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 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.

Laysan albatross. Photo: Pacific Islands Fishery Science Center

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 the 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 though 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 stake-holder 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.

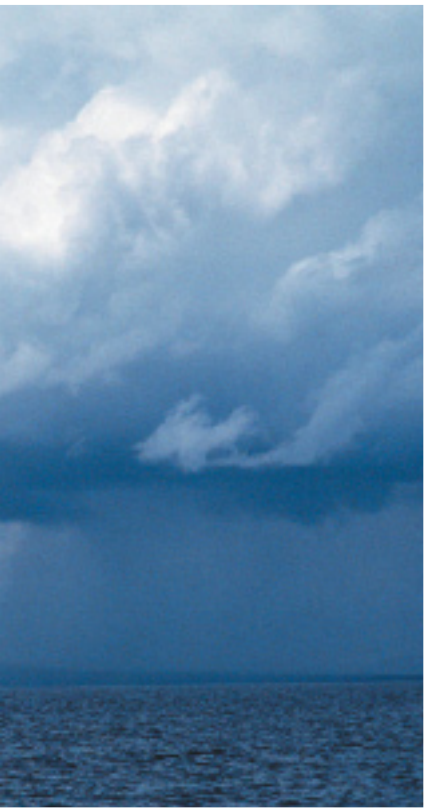
FUTURE OUTLOOK

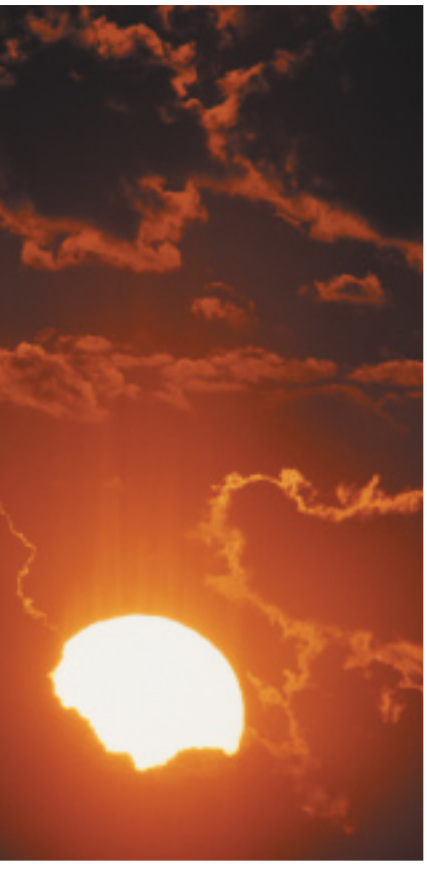
NOAA Fisheries Service bears stewardship responsibility for the largest EEZ in the world. Healthy and productive coastal, marine, and Great Lake ecosystems create billions of dollars of value in recreational and commercial activity. New legislation, evolving management philosophies, and scientific advances 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.

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





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.

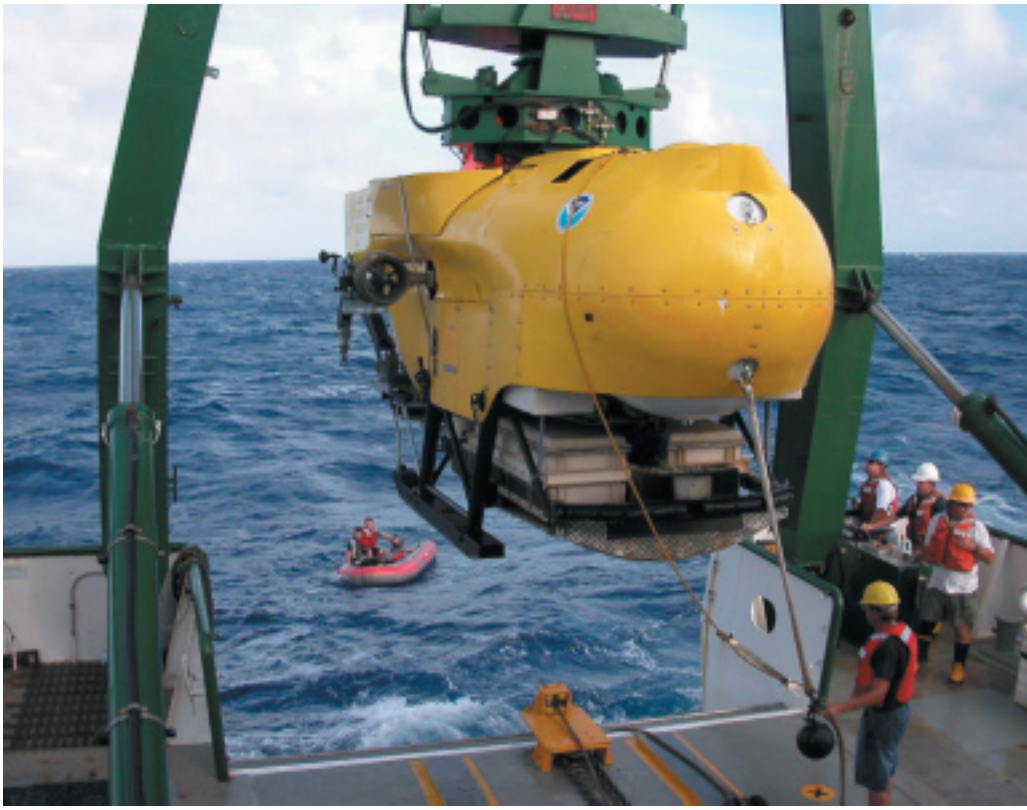
The NOAA Research network consists of 11 internal research laboratories; an Ocean Exploration Program that conducts both internal and extramural research; and extramural research at 30 National Sea Grant university programs, 6 undersea research centers, a research grants program through the Office of 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 Environmen-tal 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.

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

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

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

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.

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.

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 unhealthful 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.

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

GLERL Helps Lead Lake Erie Research Partnership

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

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

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 (CM^2) 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 (CO_2) concentrations of one percent per year, until concentrations were twice the current level of CO_2. The second scenario also ran increasing atmospheric CO_2 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.

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 practices, 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 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.

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

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

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

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—vitally 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 tornado 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 disturb-ances. 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. Colleran, *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 respiratory 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 climate 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.

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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 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.

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

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 QuickSCAT 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

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

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 expectations 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 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.

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

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 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 flights 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 Brousser 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 deploy-ment 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 operations 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

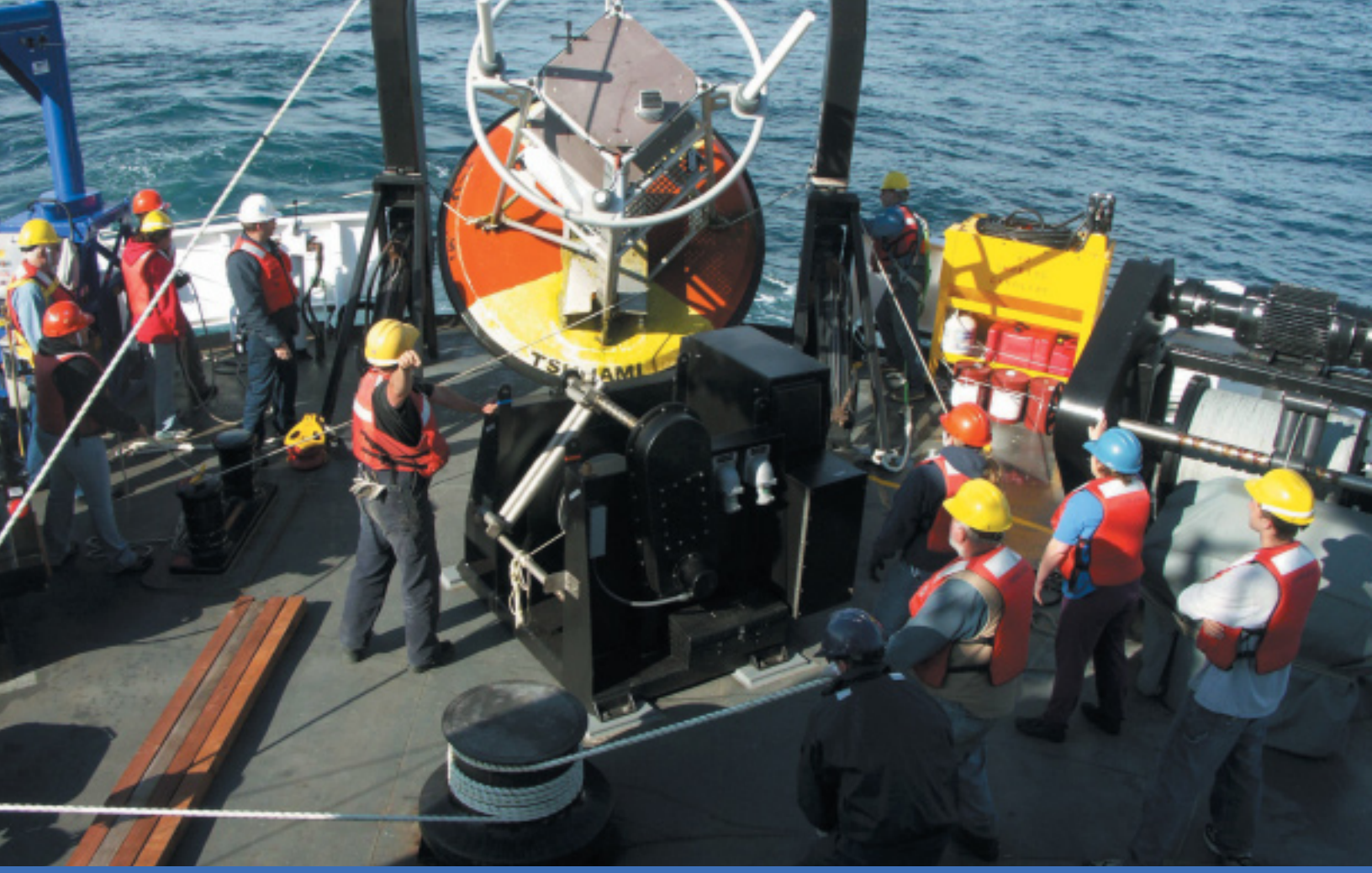
The NOAA Commissioned Officer Corps operates and manages NOAA ships and aircraft, and brings operational expertise and knowledge to land-based NOAA programs through rotational assignments. Officers work under a personnel system similar to that of the U.S. armed forces, giving them the flexibility to 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 specialty dive training to NOAA employees and outside agencies, including the Federal Bureau of Investigation, the U.S. Environmental Protection Agency, the U.S. Secret Service, the U.S. Fish and Wildlife Service, and local law enforcement.

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 Sys-tem, 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

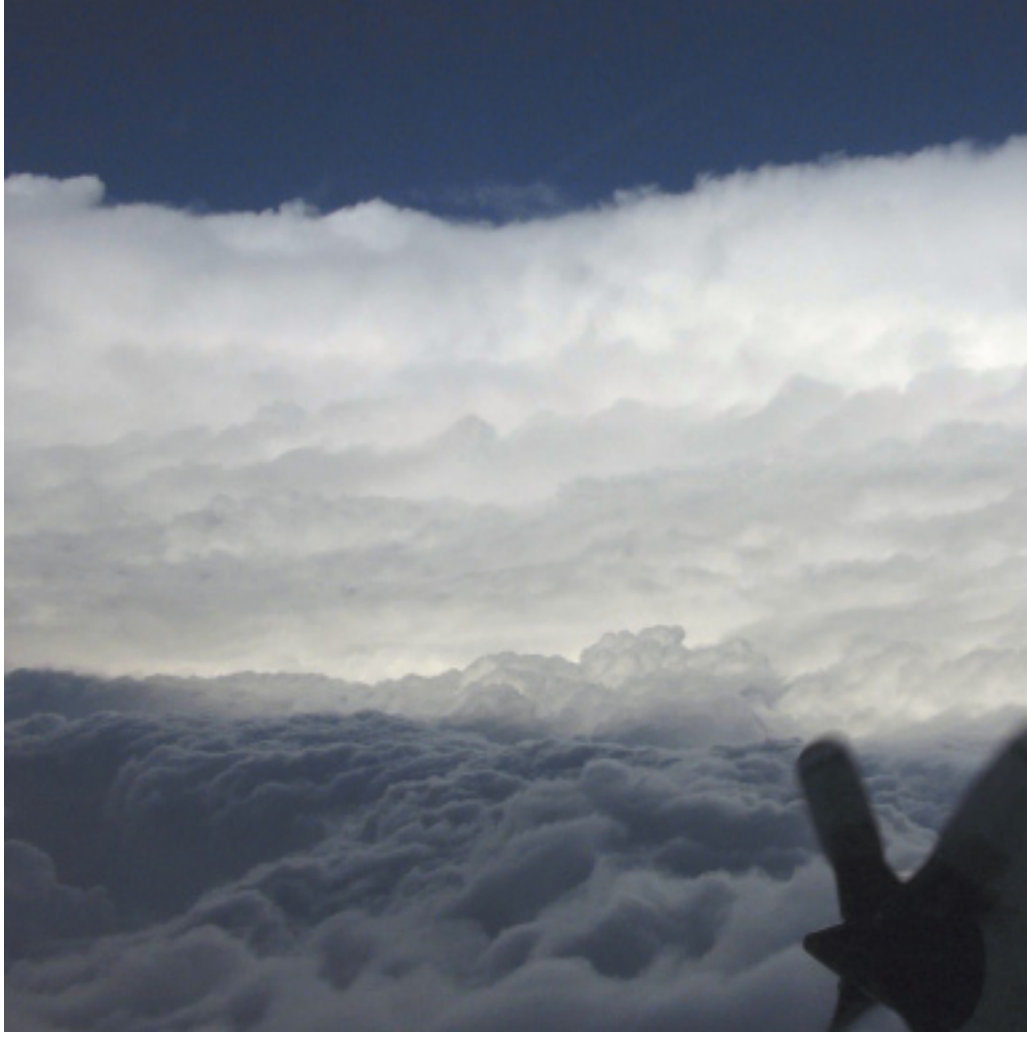
A NOAA Corps officer is director of NOAA's Homeland Security Program Office. In FY 2005, NOAA Corps officers continued to be in the vanguard of those advancing NOAA's Homeland Security efforts to keep the agency up and running in the event of an emergency. Along with other Line Office representatives, 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

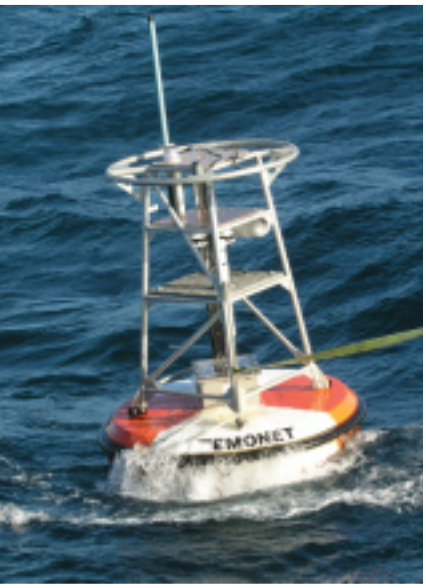
PPI leads the agency's development of performance measurements, at the program and corporate levels. It refines their content over time and ensures their consistent and appropriate use across diverse management and reporting processes. PPI is the interface to NOAA's budget office regarding metrics and 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

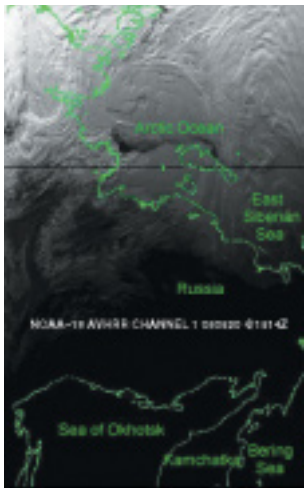
NOAA led the U.S. delegation to the 57th Annual Meeting of the International Whaling Commission (IWC) in Ulsan, Korea. The U.S. delegation, headed by IWC Commissioner Rolland Schmitten, was comprised of NOAA officials, representatives from Congressional offices, and the Departments of State, Defense, 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 intersessionally 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 observations 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.

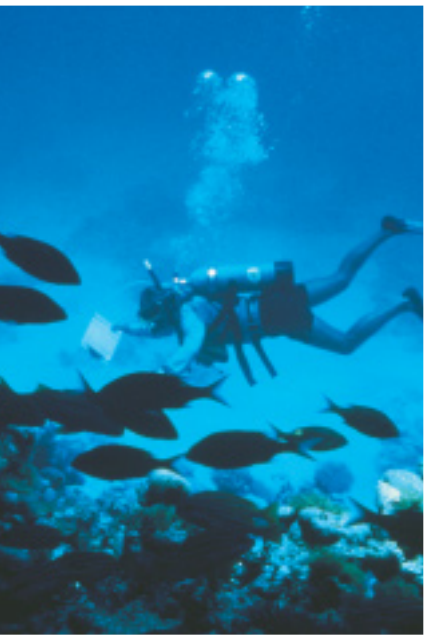
NOAA Provides Positioning Assistance to U.S. Military in Iraq

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


WILD SALMON
5.99



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).

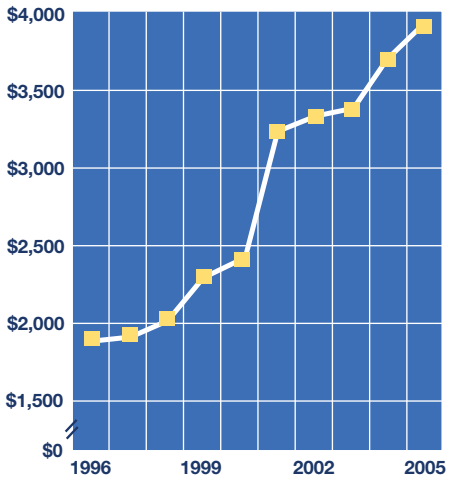
TABLE 2
Allocation of NOAA Resources by Line Office

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.

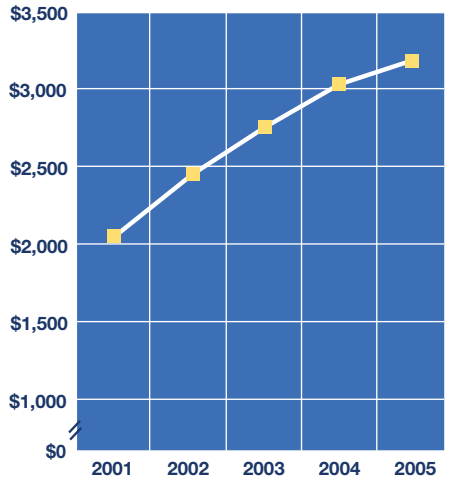
TABLE 3
Assets (in thousands)

	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).

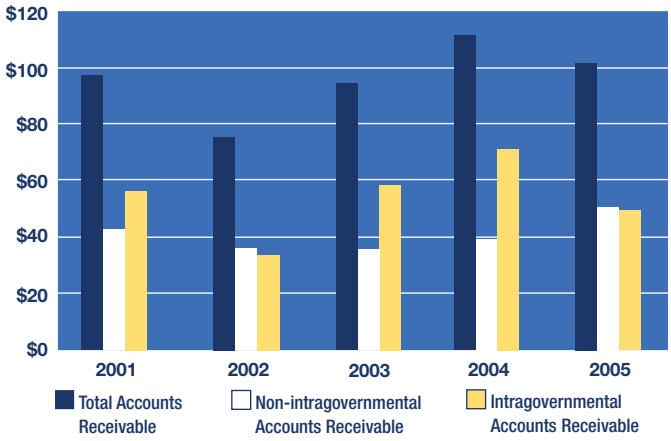
FIGURE 2
Fund Balance with Treasury (in millions)



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)

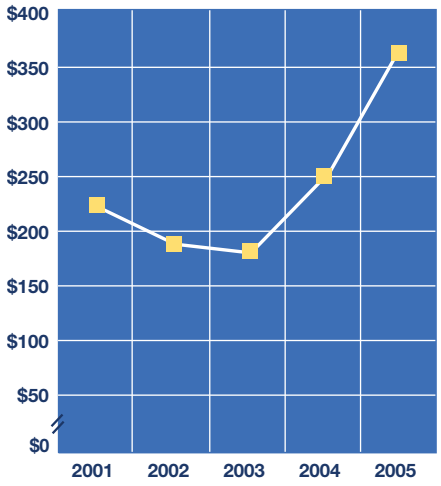
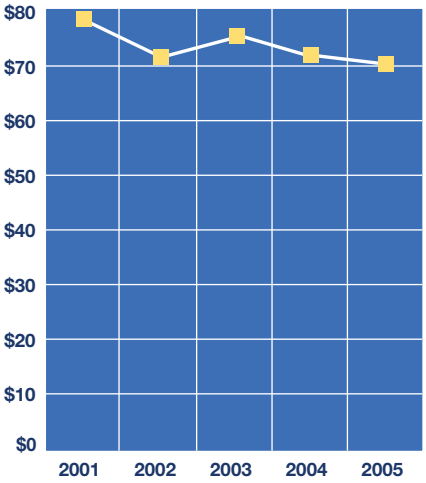


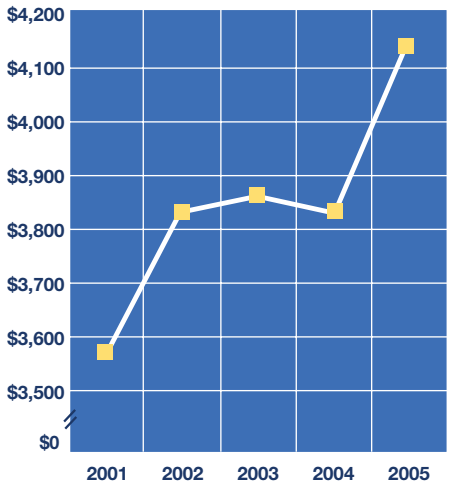
FIGURE 5
Operating Materials and Supplies (in millions)



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.

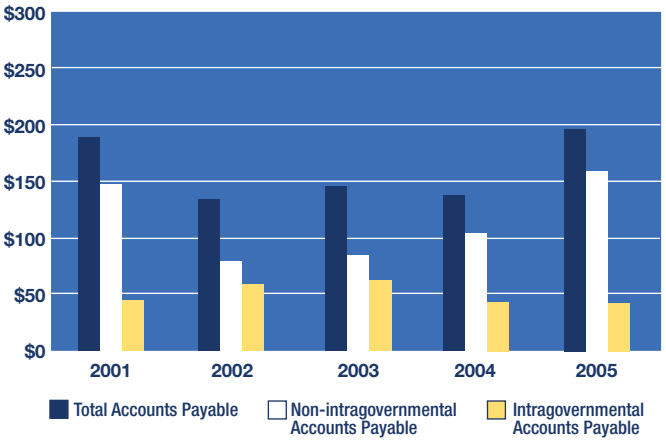
TABLE 4
Liabilities and Net Position (in thousands)

	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).

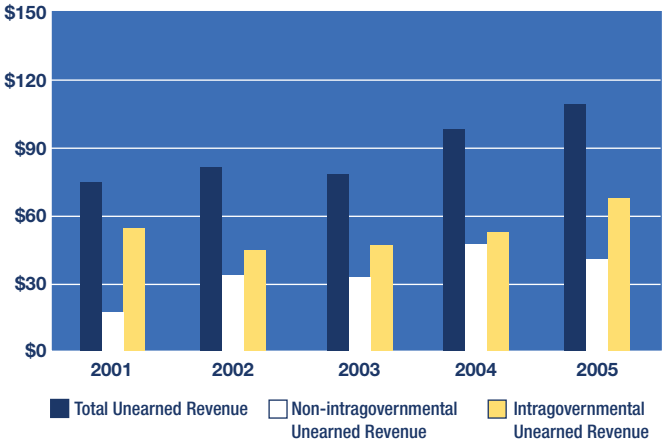
FIGURE 7
Accounts Payable (in millions)



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)

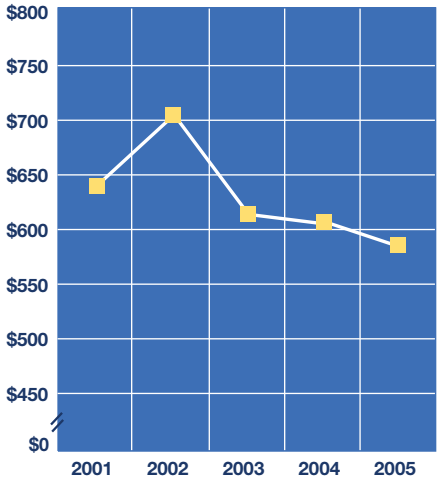


Future Funding Requirements

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.

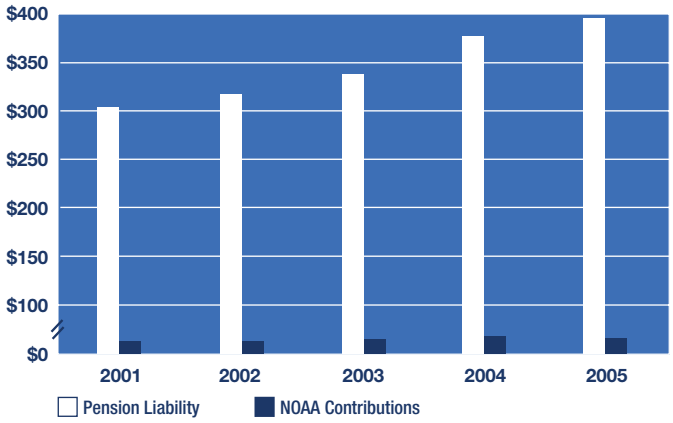
FIGURE 9
Future Funding Requirements (in millions)



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

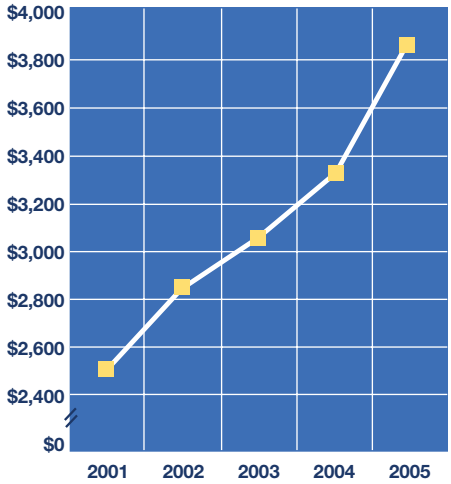
NOAA's Net Position increased by approximately $447.9 million from FY 2004 to FY 2005. The $6.6 billion of net position consists of $2.9 billion of Unexpended Appropriations and $3.7 billion from Cumulative Results of Operations.

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).

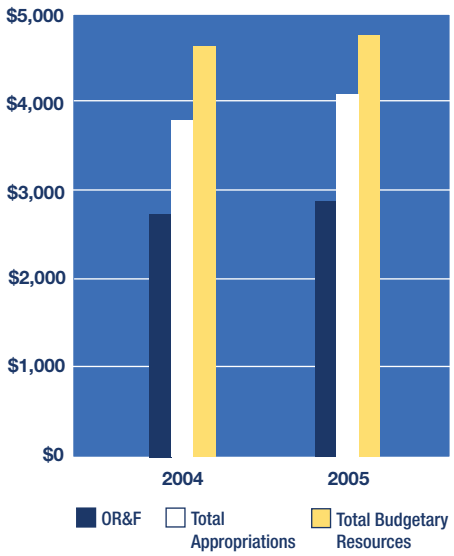
FIGURE 11
Appropriated Capital Used (in millions)



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)



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