from research, to observation collection, to forecast dissemination, to warning the public when hazards threaten. NWS will obtain and use more data and increase its computer power at local offices and national centers to provide more accurate, frequent, time- and space-specific data and information. As NWS makes more of its data and information available in digital form, conversion into text, graphics, or other forms will be easier for

NWS and others. Through use of the National Digital Forecast Database, businesses will be able to produce a variety of applications and products, giving customers what they want when they need it.

NWS is committed to fostering the growth of this complex and diverse enterprise to serve the public interest, and to sustaining and improving NWS's core observing, forecasting, and warning services.

In a world of rapidly expanding technology, scientific capabilities, and expectations, NWS faces the challenge of providing more reliable and specific weather, water, and climate information to citizens, public officials, and private companies in a form they can easily understand for use in their decision making.



National Environmental Satellite, Data and Information Service

The Nation's Eye on the Environment



*Gregory W. Withee
Assistant Administrator*

NOAA's National Environmental Satellite, Data and Information Service (NESDIS) operates the Nation's civil operational environmental satellite system, which takes observations of our Earth, oceans, and atmosphere every day. These observations are made available via the products, services, and data center infrastructure that benefit all people and sectors of society.

Composed of the Geostationary Operational Environmental Satellites (GOES) and the Polar-orbiting Operational Environmental Satellites (POES), the system provides 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 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 manages the world's largest collection of atmospheric, geophysical, and oceanographic data, derived from both *in-situ* and space-based systems. NESDIS contributes to the national economy by providing environmental data for weather forecasts and for decisions on energy distribution, the development of global food supplies, and the management of natural resources. NESDIS also provides data and information to a broad spectrum of users, including weather forecasters issuing severe storm warnings and researchers studying the environment.

ACCOMPLISHMENTS

NOAA-N Satellite Successfully Launched

NOAA-N was successfully launched from California's Vandenberg Air Force Base on May 20, 2005. Upon achieving orbit, NOAA-N became NOAA-18. The satellite was declared operational on August 30, 2005, as one of two primary satellites in the POES constellation. NOAA-18 marks the beginning of the Initial Joint Polar System (IJPS) agreement between NOAA and the European Organisation for Exploitation of Meteorological



Satellites (EUMETSAT). The IJPS project comprises two NOAA polar satellites (NOAA-18 and NOAA N-Prime) and two EUMETSAT satellites (Metop A and Metop B). Under this agreement, NOAA and EUMETSAT will share satellite instrument data and products.

NESDIS Provides Satellite Observations During Severe Hurricane Season

NESDIS provided critical satellite support during a historically active 2005 hurricane season, which included Hurricanes Katrina and Rita. 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 and contributed significantly to NOAA's accurate predictions of hurricane landfall.

NOAA Provides for Future Geostationary Environmental Satellite Continuity

NOAA's geostationary satellites are the Nation's severe weather sentinels in space. To maintain requirements for continuity of its geostationary environmental data observations, NOAA completed construction of the GOES-N satellite, now scheduled for launch in the spring of 2006. Its follow-on satellites, GOES-O and GOES-P, remain on schedule.

To prepare for the next generation of geostationary satellites, NOAA announced its acquisition strategy for the Geostationary Operational Environmental Satellite-R program in March 2005. NOAA will be responsible for the GOES-R mission and will partner with the National Aeronautics and Space Administration (NASA) to achieve mission objectives. NASA's Goddard Space



During the historically active 2005 hurricane season, NESDIS provided continuous geostationary observational coverage. Photo: NESDIS

Flight Center in Greenbelt, Maryland, will be responsible for both managing the GOES-R flight project, including the development of the command-and-control system, and supporting advanced technology developments for instruments and spacecraft.

New Satellite Applications and Data Products Implemented

NESDIS implemented numerous new satellite applications and data products in FY 2005. Experimental satellite products transitioned from research to operations, including the transition of surface vector wind products from the NASA Quick-SCAT satellite into the National Weather Service's Advanced Weather Information Processing System. NOAA scientists were able to use satellite altimetry after the devastating Indian Ocean tsunami to measure the tsunami's height.

NOAA's National Data Centers developed more than 100 new climate, oceanic, and geophysical data



To maintain requirements for continuity of NOAA's geostationary environmental data observations, NOAA completed construction of the GOES-N satellite, now scheduled for launch in the spring of 2006. Photo: NESDIS



products in FY 2005. The National Climatic Data Center produced an updated guide to its products and services, as well as a number of assessments of climatic data, including a report on weather disasters that have resulted in losses of more than one billion dollars, and monthly, seasonal, and annual climate historical perspectives.

NOAA-N was successfully launched from California's Vandenberg Air Force Base on May 20, 2005. Photo: NESDIS

NOAA Contributes to the Advancement of Integrated Earth Observation Systems

NOAA continues to play key national and international roles in the development of comprehensive, coordinated, and sustained Earth observation systems. At the national level, NOAA serves as co-chair on the U.S. Group on Earth Observations (USGEO), a standing subcommittee of the White House Committee on Environment and Natural Resources. Composed of 15 Federal agencies and three White House offices, the USGEO is charged with developing a U.S. Integrated Earth Observation System. The USGEO reached an

PRODUCTS AND SERVICES

Weather and Climate Ocean Observation

NESDIS satellites provide a robust, integrated, comprehensive satellite observing system that protects the Nation and its economic infrastructure from the threats of severe weather, extreme environmental events, and unusual climate and their often devastating impacts. The global, continuous, environmental observations that NESDIS satellites provide drive weather- and climate-forecasting models. NESDIS observations also contribute to the preservation of marine and coastal habitats, safeguard navigation and transportation, and provide search-and-rescue capability.

Geostationary Satellite System

NESDIS operates a system of environmental satellites in geostationary orbits to provide data for short-term weather warnings and forecasts. Known as GOES, these Geostationary Operational Environmental Satellites orbit the Earth at 22,600 miles above the equator. Two GOES satellites remain operational at all times—one providing coverage for the eastern United States and most of the Atlantic Ocean, and

the other providing coverage for 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. GOES satellites 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 of severe weather events. GOES images are seen every day on local and national television weather shows.

Polar-orbiting Satellite Systems

The NESDIS Polar-orbiting Operational Environmental Satellite (POES) system provides an uninterrupted flow of critical global information used in 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 loca-

tion, onset, and severity of such events as El Niño as early as possible. Longer lead times of these impending events allow emergency and agricultural managers to activate plans to reduce the impact 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 provides an improved, single national system capable of satisfying both civil and national security requirements for real-time, space-based, remotely sensed environmental data. NOAA will receive data from and share data with its European partner, EUMETSAT, who will launch its first polar-orbiting satellite dedicated to operational meteorology in 2006.

Advanced NPOESS sensors will deliver higher-resolution atmospheric, oceanic, and terrestrial data, enabling more accurate short-term weather forecasts and severe storm warnings. NPOESS will also provide improved measurements and information about

important milestone in April 2005 with the release of its *Strategic Plan for the U.S. Integrated Earth Observation System*.

Search-and-Rescue Satellite System Aids 248 Rescues

In FY 2005, 248 people in 93 events were rescued through the SARSAT program in the United States. Of these, 181 people were rescued at sea, 37 were rescued from aviation events, and 30 were rescued after setting off their Personal Locator Beacon. The rescues this year pushed the U.S. rescues to date past the 5,000 mark. The system has led to more than 18,000 rescues worldwide since its inception.

the space environment necessary to ensure reliable operations of space-and ground-based systems, and will continue to provide surface data collection and search-and-rescue capabilities.

Environmental Data and Information Services

The NOAA Data Centers provide worldwide environmental data and information products and services in the atmospheric, marine, solid earth, and solar-terrestrial sciences to meet the needs of users in commerce, industry, agriculture, science, and engineering; the general public; and Federal, state, and local agencies. Environmental data and information maintained by NOAA are vital to practically every economic sector and are used in making decisions critical to national defense; industrial productivity; energy development and distribution; world food supplies; public health, safety, and welfare; and development of natural resources. Environmental scientists and observers also have a critical need for long time-series of historical and recent global data to assess long-term environmental trends, to evaluate the current state of the environment, and to predict future environmental conditions and events. This

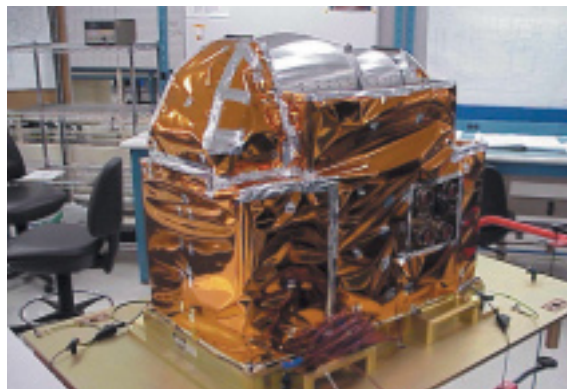
FUTURE OUTLOOK

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. Several factors—including future environmental observing capabilities, new information technology, and the growing needs and expecta-

The ATMS Engineering Development Unit instrument in its flight configuration, with multilayer insulation blankets. The Engineering Development Unit sits attached to the instrument handling plate. Interface connectors can be seen on the right-hand side of the spacecraft. Photo: Northrop Grumman Electronic Systems

tions of our numerous customers—will present opportunities for delivering improved products and services to meet future challenges.

Our national security, economy, and environment have become inextricably linked. No single environmental observing platform can fulfill



makes NOAA's data archives a national treasure that our country must maintain.

National Oceanographic Data Center (NODC)

Located in Silver Spring, Maryland, NOAA's NODC maintains the largest collection of publicly available oceanographic information in the world, including hundreds of millions of records gathered from ocean observation programs conducted over the past 150 years. These data document the physical, chemical, and biological properties of the oceans, currents, weather, and biota as observed from ships, buoys, and satellites.

The NODC provides access to these data to more than 270,000 users each year, including ocean researchers within NOAA, other agencies and academia, environmental program managers, educators, maritime industries, and foreign communities. Examples of these products and special topic data sets include the World Ocean Database, the Global Argo Data Repository, the Coral Reef Information System (CoRis), and the Global Ocean Data Assimilation Experiment (GODAE) High Resolution Sea Surface Temperature Pilot Project.

The NODC also operates the NOAA Library and Information System, which consists of the NOAA Central Library in Silver Spring and the Seattle, Washington, and Miami, Florida, 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 World Wide Web, which routinely handles more than 250,000 queries a month.

National Climatic Data Center (NCDC)

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

The NCDC serves a large and diverse community, responding to more than one million requests a year. It makes environmental data and information available through on-line Internet



all environmental remote-sensing requirements. Our customers need the best mix of observations from available and planned observing platforms and sensors. The upcoming expansion of advanced satellite instruments and data from such systems as the National Polar-orbiting Operational Environmental Satellite System, the next-generational geostationary satellites (GOES-R), and the European polar meteorological satellite program (Metop) present a daunting challenge, as we move toward the

*SARSAT Mission Control Center, NOAA Satellite and Information Center, in Suitland, Maryland.
Photo: NOAA Photo Library*

access and through off-line delivery of products and services. 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 users include climate researchers, engineers, agribusiness, emergency planners, attorneys, government agencies, and the public. NCDC data benefit such sectors as energy development and conservation, power and food production, healthcare, construction decision and scheduling, air pollution control, and transportation. The NCDC also performs climatic applications studies for other government agencies, including the National Aeronautics and Space Administration, the Environmental Protection Agency, and the Departments of Defense and Energy.

National Coastal Data Development Center (NCDDC)

NESDIS established the 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. The NCDDC's goal is to improve the quality of, and accessibility to, such marine data characteristics as chemistry, biology, and geology, and such physical parameters as water levels, bathymetry, winds, and waves.

Working with Federal, state, and local agencies, academic institutions, nonprofit organizations, and the private sector, the 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 on-line access to the coastal user community. Additionally, the 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, Colorado, 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 300 digital and analog databases, some of which are very large. As technology advances, so does the search for more efficient ways of preserving these data. The NGDC works closely with contributors of scientific data to prepare documented, reliable data sets. It works cooperatively with other government agencies, nonprofit organizations, and universities, and encourages data exchange. The Center continually develops data management programs that reflect the changing world of geophysics. For example, it is participating in NOAA's program to address the threat of tsunamis by producing tsunami inundation models.

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 local, regional, national, and global scales.

To be the source for 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, leading 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 becoming available that describe our climate, fulfilling growing customer requirements for quality and timely state-of-the art products and services.



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. The NOAA SARSAT Mission Control Center receives a distress signal through the use of NOAA satellites, and routes it to a rescue coordination center (RCC) operated by the Coast Guard, who has responsibility for maritime rescues, and the Air Force, who has responsibility for inland search-and-rescue cases. Following are select highlights of SARSAT rescues during FY 2005.

Rescue Dates and Sites

Rescue Details

- 10/19/2004
- 200 nautical miles (NM) west of Brays Harbor, Washington

When the crew aboard the *S/V Kamaa* encountered heavy storm conditions, they manually activated their EPIRB (emergency position indicating radio beacon). Upon receiving the alert signal, Coast Guard District 13 dispatched four fixed-wing aircraft and two rotary-wing aircraft. Two Canadian warships also participated in the search for the vessel. The crew members were located and hoisted aboard a Coast Guard HH-60 helicopter and flown to Astoria, Oregon, where they were released to the paramedics.

- 11/2/2004
- 70 NM West of San Juan, Barbados

As the *Lady Grace* was taking on water, the seven people on board abandoned ship. The RCC provided information to the Trinidad and Tobago Coast Guard, who rescued six people. There was one casualty.

- 2/2/2005
- 50 NM southeast of Bermuda

Upon receiving a distress signal, Bermuda RCC diverted the *M/V YEOMAN BROOK* to the area and contacted the Lantarea RCC in Portsmouth, Virginia, for assistance. The Coast Guard diverted a C-130 aircraft to the area to assist in locating the source of the signal. The C-130 aircraft and the *YEOMAN BROOK* both arrived on scene, and located debris and a life raft with four people on board. The crew of the *S/V Emilien II* had abandoned ship into a life raft when the vessel began to sink. The *YEOMAN BROOK* recovered the four people and their EPIRB in good condition.

- 5/16/2005
- Gulf of Alaska

Coast Guard District 17 received an EPIRB alert from the vessel *Heather Kay*, which experienced a fire onboard that could not be contained. Before abandoning ship into a life raft, the crew of four activated the EPIRB. A Coast Guard helicopter arrived on scene, rescued the crew, and recovered and secured the EPIRB.

- 8/26/2005
- Northwest of Dry Tortugas, Florida

Upon detecting a distress signal, Coast Guard District 7 RCC launched an HH-60 helicopter and a C-130 fixed-wing aircraft to the site. On arrival, they hoisted three people from the *Mary Lynn*, which was in the trailing edge of Hurricane Katrina's eyewall.



Office of Marine and Aviation Operations

On the Sea and in the Air



*Rear Adm. Samuel P. DeBow, Jr.
Director, OMAO and
NOAA Corps*

The mission of NOAA's Office of Marine and Aviation Operations (OMAO) is to manage, operate, and maintain the Nation's largest civilian fleet of research and survey ships and aircraft, which collect data for NOAA's environmental stewardship assessment and prediction programs. OMAO also manages NOAA's Diving Program and the NOAA Commissioned Officer Corps, one of the Nation's seven uniformed services. OMAO employees are civilians, including wage marine, as well as commissioned officers.

NOAA ships operate worldwide, supporting a wide range of common and unique oceanic and atmospheric activities, including fisheries and coastal research, nautical charting, and long-range ocean and climate studies. The ships are designed and equipped to support NOAA and non-NOAA programs, having data collection capabilities not found in the commercial fleet. For example, NOAA's new fisheries vessel *OSCAR DYSON* can conduct joint operations of fishery stock assessments and oceanography, giving scientists a complete picture of a fish species, its habitat, and 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, to coastline mapping for erosion studies, to marine mammal surveys. NOAA's aircraft are unique, being continually modified to carry instruments needed to support NOAA and non-NOAA missions.

NOAA Corps officers operate and manage NOAA ships and aircraft, and bring their operational expertise and knowledge of platform capabilities to land-based assignments throughout the agency. Officers work in locations as diverse as NOAA's mission, serving in management and technical positions throughout all of NOAA's Line Offices. They are ready to be assigned to any area within the agency or across the Nation as needed.

ACCOMPLISHMENTS

Ship Modernization Moves Forward

This was another milestone year for NOAA's fleet modernization. The first new fisheries survey vessel (FSV), *OSCAR DYSON*, was commissioned and began operations from its home port in Kodiak, Alaska. The second FSV, *HENRY B. BIGELOW*, was launched the



day after construction began on FSV #3. A contract was awarded for, and conversion is underway of, the former Navy T-AGOS vessel *CAPABLE*, which will be NOAA's first ship devoted to ocean exploration. As a result of a national ship-naming contest, *CAPABLE* will be commissioned *OKEANOS EXPLORER*.

NOAA Platforms and Charters Advance Data Collection and Global Observations

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

During FY 2005, NOAA aircraft logged more than 3,905 flight hours, and NOAA ships recorded 3,926 operating days in support of NOAA's programs. To meet additional program needs, OMAO outsourced 3,947 flight hours and 553 operating days. Another 1,606 operating days were outsourced through the use of NOAA Line Office program funds.

OMAO Publishes First Teacher at Sea Book

NOAA's Teacher at Sea Program, managed by OMAO, published its first children's book in 2005. Co-authored by two Teachers at Sea aboard the NOAA ship *RONALD H. BROWN* and illustrated by the



The HENRY B. BIGELOW was launched in July 2005 in Moss Point, Mississippi. Photo: Ray Broussier for NOAA

BROWN's chief boatswain, the book is about the oceanic and atmospheric research that was conducted during the teachers' cruise aboard the *BROWN*, including deployment of a tsunami warning buoy off the Chilean coast. The book was unveiled last spring with a book-signing ceremony at the National Science Teacher's Association meeting in Texas. It has been widely disseminated to teachers and students across the Nation.

Aircraft Operations Center Takes on Intense Hurricane Season

The severe 2005 hurricane season kept NOAA hurricane aircraft extremely busy in support of the National Hurricane Center and Hurricane Research Division. In FY 2005, OMAO flight crews flew in

four tropical storms and five hurricanes. The Gulfstream-IV high-altitude surveillance jet flew 47 missions, logged 351 flight hours, and deployed 1,076 dropsondes into the storms. The two WP-3D Orion research and reconnaissance turbo-props flew 70 missions for a total of 475 flight hours and 840 dropsondes deployed.

NOAA's Citation jet took aerial shots of what was left of Cameron, Louisiana, after Hurricane Rita.

Photo: NOAA Remote Sensing Division



After the major hurricanes that made landfall passed, the NOAA Citation jet flew thousands of track lines during 50 flights and logged 105 flight hours in support of NOAA's Remote Sensing Division. More than 8,300 photographs of the devastation were taken for Federal and local managers. A NOAA WP-3D Orion conducted damage assessment flights after Hurricane Katrina to compare hurricane forecasts with actual damage. NOAA aircraft also flew critical supplies to affected areas and conducted missions to find hazardous material spills and stranded marine mammals.

OMAO Aviation Safety Program Approved

To address safety concerns about the use of chartered aircraft by NOAA employees, OMAO conducted, along with all NOAA Line and Staff Offices, an exhaustive review of employee use of non-

NOAA aircraft. The review culminated in the development of a new NOAA Administrative Order entitled "NOAA Aviation Safety Policy," which was approved by the NOAA Executive Council on July 1. The order will be fully implemented in October 2006, once OMAO establishes several program components set forth in the policy.

NOAA Transfers the WHITING to Mexico

The NOAA ship *WHITING* was transferred to the Mexican Navy, to be Mexico's first dedicated hydrographic survey vessel. The transfer was part of cooperative efforts between the two nations to share data and resources.

FAIRWEATHER's Multi-mission Capabilities Pay Off

Last summer, the NOAA ship *FAIRWEATHER* was diverted from its usual nautical charting opera-

tions in Alaska, first to respond to an urgent request to recover a lost tsunami warning buoy and then to provide support to NOAA scientists conducting biological and oceanographic observations in the Gulf of Alaska ecosystem. These major diversions from the ship's primary mission required the use of the *FAIRWEATHER*'s large frame and winch and dry and wet labs, which had been added to the ship during a recent refurbishment to improve the ship's versatility. Also required was a crew willing to learn new operational skills in fishing and buoy recovery. This personnel and platform adaptability and flexibility provided an outstanding example of how cross-program cooperation and

The NOAA hydrographic survey ship FAIRWEATHER recovers a lost tsunami buoy, using a recently installed A-frame to hoist it out of the water. Photo: NOAA crew member

PRODUCTS AND SERVICES

Outsourcing Support

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

NOAA Commissioned Officer Corps

The NOAA Commissioned Officer Corps operates and manages NOAA ships and aircraft, and brings 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.

They may work closely with other uniformed services, such as coordinating many of NOAA's hurricane response activities this year with the U.S. Coast Guard, U.S. Army Corps of Engineers, and Navy, and flying remote-sensing missions over the collapsed World Trade Center and Pentagon after September 11, 2001, at the request of the U.S. Army. NOAA Corps officers, with their flexibility and cross-cutting research, leadership, operational, and management skills, are a valued resource used by all NOAA Line Offices to achieve mission goals.

NOAA Diving Program

The NOAA Diving Program oversees and manages NOAA diving personnel, equipment, and activities, ensuring that all diving operations are performed safely and efficiently. The program provides beginner and spe-

cialty 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.

Data Collection and Global Observations

NOAA ships and aircraft have sophisticated data collection capabilities, such as Doppler radar on the *RONALD H. BROWN* and the Stepped Frequency Microwave Radiometer on the WP-3D Orion hurricane hunter research aircraft. Most ships are equipped with an OMAO-developed Scientific Computer System, which integrates data from shipboard and deployed sensors into one central system. This enables 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, OMAO has developed capabilities that enable ships at sea to connect to the Internet 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 part of the Global Earth Observation System of Systems.

NOAA Teacher at Sea and Teacher in the Air Programs

Now in its 15th year, the NOAA Teacher at Sea Program has enabled more than 430 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 with the scientists. This unique opportunity provides the teachers with a new understanding of NOAA science and shipboard life that enriches their curricula and lives. While onboard, teachers write daily logs, take photos, interview scientists and crew, and 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, experiencing the same unique opportunities as their sea-going brethren.

Small Boat and Aviation Safety Programs

NOAA's Small Boat Safety Program ensures that NOAA offices that use

small boats to meet their mission requirements have trained personnel, appropriate equipment, and safety standards. The program provides standardized operator training and safety equipment, assistance with boat acquisition and alterations, and routine safety inspections.

Once fully implemented, NOAA's Aviation Safety Program will provide support to ensure that NOAA personnel who use contracted 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 guarantees that contracted aircraft meet NOAA airworthiness and operational safety standards and that these standards are incorporated in NOAA documents for procuring aviation services.



The crew of the NANCY FOSTER recovers an overturned weather data buoy after Hurricane Katrina. Photo: NOAA crew member

multi-mission capabilities lead to greater efficiencies of cost, resources, and time within NOAA.

NOAA Ships Support Hurricane Response Efforts

The *GORDON GUNTER* and *OREGON II*, home ported in Pascagoula, Mississippi, were in the path of Hurricane Katrina. The *GUNTER*, undamaged, provided temporary housing and meals for NOAA's employees who became homeless after the storm. The *GUNTER* also provided communications support for local Navy, Coast Guard, and emergency management personnel. The *OREGON II* sustained damage, but its NOAA Corps officers and crew reached out to help the devastated community, despite extensive personal losses. The *NANCY FOSTER* was quickly outfitted with hydrographic survey equipment to help open up the approaches to Mobile, Alabama. The *FOSTER* then conducted environmental damage surveys for NOAA's National Marine Fisheries Service, National Ocean Service, and Office of Oceanic and Atmospheric Research. The *THOMAS JEFFERSON* was diverted to the

Gulf of Mexico to help open up approaches to Pascagoula and Gulfport, Mississippi, Galveston/Houston, Texas, and other port areas.

OMAO Supports Homeland Security Preparedness

A NOAA Corps officer is director of NOAA's Homeland Security Program Office. In FY 2005, NOAA Corps officers continued to be in the vanguard of those advancing NOAA's Homeland Security efforts to keep 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 around the clock during significant events. In addition, the catastrophic 2005 hurricane season required NOAA Corps officers, OMAO civilians, and other Line Office personnel to staff NOAA's Incident Coordination Center above and beyond normal duties.

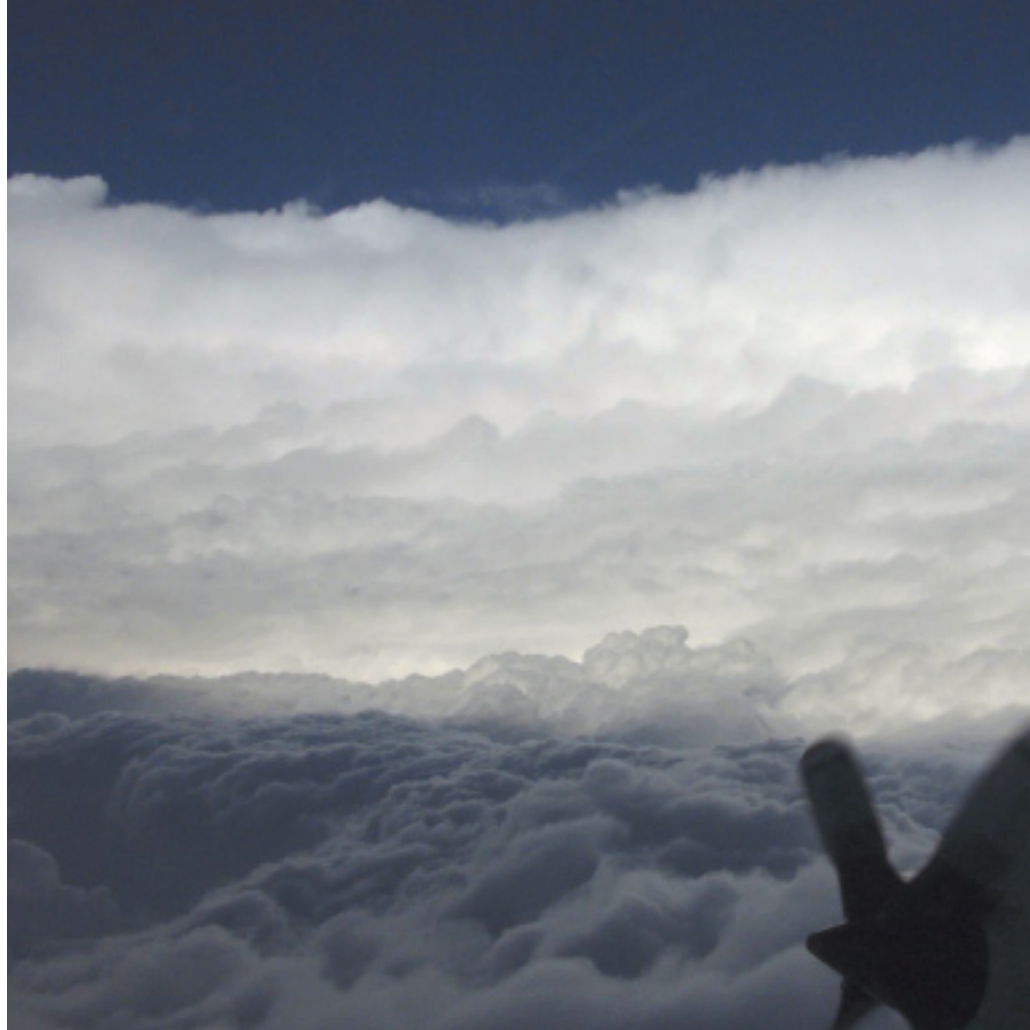
Commissioned Personnel Center Improves NOAA Corps HR Systems

OMAO's Commissioned Personnel Center (CPC) reengineered with technology several key NOAA Corps human resource systems and services in FY 2005. Among them is Virtual CPC, a Web-based system that provides officers with immediate access to their official personnel folders, eliminating the need to visit CPC or request a copy of a record. Technological improvements have led to enhanced Web pages that provide more information and allow easier access to forms and directives. The Officer Personnel Board (OPB) process has been transitioned from a paper-based process to an electronic OPB. Besides providing enhanced capabilities, during FY 2005 this new electronic board process reduced the number of days needed to hold boards from three to one. CPC also converted the NOAA Corps Directives to a searchable Web-based format, greatly enhancing accessibility to agency policies. In addition to technological improvements, CPC has been actively engaged in preparing draft legislation and rewriting the laws and policies governing the NOAA Corps.

NOAA Corps Billet List Revised to Reflect Authorization

CPC has established a NOAA Corps personnel allowance list that is reflective of the number of billets authorized by law. A downsizing of the Corps took place between 1995 and 1998, with an end result of 216 officers at the beginning of

NOAA's P-3 hurricane hunter slices through Hurricane Katrina's eyewall the day before the storm made landfall. Photo: Lt. Mike Silah, NOAA Corps



1999. However, the 400-billet list did not change. In early FY 2005, CPC initiated a review of billets that resulted in better management of the limited number of officers, reflecting the true needs of NOAA programs, and met Congress' expectation of the total number of billets reflecting authorized strength.

FUTURE OUTLOOK

As NOAA's emerging mission requirements, such as homeland security, ocean exploration, and habitat mapping, place additional demand for future ship and aircraft data acquisition, OMAO 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 NOAA's goals. NOAA will continue to seek a proper mix of in-house and contracted work to meet these needs, while working to improve the efficiency of existing NOAA platforms; will modernize or replace aging platforms with platforms that have the capabilities to serve more than one NOAA Line Office; will incorporate into the fleet emerging technologies, such as unmanned aerial vehicles and autonomous underwater vehicles; and will recruit and retain a technically competent workforce.

The NOAA hydrographic survey ship FAIRWEATHER takes on a FOCI (Fisheries-Oceanography Coordinated Investigations) mission for the National Marine Fisheries Service and the Office of Oceanic and Atmospheric Research. Photo: Lt. Mark Wetzler, NOAA Corps





Office of Program Planning and Integration

Guiding NOAA Strategically



Mary Glackin
Assistant Administrator

The Office of Program Planning and integration (PPI) leads NOAA's management by integrating the agency's diverse capabilities into programs that satisfy the Nation's social, economic, and environmental needs. Through its four distinct capabilities—strategic planning, performance evaluation, program integration, and policy integration—PPI provides corporate management to coordinate NOAA's many lines of service with the Nation's needs for environmental information and stewardship. It ensures that NOAA's investments and actions are guided by a strategic plan; are based on sound social and economic analysis; adhere to executive and legislative science, technology, and environmental policy; and integrate the full breadth of NOAA's resources, knowledge, and talent to meet its stated mission goals.

Since its inception in 2003, PPI has forged a new management culture in which a clear vision and a long-term strategy drive NOAA to meet the needs of society. PPI was tasked to change NOAA management in the context of institutional momentum and funding declines. Prioritizing and integrating programs within new strategic planning and budgetary formalities was a process foreign to many. PPI has developed the NOAA strategic plan, aligned NOAA's programs to the plan, linked key planning information to Department of Commerce (DOC) and NOAA annual operating plans, established and managed matrix programs, and ensured effective budget planning.

NOAA's organizational structure is now formally aligned with NOAA's and DOC's strategic plans, allowing for more efficient and effective execution of DOC's mission. NOAA's programs are better positioned to respond to new challenges, such as the President's *U.S. Ocean Action Plan* and tsunami warning enhancements. NOAA's budget formulation integrates long-term thinking and robust analysis and is thus a significant improvement over previous efforts to support DOC. PPI has ensured that every new initiative in the next three to five years will arise from a collaborative effort among Line Offices, Goal Teams, and Councils. From the perspective of our partners in the public, private, and academic sectors, more developed and better executed NOAA programs foster richer, more productive partnerships.

ACCOMPLISHMENTS

PPI Leads Implementation of *U.S. Ocean Action Plan*

The President's *U.S. Ocean Action Plan* for improved management of ocean resources is being implemented under PPI's leadership. PPI Assistant Administrator Mary Glackin co-chairs the 18-member interagency committee charged with identifying specific actions for

responding to needs of state, local, and tribal communities as well as improved Federal management actions. The committee has supported approaches to ecosystem-based management on a regional level, including the Gulf of Mexico Alliance. It has also brought state and Federal managers together to identify needs for science and technology and strategies to accelerate their implementation and application.

Performance-based Management Advances at NOAA

PPI led an agency-wide collaboration to refine NOAA's portfolio of Corporate Performance Measures (CPMs); address existing gaps in, and ensure fidelity to, the Strategic Plan and its utility to stakeholders; and manage efficient data collection, verification, and reporting. CPMs will

allow NOAA to improve tracking of its strategic progress.

NOAA-wide Policy Solutions Improve Performance

PPI led efforts to establish an agency-wide policy for managing mission requirements, from identification and validation through solution selection and execution. The requirements policy identifies roles and responsibilities and authorizes the issuance of related guidance for its implementation. PPI has been instrumental in leading NOAA's efforts to ensure the effective, efficient, and streamlined transition of research to applications. To date, NOAA has adopted the Transition of Research to Application Policy and an implementation procedure that provides a generic framework for all NOAA transitions.

PPI Engages Stakeholders in Strategic Planning

PPI revised the April 2005 *NOAA Strategic Plan* with a vision of: "An informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions." PPI also developed the FY 2008 Annual Guidance Memorandum, identifying the most urgent and compelling programmatic and managerial priorities for FY 2008–2012. These revisions were assisted through a PPI-led national stakeholder forum. Information from stakeholders focused on identifying ways to collectively improve service delivery, build capacity through partnerships, address regional issues, and enhance effectiveness globally.

PRODUCTS AND SERVICES

National Environmental Policy Act Responsibilities

Successfully meeting NEPA requirements is an essential element of achieving program and NOAA-wide outcomes. The NOAA NEPA Coordinator in PPI ensures NEPA compliance within 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 White House Council on Environmental Quality.

Strategic Planning

PPI is responsible for managing the NOAA-wide planning cycle and for producing its outputs. These include the 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's programs.

Performance Evaluation

PPI leads the agency's development of performance measurements, at the program and corporate levels. 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 Congress.

Program Integration

PPI provides oversight of the direction, integrity, and performance of NOAA's 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, including 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, and 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, the *U.S. Ocean Action Plan*, and the Climate Change Science Strategic 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.



NOAA International Affairs

Building Global Alliances



*William J. Brennan, Ph.D.
Deputy Assistant Secretary for
International Affairs*

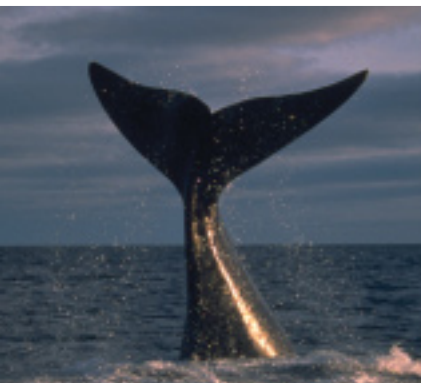
International affairs is one of NOAA's core capabilities, essential to the support of the agency's overarching mission goals. For this reason, Exercising International Leadership is designated in NOAA's Strategic Plan as one of its six crosscutting priorities for the 21st century. To advance NOAA's mission, 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 Provides Tsunami Advisories to Several Regions

NOAA is providing direct, ongoing technical assistance to the Intergovernmental Oceanographic Commission (IOC), as it assumes the lead role in developing and coordinating an international tsunami warning system. The system will be comprised of regional systems for the Indian Ocean, the Caribbean, the Northeast Atlantic, and the Mediterranean, as well as NOAA's existing Pacific tsunami-warning system. NOAA is also providing tsunami advisories to the Indian Ocean and Caribbean regions on an interim basis, until regional warning centers can be established. Throughout this global effort, NOAA stresses the interoperability and compatibility of systems, the sharing of data, and the need for the systems to respond to a multitude of hazards. NOAA is also working toward global, all-hazards coverage through international initiatives, such as the Global Earth Observation System of Systems (GEOSS), and is providing inputs on tsunami observations to the IOC requirements.



NOAA's contributions to the design and coordination of an end-to-end Indian Ocean Tsunami Warning System are funded by \$4.5 million in 2005 emergency supplemental appropriations, and are part of the coordinated U.S. government effort. To date, NOAA has designed the first version of a regional tsunami-warning data system that will provide at least one hour of advanced warning time to most Indian Ocean countries when complete. Other key areas of NOAA assistance include technology transfer of detection equipment, such as deep-sea monitoring stations and near-shore sea level stations; prediction and warning formulation; communications systems and integration; and local preparedness.

Group on Earth Observations Endorses 10-Year Plan

Vice Admiral Lautenbacher serves as the U.S. co-chair for the intergovernmental Group on Earth Observations (GEO). GEO, which includes 60 countries and the European Commission as members and 43 international organizations as participants, is working to develop the GEOSS. In 2005, NOAA led U.S. delegations to three GEO meetings. Secretary Gutierrez led the U.S. delegation to the Third Earth Observation Summit in Brussels in February 2005, and presented the Strategic Plan for the U.S. Integrated Earth Observation System as the U.S. contribution to the GEOSS. GEO members endorsed the GEOSS 10-Year Implementation Plan—an important first step toward the development of the GEOSS. Vice Admiral Lautenbacher and all of NOAA's leadership made GEO and GEOSS a priority in each of their international engagements during FY 2005.

NOAA Works to Streamline the International Hydrographic Organization

NOAA's National Ocean Service (NOS) served as a member of the U.S. delegation to the 3rd Extraordinary International Hydrographic Conference in Monaco, working to streamline the International Hydrographic Organization and increase its effectiveness in the 21st century. The United States was successful in ensuring that the changes in the terms of the U.N. Convention on Law of the Sea were in keeping with U.S. objectives and interests.

U.S. and Canada Sign Climate and Weather MOU

NOAA's National Climatic Data Center and Meteorological Services



Canada hosted a bilateral meeting in Toronto to coordinate climate and weather monitoring activities between the two countries. At the meeting, they signed a Memorandum of Understanding (MOU) on Cooperation in Environmental Data Acquisition and Utilization. The third annex of the MOU, entitled the North American Strategic Plan for Monitoring Climate and Weather Extremes for Improved Decision Making, will incorporate several projects, including the North American Drought Monitor (a joint project between Canada, the United States, and Mexico), and the co-placement of U.S. and Canadian climate measurement stations.

NOAA and U.S. Navy Map U.S. Continental Margin

NOS and the U.S. Navy worked together to map 300,000 square kilometers of U.S. continental margin along the East Coast. This effort was in support of a potential national claim for extending the continental shelf beyond the Exclusive Economic Zone, under Article 76 of the U.N. Convention on Law of the Sea.

In April 2005, NOAA transferred the survey vessel WHITING to the Mexican Navy, in support of U.S.–Mexican efforts to promote coordination of survey and nautical charting operations in the Gulf of Mexico. The vessel is Mexico's first dedicated hydrographic survey vessel. Photo: NOAA Photo Library

NOAA Assists Galapagos National Park and Marine Reserve

Experts from NOAA's National Marine Sanctuary Program and Special Projects Office visited Ecuador's Galapagos National Park/Marine Reserve in July 2005 to learn first hand about the complex resource management issues facing the islands. During their visit, they discussed potential opportunities for NOAA to help the park achieve its conservation mandates, and lay the groundwork for a long-term collaborative relationship. A draft set of recommendations for both short- and long-term cooperative projects has been developed and is under discussion between NOAA and the park.

NOAA Shares Harmful Algal Bloom Technology with Korean Scientists

NOAA worked with the Korean Ministry of Maritime Affairs and Fisheries to develop a rapid, diagnostic test for the most problematic



Marc Denis Everell, Assistant Deputy Minister of the Meteorological Service of Canada (left), National Weather Service Assistant Administrator David L. Johnson (center), and Michel Rosengaus Moshinsky, Unit Head at the National Meteorological Service of Mexico (right), inaugurate the North American Ensemble Forecast System at a November 16, 2004, ceremony in Camp Springs, Maryland. Photo: National Weather Service

harmful algal bloom (HAB) species that plague Korea, and provided the technology to Korea in an exchange program. Korean coastal managers will use the automated, molecular test to implement mitigation techniques and reduce the potentially devastating economic impacts of HABs, which can approach \$95 million a year in Korea alone.

NOAA Celebrates Ocean Exploration in China

NOAA exhibited at the “600th Anniversary of Zheng He Voyages to the West Ocean Exposition” in Shanghai on July 6–14. More than 150,000 Chinese viewed the exhibit during the eight-day expo. NOAA personnel were on hand to share information on NOAA’s tsunami research and deployment, ocean exploration, fisheries management, safe navigation, climate observations, and coastal and ocean remote sensing.

NOAA Participates in International Whaling Commission Meeting

NOAA led the U.S. delegation to the 57th Annual Meeting of the International Whaling Commission (IWC) in Ulsan, Korea. The U.S. delegation, headed by IWC Commissioner Rolland Schmitt, was comprised of NOAA officials, representatives from Congressional offices, and the Departments of State, Defense, and the Interior, as well as representatives from the Alaska Eskimo Whaling Commission and the Makah Indian Tribe. Highlights of the meeting included a consensus resolution requesting Japan to halt its scientific research whaling program. Japan responded by announcing that it will begin the second phase of its JARPA (Joint Acquisition Resource Permit Application) research program by doubling the take of minke whales and adding two new species, humpback and fin whales. The Commission agreed to meet inters-

essionally to determine whether consensus is possible on the revised management scheme for the regulation of any possible future commercial whaling. The United States formally offered to host the 59th IWC meeting in Anchorage, Alaska, in 2007.

U.S. and China Address Ocean Policy

NOAA and counterparts from China convened an international two-day Ocean Policy Forum to share science, technology, and policy information. Other participants represented Korea, Japan, and Canada.

NOAA Partners Expand TAO Array into the Indian Ocean

Scientists from NOAA are working with international climate scientists to develop a plan for expanding the TAO array system of moored buoys in the Pacific that has helped predict El Niño. The TAO surface buoy is a 2.3-meter-diameter fiberglass-over-foam toroid, with an aluminum tower and a stainless steel bridle. The buoy can be seen on radar from 4 to 8 miles, depending on sea conditions. Expanding the array into the Indian Ocean will help improve the understanding of the region’s climate system. Five buoys have been deployed through funding by the NOAA Office of Climate Observation, in cooperation with the Indian National Institute of Oceanography and Department of Ocean Development. The Japan Agency for Marine-Earth Science and Technology deployed three additional buoys, and another NOAA buoy is slated to be deployed in November 2006. Seven additional buoys are expected to be deployed by 2007. Additional buoys will be guid-



A few hours after being launched from Vandenberg Air Force Base in California on May 20, 2005, the NOAA-18 polar-orbiting satellite took this image of Russia and the Arctic Ocean. Photo: NOAA Photo Library

ed by international plans and future budgets. Plans envision a total of 39 buoys when the array is completed.

North American Ensemble Forecast System Launched

National Weather Service Assistant Administrator David L. Johnson and the heads of the Canadian and Mexican Meteorological Services recently signed ceremonial documents at the National Centers for Environmental Prediction (NCEP) in Camp Springs, Maryland, to demonstrate support for a new system designed to improve forecasts for North America. The signing ceremony kicked off a three-day workshop on the North American Ensemble Forecast System (NAEFS),

led by NCEP's Environmental Modeling Center and the Canadian Meteorological Center of the Meteorological Service of Canada.

The NAEFS is based on conducting more than 60 model predictions per day using the Canadian and NOAA global "initial conditions" required to predict the evolution of weather systems. The Meteorological Service of Canada and NOAA have been working together to develop NAEFS since early 2003. The National Meteorological Service of Mexico became involved with the system in October 2004. NAEFS is the first formal attempt to join forces in the development of an international ensemble forecast system and its use throughout the countries of North America and beyond. NAEFS is already creating an international buzz for future cooperation. The United Kingdom's Met Office plans to join the NAEFS in a few years, after its own ensemble forecast system becomes operational.

Observing Monsoons Improves Predictions

NOAA successfully completed the North American Monsoon Experiment (NAME) field campaign in collaboration with other U.S., Mexican, and Central American agencies and academic institutions. NAME provided an unprecedented collection of detailed atmospheric, oceanic, and land-surface observa-

tions in the core region of the North American Monsoon over northwestern Mexico, the southwestern United States, and adjacent oceanic regions. The experiment better documents the evolution of the monsoon convection and precipitation, and helps to outline the physical processes that play a key role in improving the predictability of monsoons. One of the challenges for NOAA and its partners is to develop models of sufficiently small spatial scale in order to better predict warm-season precipitation associated with the North American Monsoon.

NOAA Provides Positioning Assistance to U.S. Military in Iraq

NOAA provided critical assistance in the design, development, and implementation of the Iraqi Geospatial Reference System. U.S. Army, Air Force, Marine, and civilian surveyors from many nations and disciplines are using the Continuously Operating Reference Stations for projects all around Iraq. In August, more than 170 points were positioned in the country using NOAA's Online User Positioning Service.



Group on Earth Observations co-chairs (from left): Rob Adam, South Africa's Director-General of the Department of Science and Technology; Vice Admiral Lautenbacher, NOAA Administrator; Achilleas Mitsos, European Commission Research Director-General; and Akio Yuki, Japanese Deputy Minister of Education, Culture, Sports, Science and Technology. Photo: NOAA Program Coordination Office

FINANCIAL OVERVIEW







Office of the Chief Financial Officer

Managing NOAA's Resources



*Maureen E. Wylie
Chief Financial Officer*

The Chief Financial Officer (CFO) serves as the principal financial manager for NOAA's appropriated resources. The CFO Act of 1990 requires the CFO's Office to provide the leadership necessary for NOAA to obtain a yearly unqualified opinion in the audit of its consolidated financial statements. Under the direction of the CFO, the Budget and Finance Offices perform studies using methods and procedures analysis, and systems and organizational analysis, to support senior management's executive decisions for ensuring operational efficiencies within NOAA.

The Budget Office coordinates the preparation of NOAA budget submissions to the Department of Commerce, the Office of Management and Budget (OMB), and Congress, including data on budget authority, obligations, outlays, permanent positions, and full-time equivalent employment. It also provides for the proper allocation and control of the execution of all budgetary resources, as required under the Congressional Budget and Impoundment Act of 1974 and related statutes, and as specified by OMB. The Budget Office also maintains a staff that focuses on outreach and communication, particularly with the staff of Congressional appropriations committees, as well as other Executive Branch agencies.

The Finance Office works to ensure that NOAA's consolidated financial statements and reports accurately reflect NOAA's fiduciary status at the end of the fiscal year, as required of all government agencies under the CFO Act. It provides NOAA's managers access to timely financial data necessary to make informed programmatic decisions, and is responsible for paying NOAA's bills in a timely manner.

NOAA FY 2005 RESOURCE ALLOCATIONS

Allocations by Mission Goals

The 21st century poses complex challenges for NOAA. Every aspect of NOAA's mission—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. Table 1 presents the allocation of NOAA resources by the agency's mission goals.

TABLE 1
Allocation of NOAA Resources by Mission Goals

Ecosystem Management	\$1,518,211,000
Climate Change	\$501,771,000
Weather and Water	\$1,617,019,000
Commerce and Transportation	\$365,237,000

Allocations by Line Offices

NOAA's resources are used to develop the science necessary to improve weather, water, and ecosystem forecasts of the future, as well as to give policymakers the data they need to make important decisions related to climate variability and change. These resources fund programs that enhance our scientific understanding of the oceans and atmosphere and our ability 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's Line Offices are at the forefront of many of the Nation's most critical issues (Table 2).

TABLE 2
Allocation of NOAA Resources by Line Office

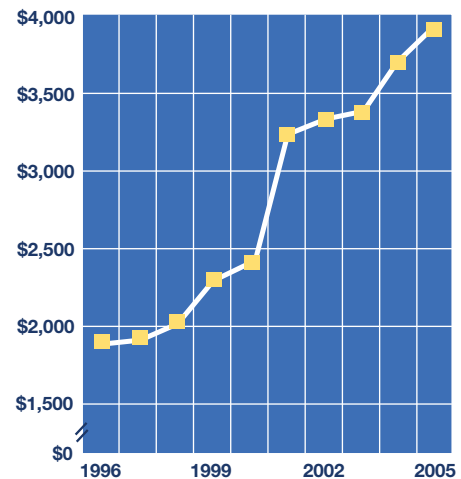
National Ocean Service	\$669,295,000
National Marine Fisheries Service	\$824,195,000
Office of Oceanic and Atmospheric Research	\$413,769,000
National Weather Service	\$782,981,000
National Environmental Satellite, Data and Information Service	\$907,448,000
Office of Marine and Aviation Operations	\$225,055,000
Office of Program Planning and Integration	\$2,464,000

BUDGET OVERVIEW

NOAA's total budget appropriation was \$3.9 billion for FY 2005. 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 oceans, atmosphere, space, and solar activities, and applies this knowledge to science and services to improve our understanding and stewardship of the environment that sustains the lives of all Americans. NOAA warns of dangerous weather, charts our seas and skies, and guides us in the wise use of ocean and coastal resources. Over the last 10 years, NOAA's appropriated funding level has grown by 50 percent (Figure 1).

FIGURE 1
NOAA Budget Growth (in billions)



NOAA's budget is composed of several appropriations and special fund accounts. Its 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; management of fisheries and protected species; and responsibilities for sustaining the health of coastal ecosystems. 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.

CONSOLIDATED BALANCE SHEET

Assets

The FY 2005 Consolidated Balance Sheet reflects total assets of \$8.0 billion (Table 3) and primarily consists of: Fund Balance with Treasury; Accounts Receivable, Net; Loans Receivable and Related Foreclosed Property, Net; Inventory and Related Property; and General Property, Plant, and Equipment, Net.

TABLE 3

Assets (in thousands)

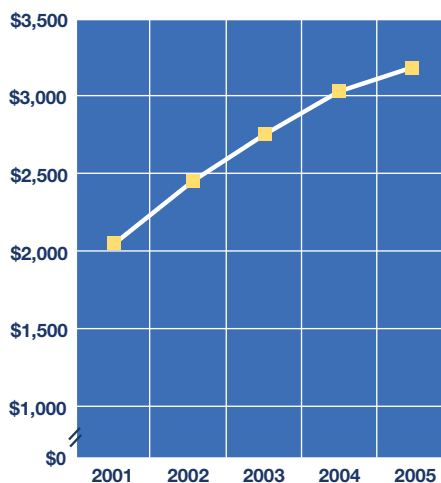
	FY 2005	FY 2004
Intragovernmental Assets	\$3,321,026	\$3,144,690
Fund Balance with Treasury	3,229,954	3,036,863
Accounts Receivable, Net	49,263	71,090
Advances and Prepayments	41,809	36,737
Non-intragovernmental Assets	\$4,694,587	\$4,208,573
Cash and Other Monetary Assets	641	1,688
Accounts Receivable, Net	51,718	39,246
Loans Receivable and Related Foreclosed Property, Net	357,844	249,017
Inventory, Materials, and Supplies	70,914	72,642
General Property, Plant, and Equipment, Net	4,133,867	3,827,199
Advances and Prepayments	76,366	14,510
Other	3,237	4,271
Total Assets	\$8,015,613	\$7,353,263

Fund Balance with Treasury

The Fund Balance with Treasury of \$3.2 billion primarily consists of appropriated funds to pay current liabilities and finance authorized purchase commitments (Figure 2).

FIGURE 2

Fund Balance with Treasury (in millions)

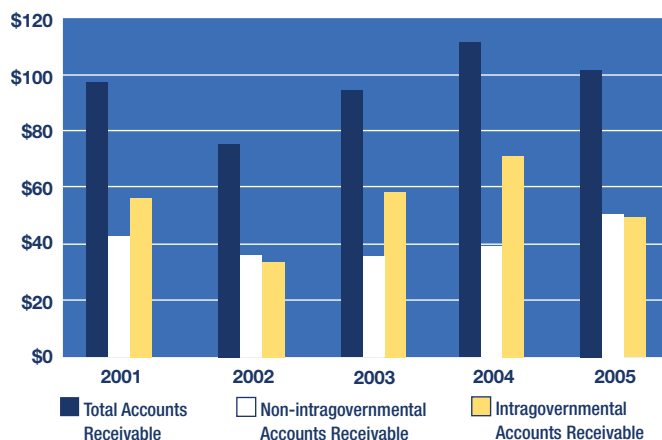


Accounts Receivable, Net

Accounts Receivable, Net of \$101.0 million consists of intragovernmental (Federal agency) accounts receivable of \$49.3 million and non-intragovernmental accounts receivable of \$51.7 million (Figure 3). Outstanding billed and unbilled reimbursable services provided to other Federal agencies comprise 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.

FIGURE 3

Accounts Receivable, Net (in millions)



Loans Receivable and Related Foreclosed Property, Net

Loans Receivable and Related Foreclosed Property, Net of \$357.8 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 \$6.9 million and \$350.9 million, respectively (Figure 4).

Inventory and Related Property

Inventory and Related Property of \$70.9 million consists solely of operating materials and supplies that are tangible personal property to be consumed in normal operations (Figure 5). The majority of operating materials and supplies are located at the National Logistics Support Center and are used mainly by the National Weather Service. NOAA's inventory, comprised primarily of maps and charts, was transferred to the Federal Aviation Administration during FY 2001.

FIGURE 4
Loans Receivable and Related Foreclosed Property, Net (in millions)

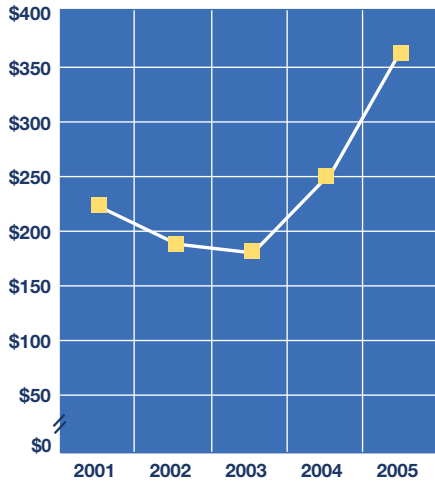
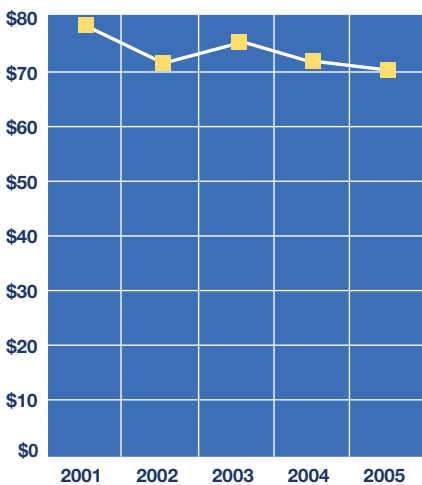


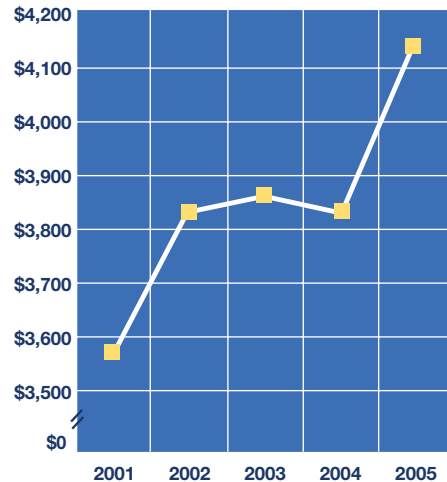
FIGURE 5
Operating Materials and Supplies (in millions)



General Property, Plant, and Equipment

General Property, Plant, and Equipment is stated at net book value of \$4.1 billion (Figure 6). It consists mainly of construction work in progress, satellites and weather systems, structures and facilities, and other personal property with net book values of \$2.8 billion, \$0.8 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.

FIGURE 6
General Property, Plant, and Equipment (in millions)



Liabilities

The FY 2005 Consolidated Balance Sheet reflects NOAA liabilities totaling \$1.4 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.

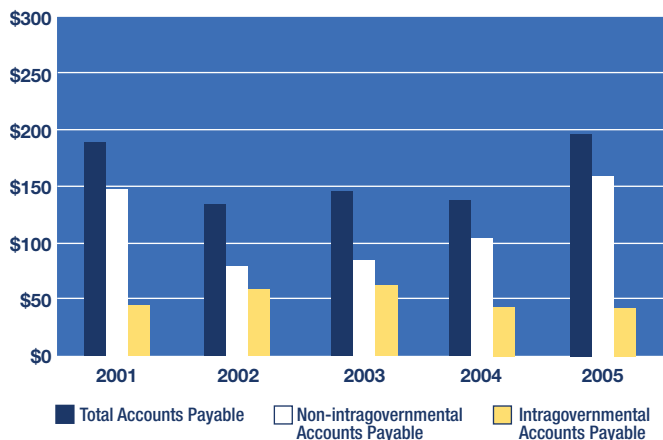
TABLE 4
Liabilities and Net Position (in thousands)

	FY 2005	FY 2004
Intragovernmental Liabilities	\$509,058	\$366,081
Accounts Payable	39,289	40,091
Debt to Treasury	357,581	245,226
Resources Payable to Treasury	3,196	9,752
Unearned Revenue	69,663	52,007
Other	39,329	19,005
Total Non-intragovernmental Liabilities	\$895,767	\$824,361
Accounts Payable	155,948	102,923
Accrued Payroll and Annual Leave	128,696	119,258
Actuarial FECA Liability	61,712	59,133
NOAA Corps Pension	350,300	335,700
NOAA Corps Retirement Health Benefits	45,400	42,800
Accrued Grants	54,655	33,890
Environmental and Disposal Liabilities	29,952	41,998
Capital Leases	17,868	14,338
Unearned Revenue	41,082	47,600
Other Liabilities	10,154	26,721
Total Liabilities	\$1,404,825	\$1,190,442
Net Position	\$6,610,788	\$6,162,821
Unexpended Appropriations	2,909,502	2,756,492
Cumulative Results of Operations	3,701,286	3,406,329
Total Liabilities and Net Position	\$8,015,613	\$7,353,263

Accounts Payable

Accounts Payable of \$195.2 million consists of \$39.3 million of intragovernmental accounts payable and \$155.9 million of non-intragovernmental accounts payable (Figure 7).

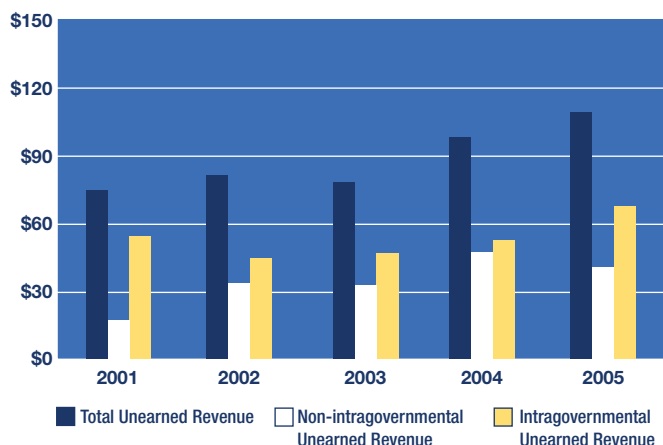
FIGURE 7
Accounts Payable (in millions)



Unearned Revenue

Unearned Revenue of \$110.7 million consists of intragovernmental and non-intragovernmental unearned revenue of \$69.6 million and \$41.1 million, respectively (Figure 8). The majority of NOAA's unearned revenue consists of amounts advanced to NOAA by other Federal entities (such as the Departments of Transportation and Defense) and non-intragovernmental entities, for goods and services to be furnished.

FIGURE 8
Unearned Revenue (in millions)

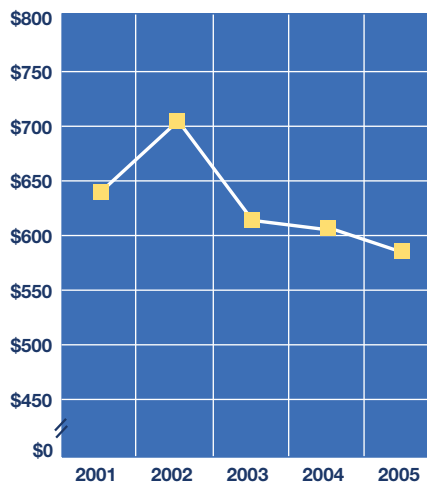


Future Funding Requirements

Future Funding Requirements of \$590.0 million represent liabilities not funded by budgetary resources (Figure 9). These liabilities include a NOAA Corps pension liability of \$350.3 million, NOAA Corps retirement health benefits of \$45.4 million, accrued leave balances of \$92.0 million, Federal Employee Compensation Act actuarial and accrued liabilities of \$73.4 million, environmental cleanup costs of \$30.0 million, contingent liabilities of \$1.3 million, and other liabilities of -\$2.4 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 NOAA earnings. As of September 30, 2005, the total amount of liabilities classified as unfunded exceeded the \$232.8 million in available unobligated appropriations by \$357.2 million. These liabilities are presented as unfunded, rather than allocating portions of each of them to appropriated funds.

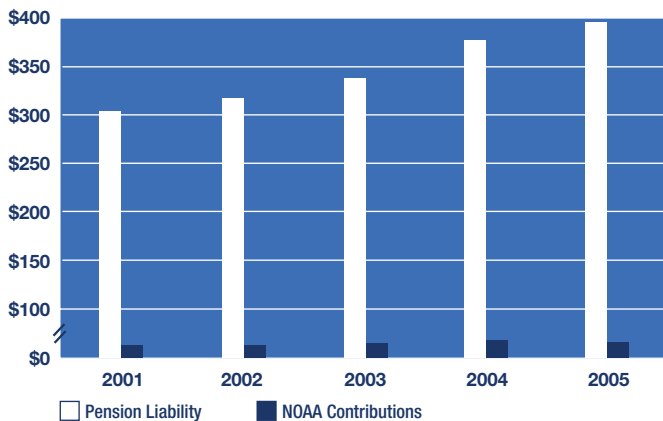
FIGURE 9
Future Funding Requirements (in millions)



NOAA Corps Pension Liabilities

NOAA Corps Pension Liabilities of \$395.7 million, as mentioned above, represent non-intragovernmental liabilities not covered by budgetary resources relating to the NOAA Corps Retirement System (Figure 10). The NOAA Corps Retirement System is a noncontributory, defined benefit plan covering all active duty officers, retiree annuitants, and surviving families totaling 657 as of September 30, 2005. During FY 2005, NOAA contributed \$17.2 million to the NOAA Corps Retirement System.

FIGURE 10
NOAA Corps Pension Liabilities (in millions)



Fluctuation Analysis

The following balance sheet fluctuations were noted between FY 2004 and FY 2005 financial statements:

Total Assets

NOAA's total assets increased by approximately \$662.3 million from September 30, 2004, to September 30, 2005. The majority of the increase in total assets is attributable to increases in: Property, Plant, and Equipment of \$305.1 million; Fund Balance with Treasury of \$193.0 million; and Loans Receivable and Related Foreclosed Property of \$108.8 million.

Total Liabilities

NOAA's total liabilities increased by approximately \$214.4 million from September 30, 2004, to September 30, 2005. This was mainly due to an increase in Debt to Treasury of \$112.4 million, as well as an increase in Accounts Payable to private-sector vendors of \$53.0 million.

Equity

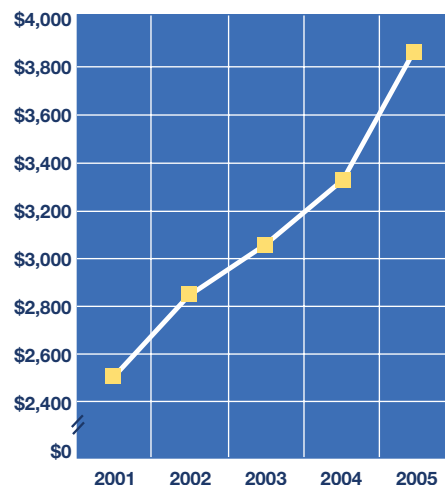
NOAA's Net Position increased by approximately \$447.9 million from FY 2004 to FY 2005. The \$6.6 billion of net position consists of \$2.9 billion of Unexpended Appropriations and \$3.7 billion from Cumulative Results of Operations.

Appropriated Capital Used

The FY 2005 Statement of Changes in Net Position reports the beginning net position, the items that 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—net cost of operations and appropriations used (revenues), totaling \$3.7 billion and \$3.8 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 (Figure 11).

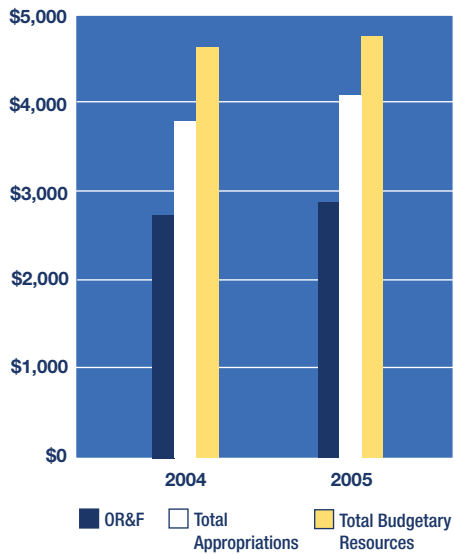
FIGURE 11
Appropriated Capital Used (in millions)



Budgetary Resources

The FY 2005 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 85 percent, or \$4.0 billion, of its budgetary resources of \$4.7 billion through appropriations (Figure 12). Of the \$4.0 billion, NOAA's OR&F appropriation received \$2.8 billion. Other major sources of budgetary resources include unobligated balances carried over from FY 2004 and spending authority from offsetting collections, totaling \$418.7 million and \$306.6 million, respectively. Of the total budgetary resources of \$4.7 billion, \$4.4 billion was obligated during FY 2005.

FIGURE 12
Budgetary Resources (in millions)



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
14th and Constitution Avenue, N.W.
Washington, D.C. 20230

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
www.nws.noaa.gov

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

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