

# STRATEGIC GOAL 3

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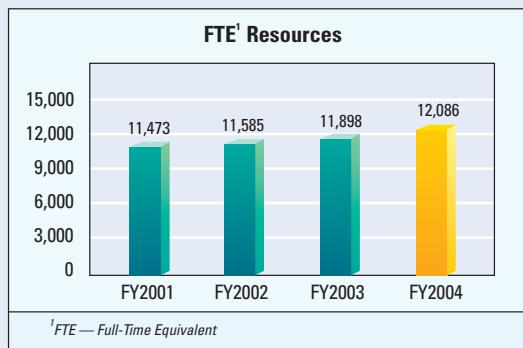
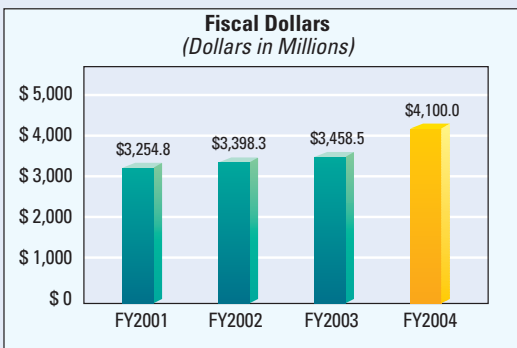




**STRATEGIC GOAL 3**

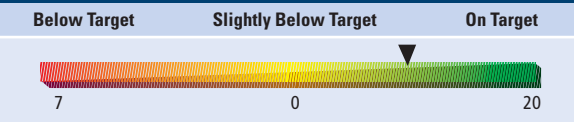
*Observe, protect, and manage the Earth's resources to promote environmental stewardship*

**STRATEGIC GOAL 3 TOTAL RESOURCES**



The Department is a future-minded environmental science agency whose mission is to understand and predict changes in the Earth's environment and manage coastal and marine resources to meet our nation's economic, social, and environmental needs. Known as the oceans and atmosphere agency, the Department is also an earth sciences and space agency. The Department has responsibilities for the environment, ecosystems, safety, and commerce of this nation that span oceanic, coastal, and atmospheric domains.

**Average Performance Rating and Number of Reported Results**

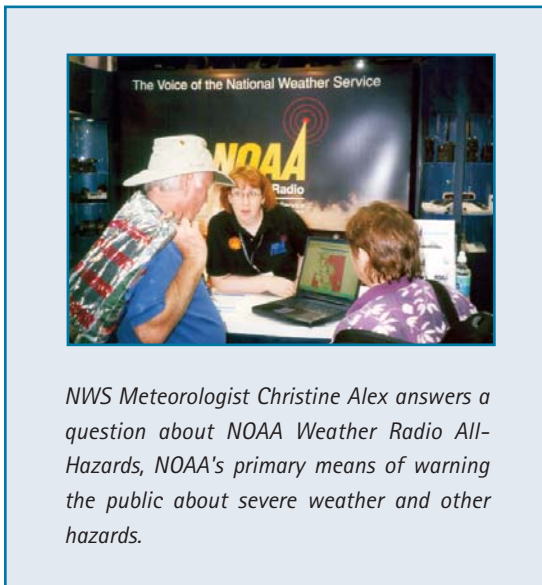


▼ = If in the yellow to green area then considered met.  
 If in the yellow to red area then considered not met.

See Appendix A: Performance and Resource Tables for individual reported results.

Understanding the oceans and atmosphere is essential to sustaining the United States' environmental and economic health. The Department provides products and services that are a critical component of the daily decisions made across the United States. From satellite imagery to tornado warning, navigational charts to fishery stock assessments, hurricane tracking to El Niño and harmful algal bloom predictions, severe weather forecasts to coastal zone management—Commerce's science, service and stewardship touches the life of every citizen in this country and in much of the world every day.

Together Commerce and its partners provide weather and climate services; manage and protect fisheries and sensitive marine ecosystems; conduct atmospheric, climate, and ecosystems research; promote efficient and environmentally safe commerce and transportation; and provide emergency response and vital information in support of homeland security. The breadth and scope of these services demands that the Department be responsive to both short-term and long-term societal needs.

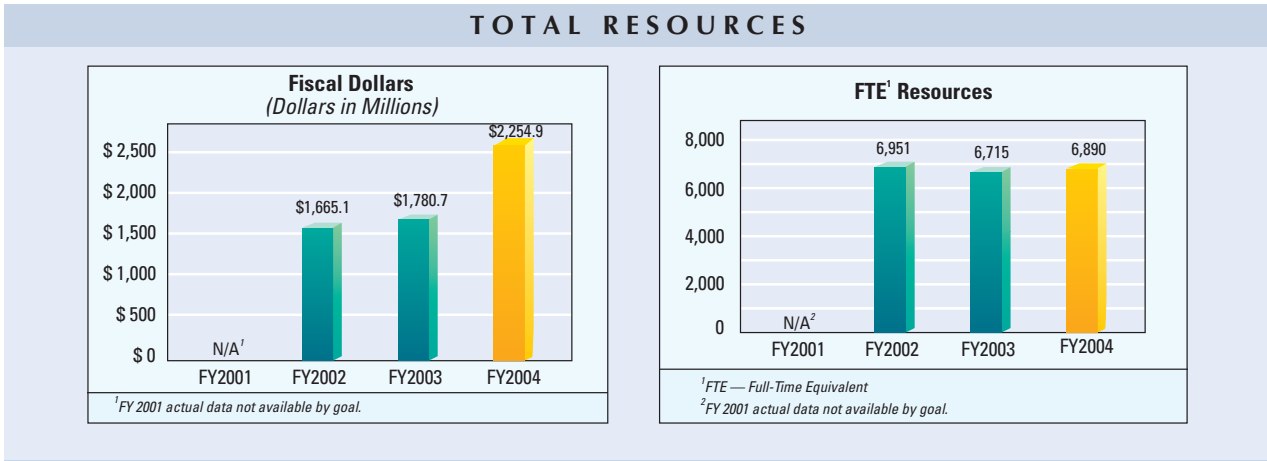


In FY 2004, the National Oceanic and Atmospheric Administration (NOAA) revised its Strategic Plan for FY 2005 -FY 2010, providing the framework of goals, strategies, and performance objectives to improve its own and the Department's ability to best serve the United States and its citizens. The NOAA Strategic Plan's four programmatic mission goals fall under Objectives 3.1 and 3.2.

The Department successfully moved this strategic goal forward. The bureau with the overall responsibility for the successes in this goal is NOAA.

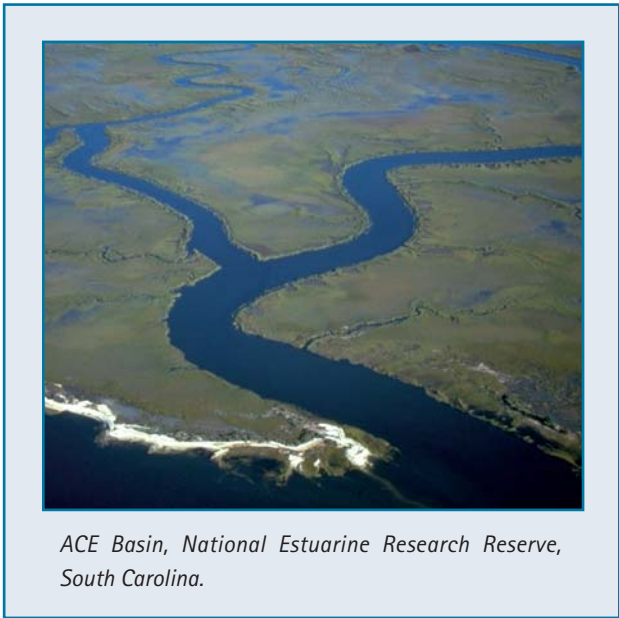
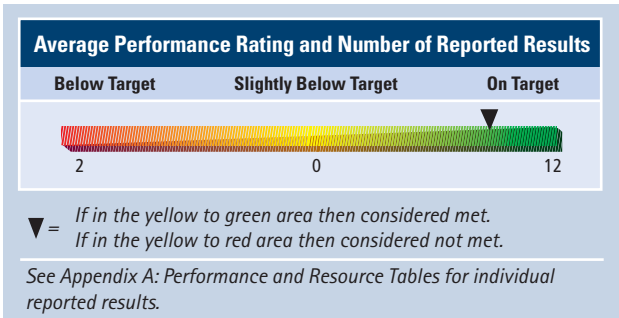
**STRATEGIC OBJECTIVE 3.1**

*Advance understanding and predict changes in the Earth's environment to meet America's economic, social, and environmental needs*



The Department's role in understanding, observing, forecasting, and warning of weather events is expanding. The Department is strategically positioned to conduct sound, scientific research and provide integrated observations, predictions, and advice for decisionmakers who manage environmental resources, ranging from fresh water supplies to coastal ecosystems to air quality.

Realizing that the Department's information and services bridge both weather and climate timescales, it will continue to collect and analyze environmental data and issue forecasts and warnings that help protect life and property and enhance the U.S. economy. Commerce is committed to excellent customer service and depends on its partners in the private sector, academia, and government to add value and help disseminate critical weather and climate information. Commerce will expand services to support evolving national needs, including those associated with space weather, freshwater and coastal ecosystems, and air quality prediction.



## IMPORTANT HIGHLIGHTS FOR STRATEGIC OBJECTIVE 3.1

**I**n June 2004, NOAA and the Department of Homeland Security (DHS) signed an agreement that allows DHS to send critical all hazards alerts and warnings directly through the NOAA All-Hazards Network via NOAA Weather Radio. This partnership with DHS extends NOAA Weather Radio's capabilities from primarily broadcasting weather forecasts and warnings to include a wider range of alerts and warnings, both man-made and natural disasters, which will make critical information more readily available to the public. Alerts can be delivered nationally, regionally or locally, giving DHS a strengthened capability to send emergency messages to national and targeted populations with minimum delay.



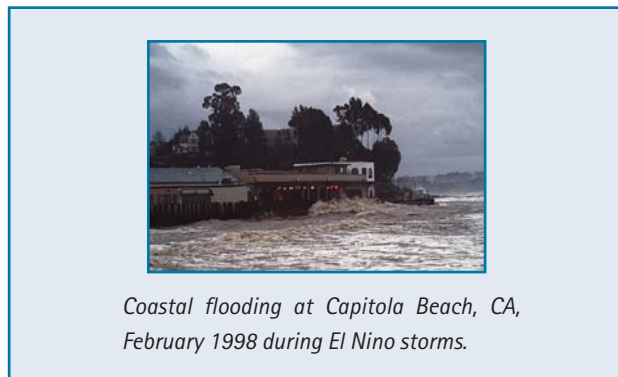
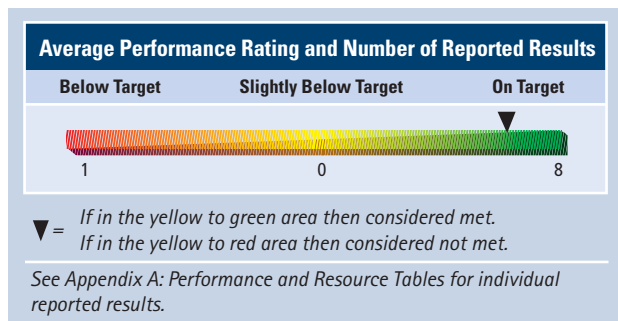
**T**he Department and the Western Governors' Association (WGA), developed a plan for "Creating a Drought Early Warning System for the 21<sup>st</sup> Century," outlining the details for a National Integrated Drought Information System (NIDIS). With \$6 billion to \$8 billion in estimated losses to the U.S. economy, and impacts widespread throughout society, Vice Admiral Lautenbacher has recognized the value and importance of the NIDIS, and its relation to NOAA's mission: "We cannot overlook the need for science to predict, monitor, and mitigate this phenomenon.... The NIDIS will provide the framework... for the 21<sup>st</sup> century that will improve our existing capabilities in monitoring and forecasting drought."

**Performance Goal: Improve accuracy and timeliness of weather and water information (NOAA)**

Floods, droughts, hurricanes, tornadoes, tsunamis, and other severe weather events cause \$11 billion in damages each year in the United States. Weather is directly linked to public safety, and nearly one-third of the U.S. economy (~ \$3 trillion) is sensitive to weather and climate. With so much at stake, NOAA's role in understanding, observing, forecasting, and warning of environmental events is expanding. Private and business sectors are also getting more sophisticated about how to use NOAA's weather, air quality, water, and space weather information to improve operational efficiencies, to manage environmental resources, and to create a better quality of life.

The Department is supported by NOAA's Weather and Water Mission Goal Team:

- ◆ The *Local Forecast and Warning Program* puts "NOAA in your neighborhood" by delivering essential NOAA services to local communities through its distributed structure of Weather Forecast Offices, Weather Service Offices, and data collection offices.
- ◆ The mission of the *Tropical Storm Program* is to save lives, mitigate property loss, and improve economic efficiency by issuing the best watches, warnings, forecasts and analyses of hazardous tropical weather, and by increasing understanding of these hazards.
- ◆ The NOAA *Air Quality Program* is a major and unique resource in the national effort to ensure that the public has clear air to breathe.
- ◆ NOAA's Hydrology Program delivers flood watches; river and flash flood warnings; and river, lake level, and water quality forecasts through Weather Forecast Offices to a broad spectrum of customers.
- ◆ The *Space Weather program* provides timely and accurate operational space weather forecasts, warnings, alerts, and data to civilian end users. Customers affected by space weather include power grid operators, National Aeronautics and Space Administration (NASA), Global Positioning System (GPS) and LORAN users, airlines, and radio communicators.
- ◆ The *Environmental Modeling Program* provides models and model-based estimates of both the current and future states (at all time scales) of the environment based upon observations and scientifically based modeling techniques. It operates and maintains both a suite of operational models and a research and development (R&D) program to improve and extend the capability and performance of the operational and research model suite.
- ◆ The *Science Technology and Infusion program* (ST&I) investigates, develops, and transfers new sciences and technology for improved NOAA operations, products, and services. ST&I performs state-of-the-art research and works with NOAA's service programs to infuse new science and technology via prototyping, evaluation, acquisition, and training.



On average, hurricanes, tornadoes, tsunamis, and other severe weather events cause \$11.4 billion in damages in the United States every year. Weather not only directly impacts public safety, but also nearly one-third of the total U.S. national economy. With so much at stake, NOAA's role in observing, forecasting, and warning of environmental events is expanding. Emergency managers, business, and the public are increasingly adept at using NOAA's weather and water information to achieve operational efficiencies, manage environmental resources, and protect lives and property.

NOAA's National Weather Service (NWS) announced on September 16, 2004, that three elements of the National Digital Forecast Database (NDFD) would become official on December 1, 2004. The NWS provides access to gridded forecasts of sensible weather elements (e.g., cloud cover, maximum temperature) through the NDFD. The NDFD contains a seamless mosaic of digital forecasts made available to the public, private, and academic sectors. Customers and partners may use this data to create a wide range of text, graphic, gridded, and image products of their own. Making gridded forecasts available to customers and partners is a significant advance in service to the public and is a result of a major shift in the way NOAA's NWS prepares and distributes forecasts. The gridded elements becoming official NDFD products in December are: Maximum Temperature, Minimum Temperature, and Probability of Precipitation (12 hour). The nine experimental elements remaining are: Temperature, Dew Point, Weather, Wind Speed, Wind Direction, Significant Wave Height, Sky Cover, Snow Amount, and Quantitative Precipitation Forecast.

During the recent spate of landfalling hurricanes in coastal Florida and Alabama, scientists from AOML, GFDL, and Department partners at the University of Miami/ Cooperative Institute for Marine and Atmospheric Studies (CIMAS) contributed to modeling and monitoring efforts that could advance defining how storms are operationally monitored in the future. The GFDL Hurricane Model continues to play a critical role in producing NOAA's hurricane forecasts. GFDL's hurricane researchers collaborate with forecasters at the National Hurricane Center to carefully monitor and continually improve the NWS's operational hurricane model used to determine where the storms are likely to go. As Frances and Ivan approached the United States, scientists used the H\*Wind system developed at AOML to objectively analyze the intensity of the storms at three to six-hour intervals utilizing real-time data from NOAA P3 research aircraft as well as conventional sea-, land-, and space-based observing platforms. The "snapshot" wind field analyses were used by colleagues at the University of Miami to run an experimental storm surge and wave model as part of a National Ocean Partnership Program (NOPP) project and were also available to National Hurricane Center forecasters via a special Web site. At the request of DHS-Federal Emergency Management Agency (FEMA), the analyses were used to help determine wind field parameters for the HAZUS model, a damage and response model developed for FEMA's mitigation division. As the storms neared landfall, H\*Wind gathered additional real-time storm intensity data from wind towers placed in the storm's path by a NOAA Sea Grant and State of Florida sponsored Florida Coastal Monitoring Program. These strategically placed observations provided valuable supplemental data, since the nation's Automated Surface Observing System (ASOS) surface observing network is not robust enough to operate in extreme conditions.

NWS predictions of an active Atlantic hurricane season foreshadowed a very busy August in 2004. The total of eight tropical cyclones reaching storm strength set a new August record, breaking the previous record of seven set in 1933 and 1995. Florida was hardest hit as Charley, Frances, and Ivan each impacted the state over a six-week span. Throughout that span of time, Americans relied on the National Hurricane Center (NHC) for predictions and information. Of note, NHC forecasters correctly made a difficult call that Hurricane Charley would intensify before making landfall. NOAA's 5-day hurricane forecasts are as good as 3-day forecasts were 10 years ago – and Hurricane Frances forecasts were even better than that. Numerous NWS and NOAA offices collaborated on Hurricane Ivan forecasts before and after it became the third storm in 2004 to hit Florida and then impacted interior states to the north with tornadoes, high winds and floods. Between mid-August and mid-September, the NHC Web site had more than 2.5 billion hits, and NHC forecasters provided



hundreds of television, radio and print media interviews in the same period. In early September, a congressional resolution was introduced to honor NOAA and its employees "for their dedication and hard work during Hurricanes Charley and Frances."

NOAA began issuing Air Quality Forecasts (AQF) for the northeastern United States, developed jointly by NOAA and the Environmental Protection Agency (EPA) in September 2004. The new AQF provides forecasts of hour-by-hour ozone levels through midnight of the following day, at 12 kilometer-grid resolution. The information is posted and updated twice daily on NWS and EPA data servers. The AQF capability was developed and tested over the past two summers in the Northeast. Users of the forecasts may include state and local air quality forecasters, ozone sensitive people, and private sector partners who help distribute air quality alerts to the public. The nationwide phased implementation of the ozone air quality forecast capability will occur between 2004 and 2009.

NWS's National Centers for Environment Prediction (NCEP) implemented a new global coupled atmosphere-ocean Climate Forecast System (CFS) model. This is the first system capable of producing operational climate forecasts using a fully interactive computer model of the ocean-land-atmosphere system. Historically, the operational seasonal forecast process relied mostly on knowledge of past conditions and trends to make future projections. The CFS model takes into account the interaction between the ocean and the atmosphere. These interactions are critical to determine the evolution of Earth's climate on seasonal time scales. The CFS will complement and significantly improve the existing seasonal forecasting process. Use of the CFS will lead to improvements in operational seasonal forecasts, which provide important guidance to many important economic sectors, including agriculture, energy, water resources, transportation, and the financial markets. NCEP's Environmental Modeling Center (EMC) developed the CFS in cooperation with a number of government, university, private, and international partners.

Prompt action by an Illinois manufacturing plant following a NOAA Weather Radio (NWR) All-Hazards alert kept as many as 140 plant workers safe in the face of an F4 tornado that struck July 13, 2004, in Roanoke, Illinois. The Parsons Manufacturing Plant dispatched employee spotters based on NWR receipt of a Severe Thunderstorm Warning 12 minutes prior to the tornado. A plant manager said employees were just starting to go to their designated shelters when the Tornado Warning was received—seven minutes prior to the tornado. The company owner established a severe weather plan nearly 30 years ago when he started the business, and the plant had shelters made of steel reinforced concrete. The plant also holds regular emergency drills.

NOAA and DHS signed an agreement, enabling DHS to send critical all-hazards alerts and warnings directly through the NOAA NWR All-Hazards Network. This partnership with DHS extends NWR's capabilities from primarily broadcasting weather forecasts and warnings to include a wider range of alerts and warnings, for both man-made and natural disasters, which will make critical information more readily available to the public. Alerts can be delivered nationally, regionally, or locally, giving DHS a strengthened capability to send emergency messages to national and targeted populations with minimum delay. NOAA also collaborated in 2004 with the Consumer Electronics Association (CEA) and Environment Canada to establish a new performance standard for public alert receivers to protect lives and property. Public alert receivers for NWR broadcasts using the new industry standards will be entitled to bear a new certification from CEA. The standard, titled CEA-2009 – Receiver Performance Specification for Public Alert Receivers, defines minimum performance criteria for consumer electronic products designed to receive the digital alert signals broadcast by NWR and Environment Canada's Weatheradio network.

Flash Flood and Monitoring Prediction (FFMP), a component of the NWS Advanced Hydrologic Prediction Service, gave emergency management officials enough specific warning information to barricade roads and divert school buses in advance of May 2004 flash flooding in Pennsylvania. Early in the afternoon of May 12, 2004, a thunderstorm developed over Miller and Shaver Mountains south of Tunkhannock, Pennsylvania. The Binghamton, New York, Weather Forecast Office (WFO) issued flash flood warnings about an hour before flooding hit the specific area of Wyoming County mentioned in the warning. The thunderstorm was nearly stationary and rainfall totals exceeded six inches in just a few hours. The specificity of the warning message and lead time allowed Gene Dziak, Director of Wyoming County Emergency Management Agency, and his staff to take protective action by barricading roads, and diverting school buses out of the affected area. There were no injuries or deaths related to this flash flood.

High-resolution radar data from the national network of Next Generation Radar (NEXRAD) was made available in real time in April 2004 to government, university, and private sector users. NWS distributes the NEXRAD data through four top-tier sites. Three of these sites, Purdue University, University of Oklahoma, and The Education and Research Consortium of the Western Carolinas, make Level II data available to all private sector users equally on a cost-recovery basis without restriction on redistribution or use. The fourth site, the NWS Telecommunication Operations Center, makes data available through a collection of data communication line services called the Family of Services (FOS).

The NWS Climate Prediction Center (CPC) changed the release time for the official One- and Three-Month Outlooks and U.S. Drought Outlook products to 8:30 a.m. Eastern Standard Time in place of the previous 3 p.m. Eastern release time. Products are issued on the third Thursday of each month. Customers, especially in the commodities market and weather risk management sectors, have been requesting that CPC release its long-lead forecasts in the morning before the markets open, rather than in the afternoon to provide U.S. markets an opportunity to react before foreign markets.

A Texas emergency manager credited timely NWS flood warnings and strong interagency cooperation with saving lives during a West Texas flood event April 3-4, 2004. When fast moving floodwaters caused an Interstate-20 bridge to collapse 15 miles west of Pecos, TX (Reeves County), on a late Sunday afternoon, nobody was on it. State and local authorities had already closed the bridge to traffic. A Flash Flood Statement issued about an hour and a half before the collapse, warned "A Flash Flood Watch remains in effect through tonight for all of southeast New Mexico and West Texas." Reeves County Emergency Manager Rick Herrera, officers of the Texas Department of Transportation, Department Public Safety, and the Sheriff's office then closed the bridge to traffic. Several thousand cars and trucks are estimated to use the bridge daily. "We have a lot of traffic go through here. I'm sure we would have lost some lives and we were lucky not to have any injuries," he added. Herrera says he was in close contact with the Midland WFO and local storm spotter network throughout the storm. "It worked like clockwork and the National Weather Service deserves praise for the help they gave us."

NOAA's Deep-Ocean Assessment and Reporting of Tsunamis (DART) system hit the bull's eye on November 16, 2003, when it detected a small tsunami generated by an earthquake near Adak, Alaska. This was the first time the DART system was able to capture tsunami data in real-time since going operational in October 2003. The system is designed to be triggered into a rapid data-gathering mode by a strong earthquake's seismic waves, and then monitor and transmit real-time ocean surface data to NOAA's Tsunami Warning Centers in Palmer, Alaska, and Honolulu, Hawaii. In this event, the DART system nearest to the earthquake epicenter was triggered by the earthquake at 9:45 p.m. and captured the tsunami arrival at 10:50 p.m. The amplitude of the small tsunami measured by the DART system confirmed expectations of the scientists on duty at the Tsunami Warning Centers and allowed the Tsunami Warning to be canceled very early in the warning process. Rapid confirmation that damaging tsunami waves have not been generated is equally important as warnings of damaging tsunami waves, eliminating the need for unnecessary, disruptive, and expensive evacuations.

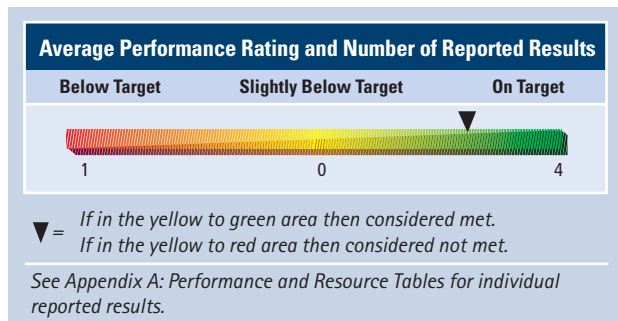
The Coastal Storms Initiative is wrapping up its first pilot in northeast Florida. The products produced for the Florida pilot have been very valuable in preparations for and response to the hurricanes that have hit the region this year. For example, a new buoy was deployed off Jacksonville resulting in greatly improved wind forecasts during Hurricanes Charley and Frances. The information provided by the buoy was key to the U.S. Navy's preparations and decision to not send certain ships to sea during these hurricanes.

In September 2003, the Office of Inspector General (OIG) made recommendations to improve the reporting of various NWS performance measures. One recommendation required that NWS provide performance data to reflect the percentage of events when the public is not provided a warning in time to take action for both tornado and flash flood events. NWS concurred and now provides this information on its Web site and disclosed the percentage of events with a lead time greater than zero for these two performance measures in the FY 2006 Annual Performance Plan (APP).

**Performance Goal: Increase understanding of climate variability and change (NOAA)**

*One of NOAA's mission goals is to understand climate variability and change to enhance society's ability to plan and respond by employing an end-to-end system comprised of integrated environmental observations leading to a scientific understanding of past and present climate and enhanced climate predictive capabilities, and enhanced service delivery methods that continuously assess and respond to stakeholder needs.*

Climate shapes the environment, natural resources, economy, and social systems that people depend upon worldwide. The Department delivers reliable climate information in understandable and useful ways to help minimize risks and maximize opportunities for decisions in agriculture, public policy, natural resources, water and energy use, and public health. Together with its partners Commerce can accelerate the development of information to support climate policy decisions and planning that consider both climate variability and long-term climate change. The Department's trusted climate information, products, and services enable society to understand and respond to changing climate conditions.



The Department's performance goal is supported by NOAA's Climate Program. The Program consists of five components that contribute toward meeting the goal:

- ◆ *Climate Observations and Analysis* provides an integrated observational network for sustained monitoring of key climate related parameters, with a data stewardship system and ongoing climate analysis capability.
- ◆ *Climate Forcing* supports information needs associated with the atmospheric constituents, such as carbon dioxide and aerosols, whose human-caused changes force the climate system to change.
- ◆ *Climate Predictions and Projections* provides intraseasonal to decadal climate predictions and projections to enable managers to better plan for the impacts of climate variability and change.

- ◆ *Climate and Ecosystems* seeks to deliver the knowledge and tools needed to incorporate climate variability into the management of living marine and coastal resources to fisheries and coastal zone managers.
- ◆ *Regional Decision Support* seeks to provide better public access, understanding, and use of climate information in planning and decision-making.

Society exists in a highly variable climate system, with conditions changing over the span of seasons, years, decades, and longer. Weather and climate-sensitive industries, directly or indirectly, account for about one-third of the nation's gross domestic product (GDP), or \$2.7 trillion. To enable society to better respond to changing climate conditions, NOAA is working with national and international partners to: employ an end-to-end system comprised of integrated observations of key atmospheric, oceanic, and land-surface processes that influence climate; apply this improved understanding to create more reliable climate predictions on all time scales; and create service delivery methods that continuously assess and respond to user needs with the most reliable information possible.

NOAA received international and national recognition of research scientists. Susan Solomon, senior scientist at the Aeronomy Laboratory and head of its Chemistry and Climate Processes program, was announced on June 23 as a winner of the 2004 Blue Planet Prize. The Blue Planet Prize is a prestigious international award that recognizes individuals and organizations that have made major contributions to solving global environmental problems. Solomon received the award "...for her pioneering work in identifying the mechanism that produces the Antarctic ozone hole and momentous contributions towards the protection of the ozone layer," and for her research on the linkages between ozone depletion and the Antarctic surface climate. This year marks the 13th awarding of the Blue Planet Prize, which is sponsored by Japan's Asahi Glass Foundation. Solomon is the second NOAA scientist to receive the honor (Suki Manabe, formerly of Geophysical Fluid Dynamic Laboratory (GFDL), was the first). The award carries a prize of 50 million yen, or about \$460,000.

Two Ocean and Atmospheric Research (OAR) NOAA scientists were honored in 2004 at separate White House ceremonies where they received a *2002 and 2003 Presidential Early Career Award in Science and Engineering (PECASE)*. Gabriel Vecchi of NOAA's Geophysical Fluid Dynamic Laboratory in Princeton, New Jersey, and Sim Aberson of NOAA's Atlantic Oceanographic and Meteorological Laboratory in Miami, Florida, were awarded the nation's highest award for young scientists in 2002 and 2003. Vecchi was cited for his "fundamental contributions concerning the roles of sub seasonal variability on the onset and termination of El Niño and on Indian Monsoon rainfall." Aberson was nominated for his "research leading to significant improvements in hurricane track forecasts and development of programs bringing science to young students, and young students to science."

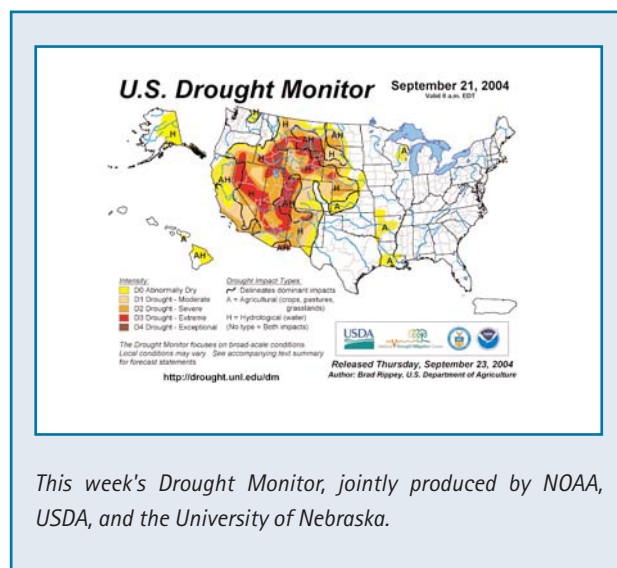
NOAA achieved operational implementation of NCEP's coupled climate forecast system. On August 24, 2004, a global ocean and atmosphere coupled CFS became operational at NCEP. Under development for a year by a team of NOAA scientists working in the NCEP's EMC, with support from the Office of Global Programs (OGP)/ Climate Dynamics and Experimental Predictions (CDEP) program, the CFS is a fully coupled model representing the interaction between the Earth's oceans and the atmosphere. These interactions are critical for determining climate on seasonal time scales. The atmospheric model is a recent version of the NCEP Global Forecast System (GFS) model, also developed at NCEP's EMC. The ocean model is the Modular Ocean Model (MOM3) developed in the GFDL in Princeton, New Jersey. The coupling between the two models is done without corrections to model biases. Most current coupled models require this correction to prevent model drift. Currently 30 seasonal forecasts are made each month, each out to 10-month predictions. This ensemble approach is necessary since the signal-to-noise ratios for seasonal predictions of temperature and

precipitation over the United States are small. The CPC, NCEP is the primary customer of the products of this system but products will become available to all customers in the near future. This implementation is a recent example of a successful transition of research into operations through long-term, ongoing collaborative efforts by scientists in NOAA laboratories (GFDL, EMC), NOAA climate program supported applied research centers (ARC), other federal agencies (NASA/Goddard Space Flight Center (GSFC), National Science Foundation (NSF)/National Center for Atmospheric Research (NCAR)), and the university research community.

A landmark paper by scientists at Pacific Marine Environmental Laboratory (PMEL) and Atlantic Oceanographic and Meteorological Laboratory (AOML) described the first observation-based inventory of anthropogenic carbon dioxide in the ocean (*Science* 305, 367-371, 2004). The effort was the culmination of a decade of ocean carbon observations as part of the World Oceans Circulation Experiment (WOCE) hydrographic survey. Several of the cruises were sponsored by the NOAA/OGP Ocean-Atmosphere Carbon Exchange Study and were led by investigators at AOML and PMEL with joint institute and extramural participation sponsored by OAR/OGP. Extremely accurate measurement of total carbon content of the ocean, painstaking synthesis including checking of data for small biases between cruises, and new methods of separating the relatively small anthropogenic carbon signal from a large and variable natural background were accomplished. This resulted in a robust estimate that 48 percent of the carbon released by burning of fossil fuel during the industrial era has entered the ocean, making it the largest sustained sink of carbon over the last 200 years. The potential impacts of increased anthropogenic carbon dioxide (CO<sub>2</sub>) in the oceans on marine ecosystems were published in a companion paper in the same July 16 issue of *Science* (*Science* 305, 362-366, 2004). If organisms cannot adapt to the changes in seawater chemistry that will occur, the geographical range of some calcifying species may be reduced or may shift in response to rising CO<sub>2</sub> as humankind continues to release large quantities of CO<sub>2</sub> into the atmosphere.

NOAA's Climate Program, including the NWS CPC and Climate Services Division (CSD); OAR Climate Diagnostics Center (CDC) and OGP; and National Environmental Satellite, Data, and Information Service's (NESDIS) National Climatic Data Center (NCDC) worked with federal, state, and local government officials and the private sector to support the WGA's development of the report entitled *Creating a Drought Early Warning System for the 21<sup>st</sup> Century: The National Integrated Drought Information System* (NIDIS; available online at <http://www.westgov.org/wga/publicat/nidis.pdf>). The NIDIS document serves as a roadmap and requirements document for the creation, operation, and management of an effective national drought system focused on user needs, observations, and data requirements; existing and needed tools; research and science; information dissemination and feedback; and recommendations to implement the NIDIS. The WGA approved the NIDIS report at its annual meeting in June 2004. NOAA is currently determining the most effective way to act on the recommendation in the report to establish a NIDIS Implementation Team, within existing resources.

NOAA research helped to lead and carry out the multi-agency air quality and climate study performed under the auspices of the International Consortium for Atmospheric Research on Transport and Transformation (ICARTT), which was based in New England this summer (New England Air



This week's Drought Monitor, jointly produced by NOAA, USDA, and the University of Nebraska.

Quality – Intercontinental Transport and Chemical Transformation Study). Colleagues from five nations were engaged in the endeavor, which extended from the Western United States to continental Europe. The research is addressing significant information gaps and delivering sound science leading to an improved understanding of the processes that influence the air pollution levels to which the citizens of New England are exposed. In addition to those regional goals, the research is an integral part of NOAA's effort to develop the tools needed to provide reliable air quality forecasts in the continental United States. In addition, the research will lead to a better understanding of the linkages between air quality and climate, information that will aid decision-making in both arenas. Observations were taken at ground sites, from airborne platforms (including NOAA's WP-3D aircraft and the NOAA airborne ozone/aerosol lidar), and at sea (from the NOAA R/V *Ronald H. Brown*). The study was an unqualified success, with all of NOAA's initial goals achieved. The 200-plus scientists (more than 120 from NOAA in OAR's laboratories and Joint Institutes) from the United States, Canada, and Europe who were involved in the study have collected data that will provide an unprecedented view into the key process that shapes air quality and climate change on regional and hemispheric scales.

Researchers develop seamless mosaic of radar data nationwide. The National Severe Storms Laboratory's Worldwide Integrated Sensor Hydrometeorology (WISH) team has completed an ambitious project to seamlessly mosaic all 130 NWS radars across the United States. The mosaic provides the first high-resolution depiction of storms and quantitative precipitation estimation (QPE) products from coast-to-coast in real time. The team developed a national real-time radar data archival and Internet2 delivery system for university, government, and private sectors, known as the Collaborative Radar Acquisition Field Test (CRAFT). Taking advantage of high performance networking capabilities and other recent technological advances, the team successfully transferred the technology from research into NOAA's NWS, private sector operations, and research and education facilities. The effort was recognized with a 2004 NOAA Tech Transfer Award.

NOAA's OAR and NWS successfully completed the North American Monsoon Experiment (NAME) 2004 field campaign this summer in collaboration with other United States, Mexican, and Central American agencies and institutions. NAME 2004 provides an unprecedented collection of detailed atmospheric, oceanic, and land-surface observations in the core region of the North American Monsoon over northwest Mexico, southwest United States, and adjacent oceanic regions to better document the evolution of the monsoon convection and precipitation, and to help understand the key physical processes that must be parameterized for improved simulations and predictions with climate models. Program objectives were accomplished with ten Intensive Observing Periods (IOP) over the four-month experiment duration. The IOPs, many of which involved flight missions on the NOAA P-3, captured a sufficient number of "normal monsoon" days to evaluate monsoon dynamics and their representation in climate and weather models. A number of IOPs documented special monsoon events such as the monsoon onset, Gulf of California surges, and dry air intrusion/monsoon suppression. The NWS Forecast Operations Center in Tucson was quite a success with the participation of over 30 NWS forecasters from across the country trying their hand at providing detailed synoptic scale forecasts to support field operations.

In September 2003, OIG made recommendations to improve the climate performance indicator, "New Climate Observations Introduced." One recommendation focused on expanding the scope of the indicator to include all ocean observations. The second recommendation suggested a reevaluation of the usefulness of the measure. Since these recommendations were made, the Department has begun a thorough review of its Government Performance and Results Act (GPRA) performance measures, moving toward more outcome-oriented indicators of progress. The FY 2006 APP will reflect these changes, with discontinued output measures, as well as revised and new measures that better represent the outcomes and performance objectives of the Department's climate goal.

## STRATEGIES AND FUTURE PLANS

### *Weather*

- ◆ Improve the reliability, lead-time, and understanding of weather and water information and services that predict changes in environmental conditions.
- ◆ Integrate an information enterprise that incorporates all stages from research to delivery, seek better coordination of employee skills and training, and engage customers.
- ◆ Develop and infuse research results and new technologies more efficiently to improve products and services, to streamline dissemination, and to communicate vital information more effectively.
- ◆ Build a broad-based and coordinated education and outreach program by engaging individuals in continuous learning toward a greater understanding of the impacts of weather and water on their lives.
- ◆ Employ scientific and emerging technological capabilities to advance decision support services and to educate stakeholders.
- ◆ Work with universities, industry, and national and international agencies to create and leverage partnerships that foster more effective information services.

One of NOAA's top priorities is to effectively and efficiently deliver information and services to customers when they need it and in standardized formats. NOAA-wide information such as all-hazards warnings and a wide range of environmental information from an expanding customer base must be available in digital formats with the necessary supporting infrastructure. This includes NOAA Weather Radio and NOAA Enterprise-wide service delivery system.

NOAA must also acquire new capabilities to support customer demand for improved predictions, including: advancing science to improve water resource forecasting and service delivery; providing extended outlooks for fire weather; improving international efforts to address medium range forecasting and climate variability; accelerating the transition of new space weather models and products into operations; and improving and providing new integrated products and services for coasts, estuaries, and oceans.

NOAA must address gaps in the observing architecture to ensure continuity of observations, establish cost effective approaches for future integrated observing capability, and meet NOAA's global environmental observing system of systems (GEOSS) commitments. This effort will focus on GEOSS and integrated observations, including: Integrated Surface Observing System (ISOS), Integrated Upper Air Observing System (IUAOS), and Integrated Ocean Observing System (IOOS).

### *Climate*

The Department utilizes several strategies to assist customers in better understanding the impacts of climate change and variability. Like weather, improved climate information can have a profound impact on the economy and the Department strives to ensure that reliable, unbiased climate information is available for informed and reasoned decision-making. Strategies to achieve this end state include:

- ◆ Improving the number and quality of climate observations and analyses
- ◆ Quantifying the forces and feedbacks from human-induced changes in atmospheric gases (e.g. greenhouse gases)

- ◆ Advancing climate predictions from sub-seasonal to decadal time scales and beyond
- ◆ Effectively delivering timely climate services and products to climate-sensitive sectors (e.g. health, safety, energy, and resource management)
- ◆ Supporting educational efforts to create a more climate-literate public.

The Department's Climate Program is currently aligned with the U.S. Climate Change Science Program (CCSP), in an effort to ensure optimal partnerships with other federal agencies and to advance the state of the science, while also enabling society to understand and respond to changing climate conditions. The program is working to improve the efficiency in which research products and services are made operational, and expanding its outreach capacity to ensure that the information produced is driven by stakeholder need. As these efforts are realized, the Department's performance measures will be adjusted to evolve with the needs of the program.

*FSD-15643-3-0001, Improvements needed in the reporting of performance measures related to goals for advancing short-term warnings and implementing seasonal to interannual climate forecasts*

The report concluded that NOAA should establish procedures for reporting only appropriate fiscal year results, developing and maintaining adequate support documentation, and reconciling performance data with documentary evidence. Actions to implement these recommendations have been taken.

*FSD-15989-4-0001, Improvements needed in the reporting for NOAA GOALS – Build Sustainable Fisheries, Recover Protected Species, and Predict and Assess Decadal to Centennial Climate Change (four recommendations)*

The report concluded that titles of measures and targets did not precisely characterize reported data, documentation to support results should be maintained, PAR explanations need to be clear and accurate, and verification procedures are needed. A plan to implement these recommendations is being drafted.

## CHALLENGES FOR THE FUTURE

The 21<sup>st</sup> century poses complex challenges for the Department. As the new century unfolds, new priorities for NOAA action are emerging in the areas of climate change, freshwater supply, and ecosystem management. Within the Department of Commerce, every aspect of NOAA's mission to protect and manage coastal and marine resources faces a new urgency to address intensifying national needs related to the economy, the environment, and public safety. Significant reports, such as the Report of the U.S. Commission on Ocean Policy, cite growing need to respond to increasing pressures on our oceans and coasts. Recommendations in such reports were used to form the revised NOAA Strategic Plan, setting a framework for addressing the needs of the nation today and tomorrow.

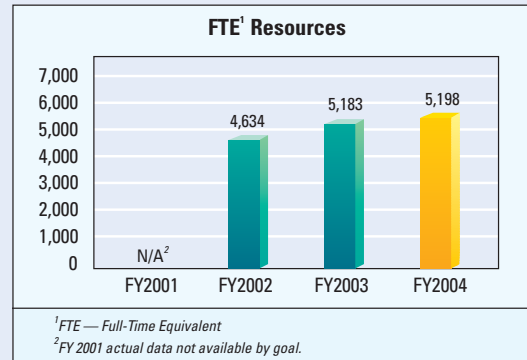
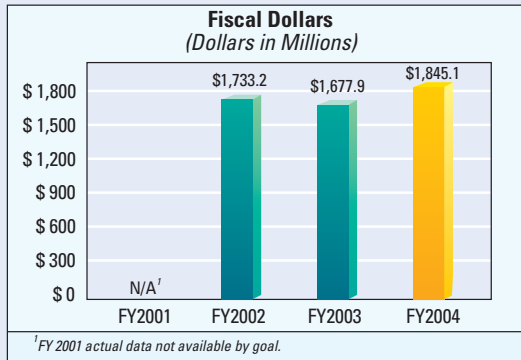
In recent years, extreme drought and flooding conditions in large regions of the nation have combined to make improved water resources prediction an urgent requirement for the Department's future weather and climate mission. Human health linkages with weather, climate, and ecosystem goals are also priorities and directly relate to the Administration's focus on a healthy and growing economy. In 2003, the U.S. government formed the CCSP to facilitate the creation and application of knowledge of Earth's global environment through research, observations, decision support, and communication. The Department, working with 12 other federal agencies, leads this nationwide effort.



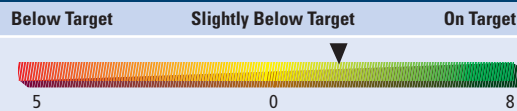
**STRATEGIC OBJECTIVE 3.2**

*Enhance the conservation and management of coastal and marine resources to meet America's economic, social, and environmental needs*

**TOTAL RESOURCES**

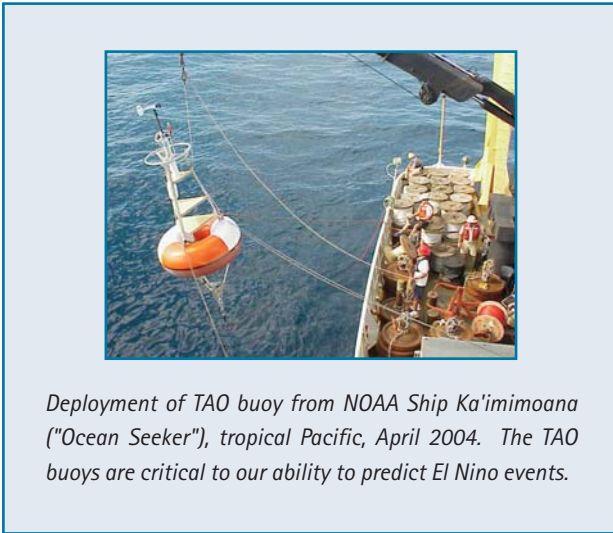


**Average Performance Rating and Number of Reported Results**




▼ = If in the yellow to green area then considered met.  
If in the yellow to red area then considered not met.

See Appendix A: Performance and Resource Tables for individual reported results.




The Department has a unique mandate from Congress to be the lead federal agency in protecting, restoring, and managing ocean and coastal resources. To meet this mandate, the Department maintains a world-class expertise in oceanography, marine ecology, fisheries management, conservation biology, and risk assessment. To achieve balance among ecological, environmental, and social influences, the Department has adopted an ecosystem approach to management – an approach that must be deliberate, incremental, and collaborative. Within the Department of Commerce, NOAA's mission is "to protect, restore, and manage fisheries and coastal and ocean resources is critical to the health of the U.S. economy." To the extent it is possible to balance sustainable economic development and healthy functioning marine ecosystems, Commerce seeks to provide an example for the rest of the world in how to protect, restore, and manage resources of the world's oceans and coasts. In addition, "Safe and efficient transportation systems" are crucial to the U.S. economy. The Department information improves transportation efficiency and safety on roads, rails, and waterways. The Department supports commerce through marine, aviation, and surface weather forecasts; the availability of accurate and advanced Electronic Navigational Charts (ENC); and the delivery of real-time oceanographic information. The Department provides consistent, accurate, and timely positioning information that is critical for air, sea, and surface transportation. The Department responds to hazardous material spills and provides


IMPORTANT HIGHLIGHTS FOR  
STRATEGIC OBJECTIVE 3.2

 OAA contributed to the preparation for response by the Administration to the recommendations of the *U.S. Commission on Ocean Policy Report*, which was released in September. The report calls for substantial investment in NOAA's capabilities in ocean research, observations, and management.



 s a result of the Department's efforts to conserve and manage the nation's fishery resources, four formerly overfished fish stocks have been declared fully rebuilt: Georges Bank winter flounder in the Northeast, Atlantic blacktip shark, and South Atlantic and Gulf of Mexico stocks of yellowtail snapper. This is the first time that so many stocks have been declared rebuilt in a single year. This good news accompanies continued declines in the number of stocks that are overfished or subject to overfishing.



 OAA's programs also benefited the nation's commerce with new nautical charts, tide and tidal current predictions, real time oceanographic observations, oceanographic nowcasts (present conditions) and forecasts (future conditions), and accurate positioning services. NOAA is responsible for providing these products for the U.S. Exclusive Economic Zone, the Great Lakes, and interconnecting waterways, but places special emphasis on the ports and harbors of the U.S. Marine Transportation System (MTS). Over 95 percent of U.S. overseas trade by volume passes through this system; two-thirds of everything that U.S. consumers buy, eat, or wear comes via the MTS. Downloads of NOAA's Electronic Navigational Charts, available for free on the Internet, exceeded 3 million in FY 2004. In addition, the Department established two Physical Oceanographic Real Time Systems (PORTS®) this year, one in New Haven, Connecticut, and one in Tacoma, Washington. PORTS supports safe and cost-efficient navigation by providing shipmasters and pilots with accurate real-time information required to avoid groundings and collisions. This innovation can save the maritime insurance industry from multi-million dollar claims resulting from shipping accidents. PORTS provides real-time water levels, currents, and other oceanographic and meteorological data from bays and harbors to the maritime users through telephone voice response and Internet.

search and rescue location support routinely to save lives and money and to protect the coastal environment. The Department works with port and coastal communities and with federal and state partners to ensure that port operations and development proceed efficiently and in an environmentally sound manner. The Department works with the Federal Aviation Administration (FAA) and the private sector to reduce the negative impacts of weather on aviation without compromising safety. Finally, the Department enforces regulations, reviews applications, and supports the U.S. government interests in policy coordination on commercial remote sensing.

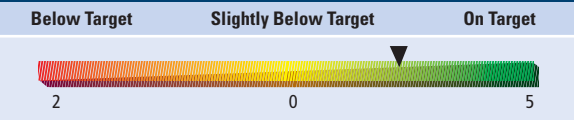
**Performance Goal: Improve protection, restoration, and management of coastal and ocean resources through ecosystem-based management (NOAA)**

*NOAA's mission to conserve, protect, manage, and restore fisheries and coastal and ocean resources is critical to the health of the U.S. economy. The Department has a responsibility for stewardship of the marine ecosystem and for setting standards to protect and manage the shared resources and harvests of the oceans. The Department strives to balance sustainable economic development and healthy functioning marine ecosystems, and to conserve, protect, restore, and better manage resources.*

NOAA's Ecosystem Management goal comprises nine programs relating to the various types of natural resources that fall within the agency's management mission. Two of these programs relate to scientific data collection and analysis, one concerns enforcement of permits and regulations, one concerns the culturing of marine organisms, and the other five concern specific resources. These include both creatures and the habitats and ecosystems in which they live.

- ◆ **Aquaculture:** Develops a science- and technology-based regulatory framework for a well-managed and productive U.S. marine aquaculture industry.
- ◆ **Coastal and Marine Resources:** Helps federal, state, local, and international managers to protect, restore, and use coastal ecosystem services.
- ◆ **Corals:** Reduces the impacts of key threats to both warm water- and cold water-coral reef ecosystems.
- ◆ **Ecosystem Observations:** Provides information on the status of living marine resources and distributes this information to NOAA's managers and clients. Nine stock assessments completed for major fish stocks with "unknown" status.
- ◆ **Ecosystem Research:** Develops new analytical methods and technology to enhance the capability of the Ecosystem Observations Program, as well as providing additional information necessary for ecosystem management to NOAA managers and to coastal stakeholders.

**Average Performance Rating and Number of Reported Results**



▼ = If in the yellow to green area then considered met.  
 If in the yellow to red area then considered not met.

See Appendix A: Performance and Resource Tables for individual reported results.



Deployment of an Argo profiling float from the NOAA Ship Ka'imimoana, tropical Pacific. These instruments measure temperature and salinity down to 2,000 meters.

- ◆ *Enforcement:* Provides law enforcement services directed to obtain compliance with management regimes instituted by NOAA in support of its stewardship responsibilities for living marine resources.
- ◆ *Fisheries Management:* Ensures that fisheries are maintained at productive levels for supporting sustainable fisheries and the ecosystems to which they contribute.
- ◆ *Habitat:* Protects coastal, marine, and Great Lakes habitat and improves the quality and increases the quantity of restoration of NOAA trust resources.
- ◆ *Protected Species:* Achieves protection and recovery of Endangered Species Act (ESA) listed species, as well as most marine mammal species, through planning, regulation, partnerships, direct action, and outreach and education in both domestic and international arenas.

Coastal areas are among the most developed in the nation, with over half the population residing within less than one-fifth of the land area in the contiguous United States. Coastal counties are growing three times faster than counties elsewhere, adding more than 3,600 thousand people a day to their populations. Coastal and marine waters support over 28 million jobs, generate over \$54 billion in goods and services a year, and provide a tourism destination for 180 million Americans. The value added to the national economy by the commercial fishing industry is over \$28 billion annually, and about 18 million Americans engage in marine recreational fishing every year. Within this context, NOAA works with its partners to achieve a balance between the use and protection of these resources to ensure their sustainability, health, and vitality for the benefit of this and future generations, and their optimal contribution to the nation's economy and society.

- ◆ In FY 2004, the NOAA Coral Reef Conservation Program removed 61 tons of marine debris from the Northwest Hawaiian Island Coral Reef Ecosystem Reserve. To date, the program has removed a total of 424 tons of marine debris, which has significantly reduced the physical injury threat to coral reefs in this area.
- ◆ NOAA National Marine and Fisheries Service (NMFS) is now providing near-real-time fishing vessel tracking of more than 2,250 vessels in 14 different fisheries via a satellite-based vessel monitoring program. This is a 36 percent increase over 2003, and the coverage is expected to increase five fold (8,308 vessels) by 2009. The program provides 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 their search and rescue mission (assisting two rescues in 2004), and in some fisheries, provides a real-time communications link for transmitting daily catch and effort information to NOAA for use in quota management of fisheries.
- ◆ NMFS increased observer coverage to 42 fisheries in 2004, monitoring nearly 60,000 fishing days, up from 45,000 in 2000. NMFS also made significant improvements in data quality through enhanced data checking and quality assurance procedures, an emphasis on statistically valid and unbiased sampling methodologies, and better training of observers. Observer training also focused on implementing new safety standards and incorporating more hands-on practice methods. New technologies were tested to improve access to real-time data and to supplement observer coverage through electronic monitoring (video cameras).
- ◆ The May 2004 release of the status of stocks report showed that 10 stocks were taken off the overfished list over the last year as they continue to rebuild (76 vs. 86 in 2002); six stocks were taken off the overfishing list (60 vs. 66 in 2002); and four stocks were declared fully rebuilt in 2003 (Georges Bank winter flounder, Atlantic blacktip shark, and yellowtail snapper stocks in the South Atlantic and Gulf regions). The 2004 assessments will not be completed for several more months but already indications are that the Pacific whiting and the Atlantic spiny dogfish stocks will likely be declared rebuilt.

- ◆ NMFS is continuing to make the regulatory process more efficient for both the agency and its constituents. The Magnuson-Stevens Act Operational Guidelines, which describe the process and procedures for fisheries management by Regional Fishery Management Councils and NMFS, have been overhauled to simplify processes and document requirements. Advanced information technology (IT) has been implemented for capturing public comments on regulations electronically, and additional e-rulemaking features of notices, constituent comments and *Federal Register* filings have been initiated. These efficiencies will help shorten the regulatory review and analysis cycle and make it easier to create an administrative record of policy decisions. Delegations of authority to regional managers have helped simplify the decision process. As a result of these types of improvements the agency is winning more litigation decisions while reducing future vulnerabilities. On a 2004 calendar year basis, 32 new lawsuits have been filed against NMFS, which is up from 21 in 2003. However, of the 31 decisions rendered thus far in 2004, NMFS has won 27 cases (87 percent) and lost only four. This compares very favorably to 2003 when NMFS won only 70 percent of the 46 decisions rendered, and a significant improvement compared to the time period immediately following passage of the Sustainable Fisheries Act amendments when the winning percentage averaged just 45 percent from 1997-2001.
- ◆ In 2004 NMFS released its strategic plan to reduce ship strikes of North Atlantic right whales. The comprehensive, multi-year, multi-agency blueprint addressed the most significant known threats to the highly endangered North Atlantic right whale. A suite of domestic and international changes in shipping operations and practices was proposed to reduce a significant source of mortality to this species: collisions with vessels (38 known collisions from 1975-2002).
- ◆ Collaboration with national and regional agencies and alliances with over 500 community groups resulted in restoration of more than 3,700 acres of habitat in 2004. Since 2001, NOAA has restored 11,000 habitat acres and opened 555 stream miles, with goals of 30,000 acres restored and 13,000 miles opened over the next five years.
- ◆ NMFS has aggressively pursued improvements in communications with constituents and stakeholders in 2004. For example, over 1,000 people attended nine regional workshops hosted by the Assistant Administrator that focused on all aspects of NMFS' performance; an additional 400 written or oral comments were received. The comments and suggestions were organized into 16 issues for response or action, and additional workshops are being planned for 2005 as follow up. NMFS also issued a series of new policies on state-federal communications, establishing regional and national points of contact and new procedures and practices to strengthen partnerships and collaboration on mutual conservation and recovery goals with coastal states. In addition, with the assistance of the recreational fishing industry, NOAA Fisheries co-sponsored 10 regional meetings with recreational fishing stakeholders to assist the Agency in creating a new NOAA Recreational Fishing Strategic Plan.
- ◆ Reduction of fishery overcapacity is an essential element of rebuilding and sustaining fisheries. By the end of next year, NMFS will have accomplished \$235 million worth of fishing capacity reduction, rationalizing three major fisheries at a cost to taxpayers of only \$25 million. The 2004 program in progress is the capacity reduction program for the crab species managed under the Bering Sea/Aleutian Islands King and Tanner Crabs Fishery Management Plan. The program is authorized under both special legislation and existing NMFS regulations governing fishing capacity reduction programs. Its objectives include increasing harvesting productivity for crab fishermen who remain after capacity reduction, helping conserve and manage fishery resources, and encouraging harvesting effort rationalization. Program participation is voluntary. Under the program, NMFS will pay participants for withdrawing vessels from fishing, relinquishing fishing licenses, and surrendering fishing histories. NMFS will finance the program's \$100 million cost with a 30-year loan to be repaid by post-reduction fishermen.

- ◆ Collaborative industry research has resulted in improved protection of sea turtles during shrimp and longline fishing activities. Working with fishermen, NMFS scientists developed a new soft Turtle Excluder Device (TED) and a highly effective double-flap hard TED that the shrimp industry has adopted to reduce the incidental capture of endangered and threatened sea turtles. This resolved risks of closures of the \$406.5 million Gulf and South Atlantic fishery because of excessive bycatch of sea turtles. For Kemp's Ridley turtles, these bycatch reduction initiatives, combined with full protection of nesting turtles and their nests in Mexico, have produced an increasing population trend for this endangered species.
- ◆ Collaborative industry research with longline fishing vessels on development and testing of new fishing techniques and circle hooks has produced new fishing practices that reduce leatherback and loggerhead sea turtle fishing interactions. These techniques have worldwide applicability. NOAA has reduced takes of sea turtles by 92 percent in the north central Atlantic Ocean, which allowed the agency to re-open 2.6 million square nautical miles of ocean to the swordfish fishery. In the Pacific, NMFS re-opened the Hawaii longline fishery in March 2004. Closed since April 2001 because of the excessive bycatch of loggerhead and leatherback turtles (with harvest losses totaling \$33.0 million per year), this fishery was re-opened with requirements to use specific gear, bait, and fishing practices.
- ◆ In FY 2004 NMFS initiated pilot projects in the New England, mid-Atlantic, south Atlantic, and Gulf geographic areas to advance ecosystem approaches to management of living marine resources. This activity included grants to Regional Fishery Management Councils to seek public consensus on broader ecosystem management objectives involving key local, state, national, and international stakeholders; research and workshops on the identification of indicators of ecosystem health; and establishment of decision support tools, including geographic information system (GIS) mapping techniques, public opinion survey instruments, and economic valuation techniques for eliciting and analyzing public preferences for different ecosystem objectives.
- ◆ NMFS also developed draft guidelines for implementing collaborative ecosystem approaches to management by all federal agencies and their regional, state, and local partners. The guidelines include institutional and process recommendations for identifying and implementing a common vision and strategic goals of an ecosystem approach that derives the greatest sustainable net benefits to the nation. An inter-agency workshop on delineating major ecosystem definitions and boundaries has already been held.
- ◆ For the first time, NOAA compiled key restoration monitoring information applicable to coastal habitats nationwide. "Science-Based Restoration Monitoring of Coastal Habitats, Volume One: A Framework for Monitoring Plans Under the Estuaries and Clean Waters Act of 2000 (Public Law 160-457)" offers technical assistance, outlines steps, and provides useful tools for developing and carrying out monitoring of coastal restoration efforts. Already the document is being recommended by groups internal and external to NOAA as the reference for the design of monitoring for coastal habitat restoration projects. Additionally, the interest in this work from international organizations suggests that this document will support NOAA and National Ocean Service (NOS) mission to provide global leadership in the area of integrated coastal management.
- ◆ The Hollings Marine Laboratory, a multimillion-dollar research facility in Charleston, South Carolina, which provides for the application of medical technologies to issues of ecosystem health, became fully operational in FY 2004. The laboratory is a partnership of five state, federal, and private entities: NOAA, National Institute of Standards and Technology (NIST), University of Charleston, Medical University of South Carolina, and the South Carolina Department of Natural Resources. The multi-year construction and renovation of the Kasitsna Bay Laboratory reached a milestone in FY 2004 with the completion of the new bunkhouse. The Kasitsna Lab, located in south-central Alaska, is operated in partnership by NOAA and the University of Alaska – Fairbanks. This facility allows researchers and students unrestricted access to the diverse habitats of Kachemak Bay and Cook Inlet.

- ◆ The National Marine Sanctuary Program's Education Team received extremely positive feedback from a February 20-21 marine science education professional development workshop in Hawaii. Of the 85 K-12 teachers that participated, 93 percent rated the "Dive into Education" workshop as among the best professional development opportunities available. More than half of the respondents noted that the workshop was one of the best they had ever attended, and 95 percent said that they are now very likely to integrate marine science into their classrooms. The workshop included 36 sessions aimed at providing teachers with the knowledge and resources they need to bring marine science into Hawaiian classrooms.
- ◆ The Monterey Bay National Marine Sanctuary launched a new Sanctuary Integrated Monitoring Network (SIMoN). Users can access the Web site to obtain local water quality monitoring information, generate watershed maps, locate monitoring information, link to data sets from individual stations, and download GIS layers. For more information, visit the Web site at <http://mbnms-simon.org>.

A listing of program evaluations that have been conducted follows.

## OIG

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### **IPE-15721: NMFS Observer Programs Should Improve Data Quality, Performance Monitoring, and Outreach Efforts** (10 recommendations–Final Report)

This investigation found several problems with NMFS observer programs and made recommendations touching on a wide range of issues, including the statistical validity of vessel selection procedures, training and retention of observers, outreach to the fishing industry, and the need for a greater focus on performance in management of the observer program. NOAA concurred with nine of the 10 recommendations, and implementation will begin in 2005.

### **FSD-15989-4-0001: Improvements Needed in the Reporting for NOAA GOALS–Build Sustainable Fisheries, Recover Protected Species, and Predict Climate Changes** (three recommendations–Draft Report)

This investigation concluded that NOAA has unclear measures, weak procedures in place to ensure data reliability, insufficient documentation, and inadequate explanations. A plan to implement recommendations to clarify measures, strengthen procedures, and add detail to supporting documentation is being drafted.

### **STD-15750-3-0001: Recent Gear Protocols Should Improve NMFS Groundfish Bottom Trawl Survey But More Should Be Done** (17 recommendations–Final Report)

This investigation found a need for creation, maintenance, and communication of bottom trawl survey protocols, as well as a few other improvements to the fishery survey process. Actions to implement these recommendations have been taken.

### **STD-14440-2-0001: Northwest Fisheries Science Center Needs Improved Research Management Processes to Better Implement Its Salmon Research Plan** (seven recommendations–Final Report)

While the investigation showed that the salmon research plan was working effectively to improve the quality of salmon research, OIG found that a stronger peer review process and more multi-year plans would improve it further. Actions to implement these recommendations have been taken.

### **FSD-14998-3-0001: Improvements Needed in the Reporting of Performance Measures Related to Promoting Safe Navigation and Sustaining Healthy Coasts** (eight recommendations–Final Report)

This was a performance audit of the measures for two of NOAA's seven former performance goals. The audit found that improvements were needed for each of the five measures reviewed. New reviewing, tracking, and reporting procedures have been and are being implemented to satisfy these recommendations.

## **GAO**

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**GAO-04-606:** *Pacific Groundfish: Continued Efforts Needed to Improve Reliability of Stock Assessments* (four recommendations–Final Report)

In its investigation, GAO found the reliability of NMFS stock assessments questionable despite their having been based on the best available information. This information was inadequate due to the lack of NMFS data and the unreliability of non-NMFS data. Plans to implement the recommendations of this report are being put in place.

**GAO-04-602:** *Columbia River Basin: A Multilayered Collection of Directives and Plans Guides Federal Fish and Wildlife Activities* (no recommendations–Final Report)

This report described the various federal efforts to conserve and manage natural resources in the Columbia River Basin and the agencies to which they belong. It contained no recommendations for NOAA.

**GAO-03-159:** *Individual Fishing Quotas (IFQs): Better Information Could Improve Program Management* (Part 1 IFQ Study) (three recommendations–Final Report)

This study examined the extent of consolidation of holdings of individual fishing quotas in the various IFQ fisheries, and the nature of the quota holders. It found that consolidation has occurred, but that there are no non-American quota holders as yet. It also found that in some cases, information is not sufficient to determine the extent of consolidation, and that sufficient guidelines on what constitutes an excessive holding do not exist. The recommendations to rectify these deficiencies through improved data collection and Council action are being implemented.

**GAO-04-277:** *Individual Fishing Quotas (IFQs): Methods for Community Protection and New Entry Require Periodic Evaluation* (Part 2 IFQ Study) (three recommendations–Final Report)

GAO examined and evaluated different types of individual fishing quota programs, in particular as they relate to protection of fishing communities and facilitation of new entrants into the fisheries. They determined that no one design is superior and that all have different strengths and weaknesses. The report recommended that NMFS develop objectives relating to these issues and measure progress toward them, and NMFS agreed to do so within the scope of its legal authority.

**GAO-04-93:** *Endangered Species: More Management Attention is Needed to Improve the Consultation Process* (four recommendations–Final Report)

This study was initiated in response to concerns about the timeliness of consultations under the ESA. GAO found that while a majority of consultations were timely, a significant number were not, and the available data were not sufficient to judge the actual timeliness of the entire consultation process. Plans to implement the recommendations to improve the process through consultation with stakeholders and the Fish and Wildlife Service are being drafted.



**GAO/RCED-00-69: Fishery Management: Problems Remain With National Marine Fisheries Service's Implementation of the Magnuson-Stevens Act** (five recommendations–Final Report)

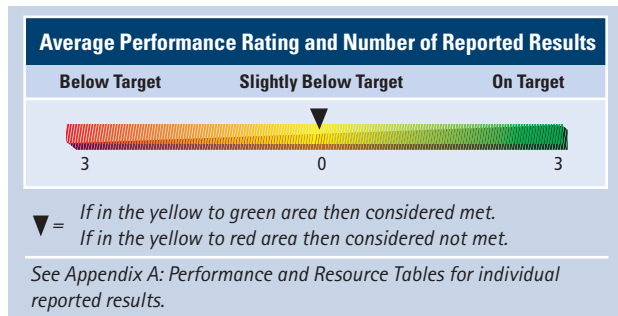
This study examined NMFS' implementation of the Magnuson-Stevens Act with respect to three major issues: use of the best available science, consideration of the economic importance of fishery resources on fishing communities, and designation of Essential Fish Habitat (EFH). The study found that NMFS does use the best available science but that sometimes that science is inadequate; that NMFS does consider the economic impacts of management measures on fishing communities but that concerns about the extent of the consideration and the data on which it is based remain; and that NMFS has complied with the requirement to identify EFH but that the areas identified have been very broad. Actions to correct these deficiencies have largely been implemented.

**Performance Goal: Support the nation's commerce with information for safe, efficient, and environmentally sound transportation (NOAA)**

*U.S. transportation systems are economic lifelines for the nation. As U.S. dependence on surface and air transportation grows over the next 20 years, and as maritime trade doubles, better navigation and weather information will be critical to protect lives, cargo, and the environment. Marine, aviation, and surface weather forecasts; accurate ENC's; real-time oceanographic information; consistent positioning capabilities; emergency response; environmentally sound port development support – these NOAA products and services are essential to the safe and efficient transport of people and goods on the water, in the air, and on the land.*

The NOAA Programs that support the nation's commerce with information for safe, efficient, and environmentally sound transportation include:

- ◆ *MTS Services*, providing tools and services to help maritime commerce and mariners of all types navigate more safely and efficiently, thereby reducing the risk of accidents and damage to the environment.
- ◆ *Geodesy*, which builds on the satellite GPS to maintain a national spatial reference framework for highly accurate positioning in navigation, surveying, infrastructure building, just-in-time delivery services, and the like.
- ◆ *Aviation Weather*, turning research into better models and operational forecasts to mitigate weather delay impacts and enable advance routing in our National Air Transportation System.
- ◆ *Marine Weather*, whose goal is to improve the safety and efficiency of marine transport with more accurate and timely forecasts and warnings of marine weather conditions.
- ◆ *Surface Weather*, providing relevant weather and geospatial information to reduce fatalities, injuries, and economic losses from surface weather-related crashes and delays.
- ◆ *Emergency Response*, uniting NOAA HAZMAT for chemical and oil spill response with Satellite Search and Rescue to provide the information, scientific expertise, and technology to enable emergency responders to choose a course of

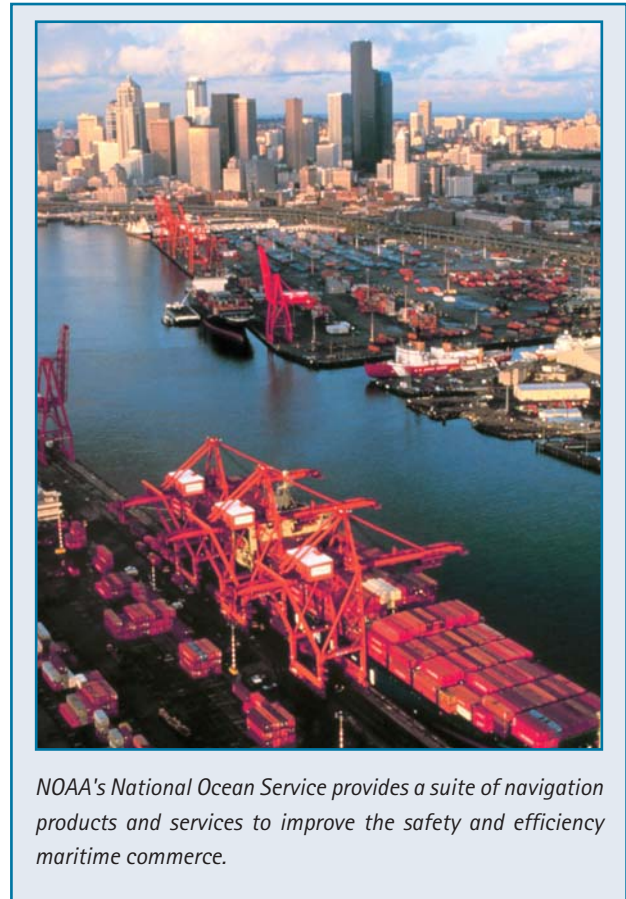


action that reduces threats to public safety, the economy, and the environment.

- ◆ *Commercial Remote Sensing Licensing*, which issues and enforces regulations, reviews applications, and supports U.S. government interests in policy coordination on commercial remote sensing.

Safe and efficient transportation systems are crucial lifelines for the nation. NOAA's information products and services are essential to the safe and efficient transport of goods and people at sea, in the air, and on land and waterways. More accurate and timely warning associated with severe weather threats, marine navigational products and services, and improved positioning data can better support the growing commerce on U.S. roads, rails, and waterways through improvements in transportation safety and just-in-time efficiencies.

NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) established two new PORTS in FY 2004 in Tacoma, Washington, and New Haven, Connecticut, to support safe and efficient marine navigation. This brings the number of PORTS to 12, and provides real-time oceanographic and meteorological data to 32 U.S. seaports through which 37 percent of cargo by tonnage passes annually.



*NOAA's National Ocean Service provides a suite of navigation products and services to improve the safety and efficiency maritime commerce.*

In 2004, NOAA's National Geodetic Survey (NGS) registered the 100,000th user of Online Processing User Service (OPUS). OPUS allows users to submit their GPS data files to NGS, where the data are processed to determine a position. Planned investments in Geoid modeling enabled the Geodesy Program to estimate heights to less than 5 centimeters for most of the over 550 Continuously Operating Reference Stations (CORS), allowing improvements in the National Spatial Reference System (NSRS) without the tremendous expense of traditional leveling.

The NGS, in partnership with the FAA, developed standards and procedures for using digital systems to map airport obstructions. This is the first time aeronautical charting information has been collected digitally, and is a significant first step in NGS' "Digital By the End of the Decade" initiative, which aims to collect, process, and store all charting and mapping data digitally by 2010. This initiative will streamline and simplify nautical and aeronautical data collection procedures.

On June 30, 2004, CO-OPS, through a partnership with the Office of Coast Survey's (OCS) Coast Survey Development Laboratory (CSDL), launched the Galveston Bay Operational Forecast System (GBOFS). Mariners in Galveston Bay now have a new tool to assist them in navigating safely through the bay. GBOFS provides mariners, port managers, and emergency response teams with present and future conditions of water levels, currents, temperature, and salinity. Key products of the nowcast and forecast system include data plots and animations of water levels, currents, temperature and salinity. These products will assist port managers and shippers in making decisions regarding maximum tonnage (based on bottom clearances) and limiting passage times, without compromising safety. The system was developed by CSDL and will

be maintained on an operational basis by CO-OPS. The nowcast component performs hourly updates and is driven primarily by real-time water levels and winds from the Galveston Bay PORTS. The forecast component performs 30-hour forecasts, four times a day (every six hours).

The three millionth ENC was downloaded in July 2004. NOAA ENCs are perhaps the most critical component of NOAA's suite of navigation tools. Built to international standards, ENCs are essentially a database of vector chart features that can be intelligently processed and displayed by electronic charting systems. As "smart charts," ENCs give the user much more information than the paper chart can. They can be incorporated with GPS satellite data and other sensor information (water levels, winds, and weather) to significantly improve navigation safety and efficiency by warning the mariner of hazards to navigation, and situations where the vessel's current track will take it into danger. They are available for download, free and open, on the Internet. NOAA ENCs will also provide fully integrated vector base maps for use in GIS that are used for coastal management or other purposes.

Under a cooperative charting agreement with Mexico, OCS and the NOAA Ship THOMAS JEFFERSON will conduct a joint hydrographic survey in Mexican waters, at the approaches to Tampico and Altamira, in the Gulf of Mexico. This joint charting effort will economize resources in the two nations; improve communication between the two nations' mapping and charting offices; and support safe, efficient and environmentally sound navigation for all users in the Gulf of Mexico.

NOAA's Commercial Remote Sensing Licensing Program granted an operating license for a revolutionary remote sensing technology. This decision followed extensive interagency consultations and coordination relating to national security, foreign policy, and commercial issues.

NOAA provided scientific support on a dangerous hazardous material spill in the Texas City, Texas, ship channel in November 2004. NOAA was on-scene for the 10 days it took to safely address the risk and potential environmental impacts caused by the overturning of a barge loaded with 235,000 gallons of concentrated sulfuric acid.

NOAA provided excellent marine weather warnings and forecasts of storm tracks (including tropical cyclones), wind speed, and wave heights during 2004. This advance notice of vessel-disrupting weather events helped commercial shippers make decisions on avoiding and minimizing the impact of weather on operations. These services aided the smooth flow of commerce both in and out of U.S. waters.

NOAA created the Surface Weather program in 2004 to expand and formalize partnership efforts with the Department of Transportation on improving NOAA surface weather information to facilitate intermodal transportation.

NOAA made significant improvements in the accuracy of the Aviation Weather Terminal Aviation Forecast. FY 2004 performance was 9 percent better than the goal for False Alarm Rate of Instrument Flight Rules (defined as ceilings and visibilities less than 1,000 feet and/or three miles and greater than, or equal to, 500 feet and/or one mile). Most of the improvements were primarily attributable to Distance Learning training focused on low ceiling and visibility and significant improvements to the Aviation Forecast Preparation System.

A listing of program evaluations that have been conducted follows.

OIG regularly conducts reviews of NOAA programs relating to performance and on occasion provides recommendations. Two recent OIG reviews related to this goal focused on NOAA's reporting of performance measures related to promoting safe navigation and improving management controls in the process for reducing the critical hydrographic survey backlog.

The primary recommendation to report on all miles surveyed in a year rather than just critical areas is reflected as a revised performance measure in this report; other measures related to the provision of navigation services were also improved. The MTS Program's Nautical Charting activity was analyzed by the Office of Management and Budget (OMB) in 2004 using its Performance Assessment Rating Tool (PART). Rated Moderately Effective, the program is acting on all of OMB's recommendations to improve performance management. NOAA's goal to support the nation's commerce with information for safe, efficient, and environmentally sound transportation is evaluated at a variety of levels, from peer reviews of products, papers, and projects, to internal and external reviews of entire programs. Stakeholder input is an important part of the evaluation process and is solicited regularly through constituent workshops and customer interactions.

The current form of services provided by the MTS Program is a direct result of comprehensive reviews, including a number of National Research Council Marine Board studies on the nautical charting program and its transition into the digital era. The September 1999 Report to Congress that assessed the U.S. MTS further articulated the need for improvements to NOAA's programs to support a coordinated federal approach to becoming the world's most technologically advanced, safe, efficient, globally competitive, and environmentally responsible system for moving goods and people. Also in 1999 NOAA completed an assessment of its tidal currents program to develop guidelines for future current surveys to update U.S. reference stations for the Tidal Current Tables. Most recently, the MTS Program received authorization in the 2002 Hydrographic Services Improvement Act for a Federal Advisory Committee to review and make recommendations on navigation services to the NOAA Administrator. That panel is currently educating itself fully on program activities in order to inform its reviews.

On the geodetic front, Congress authorized in 1998 the Height Modernization study to evaluate the technical, financial, legal, and economic aspects of modernizing the national height system with GPS. The study demonstrated the significant benefits to the United States in terms of dollars and lives saved associated with GPS technology, and it led to current development of the vertical component of the NSRS.

The Surface Weather program harnesses momentum generated by the 2004 National Research Council Study "Where the Weather Meets the Road: A Research Agenda for Improving Road Weather Services" and the 2002 "Weather Information for Surface Transportation" Report by the Office of the Federal Coordinator for Meteorology covering surface transportation user needs.

## STRATEGIES AND FUTURE PLANS

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### *Ecosystems*

- ◆ Engage and collaborate with the Department's partners to achieve regional objectives by delineating regional ecosystems, forming regional ecosystem councils, and implementing cooperative strategies to improve regional ecosystem health.
- ◆ Manage uses of ecosystems by applying scientifically sound observations, assessments, and research findings to ensure the sustainable use of resources and to balance competing uses of coastal and marine ecosystems.
- ◆ Improve resource management by advancing the Department's understanding of ecosystems through better simulation and predictive models.
- ◆ Build and advance the capabilities of an ecological component of the NOAA global environmental observing system to monitor, assess, and predict national and regional ecosystem health, as well as to gather information consistent with established social and economic indicators.

- ◆ Develop coordinated regional and national outreach and education efforts to improve public understanding and involvement in stewardship of coastal and marine ecosystems.
- ◆ Engage in technological and scientific exchange with Commerce's domestic and international partners to protect, restore, and manage marine resources within and beyond the nation's borders.

NOAA has fully endorsed the call by its stakeholders to move towards an ecosystem approach to managing uses of coastal and marine resources. In order to advance an ecosystem approach, NOAA will integrate the application of its multiple ecosystem mandates in partnership with universities, industry, non-governmental organizations, and local, state, and federal agencies, by developing and implementing place-based ecosystem approaches to management of coastal and marine resources. To implement this strategy, NOAA will seek improved understanding of ecosystems, identification of regional ecosystems, development of ecosystem health indicators, and new methods of governance to establish the necessary knowledge, tools, and capabilities to fully implement ecosystem approaches to managing coastal, ocean, and Great Lakes resources. Once regional ecosystems have been delineated and mapped, a new set of ecological, social, and economic indicators of ecosystem health will be established to measure and monitor the status of each ecosystem. These could include:

- ◆ Number of identified ecosystems with agreed-to indicators of ecosystem health.
- ◆ Number of identified ecosystems where ecological functions and linkage to human activities and impacts are adequately understood for management purposes.
- ◆ Number of coastal and marine regional ecosystems with improving indicators of ecological, social, and economic health.

The Protected Species program maintained the number of threatened species with lowered risk of extinction by enforcing existing conservation measures, conducting priority research as identified in species recovery plans, developing partnerships with states and others to implement conservation programs, and building the tools and technology to improve the effectiveness of conservation actions. The threatened species with continued lowered risk of extinction include: Johnson's seagrass, the eastern population of Steller sea lions, and five species of Pacific salmon and steelhead.

### ***Commerce and Transportation***

NOAA's strategies designed to help transportation information customers and stakeholders reach their own goals are to:

- ◆ Expand and enhance advanced technology monitoring and observing systems, such as weather and oceanographic observations, hydrographic surveys, and precise positioning coordinates, to provide accurate, up-to-date information.
- ◆ Develop and apply new technologies, methods, and models to increase the capabilities, efficiencies, and accuracy of transportation-related products and services.
- ◆ Develop and implement sophisticated assessment and prediction capabilities to support decisions on aviation, marine, and surface navigation efficiencies; coastal resource management; and transportation system management, operations, and planning.
- ◆ Build public understanding of the technology involved and the role of the environment in commerce and transportation.

NOAA's future plans to facilitate intermodal transportation include improvements to the products and services available to users of NOAA information, as well as investments in the underlying observing systems that support the development of this data. For example, NOAA will continue to build and maintain its suite of ENC's to supply commercial and

recreational mariners with the digital navigation data they need to navigate safely in the 21st century. Additionally, NOAA will focus on equipping all 175 National Water Level Observation Networks with real-time operational capability at the top 150 U.S. seaports. Enhanced ice forecasts and refinements to aviation, marine, and surface weather predictions will also contribute to NOAA's role in saving lives, property, and critical infrastructure. NOAA will continue to survey and chart U.S. waters, maintain the highly accurate positioning infrastructure the nation relies on each day, support Satellite Search and Rescue incidents, respond to hazardous material events, and support U.S. national interests in commercial remote sensing licensing. It is through these and other important activities that NOAA strives to improve and deliver its information so crucial to safe and efficient transportation.

## **CHALLENGES FOR THE FUTURE**

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NOAA's elevation of ecosystem-based management and environmentally sound transportation to high-priority goals is especially noteworthy in meeting the challenges of the 21st century. The Department must examine the land-water interfaces from an ecosystem perspective to successfully address ocean and coastal issues. Human health linkages with weather, climate, and ecosystem goals are priorities that directly impact the U.S. economy. NOAA's Strategic Plan's emphasis on the nation's needs for expanded commerce and economic development that is safe and environmentally sound directly supports the Department's focus on a healthy and growing economy.

NOAA's transportation challenges include building on the foundation of expertise, research, and technology development to deliver the information, tools, and services essential to safe, efficient, and environmentally sound transport on water, land, and in the air. Impacts to the system, particularly at vulnerable choke points, affect transit time, delivery reliability, efficiency, cost of goods transported, and the environment. To improve service delivery, NOAA must identify valid user needs that cannot be met with existing information; enhance products that support transportation systems; work with partners to conduct research and development in weather, modeling, and geopositioning; and improve the translation of research into operational value. NOAA must also focus on connecting and strengthening its observations systems that gather data for transportation information.