

**NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**  
**FY 2007 ANNUAL PERFORMANCE PLAN (APP)**

The National Oceanic and Atmospheric Administration (NOAA) is a future-minded environmental science agency whose mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet the Nation's economic, social, and environmental needs.

Success in a global economy is linked not only to the ability to respond or react to events but to anticipate and forecast them. Moreover, understanding ocean and atmosphere is essential to sustaining the United States' environmental and economic health. As an agency, NOAA aims to become the global leader for integrated management of the oceans and the atmosphere. Millions of people in the United States depend on NOAA's science, service, and stewardship. NOAA monitoring and prediction products such as satellite imagery, tornado warnings, navigational charts, fishery stock assessments, hurricane tracking, El Niño assessment and forecasts, harmful algal bloom predictions, severe weather forecasts, and coastal zone management are essential to the lives of millions of people in the United States. For example, lives, safety, and businesses depend on reliable weather and climate forecasts to minimize disruption in economic activity and everyday life. Accurate predictions of severe weather safeguard both lives and economic structure of communities. A deeper understanding of long-term climate and environmental trends can impact daily activities from the strategic planting of crops to better management of water and energy resources. Coastal communities, representing over thirty percent of the U.S. gross domestic product, depend heavily on sustaining healthy marine habitats and a robust ocean ecosystem.

NOAA's science-based management approach provides a solid foundation for economic growth and a healthy economy. New priorities for global observation systems, international cooperation, and homeland security will improve NOAA's delivery and effectiveness of services for all of its mission goals. Ultimately, NOAA's success will be measured in the quality of information, service, and benefits provided to customers – the American public.

**Priorities/Management Challenges**

The 21<sup>st</sup> century poses complex challenges for NOAA. As the new century unfolds, new priorities for NOAA action are emerging in the areas of climate change, freshwater supply, ecosystem management, and homeland security. Every aspect of NOAA's mission – ranging from managing coastal and marine resources to predicting changes in the Earth's environment – faces a new urgency to address intensifying national needs related to the economy, the environment, and public safety.

NOAA's Strategic Plan addresses global emerging trends and guides NOAA business processes to address those trends. Significant reports such as the Preliminary and Final Reports of the U.S. Commission on Ocean Policy and the Strategic Plan for the U.S. Climate Change Science Program cite growing

needs with respect to the oceans, coasts, and response to climate changes. Recommendations in such reports underlie the Strategic Plan, setting a framework for addressing the needs of the Nation today and for tomorrow. The Strategic Plan responds to the President's Management Agenda for a citizen-centered, results-driven organization that serves all Americans every day.

The NOAA Strategic Plan has five goals: four "mission goals" and one "mission support goal." The Strategic Plan sets an agenda to:

Mission Goals --

- Ecosystems: Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management.
- Climate: Understand climate variability and change to enhance society's ability to plan and respond.
- Weather and Water: Serve society's needs for weather and water information.
- Commerce and Transportation: Support the Nation's commerce with information for safe, efficient, and environmentally sound transportation.

Mission Support Goal --

- Mission Support: Provide critical support for NOAA's mission.

NOAA's elevation in FY 2003 of ecosystem-based management and climate science to high-priority goals in the Plan is especially noteworthy to meet the challenges of the 21<sup>st</sup> century. 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 NOAA's future weather and climate mission. The Plan's emphasis on the Nation's needs for expanded commerce and economic development directly relates to the Administration's focus on a healthy and growing economy.

The Strategic Plan guides all NOAA's management decisions and provides a consistent framework for Line Office and cross-organizational plans, initiatives, and performance measures to be implemented. Through the plan, NOAA employees and contractors have a better understanding of their role in meeting NOAA's strategic goal.

### **Unit Cost Measures**

The NOAA performance measures for this report relate to the scientific work conducted within the agency. Because of the technical and complex nature of NOAA activities and the impact of biological and other natural conditions, unit cost measures are currently not used in this report. However, NOAA is

continuously reviewing its existing performance measures and developing new and more relevant measures. For example, NOAA continues to work with DOC and OMB on providing appropriate programmatic performance and cost data through the on-going PART process.

### **Program Assessment Rating Tool (PART)**

FY 07 PART Programs (Note: this section will be completed for the FY 2007 Congressional Submission)

For the FY 2007 President's Budget OMB conducted its PART assessment of the Ecosystem Research and Weather and Water Services.

Ecosystem Research Program – was rated “Adequate” as a result of the Office of Management and Budget (OMB) PART for FY07. The assessment found XXX. Additional findings included: 1) XXX; 2) XXX; 3) XXX; and 4) XXX. In response to these findings, NOAA is XXX.

Weather and Water Services – includes the Local Forecast and Warnings, Space Weather, Hydrology, Geostationary Satellite Acquisition, Polar Satellite Acquisition, and Satellite Services. The PART applied by OMB gave the Weather and Water ....

### Status on implementation of recommendations of previous PART Programs

NOAA is on track to meet the recommendations made on previous PART reviewed programs. Status on implementation of PARTs by year of President Budget Request:

#### FY 2004

NMFS regulatory programs – NOAA implemented management and organizational changes including: replacement of the performance measures for the Fishery Management and Protected Species Programs; improvement of the efficiency and effectiveness of regulatory operations; decreased policy vulnerability to legal challenges; and reduced regulatory burden on the affected public.

Pacific Coastal Salmon Recovery Fund (PCSRF) – NOAA developed performance measures for the PCSRF which were published in the 2005 Pacific Coastal Salmon Recovery Fund Report to Congress. Performance data will be reported annually in the Report to Congress beginning with 2005 data in the 2006 Report.

National Weather Service – NOAA continues to invest in activities and technology such as various training courses, the NEXRAD Open Radar Data Acquisition, continued implementation of the Advanced Hydrologic Prediction Service, AWIPS Software upgrades, aviation improvements including new Terminal Aerodrome Forecast tools, climate forecast model upgrades, and the NOAA Environmental Real-time Observation Network (NERON) that will help improve outyear performance measure scores. NOAA will continue to put a great emphasis on performance and

performance improvement, and continue to establish and review performance measures and milestone objectives through the development of strategic plans and annual operating plans.

#### FY 2005

Coastal Zone Management Act Programs – NOAA developed a suite of proposed outcome-oriented measures in response to recommendations regarding the Coastal Zone Management Program and National Estuarine Research Reserve System (NERRS). In addition, eight states participated in a pilot effort to assess data sources and refine the proposed coastal management measures for implementation. In March 2005, NOAA launched implementation of coastal management performance measures among all 34 state coastal management programs. NOAA has developed or is refining a proposed suite of NERRS measures to be finalized this winter.

Nautical Mapping and Charting Program – NOAA is evaluating the viability of research by the United States Merchant Marine Academy to support clear and meaningful linkages between long-term performance measures and annual goals. NOAA is also developing additional metrics to better capture the outcomes and benefits of the program.

#### FY 2006

Climate Program – NOAA developed an action plan for implementation of PART recommendations that includes consolidating research laboratories and other management changes recommended by the NOAA Research Review Team, as well as developing an internal database for tracking performance and linking it to the budget.

Protected Areas – In response to the PART recommendations, NOAA has revised existing or created new performance measure targets and timeframes that are ambitious, strategic and realistic. NOAA is implementing processes, including bi-annual meetings of Program leadership, to monitor and report on these measures that will ensure that these targets remain ambitious and that performance data is used to improve on the ground management and better address priority management issues.

#### **FY 2007 Program Increases**

Program increases are listed under each Performance Goal (see relevant section).

## Targets and Performance Summary

### Performance Goal for Ecosystems: Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management

Measure	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Target	FY 2006 Target	FY 2007 Target	Comment
Fish Stock Sustainability Index (FSSI)	N/A	N/A	477.5	N/A	507.0 <sup>FB</sup> D[j1]	518.0	This is a new measure for use FY 2007 and replaces the overfished major stocks measure. The FY 2005 and FY 2006 targets are for informational purposes only.
Percentage of Living Marine Resources (LMR) with Adequate Population Assessments and Forecasts	N/A	N/A	36.5	37.4	37.2	38.5	This is a new measure for use in FY 2007 and replaces the unknown stocks measure and the protected resource assessment measure. Numbers for FY 2004-2006 are provided for informational purposes only.
Number of Protected Species Designated as Threatened, Endangered or Depleted with Stable or Increasing Population Levels	17	18	24	24	24	26	This is a new measure for use in FY 2006. FY 2002 – 2005 numbers are provided for informational purposes only. The changes to the FY 2005, FY 2006 and 2007 targets are due to an increase in FY 2004 actual from 18 to 24 (final reported in July 2005).
Number of Habitat Acres Restored (Annual/Cumulative)	4,300/ 5,820	5,200/ 11,020	5,563/ 16,583	4,500/ 21,083	4,575/ 25,658	4,575/ 30,233	In the FY 2004 PAR, the FY 04 actual was reported as a projection; the actual is reported here.

<b>Measure</b>	<b>FY 2002 Actual</b>	<b>FY 2003 Actual</b>	<b>FY 2004 Actual</b>	<b>FY 2005 Target</b>	<b>FY 2006 Target</b>	<b>FY 2007 Target</b>	<b>Comment</b>
Cumulative Number of Coastal, Marine and Great Lakes Ecosystem Sites Adequately Characterized for Management.	New	New	New	146	193	253	This is a new measure for use in FY 2006. FY 2004 and 05 data are provided for informational purposes. Measure has been reworded and targets have been changed from percentages to cumulative numbers.
Cumulative Number of Coastal, Marine, and Great Lakes Issue-Based Forecasting Capabilities Developed and Used for Management.	New	New	New	19	27	37	This is a new measure for use in FY 2006. FY 2004 and 2005 data are provided for informational purposes. Measure has been reworded targets have been changed from percentages to cumulative numbers.
Percentage of Tools, Technologies, and Information Services that are used by NOAA Partners/Customers to Improve ecosystem-based management.	New	New	New	New	New	TBD	Measure has been reworded and remains under development with plans to be final for use in FY 2007.
Number of Coastal, Marine, and Great Lakes Habitat Acres Acquired or Designated for Long-term Protection (Annual/Cumulative)	New	New	New	New	TBD	TBD	FY 2006 and 2007 targets remain under development; the target issue is planned to be resolved in time for the FY 07 Congressional Submission of the Budget. Measure has been reworded and scope of measure reduced since it was proposed as under development in the FY 2006 APP. (Further refinement may occur before the congressional submission, but the scope of the measures is not expected to be revised.)

**Performance Goal for Climate: Understand climate variability and change to enhance society's ability to plan and respond**

<b>Measure</b>	<b>FY 2002 Actual</b>	<b>FY 2003 Actual</b>	<b>FY 2004 Actual</b>	<b>FY 2005 Target</b>	<b>FY 2006 Target</b>	<b>FY 2007 Target</b>	<b>Comment</b>
U.S. Temperature Forecasts (Cumulative Skill Score Computed Over the Regions Where Predictions are Made)	18	17	17	18	18	19	
Reduce the Uncertainty in the Magnitude of the North American (NA) Carbon Uptake	New	Identified Five Pilot Carbon Profiling Sites and four New Oceanic Carbon Tracks	Established five pilot atmospheric profiling sites. Established one oceanic carbon track; identified two additional oceanic carbon tracks	Reduce Uncertainty of Atmospheric Estimates of NA Carbon Uptake to +/- 0.48 Gt. Carbon per Year	Reduce Uncertainty of Atmospheric Estimates of NA Carbon Uptake to +/- 0.48 Gt. Carbon per Year	Reduce Uncertainty of Atmospheric Estimates of NA Carbon Uptake to +/- 0.45 Gt. Carbon per Year	
Reduce the Uncertainty in Model Simulations of the Influence of Aerosols on Climate	New	New	New	New	Establish 15% improvement in uncertainty in model simulations of how North American aerosols influence climate	Establish 20% improvement in uncertainty in model simulations of how North American aerosols influence climate	

Determine the National Explained Variance (%) for Temperature and Precipitation for the Contiguous United States using USCRN Stations	Captured more than 85% of the Annual National Temperature Trend and more than 55% of the Annual National Precipitation Trend for the Contiguous U.S.	Captured more than 95% of the Annual National Temperature Trend and captured 84% of the Annual National Precipitation Trend for the Contiguous U.S.	Captured more than 96% of the Annual National Temperature Trend and more than 90% of the National Annual Precipitation Trend for the Contiguous U.S.	Capture 96.7% of the Annual National Temperature Trend and 90% of the Annual National Precipitation Trend for the Contiguous U.S	Capture 97% of the Annual National Temperature Trend and 91.2% of the Annual National Precipitation Trend for the Contiguous U.S	Capture 97.6% of the Annual National Temperature Trend and 93.7% of the Annual National Precipitation Trend for the Contiguous U.S	The FY 2002 actual of 55% was incorrectly reported in the Department of Commerce FY 2004 Performance and Accountability Report.
Reduce the Error in Global Measurement of Sea Surface Temperature	New	New	New	New	0.4 C	0.3 C	
Improve Society's Ability to Plan and Respond to Climate Variability and Change Using NOAA Climate Products and Information	New	New	New	New	32 risk assessments / evaluations communicated to decision makers	35 risk assessments/ evaluations communicated to decision makers	

**Performance Goal for Weather and Water: Serve society's needs for weather and water information**

Measure		FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Target	FY 2006 Target	FY 2007 Target	Comment
Lead Time (Minutes), Accuracy (%), and False Alarm Rate (FAR, %) for Severe Weather Warnings Tornadoes	Lead Time	12	13	13	13	14	15	The FY 2004 actual was not final in the FY 2006 Congressional Submission; the final is reported here.
	Accuracy	76	79	75	73	76	76	
	FAR	73	76	74	73	72	72	
Lead Time (Min) and Accuracy (%) for Severe Weather Warnings for Flash Floods	Lead Time	52	41	47	48	48	49	
	Accuracy	89	89	89	89	90	90	
Hurricane Forecast Track Error (48 Hour)	Nautical Miles	122	107	94	128	128	126	
Accuracy (%) (Threat Score) of Day 1 Precipitation Forecasts		30	29	29	27	28	29	
Lead Time (Hours) and Accuracy (%) for Winter Storm Warnings	Lead Time	13	14	15	15	15	15	
	Accuracy	89	90	91	90	90	90	
Cumulative Percentage of U.S. Shoreline and Inland Areas that Have Improved Ability to Reduce Coastal Hazard Impacts		8%	17%	17%	28%	32%	39%	NOAA is in the process of developing a more meaningful measure

**Performance Goal for Commerce and Transportation: Support the Nation’s commerce with information for safe, efficient, and environmentally sound transportation**

<b>Measure</b>	<b>FY 2002 Actual</b>	<b>FY 2003 Actual</b>	<b>FY 2004 Actual</b>	<b>FY 2005 Target</b>	<b>FY 2006 Target</b>	<b>FY 2007 Target</b>	<b>Comment</b>
Reduce the Hydrographic Survey Backlog Within Navigationally Significant Areas (square nautical miles surveyed per year)	1,514	1,762	2,070	2,700	2,700	2,800	The FY 2006 target was revised downward from the FY 2006 APP due to a reporting error.
Percentage of U.S. counties rated as enabled or substantially enabled with accurate positioning capacity	New	New	New	28	37	47	FY2006 and FY2007 targets have been revised upward to reflect both increased user demand for the relatively new OPUS tool and the availability of more data for trend analysis. This is a new measure for use in FY 2006. FY 2005 target is provided for informational purposes.
Accuracy (%) and False Alarm Rate (FAR) (%) of Forecasts of Ceiling and Visibility (3miles/1000 ft.) (Aviation Forecasts):							
Accuracy (%)	45	48	45	46	48	48	
FAR (%)	71	64	65	68	68	64	
Accuracy (%) of Forecast for Winds and Waves (Marine Forecasts)							
Wind Speed	52	57	57	57	60	63	
Wave Height	68	71	67	67	70	73	

**Performance Goal for Mission Support: Provide critical support for NOAA's mission**

There are no GPRA measures for the Mission Support goal since the activities of this goal support the outcomes of the Mission goals. NOAA is developing new and improving existing internal management performance measures for the Mission Support Goal.

**Resource Requirements Summary**  
**(\$ in Millions)**

<b>Performance Goal for Ecosystems: Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management</b>	<b>FY 2005 Currently Available</b>	<b>FY 2006 Request</b>	<b>FY 2007 Base</b>	<b>Increase/Decrease</b>	<b>FY 2007 Request</b>
Operations, Research, Facilities					
National Ocean Service	342.0	232.2	235.1	3.6	238.7
National Marine Fisheries Service	675.0	623.5	640.2	41.2	681.4
Oceanic and Atmospheric Research	146.4	118.1	116.0	2.8	118.8
National Weather Service	-	-	-	-	-
NESDIS	16.8	17.4	18.0	0.0	18.0
Program Planning and Integration	-	-	-	-	-
Program Support	-	-	-	-	-
Procurement, Acquisition, and Construction	81.6	7.3	7.3	-	7.3
Other-Discretionary and Mandatory	117.6	107.0	109.6	(15)	94.6
Total, Direct Obligations	1,379.5	1,105.3	1126.2	32.6	1158.8
IT Funding	4.7	8.1	8.1	0.4	8.5
FTE	3,479	3,478	3,491	19	3,510

**Resource Requirements Summary**  
**(\$ in Millions)**

<b>Performance Goal for Climate: Understand climate variability and change to enhance society's ability to plan and respond</b>	<b>FY 2005 Currently Available</b>	<b>FY 2006 Request</b>	<b>FY 2007 Base</b>	<b>Increase/Decrease</b>	<b>FY 2007 Request</b>
Operations, Research, and Facilities					
National Ocean Service	-	-	-	-	-
National Marine Fisheries Service	1.5	2.0	2.0	-	2.0
Oceanic and Atmospheric Research	173.8	174.3	176.8	22.3	199.1
National Weather Service	17.6	21.6	9.4	1.8	11.2
NESDIS	54.1	32.0	32.9	(2.0)	30.9
Program Planning and Integration	-	-	-	-	-
Program Support	3.5	3.5	3.5	-	3.5
Procurement, Acquisition, and Construction	6.4	6.5	7.0	.9	7.9
Other-Discretionary and Mandatory	-	-	-	-	-
Total, Direct Obligations	256.9	239.9	231.7	23.0	254.6
IT Funding	83.1	82.1	82.1	-14.2	67.9
FTE	599	612	541	-	541

**Resource Requirements Summary**  
**(\$ in Millions)**

<b>Performance Goal for Weather and Water: Serve society's needs for weather and water information</b>	<b>FY 2005 Currently Available</b>	<b>FY 2006 Request</b>	<b>FY 2007 Base</b>	<b>Increase/Decrease</b>	<b>FY 2007 Request</b>
Operations, Research, and Facilities					
National Ocean Service	40.3	10.1	10.1	0.7	10.8
National Marine Fisheries Service	-	-	-	-	-
Oceanic and Atmospheric Research	65.4	53.1	55.8	-	55.8
National Weather Service	679.0	699.8	733.8	26.3	760.0
NESDIS	9.3	6.7	6.9	-	6.9
Program Planning and Integration	-	-	-	-	-
Program Support	0.6	0.6	0.6	-	0.6
Procurement, Acquisition, and Construction	103.5	88.3	87.8	(5.0)	82.8
Other-Discretionary and Mandatory	-	-	-	-	-
Total, Direct Obligations	898.1	858.6	894.9	21.9	916.9
IT Funding	307.1	322.0	322.0	26.1	348.2
FTE	4,654	4,652	4,727	9	4,736

**Resource Requirements Summary**  
**(\$ in Millions)**

<b>Performance Goal for Commerce and Transportation: Support the Nation's commerce with information for safe, efficient, and environmentally sound transportation</b>	<b>FY 2005 Currently Available</b>	<b>FY 2006 Request</b>	<b>FY 2007 Base</b>	<b>Increase/Decrease</b>	<b>FY 2007 Request</b>
Operations, Research, Facilities					
National Ocean Service	152.0	144.7	146.8	3.5	150.3
National Marine Fisheries Service	-	-	-	-	-
Oceanic and Atmospheric Research	-	-	-	-	-
National Weather Service	14.4	16.0	16.8	1.2	18.0
NESDIS	8.6	8.9	9.2	-	9.2
Program Planning and Integration	-	-	-	-	-
Program Support**	-	-	-	-	-
Procurement, Acquisition, and Construction	-	-	-	-	-
Other-Discretionary and Mandatory***	-	-	-	-	-
Total, Direct Obligations	175.0	169.6	172.8	4.7	177.5
IT Funding	10.8	11.6	11.6	0.6	12.1
FTE	749	760	759	-	759

**Resource Requirements Summary**  
**(\$ in Millions)**

<b>Performance Goal for Mission Support: Provide critical support for NOAA's mission</b>	<b>FY 2005 Currently Available</b>	<b>FY 2006 Request</b>	<b>FY 2007 Base</b>	<b>Increase/Decrease</b>	<b>FY 2007 Request</b>
Operations, Research, Facilities					
National Ocean Service	6.9	7.3	7.3	-	7.3
National Marine Fisheries Service	-	-	-	-	-
Oceanic and Atmospheric Research	18.5	16.3	16.3	-	16.3
National Weather Service	-	7.4	7.4	-	7.4
NESDIS	87.2	89.0	91.6	-6	91.0
Program Planning and Integration	2.5	2.0	1.9	-	1.9
Program Support	361.1	337.8	349.2	11.2	360.4
Procurement, Acquisition, and Construction	860.7	865.0	865.0	139.4	1,004.4
Other-Discretionary and Mandatory	17.6	18.5	19.3	-	19.3
Total, Direct Obligations	1,354.5	1,343.2	1,358.0	150.1	1,508.1
IT Funding	13.4	14.2	14.2	2.5	16.8
FTE	2,437	2,516	2,516	36	2,552

**Resource Requirement Summary**  
**(\$ in Millions)**

	FY 2005	FY 2006	FY 2007
	Currently Available	Request	Request
<b>Grand Total</b>			
<b>Operations, Research, and Facilities</b>			
National Ocean Service	541.2	394.2	407.1
National Marine Fisheries Service	676.5	625.5	683.4
Oceanic and Atmospheric Research	404.1	361.7	390.1
National Weather Service	711.0	744.8	796.6
NESDIS	176.1	154.0	156.0
Program Planning and Integration	2.5	2.0	1.9
Program Support	365.2	342.0	364.5
<b>Procurement, Acquisition, and Construction</b>			
National Ocean Service	127.1	14.5	12.8
National Marine Fisheries Service	31.0	2.0	-
NOAA Research	9.7	10.5	10.5
National Weather Service	89.2	94.4	102.8
NESDIS	731.4	809.9	917.1
Program Support	63.9	35.7	59.2
<b>Other Accounts</b>			
<b>Discretionary</b>			
National Ocean Service	-	-	-
National Marine Fisheries Service	90.6	90.2	75.1

**Resource Requirement Summary**  
**(\$ in Millions)**  
**(Continued)**

	FY 2005	FY 2006	FY 2007
	Currently Available	Request	Request
<b>Mandatory</b>			
National Ocean Service	1.0	6.0	6.0
National Marine Fisheries Service	26.0	10.8	13.5
Program Support	17.6	18.5	19.3
<b>Direct</b>	<b>4,046.8</b>	<b>3,716.7</b>	<b>4,015.9</b>
Reimbursable	209.2	209.2	209.2
<b>Total Funding</b>	<b>4,256.0</b>	<b>3,925.9</b>	<b>4,225.1</b>
IT Funding	419.1	438.1	453.4
<b>FTE</b>			
Direct	11,918	12,018	12,097
Reimbursable	707	815	815
<b>Total</b>	<b>12,625</b>	<b>12,833</b>	<b>12,912</b>

Note:

Other Accounts/Mandatory is a breakout of the NOAA Commissioned Officers Retirement Account.

**Performance Goal for Ecosystems: Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management**

**DOC Strategic Goal 3: Observe, protect, and manage the earth's resources to promote environmental stewardship**

**General Goal/Objective 3.2: Enhance the conservation and management of coastal and marine resources to meet America's economic, social and environmental needs**

Coastal areas are among the most developed in the Nation, with over half of our population living on less than one-fifth of the land in the contiguous United States. At over 230 persons per square mile, the population density of the near shore is three times that of the nation as a whole. That portion of the U.S. economy that depends directly on the ocean is also large, with 2.3 million people employed and over \$117 billion in value added to the national economy in 2000. Approximately 89 million people vacation and recreate along U.S. coasts every year. The amount added annually to the national economy by the commercial and recreational fishing industry alone is over \$43 billion annually with an additional \$1 billion of marine and freshwater aquaculture sales. With its Exclusive Economic Zone of 3.4 million square miles, the U.S. manages the largest marine territory of any nation in the world. 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.

NOAA has a unique mandate from Congress to be a lead Federal agency in protecting, managing and restoring these marine resources. To meet this mandate, our scientists, specialists, and external partners contribute a world-class expertise in oceanography, marine ecology, urban and regional planning, marine archeology, fisheries management, conservation biology, natural resource management, and risk assessment. We have adopted an ecosystem approach to management to achieve balance among ecological environmental and social influences. We recognize that the transition to an ecosystem approach must be incremental and collaborative. In pursuing this approach, we strive to integrate the concerns, priorities, and expertise of all citizens and sectors in the management of coastal and marine resources.

Until ecosystem approaches are fully adopted on a regional scale, NOAA will continue to manage on a smaller, more narrowly focused state, watershed, and species- or site-specific basis. However, NOAA will be improving the science, management, and regulatory processes to implement a more comprehensive ecosystem approach that will allow better management decisions for the Nation's ocean, coastal, and Great Lakes resources. This incremental and collaborative approach also applies to the development of NOAA's ecosystem based performance measures.

**Development of Crosscutting Ecosystem Performance Goal Measures**

Over the last year NOAA identified five new performance measures for the ecosystem goal. These measures are being designed to systematically track the effectiveness of NOAA's research and management in improving ecosystem health and productivity. They will improve NOAA's ability to: decide

whether programs should be continued, improved, expanded, or curtailed; assess the utility of new programs and initiatives; increase and communicate the effectiveness of program management; and to satisfy NOAA's accountability requirements. Specifically, these new performance measures will inform NOAA's assessment of its efforts to expand ecosystem-based principles and practices that affect the management of large and nested ecosystems. These measures were presented in the FY 2006 APP as under development and four of the five will be ready for use, three in FY 2006 and one in FY 2007, as follows:

- Two of the five measures in FY 2006 APP were "proxy" measures that capture the outcomes of NOAA's work, but fall short of measuring at the ecosystem level. As NOAA develops the science and organizational structure to track performance at the ecosystem level, the Ecosystem Goal will adopt the "ideal" measures, planning and reporting on them in future APPs. In the interim:
  - The proxy measure for ecosystems characterized i.e., *ecosystem sites characterized*, has been reworded and will be ready for use in FY 2006.
  - The *ecosystem health* measure is not expected to be ready for use in FY 2007 and its proposed proxy measure, *coral reef health*, will not be used; it is a long term measure and is not a useful GPRA measure. (For an update on the progress to date in developing this measure see the explanation section of the ecosystem measures.)
- The *tools and technologies* measure has been reworded and its data collection is still under development. Although data is not available at this time, it is planned to be completed in time for use in FY 2007.
- The *forecasting* measure has been reworded and will be ready for use in FY 2006.
- The new habitat measure was proposed in the FY 2006 APP to combine the existing habitat measure i.e., *habitat acres restored*, with *habitat acres acquired or designated for long term protection*; NOAA is continuing to work on how to possibly combine these activities into one measure. Currently, that has not been accomplished and the concepts will remain as separate measures. The *habitat acres acquired or designated for long term protection* measure is still considered under development due to the difficulty of establishing targets for acreage to be acquired; this issue is planned to be resolved in time for the FY 07 Congressional Submission of the Budget.

Although the ecosystem health measure is not ready for use, the other new measures are designed to assess progress toward achieving this strategic outcome of the Ecosystem Goal and these measures will all be implemented by FY 2007. These new performance measures and others that will be developed over time will give NOAA and its stakeholders an end-to-end analysis of performance for the Ecosystem Goal. Finally, the new measures are interconnected and designed to track NOAA's performance for achieving the greatest impacts.

<b>Program Initiative</b>	<b>FTE</b>	<b>Funding Request</b>	<b>Anticipated Impact</b>	<b>Location in the Budget</b>
Protected Resources Research and Management Programs	-	\$ 3,950	Funds will be used to conduct stock assessments and mortality estimation for protected species. This will allow NMFS to increase the quantity and quality of stock assessments that inform regulatory decisions.	NMFS-13
Expand Annual Stock Assessments - Improve Data Collection	-	\$ 9,150	This request will augment stock assessment efforts (stock surveys, fishery monitoring, and assessment analyses) and sampling programs in the Northeast Shelf and Gulf of Mexico. NMFS will improve fishery stock assessments by integrating more ecosystem information into mathematical models to reveal trends in biomass, recruitment levels (e.g., the number of small fish entering the fishery each year), and exploitation rates. NMFS' stock assessment activities provide the technical basis for setting annual catch quotas and are an integral component of the President's U.S. Ocean Action Plan which advocates the wider implementation of dedicated access privileges, including individual fishing quotas (IFQ).	NMFS-27
Economics & Social Sciences Research	-	\$ 1,000	Funds will initiate new economic and sociocultural surveys and assessments for the Gulf of Mexico ecosystem as well as expand on current efforts. These activities directly support efforts to identify market-based solutions to fishery management issues in the shrimp and red snapper fisheries, an approach that is advocated in both the President's U.S. Ocean Action Plan and the 2005 Economic Report of the President. In addition, establishment of economic and social monitoring programs in key fisheries will enhance NMFS' ability to conduct integrated assessments of these fisheries, resulting in more timely and accurate advice to fishery managers. This request will also enable NMFS to assess potential economic and social impacts from current and proposed open loop liquefied natural gas (LNG) projects on marine fishery resources in the Gulf of Mexico as well as to assess the economic impacts from environmental events such as hurricanes, red tide, and hypoxia. Overall, these funds will enable NMFS to support economic and sociocultural monitoring goals for 100% of the fishery management plans (FMP) with commercial fishery components in the	NMFS-30

			Gulf of Mexico ecosystem — e.g., the Shrimp, Reef Fish, and Red Drum FMPs.	
River Enhancement Initiative	-	\$ 6,000	River restoration and conservation will be attained through the modification or removal of structures (e.g., dams, barriers, culverts) that have outlived their useful purposes and pose safety hazards to the neighboring communities which will open habitat to migratory fish. Socioeconomic benefits include: an increase in land values, cost savings of potential repairs to derelict dams, removal of safety and liability concerns and an increase in recreational opportunities. The River Enhancement Initiative will benefit water quality and fish habitat and will enhance stewardship of rivers through a cooperative decision-making process. The funds will be directed towards community-based efforts to improve areas at small dams and river barriers (typically less than 6 feet high). Partnerships with communities will help develop the awareness, tools, and knowledge to address additional structures impeding migratory fish. This initiative will help provide municipalities, states, and private owners with the tools and knowledge necessary to make scientifically sound decisions regarding cooperative efforts at key river barriers through the Community-based Restoration Grants Program (CRP) model.	NMFS-48
Section 7 Consultations	14	\$ 3,500	Funds will allow NMFS to comply with court ordered pesticide consultations. Consultations are required because Section 7 of the Endangered Species Act of 1973 requires Federal agencies, in consultation with the Secretaries of Commerce and of the Interior, to ensure that any action they fund, authorize, or undertake is not likely to jeopardize the continued existence of threatened species or endangered species or result in the destruction or adverse modification of critical habitat that has been designated for such species.	NMFS-10
Aquaculture	-	\$ 1,830	Funds will support augmenting the capacity to manage a matrix aquaculture program and design and implement a regulatory program for marine aquaculture in the U.S. Exclusive Economic Zone (EEZ) called for in the Administration's legislative proposal.	NMFS-22
Pacific Islands Regional Center	-	\$ 5,000	Funds the new NMFS Pacific Islands Regional Office and Pacific Islands Fisheries Science Center in Hawai'i. It's important because it provides	NMFS-56

			resources needed for NMFS to protect, restore, and manage the use of coastal and ocean resources in the Pacific Islands Region through an ecosystem approach to management.	
Southeast Area Monitoring and Assessment Program (SEAMAP)	-	\$3,750	These funds will support SEAMAP's plankton and environmental surveys will enable NMFS to increase sampling intensity for the Gulf of Mexico thereby improving current estimates of larval mortality as well as analyses of potential economic impacts to commercial and recreational fisheries. NMFS will warehouse all of the biological and environmental data from each SEAMAP survey into the SEAMAP Information System, a distributed data management system administered in conjunction with NMFS' Southeast Fisheries Science Center. NMFS' SEAMAP initiative reflects the Office of Management and Budget and Office of Science and Technology Policy's FY 2007 Research and Development Budget Priorities by placing a high priority on data sharing across platforms and disciplines.	NMFS-55
Highly Migratory Species Research in the Gulf of Mexico	-	\$3,000	These funds will support Highly Migratory Species Research in the Gulf of Mexico in order to address the research needs for Gulf and Atlantic billfish, tunas, swordfish, and sharks as well as fund the review of the status of the Atlantic white marlin for listing as threatened or endangered under the Endangered Species Act (ESA). In 2001, NOAA Fisheries received a petition to list the severely overfished Atlantic white marlin as threatened or endangered under the ESA. Additional funding for other Gulf of Mexico highly migratory species will enable NMFS to address continuing bycatch concerns for sea turtles and marine mammals in pelagic longline and other fisheries.	NMFS-23
Catch and Release Mortality Research	-	\$ 1,000	These funds will support Catch and Release Mortality Research in the Gulf of Mexico in order to address discard mortality for both the recreational and commercial sectors. Regulations to end over-fishing such as size, bag, and trip limits, often result in increased numbers of regulatory discards. Onboard monitoring can track the fish species that are released and record their disposition (floating or swimming away), and obtain depth of capture information. These types of data could be used to determine species-specific estimates of depth related mortality that could be included in stock assessments. While there has been	NMFS-25

			research directed at estimating discard mortality for both the recreational and commercial sectors, fishers perceive that NMFS' estimates are either too high or too low.	
Southeast Cooperative Research	-	\$1,000	This increase will fund research on Bycatch Reduction Devices (BRDs) and other fishing gear in the Gulf of Mexico. A number of economically important recreational and commercial species of finfish are caught as bycatch in the shrimp fishery. With the use of BRDs, fishermen are able to retain the shrimp catch while allowing the finfish to escape the trawl net. Increased funding will enable NMFS to address the issue of lowering bycatch levels of a number of economically important recreational and commercial species of finfish including red snapper. NMFS' request directly supports efforts to support regional partnership opportunities in the Gulf of Mexico, a strategy that is advocated in the President's U.S. Ocean Action Plan.	NMFS-53
Fish Information Networks	-	\$1,000	This request funds a state-federal cooperative program that collects, manages, and disseminates statistical data and information on marine commercial and recreational fisheries off the coasts of Alabama, Florida, Georgia, Louisiana, Mississippi, and Texas. With this request, NMFS will have the capability to increase the quantity of data and improve the quality of statistics that are used to inform regulatory decisions for fisheries management.	NMFS-33
Coastal Monitoring and Assessment	-	\$ 1,700	These integrated assessments, increased monitoring capabilities, and ecosystem forecasts will enable resource managers to predict the potential impacts of their decisions on ecosystems, including the human elements, and weigh the costs against the benefits.	NOS-50
Ecological Forecast Modeling in the Northeast Shelf	-	\$ 1,000	Improve the accuracy and timely delivery of ecological forecasts that can lead to better decision-making, better communication between scientists and managers, and help to set science priorities for the future.	NOS-48
National Marine Sanctuary Observing System	-	\$900	Ensures progress toward implementing a Sanctuary system-wide monitoring and observing program in the Northeast and Gulf of Mexico that contributes to NOAA's mandated requirements for monitoring and data sharing to other federal ocean observing initiatives. The initiative supports NOAA's Ecosystem Approach to Management efforts by providing the critical data and information essential for determining the	NOS-61

			health of marine protected area water and habitat quality and living marine resources.	
Ecological Forecast Modeling in Gulf of Mexico	3	\$1,000	The NOAA Ecosystem Research Program will develop decision-support systems that incorporate observations and model-based assessments and predictions in the Gulf of Mexico and will manage these development efforts through a network of regional ecological forecasting centers, with each center sponsoring modeling and research and engaging with regional stakeholders.	OAR-72
Ecosystem Forecast Modeling Research & Outreach	-	\$1,000	The NOAA Ecosystem Research Program will develop decision-support systems that incorporate observations and model-based assessments and predictions in the Gulf of Mexico and will manage these development efforts through a network of regional ecological forecasting centers, with each center sponsoring modeling and research and engaging with regional stakeholders.	OAR-72
Aquatic Invasive Species Program	2	\$ 800	NOAA will enhance its capability to identify and assess species and pathways that pose the highest invasion danger to our Nation’s resources for which NOAA is steward and will develop tools to prevent invasion by these species and along these pathways.	OAR-88

**Measure 1a: The Fish Stock Sustainability Index (FSSI)**

**Explanation of Measure**

The Fish Stock Sustainability Index replaces the measure “Number of Overfished Major Stocks of Fish.” The index tracks the outcome of building and maintaining fish stocks at productive levels while also capturing the critical components of NOAA’s efforts to get to that outcome, i.e., managing fish harvest rates and increasing knowledge about the status of fish stocks. The measure provides a much more complete picture than the old measure of NOAA’s success at fisheries management. The FSSI is calculated by assigning a total score between 0 and 4 to each of 230 priority fish stocks (see below). Each stock receives one point if:

- NOAA has determined whether or not (1) the stock is overfished (one half point) and (2) the stock is subject to overfishing (one half point); i.e., scientific knowledge is available about the stock;
- NOAA’s management measures are succeeding at ensuring that fishing does not remove too many fish (i.e., level of fishing mortality does not exceed the threshold for overfishing);
- The stock is managed at an acceptable level (i.e., biomass is above the level defined as overfished for the stock); and

- The stock is rebuilt or is at its “optimal” level, the ultimate long term end state for a stock (i.e., biomass is within 80% of that required to achieve maximum sustainable yield).

The FSSI is computed by summing the scores of the individual stocks. Thus, the highest possible score for each stock is four and for the index it is 920.

The FSSI is based on a set of 230 priority fish stocks selected for their importance to commercial and recreational fisheries. Criteria for selection of stocks include whether they are major stocks (landings greater than 200,000 pounds), whether they are overfished or subject to overfishing, whether they have assessments scheduled, whether they have previously been identified as important, or other factors as appropriate. These stocks represent about 90% of all commercial landings in the U.S. NOAA plans for this set of stocks to be tracked over a 5-year period.

The advantages of the FSSI compared to the “Number of Overfished Major Stocks of Fish” are:

The FSSI measures aspects of both fishing mortality and biomass within a single measure, as opposed to measuring biomass only. Looking at both aspects provides a much more complete picture of the success of NOAA’s fishery management program. It will also cause the measure to show more year-to-year movement and to be much more sensitive to changes in funding.

- Stocks included in the FSSI were selected according to their relative importance, whereas previously only major stocks determined to be overfished in 2000 were included. With five times the number of stocks, the new measure includes large portions of the program that were excluded under the old measure.
- The new measure accounts for progress made relative to stocks that are rebuilding or are currently being managed at a sustainable level. As a result, it is a more accurate portrayal of the status of fisheries.

### **FY 2007 Target**

Since the FSSI is a new measure for FY 2007, the target for FY 2006 is provided for informational purposes only. The estimate for FY 2006 will be completed by September 30, 2005.

One of the major thrusts during FY 2006 and 2007 will be implementing the Regulatory Streamlining Project (RSP). The RSP is a fundamental reconsideration and redesign of the regulatory process within NMFS. Pursuant to direction from Congress, the stated goal of RSP is to improve performance, efficiency and accountability. The RSPs will improve the quality and timeliness of plans and regulations, increasing the effectiveness of management measures to end overfishing and rebuild stocks.

In response to the Bush Administration’s Ocean Action Plan, NMFS will work with Regional Fishery Management Councils to promote greater use of market-based systems for fisheries management through programs such as dedicated access privilege (DAP) programs during FY 2006 and 2007. Dedicated Access Privilege programs (DAPs) allocate a share of the resource to individuals, cooperatives, or communities. DAP programs are effective at ending overfishing where the overfishing results from “derby fishing” as a result of open access.

Other priorities during FY 2006 and 2007 will include bycatch reduction in all major commercial fisheries, monitoring of the crab rationalization program in Alaska, reauthorization of the Magnuson Stevens Fishery Conservation and Management Act, rebuilding strategies in Georges Bank, cooperation with international fish commissions, and management of highly migratory species such as sharks, white marlin and bluefin tuna.

**Program Increase**

The following program increases are directly related to this performance measure (Dollars in Thousands):

Catch and Release Mortality Research	-	\$ 1,000	These funds will support Catch and Release Mortality Research in the Gulf of Mexico in order to address discard mortality for both the recreational and commercial sectors. Regulations to end over-fishing such as size, bag, and trip limits, often result in increased numbers of regulatory discards. Onboard monitoring can track the fish species that are released and record their disposition (floating or swimming away), and obtain depth of capture information. These types of data could be used to determine species-specific estimates of depth related mortality that could be included in stock assessments. While there has been research directed at estimating discard mortality for both the recreational and commercial sectors, fishers perceive that NMFS' estimates are either too high or too low.	NMFS-25
Highly Migratory Species Research in the Gulf of Mexico	-	\$3,000	These funds will support Highly Migratory Species Research in the Gulf of Mexico in order to address the research needs for Gulf and Atlantic billfish, tunas, swordfish, and sharks as well as fund the review of the status of the Atlantic white marlin for listing as threatened or endangered under the Endangered Species Act (ESA). In 2001, NOAA Fisheries received a petition to list the severely overfished Atlantic white marlin as threatened or endangered under the ESA. Additional funding for other Gulf of Mexico highly migratory species will enable NMFS to address continuing bycatch concerns for sea turtles and marine mammals in pelagic longline and other fisheries.	NMFS-23
Expand Annual Stock Assessments—Improve Data Collection	-	\$9,150	This request will augment stock assessment efforts (stock surveys, fishery monitoring, and assessment analyses) and sampling programs in the Northeast Shelf and Gulf of Mexico. NMFS will improve fishery stock assessments by integrating more ecosystem information into	NMFS-27

			mathematical models to reveal trends in biomass, recruitment levels (e.g., the number of small fish entering the fishery each year), and exploitation rates. NMFS' stock assessment activities provide the technical basis for setting annual catch quotas and are an integral component of the President's U.S. Ocean Action Plan which advocates the wider implementation of dedicated access privileges, including individual fishing quotas (IFQ).	
Southeast Cooperative Research	-	\$1,000	This increase will fund research on Bycatch Reduction Devices (BRDs) and other fishing gear in the Gulf of Mexico. A number of economically important recreational and commercial species of finfish are caught as bycatch in the shrimp fishery. With the use of BRDs, fishermen are able to retain the shrimp catch while allowing the finfish to escape the trawl net. Increased funding will enable NMFS to address the issue of lowering bycatch levels of a number of economically important recreational and commercial species of finfish including red snapper. NMFS' request directly supports efforts to support regional partnership opportunities in the Gulf of Mexico, a strategy that is advocated in the President's U.S. Ocean Action Plan.	NMFS-51

**Measure 1b: Percentage of Living Marine Resources (LMRs) With Adequate Population Assessments and Forecasts.**

**Explanation of Measure**

This measure replaces the measures “Number of Major Stocks with an Unknown Stock Status” and “Number of Stocks of Protected Species with Adequate Population Assessments.” The latter has been incorporated into this new measure as a protected species component. This measure tracks the percent of priority fish stocks and protected species stocks that have adequate population assessments and forecasts available and useful to resource managers. The priority fish stocks consist of 230 stocks selected for their importance to commercial and recreational fisheries. They are the same stocks tracked under the FSSI. Protected species stocks tracked for this measure are those listed under the MMPA and/or ESA, which happen also by coincidence to total 230. There are thus 460 stocks tracked under this measure.

This measure combines the number of stock assessments for priority fish stocks and the number of stock assessments and forecasts for protected species to produce a percentage of LMRs that tracks the scientific basis for supporting and for evaluating the impact of living marine resource management actions. The standard of “adequate” is in reference to improving the level of scientific information on a LMR stock to Tier II as described in the Fisheries and

Protected Species Stock Assessment Improvement Plans (SAIPs) developed by the National Marine Fisheries Service. To reach this standard, assessments would have to be based on recent quantitative information sufficient to determine current stock status (abundance and mortality) relative to established reference levels and to forecast stock status under different management scenarios.

**FY 2006 and 2007 Targets**

Since this is a new measure for FY 2007, the target for FY 2006 is provided for informational purposes only. The FY 2007 target is based on information regarding the level and timeliness of each fish and protected species stock assessment. In FY 2007, we are aiming for 38.5% of a combination of selected fish stocks and protected species stocks to have Tier II stock assessments updated with sufficient timeliness to provide scientifically reliable determinations. To reach the FY 2007 target, six additional stocks of living marine resources (3 fish and 3 protected species) representing an increase of 3.5 percentage points will be raised to a Tier II assessment level, while maintaining the Tier II status of the previously assessed species. Existing assessments must be continually updated to remain current and thus retain their Tier II status. These assessments include monitoring the abundance and biological characteristics of managed fish stocks and protected species, as well as providing required status information and forecasts for each stock.

**Program Increase**

The following program increase is directly related to this performance measure (Dollars in Thousands):

Expand Annual Stock Assessments - Improve Data Collection	-	\$9,150	This request will augment stock assessment efforts (stock surveys, fishery monitoring, and assessment analyses) and sampling programs in the Northeast Shelf and Gulf of Mexico. NMFS will improve fishery stock assessments by integrating more ecosystem information into mathematical models to reveal trends in biomass, recruitment levels (e.g., the number of small fish entering the fishery each year), and exploitation rates. NMFS’ stock assessment activities provide the technical basis for setting annual catch quotas and are an integral component of the President’s U.S. Ocean Action Plan which advocates the wider implementation of dedicated access privileges, including individual fishing quotas (IFQ).	NMFS-27
Fish Information Networks	-	\$1,000	This request funds a state-federal cooperative program that collects, manages, and disseminates statistical data and information on marine commercial and recreational fisheries off the coasts of Alabama, Florida, Georgia, Louisiana, Mississippi, and Texas. With this request, NMFS will have the capability to increase the quantity of data and improve the	NMFS-33

			quality of statistics that are used to inform regulatory decisions for fisheries management.	
Observers	-	\$1,000	These funds will increase observer coverage in the shrimp trawl, red snapper, and reef fish bottom long-line fisheries in the Gulf of Mexico. Additional observer coverage enhances NMFS' capability to monitor catch, bycatch, and discard rates of finfish species such as red snapper and protected species (e.g., sea turtles). NMFS will integrate the latest bycatch data into existing stock assessments to improve the evaluation of stock status. Expansion of observer programs for many of the fisheries with significant bycatch supports one of the priorities set forth in the President's U.S. Ocean Action Plan - the implementation of a new national bycatch strategy.	NMFS-42
Southeast Area Monitoring and Assessment Program (SEAMAP)	-	\$3,750	These funds will support SEAMAP's plankton and environmental surveys will enable NMFS to increase sampling intensity for the Gulf of Mexico thereby improving current estimates of larval mortality as well as analyses of potential economic impacts to commercial and recreational fisheries. NMFS will warehouse all of the biological and environmental data from each SEAMAP survey into the SEAMAP Information System, a distributed data management system administered in conjunction with NMFS' Southeast Fisheries Science Center. NMFS' SEAMAP initiative reflects the Office of Management and Budget and Office of Science and Technology Policy's FY 2007 Research and Development Budget Priorities by placing a high priority on data sharing across platforms and disciplines.	NMFS-55
Protected Species Research and Management Programs	-	\$3,950	The increase will be used for protected species stock assessments and mortality estimation and for reducing bycatch of protected species in fisheries. The requested increase will allow NMFS to increase the quantity and improve the quality of stock surveys and assessments that inform regulatory decisions. Improved information will result in a reduced need to promulgate conservative, costly, and sometimes burdensome mitigation measures on constituents.	NMFS-13

## **Measure 1c: Number of Protected Species Designated as Threatened or Endangered under the Endangered Species Act, or as Depleted under the Marine Mammal Protection Act, with Stable or Increasing Population Levels**

### **Explanation of Measure**

This measure tracks progress at achieving partial recovery of endangered, threatened or depleted protected species under the jurisdiction of the National Marine Fisheries Service from a baseline of 65 species established as of January 1, 2004. Protected species are defined as all marine mammal stocks (except walruses, polar bears, and manatees) and those domestic non-marine mammal species listed as threatened or endangered under the Endangered Species Act (ESA) that are under the jurisdiction of the National Marine Fisheries Service. Marine mammal species included in this measure are those listed as “depleted” under the Marine Mammal Protection Act, which includes any listed under ESA.

Recovery of threatened, endangered or depleted protected species is very slow and can take decades. While it may not be possible to recover or de-list a species in the near term, progress can be made to stabilize or increase the species. For some, it is trying to stop a steep decline (right whales, stellar sea lions); for others it is trying to increase their numbers/abundance (Ridley turtles). NOAA’s protected species management efforts are focused on halting declines and conserving species while still allowing human activities to continue.

### **FY 2006 and FY 2007 Targets**

The FY 2007 target of 26 consists of 11 endangered species and 15 threatened species, up from 10 and 14 respectively in FY 2004, the most recent year for which actual data are available. Of the 65 stocks to which this measure applies, 34 are endangered, 27 are threatened, and 4 are depleted. The two targeted species for 2007 are Ozette Lake sockeye salmon and shortnose sturgeon, which are threatened and endangered, respectively.

Performance towards the FY 2006 and FY 2007 targets is based upon actions that have been taken over the last 5-10 years for Protected Species. Efforts include completion of recovery plans for Pacific salmon in the NMFS Northwest Region, continued implementation of recovery actions for Pacific salmon through both ESA Pacific salmon recovery funds and grants provided through the Pacific Coastal Salmon Recovery Fund, and improved information gained through updated stock assessments and implementation of monitoring programs.

In FY 2007, NOAA will continue to make specific investments to improve the status of all protected species in order to meet out year performance targets. These specific actions include: Implementing ESA recovery plans, completing ESA consultations on the registration of pesticides by the Environmental Protection Agency, reducing bycatch of marine mammals and sea turtles in fisheries by completing take reduction planning efforts, and implementing ship strike reduction strategies for Right Whales. Improved protected species stock assessments and improved understanding of the effects of ocean noise will help us to make informed management decisions, leading to increased protection for species, while allowing human activities to continue.

### Program Increase

The following program increase is directly related to this performance measure (Dollars in Thousands):

Section 7 Consultations	14	\$ 3,500	Funds will allow NMFS to comply with court ordered pesticide consultations. Consultations are required because Section 7 of the Endangered Species Act of 1973 requires Federal agencies, in consultation with the Secretaries of Commerce and of the Interior, to ensure that any action they fund, authorize, or undertake is not likely to jeopardize the continued existence of threatened species or endangered species or result in the destruction or adverse modification of critical habitat that has been designated for such species.	NMFS-10
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### Measure 1d: Number of Habitat Acres Restored (Annual/Cumulative)

#### Explanation of Measure

NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment and supportive of anadromous fish species. The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts.

#### FY 2006 and FY 2007 Targets

NMFS participates in a variety of regional and national programs to restore NOAA trust resources and meet the FY 2006 and FY 2007 targets. On a national basis, NMFS directs restoration planning, implementation and monitoring for the Community-based Restoration Program, a program of modest grants for local, partnership-based restoration activities. NMFS serves as the Department of Commerce representative to the Coastal Wetlands Planning, Protection and Restoration Act Task Force, through which the agency undertakes large-scale habitat restoration and protection projects in coastal Louisiana. NMFS serves as the primary source of restoration expertise for the NOAA Damage Assessment and Restoration Program. Working with staff from the National Ocean Service and the NOAA General Counsel's Office, NMFS experts address large-scale oil spills, releases of toxic compounds, and ship groundings to obtain monetary compensation from responsible parties and apply funds to restore or replace injured resources.

## **Measure 1e: Cumulative Number of Coastal, Marine and Great Lakes Ecosystem Sites Adequately Characterized for Management**

This measure was reworded since the FY 2006 APP due to suggestions from the OMB Ecosystem Research Program PART process. Sound management of coastal and ocean ecosystems requires scientifically based information on their condition. NOAA is developing methods to scale up from the site characterizations it currently produces to ecosystem characterizations. Characterization includes identification of the physical location, spatial extent, and biological, chemical, and physical characteristics. Site characterizations improve understanding of the history, current state, and future condition of ecosystems, and ecosystem characterizations will be the cornerstones to ecosystem-based management and the basis for many coastal, marine, and Great Lakes management tools including forecasts, assessments, and management plans. NOAA decides what to characterize based on: user community priorities; adequacy of indicators; significance of issue; and consequences of management action/inaction. Characterization of an ecosystem site (and in the future, a defined subecosystem) is measured as uncharacterized, substantially characterized, or adequately characterized.

NOAA has initiated a process to divide each of the Large Marine Ecosystems into subecosystems; ecosystem sites are being used as a proxy unit of measurement until that effort is completed. (LMEs are the principal assessment and management units for coastal, marine, and Great Lakes resources; there are 10 LMEs in the U.S.) At that point, NOAA will measure the cumulative number of ecosystems adequately characterized for management. The long-term target is that NOAA routinely provides adequate characterizations for management in all LMEs.

Currently the measure tracks the progress of 13 National Marine Sanctuaries (NMS) and 26 National Estuarine Research Reserves in completing monitoring and assessment to characterize the sites for ongoing management and long-term protection. In FY05 NOAA also completed its first ecosystem level characterizations – characterizing and reporting on the state of coral reef ecosystems in 14 U.S. jurisdictions.

### **FY 2006 and 2007 Targets**

In FY 2006, NOAA will complete the following characterizations of NOAA's managed areas: chemical contaminants in Stellwagon Banks NMS, environmental stressors in Monterey Bay NMS, biogeographic assessment of Central and Northern California NMSs, and benthic habitat-fish associations in Gray's Reef NMS. A characterization of Olympic Coast NMS fishing and harvest impacts will be completed in FY 2007. Using the coral reef ecosystem characterization as a model, NOAA will continue to expand its ecosystem characterizations both improving the characterizations of the 14 coral reef ecosystems completed in FY05, and adopting this approach for other ecosystems. We are evaluating the feasibility of adding data from the Coastal Change Analysis Program to this measure in FY 2007 or 2008 to capture characterization of the inland portion of coastal ecosystems.

## **Measure 1f: Cumulative number of coastal, marine and Great Lakes issue-based forecasting capabilities developed and used for management.**

This measure was reworded since the FY 2006 APP to incorporate suggestions from the OMB PART process. NOAA is developing discrete forecast models that allow resource managers to make decisions based on predicted environmental and socioeconomic impacts related to a particular issue. Managers will use these issue-based forecasts to predict the impacts of a single ecosystem stressor (i.e., climate change, extreme natural events, pollution,

invasive species, and land and resource use) and to evaluate the potential of various options to manage those stressors. These forecasts will be based upon field and laboratory studies, existing data, and models predicting environmental conditions under different scenarios. Forecast capabilities will be specific to a geographic area and will be counted for each ecosystem as they become operational – HAB forecasts in the Gulf of Mexico and Gulf of Maine will be counted as two separate forecast capabilities. Similarly, multiple, distinct forecast capabilities could be counted within a single ecosystem (i.e., NOAA may forecast harmful algal blooms (HABs), pink shrimp harvest, and hypoxia in the Gulf of Mexico).

The ultimate goal is for resource managers to routinely use NOAA’s forecasts to better manage ecosystem use, condition, and productivity. Progress toward this goal has been documented since 2001 and includes: Eastern Gulf of Mexico and Gulf of Maine harmful algal bloom alerts (2001), pink shrimp harvest and Gulf of Mexico hypoxia forecast model development (2002), transfer of an operational oyster mortality forecast capability to the US Army Corps of Engineers (2003), transfer of an operational Eastern Gulf of Mexico harmful algal bloom alert capability to NOAA’s Coastal Services Center (2004), transfer of the Great Lakes Forecasting System to NOAA programs (i.e., National Ocean Service Center for Operational Oceanographic Products and Services and National Weather Service) (2005), and preliminary forecasts for domoic acid in Pacific Northwest razor clams, coral bleaching, oyster mortality, and real-time jellyfish prediction in the Chesapeake Bay.

**FY 2006 and 2007 Targets**

By the end of FY 2004, the capability to forecast HABs in the Gulf of Mexico was complete. Under the current schema, by 2011, five NOAA ecosystem forecast capabilities are affecting management decisions. In FY 2006, NOAA will focus on developing and validating forecasts for domoic acid in Pacific Northwest razor clams, coral bleaching, oyster mortality, and real time jellyfish predictions in the Chesapeake Bay, but none of these are expected to be transferred to managers until FY 2008 and beyond. The FY 2007 target is to develop a pink shrimp harvest forecast and transfer it to the North Carolina Department of Fisheries.

**Program Increase**

The following program increase is directly related to this performance measure (Dollars in Thousands):

Ecosystem Forecast Modeling Research & Outreach	-	\$1,000	The NOAA Ecosystem Research Program will develop decision-support systems that incorporate observations and model-based assessments and predictions in the Gulf of Mexico and will manage these development efforts through a network of regional ecological forecasting centers, with each center sponsoring modeling and research and engaging with regional stakeholders.	OAR-72
Ecological Forecast Modeling in Gulf of Mexico	3	\$1,000	The NOAA Ecosystem Research Program will develop decision-support systems that incorporate observations and model-based assessments and	OAR-72

			predictions in the Gulf of Mexico and will manage these development efforts through a network of regional ecological forecasting centers, with each center sponsoring modeling and research and engaging with regional stakeholders.	
Ecological Forecast Modeling in the Northeast Shelf	-	\$ 1,000	Improve the accuracy and timely delivery of ecological forecasts that can lead to better decision-making, better communication between scientists and managers, and help to set science priorities for the future.	NOS-48

**Measure 1g: Percentage of information, tools, and technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management. (Note: Baseline data and targets are under development.)**

This measure was reworded since the FY 2006 APP to incorporate suggestions from the OMB PART process. This measure will track NOAA’s success in translating or synthesizing research findings into information, tools, and technology that improve the use and management of coastal, ocean, and Great Lakes ecosystems. Tracking the accessibility and use of information by target audiences will allow NOAA to identify and expand its most effective programs and products. NOAA partners and customers include federal, state, local and tribal authorities who make decisions that affect the state of resources in the U.S. coastal zone, and other users whose actions impact the condition of coastal ecosystems (e.g., private industry, school children.)

Examples of tools include: coastal population change data, land cover data, benthic habitat maps, and environmental sensitivity index maps. Technologies refer to the transfer of new or underused approaches for addressing coastal management (e.g., remote sensing, biosensors, Automated Underwater Vehicles (AUVs), genetic markers for fishery stocks) and resource development (e.g., culture systems for aquaculture, marine pharmaceuticals). This includes the application of technology to coastal resource management through synthesis, integration, training, and the development of new management tools. Information services would include technical assistance, education materials and curricula, extension and training. Tools or techniques used for modeling or forecasting are measured elsewhere and excluded here.

**FY 2007 Target**

The measure’s baseline data and targets remain under development, and it is planned to be ready for use in FY 2007. NOAA will continue to develop baseline and targets for this measure during FYs 2005 and 2006.

**Measure 1h (under development): Number of coastal, marine and Great Lakes habitat acres acquired or designated for long-term protection. (Note: This is a separate habitat performance measure from the established GPRA measure *number of habitat acres restored, 1d.*)**

Since the FY 2006 APP, measure has been reworded, and scope reduced to not include habitat restoration at this time. This measure is still considered under development due to the difficulty of establishing targets for acreage to be acquired; this issue is planned to be resolved in time for the FY 07

Congressional Submission of the Budget. (Further refinement to the wording, if any, may occur before the congressional submission, but the scope of the measures is NOT expected to be revised.) Serious habitat degradation is evident throughout the nation's coastal, marine, and Great Lakes areas. Current threats to these habitats include coastal urbanization, fragmentation of habitats, overuse, and impacts of vessel groundings, dredging, and fishing gear on underwater habitats. Habitat restoration (the established GPRA measure, 1d) and long-term protection (this new measure, 1h) are critically needed to help maintain the function of important coastal and marine ecosystems. Under NOAA's legislative mandates, NOAA protects and restores key habitats that provide critical ecosystem functions that support the health of endangered or threatened species, essential fish habitat, as well as provide a number of other societal or economic benefits. NOAA maintains the health of coastal, marine, and Great Lakes habitats by designating and managing important areas for long-term conservation and by providing support to state and local governments to protect additional key habitats by purchasing land from willing sellers.

This *long-term protection* measure tracks the number of acres acquired with NOAA funds by state or local government agencies from willing sellers for long-term protection of important coastal habitats, or the number of acres designated for long-term protection by NOAA or by state partners, such as through the National Marine Sanctuary Program (NMSP) and National Estuarine Research Reserve System (NERRS). The protected acres are the actual number of acres newly protected in a fiscal year. The cumulative total represents acres acquired or designated to date for the NERRS, NMSP, and Coastal and Estuarine Land Conservation Program. The goal for the long-term protection indicator is variable, as the yearly target can vary from hundreds to thousands of acres each year. For example, the initial designation or acquisition for a new reserve or sanctuary may add hundreds of thousands of acres in one year, while in other years acquisition may result in several hundred or thousand acres protected.

The measure does not track NOAA's proactive efforts to educate landowners and inform decision-makers about reducing the number of proposals that degrade or destroy habitat or its reactive efforts to comment on permits requesting development in areas that would have adverse effects on marine and coastal ecosystems.

### **FY 2006 and 2007 Targets**

This measure was under development in FY 2006 APP and targets for acres acquired are still under development for FY 2007 APP. Target numbers for "acres *designated* for long-term protection" have been established based on the planned designation of the Mission Aransas National Estuarine Research Reserve in FY 2006 and planned designation of the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve as the 14<sup>th</sup> National Marine Sanctuary in FY 2007. NOAA target numbers for "acres *acquired* for long-term protection" are difficult to establish because 1) these projects are competitively selected based on availability of funding and 2) the variability in cost per acre of land make it difficult to estimate acreage based on average cost.

***MEASURE UNDER DEVELOPMENT: Percentage of Coastal, Marine and Great Lakes Ecosystems with Improved Ecosystem Health (as Demonstrated by a Suite of Indicators of Ecosystem Health).***

The key outcome of NOAA's Ecosystem Goal is "Healthy and productive ocean, coastal, and Great Lakes ecosystems that benefit society". NOAA works to achieve this goal through the execution of numerous legislative mandates, which convey public trust responsibilities to NOAA for the nation's coastal

and marine resources. NOAA, other Federal, state, and local government agencies, the private sector, nongovernmental groups and the public influence the desired outcome. To gauge progress toward achieving this goal, NOAA is developing a new performance measure that indicates whether ecosystem health is improving in each of the large ecosystems or sub-ecosystems within its purview.

NOAA has made significant progress toward establishing this measure, but much work remains. For example, NOAA has begun to delineate coastal, marine, and Great Lakes ecosystems at their largest scale. NOAA will continue to develop this regional framework, and in consultation with key stakeholders, will identify sub-ecosystems (encompassing coastal watersheds, marine waters, and Great Lakes environments). Concurrently, NOAA will continue to develop an adaptive suite of indicators of ecosystem health in those regions. Until subecosystems are defined, NOAA will refine its adaptive suite of indicators of ecosystem health. NOAA will continue to work toward establishing a system for integrated budget and performance management that will give NOAA the verified data needed to track its planned index measure on ecosystem health.

### Discontinued Measures

#### Measure: Number of Overfished Major Stocks of Fish

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Target	45	43	43	42	42	N/A
Actual	45	42**	42			
Met/Not Met	Met	Not Met*	Not Met*			

\* The baseline was reduced from 46 to 44 for technical reasons so the planned reduction of 3 was not met.

\*\* The 2003 actual was erroneously reported as 43 in the Department of Commerce FY 2004 Performance and Accountability Report. This was a technical change that reduces the baseline from 46 to 44.

#### Measure: Number of stocks of protected species with adequate population assessments

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Target	120	88	84	77^	69^^	N/A
Actual	88	94	77			
Met/Not Met	Met	Met*	Met**			

\* Technical changes increased the baseline by eight stocks. Without these stocks, the actual would have been 86.

\*\* Of the 17 stock reductions between FY 2003 and FY 2004, 7 are stocks that moved from unknown to known status. The additional decrease of 10 stocks was the result of certain stocks being added to and dropped from the report and other stocks being merged into complexes for management purposes. However, the original target presented in the 2004 APP was based on achieving known status for three stocks; it was then increased to four stocks in the 2005 APP. Since seven stocks achieved known status the target was met.

^This target has not been adjusted to reflect the 2004 actual which was reported in August 2005. There is a planned reduction of four unknown stocks for 2005.

^^This target was adjusted to reflect the 2004 actual, but the 2005 target was not. The planned reduction in the number of unknown stocks for 2006 is therefore four rather than eight.

**Measure: Number of Stocks of Protected Species with Adequate Population Assessments**

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Target	N/A	N/A	N/A	63	59	N/A
Actual	N/A	N/A	61			
Met/Not Met						

**Explanation of Discontinued Measures**

Number of Overfished Major Stocks of Fish

This measure is being discontinued for three reasons. First, since it focused only on the major stocks that were listed as overfished in the 2000 Report to Congress on the Status of Fisheries, it did not encompass stocks that have become overfished since 2000 and thus did not convey the most up-to-date status of NMFS-managed fish stocks. Second, despite the wording, it focused on those stocks that have not yet been rebuilt to sustainable levels rather than those that remain overfished, which was confusing. Third, by focusing only on overfished status, there were many important aspects of fishery management, in particular reductions in overfishing, that it did not reflect. Because the program more directly influences fishing mortality rates and stock assessments and only indirectly influences biomass levels through controlling fishing mortality, the new measure is a more accurate and timely reflection of program performance while still being outcome oriented.

Number of Major Stocks with an “Unknown” Stock Status

This measure was problematic because it did not have a constant baseline. Due to the definition of a major stock as simply one with more than 200,000 pounds of landings, the list of major stocks changed frequently with new landings data, causing the measure to report changes in numbers that did not correspond to changes in performance. The new measure Percent of Living Marine Resources (LMRs) With Adequate Population Assessments tracks a fixed set of priority fish stocks and thus avoids this problem. It also focuses on the level and quality of scientific information available for each stock rather than on its official status determination, which is a management rather than a scientific decision.

### Number of Stocks of Protected Species with Adequate Population Assessments

This measure is a component of the new measure Percent of Living Marine Resources (LMRs) with Adequate Population Assessments, so keeping it as a separate measure would be redundant.

### **Program Evaluation**

Virtually every aspect of National Marine Fisheries Service's fisheries science program is peer reviewed, either internally within NMFS or outside the agency by, for example, the National Academy of Sciences or the National Science Foundation. NMFS also relies on extensive informal networks of university partnerships and laboratories throughout the Nation. Moreover, reviews often occur by opposing parties' scientists in the court system when fisheries management decisions are litigated.

Evaluation efforts include peer reviews of proposals, internal and external reviews of programs, and quarterly reviews of NMFS' overall performance in protected species recovery. Constituent input is an important part of the evaluation process and is solicited regularly through constituent workshops.

NOAA's goal to sustain healthy coasts is the product of more than 25 years of experience helping to understand and manage coastal resources so that their ecological and economic productivity can be fully realized and sustained. Evaluation efforts exist at a variety of levels, from peer reviews of proposals and evaluations of individual projects, to internal and external reviews of entire programs and quarterly reviews of NOAA's overall performance in coastal stewardship areas. Constituent input is an important part of the evaluation process and is solicited regularly through constituent workshops.

### **Cross-cutting Activities**

#### **Intra-Department of Commerce**

The National Marine Fisheries Service will focus on reducing overfishing and overcapitalization of U.S. fishery resources by improving stock assessment and prediction, improving essential fisheries habitat, and reducing fishing pressure, including downsizing of fishing fleets. The Department of Commerce, enlisting the support of key bureaus such as the Economic Development Administration, the Minority Business Development Agency, and the National Institute of Standards and Technology, will play a key role in mitigating the impact of these critical resource conservation decisions in the transition to economically sustainable communities.

## **Other Government Agencies**

The Department of Commerce will enlist the support of other federal agencies, such as USDA, the Small Business Administration, and the U.S. Department of Labor, to mitigate the effect of resource conservation decisions.

Over the past year, NMFS has developed innovative partnerships with the states of Maine, Washington, Oregon, and California to promote the recovery of listed and at-risk salmon and steelhead species.

NOAA has leveraged its resources through a variety of effective international, interagency, state, local, private sector, and other partnerships to develop world-class coastal stewardship capabilities. These partnerships are essential to effectively integrate coastal science, assessment, monitoring, education, and management activities.

NOAA provides technical and scientific assistance to a variety of partners involved in protection, monitoring, and restoration of coastal resources. For example, NOAA provides critical information to the U.S. Coast Guard to help the Coast Guard respond to approximately 70 serious oil and chemical spills every year. NOAA also works closely with other agencies, Department of Commerce bureaus, states, local governments, and industry on important cross-cutting activities such as reducing the risks and impacts of natural hazards, protecting and restoring essential fish habitats, reducing runoff pollution, forecasting and preventing harmful algal blooms, and exploring the deep ocean and new uses of the ocean's rich biodiversity.

## **External Factors and Mitigation Strategies**

Various external factors may affect NMFS' ability to reach its targets. The impact of climate, biological, and other natural conditions affect NMFS' efforts to recover protected species and maintain the status of healthy species. In addition, many of NOAA's coastal stewardship activities depend on contributions from multiple partners, particularly states, territories, and other federal agencies. The failure of one or more of these partners to fulfill their cooperative contributions could have very serious consequences on overall efforts. Further, the effect of national and/or local economic conditions may affect NOAA's ability to reach certain targets. Research may identify opportunities to pursue mitigating strategies in some cases.

**Performance Goal for Climate: Understand climate variability and change to enhance society’s ability to plan and respond**

**DOC Strategic Goal 3: Observe, protect, and manage the earth’s resources to promote environmental stewardship**

General Goal/Objective 3.1: Advance understanding and predict changes in the Earth’s environment to meet America’s economic, social, and environmental needs

Weather and climate sensitive industries, ranging from finance, insurance, and real estate to services, retail and wholesale trade and manufacturing, directly and indirectly account for about one-third of the Nation’s gross domestic product (GDP), or \$3 trillion,. Industries directly impacted by weather such as agriculture, construction, energy distribution, and outdoor recreation account for nearly 10 percent of the Nation’s GDP. Drought is estimated to result in average annual losses to all sectors of the economy of between \$6-8 billion. Given such stresses as population growth, drought, and increasing demand for fresh water, and emerging infectious diseases, it is essential for NOAA to provide reliable observations, forecasts, and assessments of climate, water, and ecosystems to enhance decision makers’ ability to minimize climate risks. This information will support decisions regarding community planning, public policy, business management, homeland security, natural resource and water planning, and public health preparedness. In the U.S. agricultural sector alone, better forecasts can be worth over \$300 million in avoided losses annually.

To enable society to better respond to changing climate conditions, NOAA, working with national and international partners, will employ an end-to-end system comprised of integrated observations of key atmospheric, oceanic, and terrestrial variables; a scientific understanding of past climate variations and present atmospheric, oceanic, and land-surface processes that influence climate; application of this improved understanding to create more reliable climate predictions on all time scales; and service delivery methods that continuously assess and respond to user needs with the most reliable information possible.

These activities will accelerate the development of a structure and process for improving the relevance of climate science to assist decision-makers in their development of national, regional and sectoral adaptation responses (actions to reduce vulnerability, seize opportunities, and enhance resilience) to variability and long-term changes in the climate, particularly for industry, natural resource and water managers, community planners, and public health professionals.

<b>Program Initiative</b>	<b>FTE</b>	<b>Funding Request</b>	<b>Anticipated Impact</b>	<b>Location in the Budget</b>
Climate Forcing	-	\$ 6,800	Funds research to determine emission and uptake of carbon dioxide in North America and contributes to our understanding of how clouds and aerosols interact and influence climate.	OAR-20
Integrated Ocean Observing System	-	\$ 9,000	Allows NOAA to continue building the global component of the U.S. Integrated Ocean Observing System (IOOS) and improve data management and communications (DMAC) interoperability	OAR-30

			standards and protocols within NOAA’s ocean observational activities	
Coping with Drought : Regional Decision Support Partnerships	-	\$ 4,000	Develops a focused decision-support research effort to aid risk management in the context of severe, sustained drought, and broader water resources management issues.	OAR-35
Alaskan Climate Reference Network	-	\$ 2,500	Funds the expansion of the U. S. Climate Reference Network (USCRN) into Alaska, enabling the U.S. to have the same level of climate monitoring capability in Alaska compared to the national monitoring of temperature and precipitation trends in the lower 48 states.	OAR-47
CLASS	-	\$ 859	Approximately 80% of the requested funding is IT, and will be utilized to enhance and upgrade the elements of the CLASS baseline in order to meet increasing demands on the system. These demands are driven by the exponential increase in rates, volume, and complexity of environmental data, and associated metadata, all relying on CLASS for archive, access, and stewardship.	PAC-52

**Measure 2a: U.S. Temperature Forecasts (Cumulative Skill Score Computed Over the Regions Where Predictions are Made)**

**Explanation of Measure**

Accurate temperature forecasts are critical to many sectors of the national economy, including agriculture and energy utilities. This measure compares actual observed temperatures with forecasted temperatures from areas around the country. For those areas of the United States where a temperature forecast (warmer than usual, cooler than normal, near-normal) is made, this score measures how much better the forecast is than the random chance of being correct. Areas where no forecast for surface temperature is made (i.e., areas designated as “equal chance” on the Climate Prediction Center (CPC) seasonal forecast maps) are not included in the computation of the Heidke Skill Score (HSS), the metric used for this measure to compare actual and observed temperatures. It is one of several accepted standards of forecasting in the scientific community. It is calculated as follows:

Heidke skill score:  $S = ((c-e)/(t-e)) \times 100$

where c = number of stations correct

and e = number of stations correct by chance =  $(1/3) \times$  total number of stations in a 3 equal class system

and t = number of stations, total

S is approximately equal to one-half of the correlation between forecast and observations.

The HSS is a function of whether or not a forecast is correct and for how many locations a forecast is made, but does not reward when the forecast is verified by chance. Skill score is based on a scale of -50 to +100. If forecasters match a random prediction, the skill score is zero. Anything above zero shows positive skill in forecasting. Given the difficulty of making seasonal temperature and precipitation forecasts for specific locations, a skill score of 20 is considered quite good and means the forecast was correct in almost 50% of the locations forecasted. Forecasts will likely be better in El Niño years than in non-El Niño years. Reported skill score is a cumulative average over past 48 consecutive 3-month seasons. For example, skill score of 18 reported at the end of FY 2002 is the HSS averaged over 48 surface temperature forecasts from October 1998 to September 2002. Temperatures across the United States will be measured using NOAA's cooperative network maintained by volunteers across the nation. Temperature data is collected and analyzed by NOAA.

In June 2005, NOAA switched to a new method of computing HSS and the new method will be reflected in the reporting of the FY 05 actual (none of the data reported in the summary table has changed). The old technique was done manually, and as such, was subject to occasional human errors. It was calculated using data for major cities, which resulted in the score being disproportionately weighted toward the eastern U.S. The new technique verifies a gridded objective analysis of the forecast field against a gridded analysis of the observed verification field. This treats the entire area of the lower 48 states more fairly and objectively.

### **2007 Targets**

The FY 2006 target score is 18 and is an increase over the target for FY04 of 17. Beyond FY 2006, a gradual increase in performance skill score is expected due to improvements in modeling and research activities.

Specifically, the National Weather Service accelerated implementation of the new Climate Forecast System originally scheduled for FY 2005 to FY 2004, which is expected to yield benefits in the late 2005 or early 2006 time period. NOAA's Climate Prediction (CPC) is leading an effort to spin up a Climate Test Bed which will accelerate the transition of research improvements to operational climate prediction, and has redirected nearly 25% of its federal and contract staff to accelerate improvements in seasonal climate prediction. Increased collaboration with the research climate community is also planned to enhance model diagnostics and testing from the internal and external science communities. In addition, CPC will expand the collaborative forecast process to include more scientists and experimental forecast tools in their operational seasonal forecasts. This targets the best possible prediction expertise and cutting edge science. Other activities include completion of North American Monsoon Experiment (NAME) in FY04, aimed at improving warm-season predictions, and implementing a new training program that provides forecasts that take into account the latest science and technology advances and the use of new seasonal climate tools/products.

## **Measure 2b: Reduce the uncertainty in the magnitude of the North American carbon uptake**

### **Explanation of Measure**

The annual targets have been modified to represent more realistic estimates of progress. The performance measure wording and targets have also been revised to be more focused and reflect a consistent unit of measure from year to year. These changes originated from an Office of Inspector General audit, *Improvements Needed in the Reporting for NOAA GOALS – Build Sustainable Fisheries, Recover Protected Species, and Predict and Assess Decadal to Centennial Change*, Final Audit Report No. FSD-15989-4-0001/September 2004.

By 2008, NOAA will reduce the uncertainty of atmospheric estimates of the North American carbon uptake by half to +/- 0.3 Gt C per year, assuming a full network of 36 stations has been established and monitored. Several inverse transport models are being used to determine the uncertainty in the North American carbon uptake as the number of carbon dioxide profiling sites is increased. The baseline uncertainty is +/- 0.6 GtC per year (as determined in 2000). Reducing the uncertainty by 50% will allow resolution of the interannual variability in the North American carbon flux and U.S. regional carbon dioxide emissions and uptake.

Carbon dioxide is the most important of the greenhouse gases that are undergoing changes in abundance in the atmosphere due to human activity. On average, about one half of all the carbon dioxide emitted by human activity is taken up by the oceans and the terrestrial biosphere (trees, plants, and soils). These reservoirs of carbon are known as carbon “sinks.” However, the variation in the uptake from year to year is very large and poorly understood. A large portion of the variability is thought to be related to the terrestrial biosphere in the Northern Hemisphere, and quite likely North America itself. NOAA needs to assess and quantify the source of this variability if it is to provide scientific guidance to policymakers who are concerned with managing emissions and sequestration of carbon dioxide. This can only be done by making regional-scale measurements of the vertical profile of carbon dioxide across the U.S. which, combined with improved transport models, can be used to determine carbon dioxide sources and sinks on a regional (about 600 mile) scale. This will provide a powerful tool to gauge the effectiveness of carbon management and enhanced sequestration efforts.

Research supporting this measure also ensures a long-term climate observing system that provides an observational foundation to evaluate climate variability and change, and provides the mechanism to support policy and management decisions related to climate variability and change at national and regional scales. More information can be found at <http://www.cmdl.noaa.gov/carbonamerica/>.

### **FY 2007 Target**

One key activity for FY2006 and FY 2007 will be to continue expansion of the North American observing network of tall tower and aircraft profiling sites. An intensive interagency field campaign in the north-central United States, which began in 2005 with the implementation of new aircraft sites in Iowa, Illinois, Nebraska, North Dakota and Wisconsin is also planned during the 2005-2006 period to reconcile estimates of regional carbon sources and sinks calculated from atmospheric measurements, with direct estimates utilizing field measurements, land-based carbon inventories, regional geographic

information, and remote sensing. The campaign also seeks to attribute sources and sinks of carbon dioxide to ecosystem processes and human activities within the region. This field campaign will lead to reduced uncertainty in the magnitude and the mechanisms of the North American terrestrial carbon sink.

**Changes to FY2006 Target**

The delayed and reduced FY 2005 appropriations resulted in a revised FY2006 performance measure target from that published in the FY2006 Annual Performance Plan submitted to Congress. The expansion of the North American observing network of tall tower and aircraft profiling sites is delayed from the original planned deployment, resulting in a higher degree of uncertainty in estimates of the North American carbon sink (0.48 gigatons carbon per year) vs. that originally planned (0.4 gigatons carbon per year).

**Program Increases**

The following program increase is directly related to this performance measure (Dollars in Thousands):

Climate Forcing	-	\$ 6,800	Funds research to determine emission and uptake of carbon dioxide in North America and contributes to our understanding of how clouds and aerosols interact and influence climate.	OAR-20
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**Measure 2c: Reduce the uncertainty in model simulations of the influence of aerosols on climate**

**Explanation of Measure**

The near-term goal. By 2007, NOAA observational and theoretical research will reduce the uncertainty in the simulated influence of North American aerosols on climate by 20%. The baseline for comparison will be the level of uncertainty reflected in the 2001 climate-change assessment of the Intergovernmental Panel on Climate Change (IPCC), which was prepared by the worldwide scientific community. The meeting of the 20% measure will be judged by the findings of the forthcoming 2006/7 IPCC assessment, which will update the understanding of climate change.

The longer-term goal. By 2010, NOAA observational and theoretical research will reduce the uncertainty in the simulated influence of global aerosols on climate by 40%. The baseline for comparison will again be the high level of uncertainty reflected in the 2001 climate-change assessment of the IPCC, prepared by the worldwide scientific community. The meeting of this longer-term 40% measure will be judged by the findings of forthcoming IPCC assessments, further updating the understanding of climate change.

Background on the science. Aerosols are liquid or solid particles suspended in the atmosphere. They force changes in the climate system by (i) directly absorbing and scattering of radiation from the sun and (ii) by changing the way clouds reflect back solar radiation. While greenhouse gases warm the atmosphere, aerosols and clouds can both counteract greenhouse gases by reflecting incoming solar radiation and cooling the atmosphere, or, under

different conditions, can trap solar radiation, thus heating the atmosphere. The role of aerosols, clouds, and climate is deemed to be the biggest single uncertainty in the prediction of how human activities influence climate change (IPCC, 2001).

NOAA research plan and annual performance measures. To meet the 2007 goal, NOAA has designed a four-step research program. It is complete with annual measures of success of each year’s step, plus an overall evaluation of how all four steps contribute to the 2006 goal. *Plan.* (1) The multi-stepped plan began in 2002, scoping out the information needs associated with the climate influence of North American aerosols. (2) In 2003, instruments were developed to fill the North American observational gaps. (3) In 2004, the improved measurement capabilities will be used to take a two-month, field-study “snapshot” of how well models simulate these “real-world” aerosols and their climate impact. (3) In 2005, monitoring of the seasonal changes of the aerosols and their climate impact will begin in two key North American regions. (4) Lastly, in 2006 and 2007, using all of the data, NOAA will evaluate the percentage improvement in model simulation of the role of North American aerosols on climate. *Annual Performance Measures.* Annual targets quantitatively score the success of each of the individual research tasks in preceding years. Success in each of these preceding steps is necessary for success in meeting the 20 percent reduction of uncertainty associated with the 2007 goal.

Outcome and payoffs. The desired outcome is an improved science-vetted set of options for changing the impact of North American aerosols on climate, which can be considered by governments, the private sector, e.g., transportation and energy production, and the public. Reductions in the uncertainties surrounding aerosols relate directly to the confidence with which model simulations can support policy decisions on the climate issue. Furthermore, since aerosols are also a human-health, air quality issue, there is the opportunity to quantify “win-win” opportunities of how decisions made to improve air quality may also contribute to reduce the forcing of climate change.

**FY 2006 and FY 2007 Targets**

While 2006 will be the first year this measure is presented in this report, progress toward this near-term goal is already being tracked at the program level. A series of annual research activities from instrument development in FY2003, to field process studies and long-term monitoring of aerosol distributions in FY2004 and FY2005, will be utilized to achieve the FY2006 goal and further enhance our understanding of how aerosols affect climate.

**Program Increase**

The following program increase is directly related to this performance measure (Dollars in Thousands):

Climate Forcing	-	\$ 6,800	Funds research to determine emission and uptake of carbon dioxide in North America and contributes to our understanding of how clouds and aerosols interact and influence climate.	OAR-20
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## **Measure 2d: Determine the National Explained Variance (%) for Temperature and Precipitation for the Contiguous United States using USCRN Stations**

### **Explanation of Measure**

This measure is designed to address the significant shortcomings in past and present observing systems by capturing 98% of the long-term changes in the national annual average surface air temperature and 95% of the long-term changes in the national annual average precipitation throughout the contiguous U.S. using the U.S. Climate Reference Network (USCRN). The wording of this measure has been revised and internal control procedures augmented, in response to an Office of Inspector General audit, *Improvements Needed in the Reporting for NOAA GOALS – Build Sustainable Fisheries, Recover Protected Species, and Predict and Assess Decadal to Centennial Change*, Final Audit Report No. FSD-15989-4-0001/September 2004.

Inadequacies in the present observing system increase the level of uncertainty when government and business decision-makers consider long-range strategic policies and plans. The U.S. Climate Reference Network (USCRN), a benchmark climate-observing network, will provide the nation with long-term (50 to 100 years) high quality climate observations and records with minimal time-dependent biases affecting the interpretation of decadal to centennial climate variability and change. Deployment of the U.S. Climate Reference Network is continuing, with stations added over the next several years. NOAA will deploy instrument suites in a combination of single and nearby paired sites.

Due to funding limitations, the original full national network implementation plan has been scaled back to ~110 stations deployed across the contiguous U.S., capturing long-term temperature and precipitation trends only at the national level across the lower 48 states. Given the current and future states of available technologies, the adjusted network distribution provides for the life cycle high performance operations and maintenance of the commissioned stations while maintaining the quality of the data at the highest possible level, given the current and future state of available technologies. The smaller sized network will not be able to achieve the level of monitoring and evaluation of climate variations and trends originally intended at the regional scale.

The USCRN will strengthen the existing climate record through determination of transfer functions between these stations and the instrumentation and stations of other observing networks. This will increase assurance of long-term and bias-free national and global monitoring, including higher-precision, higher-confidence validation of NOAA's space-based (satellite) measurements and monitoring capabilities. More information can be found at <http://www.ncdc.noaa.gov/crn/performanceasures.html>.

### **FY 2006 and FY 2007 Targets**

Due to reduced funding levels in FY 2005, the deployment of new stations was suspended and available funds used for operations and maintenance (O&M) of commissioned observing stations. However, a Congressional earmark funded two previously unscheduled stations in FY 2005. All other USCRN related activities, such as developing instrument transfer functions and station normals, were suspended during FY 2005. The percent national

explained variance for FY 2006 for the annual average surface air temperature will be 97.2% and for precipitation, 92.3%. Provided funding is enacted at the FY 2006 requested level, the target completion date will be extended from FY 2007 to FY 2009 for completing the deployment of the remainder of the currently planned network of stations across the lower 48 states. In addition, quality control technique improvements will be delayed, and incomplete instrument transfer functions will prevent improvements in the quality and value of other NOAA observations from in situ and remote (satellite based) observing systems, as related to climate monitoring and evaluation of present, past, and future climate variation and change.

## **Measure 2e: Reduce the error in global measurement of sea surface temperature**

### **Explanation of Measure**

This measure is intended to document progress in accurately measuring the global sea surface temperature. The unit of measure is potential satellite bias error (in degrees Celsius) of global sea surface temperature. Bias error is due to a systematic difference between multiple types of observing instrumentation (e.g., satellites and in situ buoys, ships, etc.). The current satellite bias error is 0.6 °C (2005). The long-term goal is to reduce the error to 0.2 °C by FY2008. The maximum allowed bias error has been specified as less than 0.5 °C on a monthly scale for a 5° latitude-longitude box.

The sea surface, covering over 70% of the Earth surface, has a tremendous influence on global climate. It is where the atmosphere responds to the ocean, via the transfer of heat either to or from the atmosphere. Warmer than normal sea surface temperatures in the tropical Pacific is a dominant characteristic of the El Niño phenomenon, and predictive climate models for El Niño must be initialized using the most precise observed surface temperature possible to produce accurate forecasts. Since sea-surface temperature is measured by buoys, ships, and satellites, this performance measure is well-suited as an indicator of the effectiveness of our integrated ocean observing system.

This performance measure also reflects how improvements in ocean observations will decrease the uncertainty in global sea surface temperature measurements, which will ultimately play a role in calculations of the ocean-atmosphere exchange of heat and the heat storage in the global ocean. More accurate estimates of sea surface temperature and ocean heat content will improve our ability to respond to changes in the climate system.

### **FY 2006 and FY 2007 Targets**

The integrated ocean climate observing system is ~45% complete in 2004. Current limitations in accurate measurements of global sea surface temperature include insufficient observing platforms in the global ocean. FY2006 and FY2007 will be dedicated to further expanding the global ocean observing network to 61%, working toward global coverage and the long-term goal of reduced error in the global measurement of sea surface temperature.

## Program Increase

The following program increase is directly related to this performance measure (Dollars in Thousands):

Integrated Ocean Observing System	-	\$ 9,000	Allows NOAA to continue building the global component of the U.S. Integrated Ocean Observing System (IOOS) and improve data management and communications (DMAC) interoperability standards and protocols within NOAA's ocean observational activities	OAR-30
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## Measure 2f: Improve society's ability to plan and respond to climate variability and change using NOAA climate products and information

### Explanation of Measure

This measure documents our success in working directly with stakeholders to develop and enhance a suite of climate data, monitoring, and prediction products that are valuable to our customers and stakeholders. The unit of measure is: number of risk and impact assessments/evaluations published and communicated to decision makers. The baseline is 28 risk and impact assessments/evaluations published in 2003.

NOAA currently provides state of the art science and discovery information products to a range of decision makers, from water resource managers and regional forecast offices, to national and international assessments, such as the U.S. Climate Change Science Program (CCSP) and the Intergovernmental Panel on Climate Change (IPCC). These information summaries highlight important deliverables such as reducing uncertainty in climate forcing models (e.g., carbon sources and sinks, effects of aerosols on climate), as well as in seasonal, interannual, and decadal climate forecasts. These deliverables form the basis of NOAA's emerging climate products and services. NOAA requires stakeholder input and feedback for product development and improvement. These interactions are facilitated by both interdisciplinary research and NOAA operations, bridging the gap between research and production, and decision makers. By increasing the interactions between NOAA and the users of climate information, NOAA will ensure that climate products and services are reaching the key decision making sectors.

### FY 2006 and FY 2007 Targets

NOAA is planning on continuing the development of prototype decision support tools and the broadening of decision support partnerships through extramural research grants and enhancements to the already successful Regional Integrated Sciences and Assessments program. The NOAA Climate Transition Program was also newly implemented in FY2005. This flexible program focuses on the successful transfer of experimental research and information products into operational settings.

### Program Increase

The following program increase is directly related to this performance measure (Dollars in Thousands):

Coping with Drought: Regional Decision Support Partnerships	-	\$ 4,000	Develops a focused decision-support research effort to aid risk management in the context of severe, sustained drought, and broader water resources management issues.	OAR-35
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### Program Evaluation

The NOAA Scientific Advisory Board (SAB), made up completely of private sector, university, and other Federal agency scientists, conducts periodic reviews of the activities of the Office of Oceanic and Atmospheric Research Laboratories and Joint Institutes. The SAB also provides guidance on NOAA's Climate Program. A number of NOAA line offices participate in the activities that support climate research. The National Environmental Satellite, Data, and Information Service (NESDIS) holds management performance reviews several times a year. NWS conducts reviews of the National Centers for Environmental Prediction (NCEP). In addition, programs are evaluated by the National Science Foundation and the National Research Council. NOAA holds annual constituent workshops at which NOAA's seasonal climate forecast efforts are discussed with the community of seasonal-to-interannual climate forecast users, and input is solicited to shape future efforts. NOAA's Office of Global Programs, funded in Oceanic and Atmospheric Research's (OAR) Climate and Global Change research line item, receives review from international science agencies, universities, and private sector scientists.

### Cross-cutting Activities

#### Other Government Agencies

NOAA works with a wide variety of partners in the area of climate forecasts, including other federal agencies (for example, the Federal Emergency Management Agency and the U.S. Agency for International Development), state and local agencies (for instance, state departments of environmental protection and emergency preparedness managers), academia, foreign government agencies, and international organizations. In preparing for the 1997-98 El Niño, NOAA worked closely with the Federal Emergency Management Agency and state and local officials, greatly improving public preparedness for the severe weather resulting from El Niño.

In 2003, the US government formed the Climate Change Science Program (CCSP) to facilitate the creation and application of knowledge of Earth's global environment through research, observations, decision support, and communication. The DOC, partnering with 12 other Federal agencies, leads this nationwide effort (<http://www.climate-science.gov/Library/stratplan2003/default.htm>). At NOAA, Climate Goal strategic performance objectives correspond directly to CCSP goals and are managed by NOAA's Climate Goal.

## **Government/Private Sector**

NOAA depends strongly on universities to help accomplish its science objectives through a network of joint and cooperative institutes and universities. NOAA also funds academic researchers through competitive, peer-reviewed programs, namely, OAR's Competitive Research Program (formerly referred to as the Climate & Global Change Program).

## **External Factors and Mitigation Strategies**

An unanticipated major increase of the customer base for climate-related products may strain NOAA resources. In such an event, NOAA would prioritize its activities to meet the immediate increase in demand while it looks for alternative ways to meet the needs of all its customers.

Improving our understanding of the natural environment requires advanced infrastructure and therefore continual investment in new technology, such as improved in situ observing systems, supercomputers, and environmental satellites.

**Performance Goal for Weather and Water: Serve society’s needs for weather and water information**

**DOC Strategic Goal 3: Observe, protect, and manage the earth’s resources to promote environmental stewardship**

**General Goal/Objective 3.1: Advance understanding and predict changes in the Earth’s environment to meet America’s economic, social, and environmental needs**

On average, hurricanes, tornadoes, tsunamis, and other severe weather events cause \$11 billion in damages per year. Weather, including space weather, is directly linked to public safety and about one-third of the U.S. economy (about \$3 trillion) is weather sensitive. With so much at stake, NOAA’s role in observing, forecasting, and warning of environmental events is expanding, while economic sectors and its public are becoming increasingly sophisticated at using NOAA’s weather, air quality, and water information to improve their operational efficiencies and their management of environmental resources, and quality of life.

NOAA is strategically positioned to conduct sound science and provide integrated observations, predictions, and advice for decision makers to manage many aspects of environmental resources—from fresh water to coastal ecosystems and air quality. Bridging weather and climate time scales, NOAA will continue to collect environmental data and issue forecasts and warnings that help protect life and property and enhance the U.S. economy.

NOAA is committed to excellent customer service. NOAA depends on partners in the private sector, academia, and government to help disseminate critical environmental information. NOAA will work even closer with existing partners and will develop new partnerships to achieve greater public and industry satisfaction with weather, air quality and water information. NOAA will expand services to support evolving national needs, including space weather, freshwater and coastal ecosystems, and air quality predictions throughout the Nation.

<b>Program Initiative</b>	<b>FTE</b>	<b>Funding Request</b>	<b>Anticipated Impact</b>	<b>Location in the Budget</b>
Coastal Services Center/Ocean.US activities in support of IOOS Implementation	-	\$ 700	NOAA’s work will assist the Nation in living up to the U.S. commitment to the GEOSS and the President’s Ocean Action Plan. This effort will connect our national coastal community and decision makers to national, state, and local information, tools and data in support of coastal and oceanic resources stewardship, usage, and health. Implementing and sustaining the global component and the national backbone are federal responsibilities in terms of both funding and implementation, and NOAA plays a critical leadership role.	NOS-33
Strengthen Tsunami Warning Network	4	\$11,370	Sustain the Administration’s commitment to strengthen the U.S. Tsunami Warning Program.	NWS-18/ PAC-27

National Profiler Network Frequency Conversion	5	\$7,000	Transfers wind profilers from research to operations and funds a conversion of the radio frequency over which they transmit so that the profilers do not impede search and rescue satellite communications.	NWS-22
O&M for Buoys installed with FY '05 Hurricane Supplemental Funding	-	\$1,400	Funds operation and maintenance of seven new weather data buoys funded/deployed under the FY 2005 Hurricane Supplemental Appropriation for enhanced real time hurricane data observations and storm monitoring in the Caribbean, Gulf of Mexico, and the Atlantic Ocean to support the NOAA hurricane warning and forecast mission.	NWS-17
Environmental Modeling	-	\$1,800	Maintains operational software code and manages the new advanced environmental prediction model system, the Earth System Modeling Framework in NOAA.	NWS-32
NWS Telecommunications Gateway	-	\$2,500	Implements a telecommunications network solution that resolves an existing single-point-of-failure associated with the NWS Telecommunications Gateway.	NWS-38
IOOS Data Assembly Center	-	\$1,500	Upgrades the existing NOAA National Data Buoy Center's (NDBC) Data Assembly Center (DAC) to serve as the data management and data quality control center, i.e., "backbone," for NOAA's Integrated Ocean Observation System (IOOS).	NWS-14
NOAA Center for Weather and Climate Prediction	-	\$14,400	Prepares the NOAA Center for Weather and Climate Prediction (NCWCP) for FY 2008 occupancy and operations.	PAC-78

**Measure 3a: Lead Time (Minutes), Accuracy (%), and False Alarm Rate (FAR, %) of Severe Weather Warnings for Tornadoes**

**Explanation of Measure**

The lead time for a tornado warning is the difference between the time the warning was issued and the time the tornado affected the area for which the warning was issued. The lead times for all tornado occurrences within the continental U.S. are averaged to get this statistic for a given fiscal year. This average includes all warned events with zero lead times and all unwarned events. In FY 2004, the percentage of events with a lead time greater than zero was 68 percent. Accuracy is the percentage of time a tornado actually occurred in an area that was covered by a warning. The difference between the accuracy percentage figure and 100% represents the percentage of events without a warning. The false alarm rate is the percentage of times a tornado warning was issued but no tornado occurrence was verified. The false alarm rate was added as a reportable measure in FY 2000, although it had been collected and used internally previously.

**FY 2006 and 2007 Targets**

NWS lead time target will gradually increase to 15 minutes by FY 2007 after completion of retrofits of the NEXRAD systems, implementation of new training techniques such as a weather event simulator, and realization of the operational benefits of Advanced Weather Interactive Processing System’s five software enhancements. Technological advances and new training techniques have resulted in meeting or exceeding lead time and accuracy goals in recent years. The same training techniques have also led to False Alarm Rate not meeting the goals set in FY 2002, FY 2003 and FY 2004. National emergency manager and media surveys indicate that they can "tolerate" a higher false alarm rate if it results in longer lead times and increased accuracy. Supplemental coverage from FAA radars and enhanced radar algorithms and scan strategies are being incorporated into AWIPS from FY 2005 through FY 2010 to reduce the false alarm rate. The false alarm rate goals have been revised to reflect the potential of these technological advances.

**Program Increases**

The following program increases are directly related to this performance measure (\$K). Note: this increase is related to the GPRA measures only at the Weather Forecast Offices (WFOs) within the National Wind Profiler Network; it does not affect the national GPRA targets. This is explained in more detail in the budget narrative.

National Profiler Network Frequency Conversion	5	\$ 7,000	Transfers wind profilers from research to operations and funds a conversion of the radio frequency over which they transmit so that the profilers do not impede search and rescue satellite communications.	NWS-22
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**Measure 3b: Lead Time (Minutes) and Accuracy (%) for Severe Weather Warnings for Flash Floods**

**Explanation of Measure**

The lead time for a flash flood warning is the difference between the time the warning was issued and the time the flash flood affected the area for which the warning was issued. The lead times for all flash flood occurrences within the continental United States are averaged to get this statistic for a given fiscal year. This average includes all warned events with zero lead times and all unwarned events. In FY 2004, the percentage of events with a lead time greater than zero was 74 percent. Accuracy is measured by the percentage of times a flash flood actually occurred in an area that was covered by a warning. The difference between the accuracy percentage figure and 100 percent represents the percentage of events without a warning.

### **FY 2006 and 2007 Targets**

The FY 2005 and 2006 targets for the Flash Flood performance lead time goal have been adjusted based upon performance in FY 2003, FY 2004 and the FY 2005 budget. NWS expects to improve both flash flood lead-time and accuracy over the next several years through the implementation of new Advanced Hydrologic Prediction Service (AHPS) flash flood decision assistance tools. However, the FY 2005 enacted budget will delay the implementation of forecaster-requested enhancements to the operational AHPS Flash Flood Monitoring and Prediction (FFMP) decision assistance tool, which is why the FY 2005 and FY 2006 goals have been revised. Critical flash flood operations related training to field staff will also be delayed in FY 2005, which contributes to the goal revision. The implementation of NEXRAD Open Radar Data Acquisition (ORDA) will begin in FY 2005, and will provide precipitation estimates on a much smaller grid, which will give forecasters many more points to average for the basin rainfall. The larger number of points for averaging the rainfall will deliver more precise precipitation input for forecasting flash floods. Also, in FY 2006 Distributed Modeling will be installed into the AWIPS baseline software. This will introduce a level of specificity to the hydrologic modeling that will take advantage of the smaller grid precipitation estimates provided by ORDA and improve the precision of flash flood forecasting. By FY 2007, improvements to precipitation estimates in mountainous areas will be added which will also improve the precision of forecasting in areas that have historically been difficult due to lack of data. Lead time and accuracy should be improved by these new capabilities.

### **Measure 3c: Hurricane Forecast Track Error (48 Hours)**

#### **Explanation of Measure**

The public, emergency managers, government institutions at all levels in this country and abroad, and the private sector use NOAA hurricane and tropical storm track forecasts to make decisions on life and property. This goal measures the difference between the projected location of the center of these storms and the actual location in nautical miles (nm) for the Atlantic Basin. The goal is computed by averaging the differences (errors) for all the 48-hour forecasts occurring during the calendar year. This measure can show significant annual volatility. Projecting the long-term - trend, and basing outyear goals on that trend, is preferred over making large upward or downward changes to the goals each year.

### **FY 2006 and 2007 Targets**

The average track error is projected to decrease due to improvements in observations, hurricane forecast models, aircraft upgrades, supporting data and computer infrastructure, and by conducting research within the U.S. Weather Research Program (USWRP) that will be transferred to NOAA NWS forecast operations. Specifically, the first generation Hurricane Weather Research Forecast model assessment will occur in during the 2006 hurricane season and will make use of advanced observations for large-scale atmosphere (winds, moisture and temperature observations) and oceans, and NOAA will install additional marine buoys at high priority sites in the Caribbean and Atlantic Ocean which will provide an early warning system of marine observations in

the open ocean. In addition, ten Air Force C-130 aircraft will be equipped with Stepped Frequency Microwave Radiometers in late FY 2005 which will provide more accurate observations of surface winds.

The targets for hurricane track forecast are higher than the actual trend from FY 2002 to FY 2004. However, hurricane track forecast targets are developed based on analysis of long term performance. Therefore, it would be premature to extrapolate the recent downward trend in forecast errors to derive a new GPRA target. Overall, however, we would expect forecast errors to decrease as we continue to make improvements to our observing systems and forecast models, and we continue to review and analyze past performance to determine when downward revision of the targets may be appropriate.

**Program Increases**

The following program increases are directly related to this performance measure (\$K):

Environmental Modeling		1,800	Maintain operational software code and manages the new advanced environmental prediction model system, the Earth System Modeling Framework, in NOAA	NWS-32
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**Measure 3d: Accuracy (%) (Threat Score) of Day 1 Precipitation Forecasts**

**Explanation of Measure**

This performance measure tracks the ability of the weather forecasters of NOAA’s Hydrometeorological Prediction Center to predict accurately the occurrence of one inch or more of precipitation (rain or the water equivalent of melted snow or ice pellets) twenty-four hours in advance across the contiguous U.S. This measure was originally, “Accuracy of 3-day Forecast of Precipitation.” The measure has been revised to reflect a more representative and accurate means of measuring the performance for this strategic goal. Through this measure, the HPC focuses on relatively heavy amounts of precipitation, usually a half inch or more in a 24-hour period (short-term flood and flash flood warnings), because of the major safety and economic impacts such heavy precipitation can have in producing flooding, alleviating drought, and affecting river navigation.

The HPC began providing quantitative precipitation forecasts (QPFs) in 1961. These forecasts indicate how much precipitation is expected across the United States, not just whether it will rain or snow. The HPC began making QPFs through two days into the future in 1965 and through three days in 2000. The HPC has tracked the accuracy of these forecasts very carefully over the years using a metric with the statistical name of “threat score” or equivalently “critical success indicator”. This accuracy metric ranges from 0 percent, indicating no skill, to 100 percent for a perfect forecast. In verifying the accuracy of a forecast of 1 inch or more of precipitation for day 1 (the next 24 hours), for example, the HPC first determines everywhere in the U.S. where an inch or more actually fell and was observed by rain gauges. On a given day this occurs only over a very small percentage of the country (although a 1 inch or more precipitation event is significant for the inhabitants of that particular area). The HPC then compares these observed areas of at least 1 inch of precipitation

with the forecasted areas of at least 1 inch, counting only those points in the United States where HPC forecasted and observed at least an inch as being an accurate forecast. (These points are called “hits”.) Thus, if HPC forecasts 1 inch to fall at the point representing Washington, DC, and it observed only 3/4" actually had fallen in that specific area, the forecast is then rated as a “miss”, even if an inch of rain was observed to have fallen at the points nearby representing the area of Fairfax City, Virginia, or the area of Upper Marlboro, Maryland. The overall accuracy score for the country for that particular day 1 forecast is then determined by dividing the total number of correctly forecast points (hits) by the total number of points where HPC had either forecast at least 1 inch of liquid precipitation or 1 inch of liquid precipitation had actually occurred. Thus this measure takes into consideration those areas where 1 inch or more of precipitation was correctly forecast, where it was forecasted but did not occur, and where it occurred but had not been forecasted. In summary, to earn a high accuracy score, HPC has to forecast the time, place, and amount of precipitation very well.

Regarding the quality control of the forecast and verification processes, HPC forecasters work under the supervisory control of the Senior Branch Forecaster (SBF), who is responsible for the quality and content of all products issued during the shift. The day 1 forecast is prepared by the SBF, who works closely with the day 2-3 forecaster to ensure consistent forecast products.

The forecasts from complex computerized weather prediction models are the forecasters’ starting point upon which they improve by applying their experience and scientific knowledge. The forecasters make their predictions on meteorological workstations. Approximately two days after the day 1 forecast has been made, the SBF verifies the precipitation forecasts. Another SBF serves as his or her verification assistant as needed. These verifying SBFs make sure data necessary for the verification are available, including the human forecasts and the observed precipitation observations. The observations of precipitation are collected by the NWS from several thousand locations around the U.S.

On a meteorological workstation, the verifying SBF displays a graphic of the precipitation observations with contour lines drawn to indicate the amounts of precipitation wherever it has been observed over the U.S. The verifying SBF then reviews this graphic to ensure there are no noticeable errors or large numbers of missing precipitation data. As required, the verifying SBF corrects observational errors on the graphic and supplements missing data areas based on radar information. Once satisfied with the quality of the observed precipitation graphic, the verifying SBF runs various workstation programs that provide needed calculations, save the information, and print out a copy of the statistics and graphics generated.

With each passing day, a similar procedure is followed. Once all forecasts for the month have been verified, the verifying SBF runs a computer program on workstation (called QPFV) that calculates the monthly values for threat score, equivalent threat score, bias, probability of detection, and false alarm rate for various precipitation thresholds (0.5, 1.0, 2.0, 3.0, 4.0, 5.0, and 6.0 inches), saves this information on workstation QPFV, and prints out a copy of the monthly statistics. Workstation QPFV data are backed up once a month to two places – tape and another workstation. Information in the fundamental verification database is write protected and can only be modified or deleted under one user account, which is under the control of a GS-13 meteorologist, whose primary job is not forecasting but techniques development. This account is password protected.

Several important points should be noted. First, although the accuracy scores are low with respect to perfection, the accuracy is clearly high enough to be of major utility to America’s decision makers. As indicated by the numerous requests for HPC’s precipitation products, especially in times of hardship, the

Federal Emergency Management Agency (FEMA), Army Corps of Engineers, the media, and farmers among others all rely heavily on NOAA forecasts to decide how to proceed.

Secondly, the scores are continuing to improve in accuracy. The metrics from the last 40 years indicate the day 2 forecasts of at least one inch of precipitation in 2004 had similar skill to the day 1 forecasts in 1985, and HPC’s day 3 forecasts in 2004 were as accurate as the day 2 forecasts in 1995.

**FY 2006 and 2007 Targets**

NOAA has an intensive effort internally and with its partners to improve the accuracy of its numerical weather prediction models, as well as enhance the global observing system providing the foundation for observations needed by these models. During the next several years, NOAA will implement several numerical weather prediction model enhancements aimed at improving heavy precipitation forecasts.

In addition, NOAA delivered and installed an upgrade to its Central Computer System in 2004 and began operational implementation in January 2005 that is improving the delivery of products to the field and providing system users with enhanced productivity. Investments are also being made to expand the Hydrometeorological Testbed at the HPC in FY 2006 for the purpose of improving precipitation prediction. This will include assessing scientific breakthroughs and new techniques to identify advanced, real-time, data analysis and forecast techniques, numerical forecast models and methods, observational systems, and climate-water-weather linkages that could significantly improve the forecast guidance which are necessary to improving quantitative precipitation forecasts through seven days. New training and forecast tools are also planned over the next couple of years. The combination of these activities will lead to improvements in Quantitative Precipitation Forecasts over the course of the next decade.

**Program Increases**

The following program increases are directly related to this performance measure (\$K):

Environmental Modeling		1,800	Maintain operational software code and manages the new advanced environmental prediction model system, the Earth System Modeling Framework, in NOAA	NWS-32
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### **Measure 3e: Lead Time (Hours) and Accuracy (%) of Winter Storm Warnings**

#### **Explanation of Measure**

A winter storm warning provides NOAA customers and partners advanced notice of a hazardous winter weather event that endangers life or property, or provides an impediment to commerce. Winter storm warnings are issued for winter weather phenomena like blizzards, ice storms, heavy sleet, and heavy snow. This performance indicator measures the accuracy and advance warning lead time of winter storm events. Improving the accuracy and advance warnings of winter storms enables the public to take the necessary steps to prepare for disruptive winter weather conditions.

#### **FY 2006 and FY 2007 Targets**

The performance indicator measuring the accuracy and advance warning lead time of winter storm events will rise to 90 percent accuracy and 15 hours lead time in FY 2006 and FY 2007. These advancements will be attributed to improvements in numerical weather prediction, super computer upgrades, the use of ensemble modeling forecasting techniques, and local training initiatives.

### **Measure 3f: Cumulative Percentage of U.S. Shoreline and Inland Areas that Have Improved Ability to Reduce Coastal Hazard Impacts**

#### **Explanation of Measure**

This measure tracks improvements in NOAA's ability to assist coastal areas with estimating the risks of natural hazards in U.S. coastal regions. Activities are underway to develop a coastal risk atlas that will enable communities to evaluate the risk, extent, and severity of natural hazards in coastal areas. The risk atlas will help coastal communities make more effective hazard mitigation decisions to reduce the impacts of hazards to life and property. Currently, many coastal communities make major decisions on land use, infrastructure development, and hazard responses without adequate information about the risks and possible extent of natural hazards in their area. Through the coastal risk atlas, NOS, with other Federal and state agencies, will provide a mechanism for coastal communities to evaluate their risks and vulnerabilities to natural hazards for specific U.S. coastal regions and improve their hazard mitigation planning capabilities.

#### **FY 2006 and 2007 Targets**

NOAA began working to expand phase II of the Coastal Risk Atlas to other areas within FEMA Region IV (North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi) during FY 2003. This expansion will not result in an increase to the target for FY 2004, but results in an increase in FY 2005. The completion of the expansion in FY 2005 will increase the cumulative total to 26,778 miles of the total shoreline, 97,128, or 28 percent. This increase will consist of 2,344 mile of shoreline for Georgia and 7,721 miles of shoreline for Louisiana. An evaluation at the end of the phase II expansion will determine the feasibility of continued expansion of the Coastal Risk Atlas beyond FY 2005. If continued

expansion is deemed feasible, efforts will focus on adding Oregon and Texas to the Coastal Risk Atlas. This increase will consist of 1,357 of shoreline for Oregon (53 of the total 1,410 miles of shoreline for Oregon has previously been attributed towards this measure in FY 2001) and 3,359 miles of shoreline for Texas. For 2007, the coastal risk atlas will be expanded to include Maryland and Virginia.

**Program Increases**

The following program increase is directly related to this performance measure (\$K):

Coastal Services Center/Ocean.US activities in support of IOOS Implementation	-	\$ 700	NOAA’s work will assist the Nation in living up to the U.S. commitment to the GEOSS and the President’s Ocean Action Plan. This effort will connect our national coastal community and decision makers to national, state, and local information, tools and data in support of coastal and oceanic resources stewardship, usage, and health. Implementing and sustaining the global component and the national backbone are federal responsibilities in terms of both funding and implementation, and NOAA plays a critical leadership role.	NOS-33
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**Program Evaluation**

NOAA’s vision for FY 2006 is to provide significantly improved short-term warning and forecast products and services that enhance public safety and the economic productivity of the Nation. While it is difficult to see the improvements on an annual basis because of the scientific nature and seasonal variations of weather events, historical trends have shown that NOAA continues to improve the accuracy and advance warning lead time of severe weather hazards.

Program evaluations at NWS Field Offices are conducted annually. Quality control procedures are followed to ensure the highest reliability of gathered data and weather products. The National Academy of Sciences is also involved in program analysis and evaluation processes on a national level.

## **Cross-cutting Activities**

### **Intra-Department of Commerce**

NOAA works closely with the National Institute of Standards and Technology and the Economic Development Administration on the Federal Natural Disaster Reduction initiative, which focuses on reducing the costs of natural disasters, saving lives through improved warnings and forecasts, and providing information to improve resiliency to disaster.

### **Other Government Agencies**

NOAA also works closely with other agencies such as the Federal Emergency Management Agency, the Corps of Engineers, the Bureau of Reclamation, the Department of Defense, as well as state and local governments to complement their meteorological services in the interest of national security. NOAA works closely with the U.S. Coast Guard to disseminate marine weather warnings and forecasts and works directly with the Federal Aviation Administration on aviation forecasts and with the National Aeronautics and Space Administration on launch forecasts and solar forecast effects.

### **Government/Private Sector**

Weather and climate services are provided to the public and industry through a unique partnership between NOAA and the private meteorological sector. NOAA provides forecasts and warnings for public safety, and the private sector promotes dissemination of forecasts and tailors basic information for business uses.

### **External Factors and Mitigation Strategies**

A number of factors unique to the atmospheric sciences must be considered when reviewing the performance measures for this goal. The primary factor to consider is the natural variation of this goal related to annual fluctuations in meteorological conditions. Another factor concerns the damage to critical equipment (for example, supercomputer fire and satellite outages) that can affect daily operations for extended periods, even though numerous safety measures and backup procedures are in place.

Although the performance measures for this goal may improve, the impact on society may not be obvious because of factors beyond our control. For example, hurricane warnings may become more accurate, but because of the increase in population along the coastlines, the deaths, injuries, and/or damage estimates may increase.

Improving our understanding of the natural environment requires advanced infrastructure and therefore continual investment in new technology such as supercomputers and environmental satellites.

NOAA relies on its partners in the media, private sector, and the state and local emergency management community to disseminate weather warnings.

**Performance Goal for Commerce and Transportation: Support the Nation's commerce with information for safe, efficient, and environmentally sound transportation**

**DOC Strategic Goal 3: Observe, protect, and manage the earth's resources to promote environmental stewardship**

General Goal/Objective 3.2: Enhance the conservation and management of coastal and marine resources to meet America's economic, social and environmental needs

Safe and efficient transportation systems are crucial economic 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 warnings associated with severe weather threats, marine navigation products and services, and improved positioning data can better support the growing commerce on our road, rail, and waterways through improvements in transportation safety and just-in-time efficiencies. For example, the U.S. Marine Transportation System (MTS) ships over 95 percent of the tonnage and more than 20 percent by value of foreign trade through America's ports, including 48 percent of the oil needed to meet U.S. energy demands. Merchandise trade valued at over \$729 billion moved by maritime vessels between U.S. and foreign seaports in 2002. Container shipments increased 86 percent between 1992 and 2002. Every year, 134 million passengers are ferried to work and other destinations on U.S. waterways, along with 5 million cruise ship passengers. Better aviation weather information could significantly reduce the \$5 billion that is lost through economic inefficiencies as a result of weather-related air traffic delays. Improved surface forecasts and specific user warnings would likely reduce the 7,000 weather-related fatalities and 800,000 injuries annually from vehicle crashes.

As U.S. dependence on surface and air transportation grows over the next 20 years with significant increases in the volume of land transportation and the projected doubling of maritime trade, better navigation, and weather information will be critical to protect lives, cargo, and the environment. NOAA is committed to improve the accuracy of its marine forecasts, provide advanced electronic navigational charts and real-time oceanographic information, and maintain a precise positioning network that mariners need to navigate with confidence. Consistent, accurate, and timely positioning information derived from NOAA's positioning services is critical for air and surface activities such as aircraft landings and improving the safety and efficiency of road and rail delivery.

NOAA partners in the academic, government, and private sectors are essential to realizing this goal. Improved NOAA information will enable the private weather sector to provide better weather-related forecasts and information to their clients for improved efficiencies. NOAA will work with the Federal Aviation Administration and the private sector to reduce the impacts of weather on aviation without compromising safety. Reducing the risk of marine accidents and oil spills, better search and rescue capabilities, and other efficiencies that can be derived from improved navigation and coastal and ocean information and services could be worth over \$300 million annually around the Nation's coasts. NOAA will work 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. On land, improvements in weather information will be used more effectively to reduce the \$42 billion annual economic loss and the 500 million vehicle hour delays attributed to weather-related crashes.

<b>Program Initiative</b>	<b>FTE</b>	<b>Funding Request</b>	<b>Anticipated Impact</b>	<b>Location in the Budget</b>
Hydrographic and Shoreline Data Efficiencies	-	\$ 900	Improve the accuracy of data acquisition and accelerate the delivery of navigation information to the maritime community for safe, efficient, and environmentally sound marine transportation. Reduces the amount of time it takes to collect hydrographic data, process it, apply it to the chart, and disseminate the chart to mariners.	NOS-13
Autonomous Underwater Vehicle (AUV)/Light Detection and Ranging (LIDAR) Research and Development	-	\$ 700	Increased rates of survey coverage, more effective deployment of personnel and fleet resources to survey complicated inshore areas, increased survey operation hours, greater accuracy and efficiency in ship-based multi-beam surveying by using AUVs to automate water column sampling for data validation.	NOS-10
National Vertical Transformation Tool Database (Vdatum)	-	\$ 1,000	Enables NOAA to begin work on expanding VDatum to Alaska, Hawai‘i, and territories in 2008 concurrently, much sooner than the 2011 start date under the FY 2006 funding level.	NOS-11
Increase Physical Oceanographic Real Time System® (PORTS) locations	-	\$ 700	Enable NOAA to expand the cost shared PORTS® partnership by approximately 35 additional U.S. seaports over a five-year time frame and enable a total of approximately 85 US seaports to have access to quality controlled real-time data.	NOS-26
Update Current Observations	-	\$ 500	Ensure that NOAA’s Annual Tidal Current Table predictions are accurate by systematically conducting observations to update tidal current predictions that are based on old or insufficient data. Increase the number of tidal current observation locations being updated from 70 per year to 90 per year (35 in priority areas and 55 in remaining areas), continuing the significant progress begun in FY 2006 toward an acceptable recycle rate (130 stations/year total) for the system.	NOS-25
Aviation Weather	-	\$ 1,200	Expands a multi-year effort to improve aviation weather services. Will enable procurement and fielding of 75 additional water vapor sensors as part of an Integrated Upper Air Observing system, and transition additional products to a digital environment.	NWS-25

## **Measure 4a: Reduce the Hydrographic Survey Backlog within Navigationally Significant Areas (square nautical miles surveyed per year)**

### **Explanation of Measure**

NOAA conducts hydrographic surveys to determine the depths and configurations of the bottoms of water bodies, primarily for U.S. waters significant for navigation. This activity includes the detection, location, and identification of wrecks and obstructions with side scan and multi-beam sonar technology and the Global Positioning System (GPS). NOAA uses the data to produce traditional paper, raster, and electronic navigational charts for safe and efficient navigation. In addition to the commercial shipping industry, other user communities that benefit include recreational boaters, the commercial fishing industry, port authorities, coastal zone managers, and emergency response planners. Ships traversing our coastal waters rely on charts based on sounding data that are more than 50 years old in many places. NOAA has identified approximately 510,000 square nautical miles of the U.S. Exclusive Economic Zone as navigationally significant and in need of resurvey. Since 1994, NOAA has focused primarily on surveying and reporting its accomplishments in the highest priority areas, many of which carry heavy commercial traffic, are less than 30 meters deep, and change constantly. However, this critical area constitutes only a small portion (8 percent) of the entire navigationally significant area used by large commercial vessels and recreational boaters. The square nautical miles reported in the table above reflect data collected within all areas designated as navigationally significant. NOAA's surveying activities balance in-house resources with private sector contracts and use the latest full-bottom coverage sounding technologies to survey the nation's coastal areas for navigation.

Weather, mechanical failure, and level of surveying difficulty are variables for both NOAA and its contractors, and therefore variances from the targets of +/- 50 square nautical miles per vessel are to be expected in a normal field season.

### **2007 Target**

The FY 2007 production is now estimated at 2800 SNM due to best estimates of operational capability. The FAIRWEATHER will still carry two launches, rather than four, which reduces the number of miles this platform can collect. The RAINIER and its launches are showing their age; hull, engine, and equipment issues on this 40-year old vessel are expected to impact performance in 2006 as well as 2007. Planned performance may be enhanced by NOAA's evaluation of a pilot project to collect hydrographic data while vessels are en route. If successful, NOAA hopes to expand the effort to all NOAA platforms carrying multibeam sonar systems to increase square nautical miles of navigationally significant data gathered. Contracts for hydrographic services will continue to be focused in critical waters on the Alaskan coast and the Gulf of Mexico for FY 2006 and 2007.

### **Changes to FY2006 Target**

Due to the problems cited above, the FY 2006 target was revised downward from 3,500 as reported in the FY 2006 APP.

## **Measure 4b: Percentage of U.S. counties rated as enabled or substantially enabled with accurate positioning capacity**

### **Explanation of Measure**

This new measure in FY 2006 tracks the progress of NOAA's Geodesy Program in facilitating the capacity of state and local governments and the private sector to utilize accurate positioning information. NOAA will track county level use of its Online Position User service (OPUS) to determine how well state and local governments are enabled with accurate positioning capacity. Assessing state and local government and private sector usage at the county level is the most appropriate geographic unit. County-level assessments offer entire U.S. coverage and an existing infrastructure for addressing spatial issues. Utilizing OPUS is the right indicator for how well a county is enabled with accurate positioning capacity, because its usage requires a high level of positioning sophistication. Further, OPUS is a necessary step in obtaining accurate positions.

The level of capacity varies across the nation. This variation is measured as deficient, sufficiently enabled, and enabled. Deficient capacity to conduct accurate positioning indicates that the county has not demonstrated it has the NOAA-enabled infrastructure, tools, and local capacity needed for accurate positioning. Substantially enabled capacity to conduct accurate positioning indicates the county has demonstrated it has the NOAA-enabled infrastructure, tools, and local capacity needed for accurate positioning. Enabled capacity indicates the county has validated NOAA-enabled infrastructure, tools, and local capacity needed for accurate positioning. This is indicated by having local interaction through, for example, a submitted and accepted OPUS project for inclusion in the NOAA's geodetic database.

### **FY 2006 and FY 2007 Targets**

Respectively, the targets for FY 2006 and FY 2007 will be 37 percent and 47 percent of U.S. Counties rated as enabled or substantially enabled. In other words, the targets for FY 2006 and FY 2007, respectively, will be 35 percent and 42 percent of U.S. Counties rated as substantially enabled and 2 percent and 5 percent of U.S. Counties rated as enabled. FY 2006 and FY 2007 targets have been revised upward to reflect both increased user demand for the relatively new OPUS tool and the availability of more data from which to determine performance trends. Greater demand for OPUS is the result of effective outreach efforts and increased partner funding for new Continuously Operating Reference Stations (CORS) from which OPUS solutions are derived.

## **Measure 4c: Accuracy (%) and False Alarm Rate (FAR) (%) of Forecasts of Ceiling and Visibility (3 Miles/1000 Feet) (Aviation Forecasts)**

### **Explanation of Measure**

This measure originally covered "1/4 mile/200 feet." Conditions of a 200-foot ceiling and one quarter mile visibility are components of the FY 2002 and earlier performance measure accuracy and false alarm rate percentages. However, these conditions are rare events. Because of the infrequency of these conditions, the performance measure poorly captured the operational impact of NWS aviation forecasts. The NWS decided that a better criterion of

performance is an aviation performance measure based on a 1000-foot ceiling and three miles of visibility for both accuracy and false alarm rate, and is related to Instrument Flight Rules (IFR) conditions.

In accordance with the NWS strategic plan, this measure was added in FY 2000 to reflect a segment of customers that had not been represented in other performance measures. Visibility and cloud ceiling forecasts are critical for the safety of aircraft operations. Accurately forecasting the transition between Visual Flight Rule and IFR conditions significantly improve general and commercial aviation flight planning capabilities, improving both flight safety and efficiencies.

**FY 2006 and 2007 Targets**

NWS expects to see continued improvement of aviation forecasts for low ceiling and visibility. This will be accomplished through the implementation of an improved observational sensing strategy, higher resolution forecast models, and improved guidance tools integrated into AWIPS and the Aviation Forecast Preparatory System for our meteorologists to focus on this forecast challenge. In addition, training in low ceiling and visibility forecasting will be received by more NWS meteorologists in FY 2005.

**Program Increases**

The following program increase is directly related to this performance measure (\$K):

Aviation Weather	-	\$ 1,200	Expands a multi-year effort to improve aviation weather services. Will enable procurement and fielding of 75 additional water vapor sensors as part of an Integrated Upper Air Observing system, and transition additional products to a digital environment.	NWS-26
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**Measure 4d: Accuracy (%) of Forecast for Wind Speed and Wave Height (Marine Forecasts)**

**Explanation of Measure**

This measure was originally a “combined accuracy forecast for marine wind and wave.” The measure has been revised to reflect the individual wind speed and wave height components. This performance indicator measures the accuracy of wind and wave forecasts, which are important for marine commerce.

In accordance with the NWS strategic plan, this measure was added in FY 2000 to reflect another segment of customers (marine) that had not been represented in other performance measures. The FY 2005 and FY 2006 goals have been updated to reflect recent performance and reductions in ongoing NWS training, operations, and research funding in the FY 2005 enacted budget. Loss of funding for marine training workshops will

directly affect partnering opportunities to bring in marine experts outside NWS and NOAA to help train in marine meteorology. Partnerships make it possible for NWS to develop cost-effective expansion of the marine observation network and growth in research (i.e., GLERL wave model). Loss of research partnerships and fewer observations will translate into weaker scores.

### **FY 2006 and 2007 Targets**

NWS will continue to improve marine forecast (wind speed and wave height) accuracy through the implementation of higher resolution models on AWIPS, enhanced observation networks, and expanded training for marine forecasting. More advanced smart tools applied to digital wind data should improve wave height forecasts. NWS partnerships with boating organizations (such as U.S. Power Squadron) have yielded more marine observations that can be displayed as plots on AWIPS. Future releases and upgrades to AWIPS Interactive Forecast Preparation System software used by NWS forecasters for forecasts and warnings will help NOAA attain outyear goals. The marine Professional Development Series effort continues, with three modules already on-line and six more expected on-line by the end of FY 2006.

### **Program Evaluation**

NOAA's goal to promote safe navigation is evaluated at a variety of levels, from peer reviews of products, papers, and projects, to internal and external reviews of entire programs and quarterly reviews of NOAA's overall performance in navigation products and services. Constituent input is an important part of the evaluation process and is solicited regularly through constituent workshops.

From 1992 to 1996, a number of National Research Council Marine Board studies examined the nautical charting program and its transition into the digital era. NOAA incorporated study recommendations on areas such as reducing the survey backlog, implementing new digital production techniques, and delivering new electronic chart products to the program. The Hydrographic Services Improvements Act of 1998 provided Congress and NOAA an opportunity to evaluate NOAA's capabilities for acquisition and dissemination of hydrographic data, develop standards and formats for hydrographic services, and contract for the acquisition of hydrographic data. NOAA now contracts out over 50 percent of its annual critical area hydrographic survey requirements while maintaining Federal competence and expertise with existing and developing surveying technologies. NOAA is currently studying its contracting policy with a target date of April 2006 for publishing revisions.

In 1998, Congress authorized 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 Nation in terms of dollars and lives saved associated with GPS technology, and it led to current development of the vertical component of the National Spatial Reference System. 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. The September 1999 Report to Congress that assessed the U.S. Marine Transportation System (MTS) further articulated the need for coordinated Federal leadership to achieve the MTS vision of becoming the world's most technologically advanced, safe, efficient, globally competitive, and environmentally responsible system for moving goods and people. NOAA's navigation safety support functions

underwent substantial review to identify opportunities for greater integration among Federal agencies. More recently, the 2003 National Academy of Sciences Report on establishing a *Geospatial Framework for the Coastal Zone*, the Transportation Research Board's 2004 examination of the Federal Role in the Marine Transportation System, the 2004 U.S. Commission on Ocean Policy report and the U.S. Ocean Action Plan have guided NOAA's approach to integrating and delivering its Navigation Services programs.

### **Cross-cutting Activities**

#### **Intra-Department of Commerce**

In partnership with the Technology Administration and National Telecommunications and Information Administration within the Department of Commerce and other civil agencies from all civil departments, NOAA participates on the Interagency GPS Executive Board, which with the Department of Defense jointly manages the GPS satellite program as a national asset. Now a dual-use system heavily employed by civilian and commercial sectors, GPS is a global information utility that the United States has committed to provide free to the world for use as the international standard for navigation, positioning, and timing.

#### **Other Government Agencies**

NOAA works closely with agencies such as the Department of Transportation (DOT), the U.S. Coast Guard, and the U.S. Army Corps of Engineers in support of Marine Transportation System goals and objectives to identify and improve navigation services for maritime commerce while preserving navigation and environmental safety. NOAA and DOT also cooperate on the development of the Nationwide Differential GPS System, which employs NOAA's Continuously Operating Reference Stations to enable highly accurate GPS positioning in three dimensions across the nation. This system benefits from a multipurpose cooperative effort among government, academia, and the commercial sector and supports numerous NOAA objectives and activities. In addition, NOAA and DOT's Federal Highways Administration are partnering to improve road weather forecasts for surface transportation, and NOAA is participating in the Next Generation Air Transportation System Joint Planning & Development Office with the Federal Aviation Administration and other agencies to improve aviation weather for efficiency gains and safety improvements. NOAA's navigation and weather for transportation services also play a role in emergency and Homeland Security preparation and response.

#### **External Factors and Mitigation Strategies**

Weather has a significant impact on the promotion of safe navigation activities. Both in-house and contract hydrographic survey schedules can be affected by adverse weather conditions and equipment failure, as can aerial photography flights scheduled for shoreline photogrammetry. Storm damage frequently renders water-level stations inoperable, affecting surveying capabilities and real-time observations of water levels and currents so critical to safe navigation. Natural disasters such as earthquakes and hurricanes can elevate the need to survey an area because of shoreline changes or obstruction accumulation; man-

made impacts such as shifts in shipping patterns, newly regulated shipping lanes, port expansions, or wrecks will also impact NOAA's survey schedule. Finally, in addition to mission activities, NOAA ships and aircraft provide immediate response capabilities for unpredictable events such as search and recovery efforts after the TWA Flight 800 and Egypt Air Flight 990 crashes; damage assessments after major oil spills such as the Exxon Valdez and the grounding of the New Carissa off the Oregon coast in 1999; and severe hurricanes, most recently Isabel in 2003, Charlie and Ivan in 2004, and Dennis in 2005. NOAA mitigates these impacts with backup plans for relocating assets to other projects, or by reassessing survey schedules.

**Performance Goal for Mission Support: Provide critical support for NOAA’s Mission**

**DOC Strategic Goal 3: Observe, protect, and manage the earth’s resources to promote environmental stewardship**

Strong, effective, and efficient support activities are necessary for us to achieve our Mission Goals. Our facilities, ships, aircraft, environmental satellites, data-processing systems, computing and communication systems, financial and administrative offices, and our approach to management provide the foundation of support for all of our programs. This critical foundation must adapt to evolving mission needs and, therefore, is an integral part of our strategic planning. It also must support US homeland security by providing NOAA services, such as civil alert relays through NOAA Weather Radio and air dispersion forecasts, in response to national emergencies. NOAA ships, aircraft, and environmental satellites are the backbone of the global Earth observing system and provide many critical mission support services. To keep this capability strong and current with our Mission Goals, we will ensure that NOAA has adequate access to safe and efficient ships and aircraft through the use of both NOAA platforms and those of other agency, academic, and commercial partners. We will work with academia and partners in the public and private sectors to ensure that future satellite systems are designed, developed, and operated with the latest technology. In addition, safe and adequate facilities and state-of-the-art information technology are essential to the improvement of NOAA’s operations and service delivery. NOAA’s long-range facility planning and comprehensive maintenance planning are underway with the goal to ensure right-sized, cost-effective, and safe facilities.

To achieve our Mission Goals, we must also commit to organizational excellence through management and leadership across a “corporate” NOAA. We will provide effective administrative, financial, and information technology services that enable us to deliver effective products and services. We will continue to improve the policy, programmatic, and managerial functions that support our Mission Goals. Our administrative and finance programs will ensure effective communication inside and outside NOAA, and efficient management of our assets, business processes, and financial resources.

<b>Program Initiative</b>	<b>FTE</b>	<b>Funding Request</b>	<b>Anticipated Impact</b>	<b>Location in the Budget</b>
General Counsel – PRC	2	\$150	Provides necessary procedural and legal advice in Honolulu, Hawai‘i to support decision-making by NOAA at the Western Pacific Fishery Management Council, as well as National Ocean Service in connection with National Marine Sanctuaries matters.	PS-7
End-to-End Resource Management System	-	\$2,000	Funding will be used to acquire and implement an integrated system to supporting NOAA’s planning, programming, budgeting, and execution processes. Implementation of an integrated end-to-end resource management system will provide the information needed for the effective implementation of GPRA within NOAA. The system will reduce the need for manual processes, increase user friendliness, speed information to decision makers, and lessen the reliance on "cuff"	PS-15

			systems to formulate, execute, and track NOAA's budget.	
Facilities Program office - trans from NWS	-	\$ 1,000	Transfers Planning and Design funding from the National Weather Service, WFO Construction to the Facilities Planning and Design Fund. Funds will be applied to products or deliverables commonly incorporated in feasibility studies, program/schematic design, scope definition and conceptual planning.	PS-33
Office of Education and Sustainable Development	-	\$3,463	Provides funding to continue implementation of the NOAA Education Plan, as well as priority education recommendations of the (US Commission on Ocean Policy) USCOP and fund the JASON Education and Outreach programs.	PS-24
Pacific Region Center	-	\$23,753	This project will consolidate NOAA's current locations on the island of O'ahu (with the exception of the Weather Forecast Office), including docking space for the three NOAA ships currently based in Hawai'i. This project would serve the long-term and unique needs of a science and research facility, provide space needed to support the needs of NOAA and its international efforts with the Pacific Rim nations, afford the opportunity for management consolidation in a new facility, and provide a facility that allowed NOAA to make its program and science more accessible to the public.	PAC-84
Maritime Crew Safety and Rotation	-	\$1,200	To enable NOAA to enhance safety aboard NOAA vessels. NOAA's fleet has experienced a high turnover rate; this program will use positions throughout the fleet to improve time off availability for personnel with the goal of stemming the departure of well-trained personnel. The principal intent of crew safety-training and rotation is to provide sufficient manpower in order to safely navigate; to conduct safe operations; to respond to potential emergencies (i.e., fire, accidents, etc.); and to provide adequate maintenance for the NOAA Fleet.	PS-45
Remote and Advance Diving Program	-	\$940	In order to close the deficiency gap between the 100% program requirement and the current diving program, two additional hyperbaric treatment systems and three hyperbaric stretchers are needed. The hyperbaric stretchers will be used to transfer an injured diver to a treatment chamber. Additional requirements include developing and procuring new advanced diving technologies, funding logistics associated with transport and support of the hyperbaric systems, and preparing office and equipment storage space at the NOAA Diving Center.	PS-48
G-IV Instrumentation	-	\$680	To support the G-IV instrumentation upgrade the NOAA G-IV aircraft is being modified by adding extensive instrumentation in order to provide data to the National Weather Service (NWS) Hurricane Weather Research and Forecasting (HWRF) computer model. This instrumentation will provide the operational and maintenance support required to operate and maintain the instrumentation on the aircraft, process	PS-62

			and transmit the data from the aircraft, and receive, conduct quality control, format, and submit the data for assimilation into the HWRF model.	
Operations and Maintenance of New NOAA Vessels	-	\$4,100	NOAA requests an increase of 0 FTEs and \$6,000,000 for the additional operational needs of NOAA's new vessels. These ships are newer additions to NOAA's fleet over the last two years and have fuel, supply, and crew needs that cannot be absorbed in NOAA's current budget.	PS-50
FSV #3 Operations	5	\$ 400	For first-year operation of NOAA's third vessel in a four-vessel construction contract. FSV 3 will join the Alaska and North East FSVs in providing high-quality series surveys and data collection for the NOAA Fisheries Southeast Science Center Mississippi Laboratory. FSV 3 is scheduled to be delivered fourth quarter, FY 2007. The vessel will be homeported in Pascagoula, Mississippi.	PS-53
Maintenance Differential for NOAA Ships	-	\$2,000	The newer additions to NOAA's fleet have higher costs for maintenance, repairs and spare parts that can not be absorbed in NOAA's current budget. By stocking the vessels with spare parts, disruptions in scientific cruises due to early returns to homeports or detours to other piers for unexpected repairs will be averted.	PS-56
FSV #3 Maintenance	-	\$ 100	For first-year maintenance of NOAA's third vessel in a four-vessel construction contract FSV 3 will join the Alaska and North East FSVs in providing high-quality series surveys and data collection for the NOAA Fisheries Southeast Science Center Mississippi Laboratory. FSV 3 is scheduled to be delivered fourth quarter, FY 2007. The vessel will be homeported in Pascagoula, Mississippi.	PS-57
FSV #3 Construction	-	\$ 5,600	To restore construction funds rescinded in FY 2004 from the FSV construction program FSV 3 is NOAA's third vessel in a four-vessel construction contract, and the ship will come on line late in FY 2007. The continued construction of this FSV will enable NOAA to acquire acoustically quiet ships that reduce behavioral responses of species during surveys and minimize interference with hydroacoustic signals. The ships also permit extended research missions and are capable of performing multiple missions including surveys using many different methods of fishing and physical and biological oceanography.	PAC-98
Aircraft Equipment and Technology Refreshment	-	\$1,900	Primary data instrumentation on NOAA aircraft is aging to the point of being unsupportable. Precision laser probes used to measure cloud particles have been in service for almost 30 years, far exceeding the normal serviceable life for this type of instrument. Similarly, the liquid water probes were originally purchased in the 1970s. However this program will provide data collection and data transmission upgrades for various aircrafts for both the support of Weather and Water and other	PAC-113

			NOAA goals and members of the NOAA user community.	
Vessel Equipment and Technology Refreshment	-	\$ 5,800	The SWATH affords a significant improvement in seakeeping (increased stability), thereby allowing it to operate in higher sea states. By providing operational expertise on this leading-edge mission equipment, NOAA personnel participation and management of hydrographic survey operations and integration of the latest survey technology will be enhanced. Equipment to be purchased includes a Multi-beam Sonar, a High-Speed / High-Resolution Side Scan Sonar, Vessel Motion and Positioning Sensors, and an Underway Sound Velocity Profiler.	PAC-95
Hydro Survey Launch Construction	-	\$ 3,600	Funds provide for the construction of six Hydrographic Survey Launches. These survey launches will significantly increase the capacity of the NOAA fleet to collect hydrographic data. Survey launches are a force multiplier that contributes to the reduction of NOAA's backlog of Navigationally Significant areas. New survey launches with greatly improved reliability, handling, and speed will enhance hydrographic data collection rates.	PAC-105
ASSERTIVE Conversion	-	\$1,000	Funds develop engineering design for a Navy T-AGOS vessel, ASSERTIVE, to replace NOAA's fisheries survey vessel, DAVID STARR JORDAN, which studies the biological and physical oceanography of the southwestern U.S. coast and the eastern tropical Pacific. The ASSERTIVE will enable NOAA Fisheries to continue to collect data currently being acquired by DAVID STARR JORDAN, thereby preventing fish over-harvest or implementation of more conservative management regimes that may negatively impact the fiscal well being of harvesters, processors, and the supply of seafood available to the public.	PAC-106
HENRY B. BIGELOW Calibration	5	\$3,500	Funds the cost associated with the calibration of the HENRY B. BIGELOW (FSV2) with the ship it eventually will replace, ALBATROSS IV. Funding will be required to meet the 18-month overlap requirement to calibrate ground fish surveys. This overlap will be performed to maintain the consistency and continuity of stock assessments time-series data. It is imperative to replace the capabilities of existing platforms with new vessels and technologies that are calibrated with older vessels by performing side-by-side surveys.	PAC -101
Temporary Berthing of BIGELOW	-	\$1,000	Addresses berthing issues associated with delivery of NOAA's second new FSV, HENRY B. BIGELOW, which is to homeported at the NOAA's Northeast Fisheries Science Center (NEFSC) at Woods Hole, Massachusetts. Funding is needed to provide temporary berthing of BIGELOW while the agency analyses homeporting options for this new Fisheries Survey Vessel.	PAC-108

Global Earth Observing Integrated Data Environment (GEOIDE)	-	\$2,000	Develop and implement a NOAA integrated data management system of systems plan. Identify commonalities among data management systems and determine where integration is needed to meet validated requirements. Analyze costs/benefits to determine levels and priorities for integration and build enabling components needed for integration. Identify and evaluate Goal Theme data management systems suitable for integration and develop integrating elements for the highest priority systems. Enhance our ability to address societal issues by providing easier access and use data and information from several theme areas; enable access to data and information across various NOAA goals, programs and observing systems in timely, scientifically valid, and user-friendly ways; and lower the cost of doing business through improved efficiency and reduced duplication.	NESDIS-10
NPOESS	-	\$20,278	NOAA's share of the converged NOAA/DoD/NASA NPOESS program that will replace the NOAA POES program. Continue development and production of the NPOESS instruments, including the Visible Infrared Image radiometer (VIIRS), the Conical Microwave Imager Sounder (CMIS), the Cross-track Infrared Sounder (CrIS), the Ozone, Mapping and Profiler Suite (OMPS), the Aerosol Polarimetry Sensor (APS), and the Space Environmental Sensing Suite (SESS).	PAC-47
GOES R	-	\$105,300	Continue the procurement of spacecraft, instruments, launch services, and ground systems equipment necessary to maintain an uninterrupted flow of environmental data to users. GOES data supports: cloud images and precipitation estimates for hurricanes; sea surface temperature products for locating commercial and sport fish as well as protected marine species; weather information to emergency managers in times of severe weather and during other disasters; new research products, such as ocean surface currents, that support both ecosystems management and safety of marine navigation; primary information in the Nation's Climate Reference Network; images of the U.S. and adjacent ocean areas to enable the detection of hurricanes and other major weather events; data collection from remote fixed observing platforms such as buoys and rain gauges for use in numerical weather prediction models and flood/drought assessments; a means to obtain quantitative environmental data such as temperature, moisture, wind, radiation and solar energy particle flux for use in weather predictions, hydrometrological flux, climate long term trending, ecosystems management, commercial economic gain, and transportation safety; and unique monitoring capabilities that support air, land, and marine transportation.	PAC-40

LANDSAT	-	\$2,000	Continue the integration of Landsat sensors for incorporation on NPOESS satellites C1 and C4. NOAA, NASA, and USGS have cooperatively implemented a continuity plan for Landsat. Under this plan, NOAA is responsible for funding sensor integration, as well as future continuity of the data sets. The inclusion of LANDSAT data will enhance land and coastal observations for NPOESS by providing seasonal global coverage at a 30m spatial resolution.	PAC-50
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There are no GPRA measures for the Mission Support goal since the activities of this goal support the outcomes of the Mission goals. NOAA is developing new and improving existing internal management performance measures for the Mission Support Goal.

## NOAA Data Validation and Verification

NOAA’s Budget Office coordinates an annual review of the performance data to ensure that it is complete and accurate. During this process, significant deviations from projected targets, if any, are discussed with the appropriate NOAA Line Office so that changes or corrections can be made to help meet NOAA’s performance goals. The actual validation process is conducted by individual NOAA Line Offices. The verification aspects depend on individual Line Office. For oceans and fisheries-related measures, stock assessments and reviews (internal, and/or peer) are common. For weather related measures, the verification process is, among other things, through comparison of predicted weather to the actual event. For the climate-related measures, verification is through, among other things, quality control of data. Satellite data are compared with on site data to help validate data accuracy.

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
Measure 1a: The Fish Stock Sustainability Index (FSSI)	Stock assessments and status determinations	Quarterly	NMFS Stock Information System (SIS)	Results will be reported monthly in a signed memo from the Fishery Management Program Manager to the NMFS Chief Financial Officer and are housed and made available on an intranet site managed by the NMFS Office of Management and Budget; monthly reporting on performance to NOAA Deputy Under Secretary	Results can only be reported when the SIS is updated with new information from the field	
Measure 1b: Percentage of Living Marine Resources with Adequate Population Assessments and Forecasts	Stock assessments reports and ESA status reviews	Quarterly	NMFS Stock Information System (SIS) and Excel spreadsheet maintained by NMFS’s Office of Protected Resources	Results will be approved by the NMFS Chief Science Advisor and reported monthly in a signed memo from the Ecosystem Observations Program Manager to the NMFS Chief Financial Officer and are housed and made available on an intranet site managed by the NMFS Office of	Results can only be reported when the SIS is updated with new information from the field	Discussions are ongoing to include protected species in the NMFS Stock Information System

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
				Management and Budget; monthly reporting on performance to NOAA Deputy Under Secretary		
Measure 1c: Number of protected species designated as threatened, endangered, or depleted with stable or increasing population levels	MMPA stock assessment reports and ESA status reviews	Annual	Excel spreadsheet maintained by NMFS's Office of Protected Resources	Results are reported monthly in a signed memo from the Protected Species Program Manager to the NMFS Chief Financial Officer and are housed and made available on an intranet site managed by the NMFS Office of Management and Budget; monthly reporting on performance to NOAA Deputy Under Secretary	MMPA stock assessment reports are updated only once a year and ESA status reviews are updated only every one to five years depending on priority and fund availability	Discussions are ongoing to include protected species in the NMFS Stock Information System
Measure 1d: Number of acres of coastal habitat restored (annual/cumulative)	Interim and final progress reports from each project	Quarterly	The Restoration Center Database (RCDB)	Results are reported monthly in a signed memo from the Habitat Program Manager to the NMFS Chief Financial Officer and are housed and made available on an intranet site managed by the NMFS Office of Management and Budget; monthly reporting on performance to NOAA Deputy Under Secretary	Data is primarily provided by grantees	None
Measure 2a: U.S. temperature – skill score	Forecast data, observations from U.S. Weather Forecast Offices, and from a	Monthly	NWS's National Centers for Environmental Prediction	NOAA performs quality control on the observed data (for example, error checking, elimination of duplicates, and inter-station comparison) both at the CPC and U.S. Weather	Because of natural (and unpredictable) variability of climate regimes, the skill score can fluctuate considerably from one season to another. For	None

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
	cooperative network maintained by volunteers across the nation			Forecast Office level. In June 2005, NOAA has also implemented an objective verification procedure to minimize the impact of human errors in the computation of skill score; monthly reporting on performance to NOAA Deputy Under Secretary	example, for the periods influenced by a strong ENSO forcing, GPRA measure tends to be high. Lower scores occur during the periods when ENSO is in its neutral phase.	
Measure 2b: Reduce the Uncertainty in the Magnitude of the North American Carbon Uptake	NOAA's Global Carbon Cycle Research Program	Annual	Climate Monitoring and Diagnostics Laboratory	Quality assurance and calibration against known standards performed by NOAA	Number of tall tower/aircraft sites and our ability to incorporate these data into advanced carbon models	None
Measure 2c: Reduce the Uncertainty in Model Simulations of the Influence of Aerosols on Climate	NOAA's Atmospheric Composition and Climate Program	Annual	Aeronomy Laboratory	Quality assurance and comparisons against 2001 international assessments by leading experts in the aerosol-climate community	Number of monitoring sites, process studies, and our ability to include these in global models	None
Measure 2d: Determine the Actual Long-term Changes in Temperature and Precipitation Over the United States	NOAA's National Climatic Data Center	Monthly	NOAA's National Climatic Data Center	Monte Carlo simulations based on operation stations; monthly reporting on performance to NOAA Deputy Under Secretary	Number of stations commissioned in the Climate Reference Network	None
Measure 2e: Reduce the Error in Global Measurement of Sea Surface Temperature	NOAA's Office of Climate Observations	Quarterly	Pacific Marine Environmental Laboratory	Quarterly reporting mechanism on uncertainty in sea surface temperature measurements; quarterly reporting on performance to NOAA Deputy Under Secretary	Number of deployed observing platforms in the global ocean	None

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
Measure 2f: Improve society's ability to plan and respond to climate variability and change using NOAA climate products and information.	NOAA's Office of Global Programs	Annual	NOAA's Office of Global Programs	Annual assessments of grants awarded and published risk and impact assessment/evaluations communicated to decision makers	Number of studies assessing societal impacts of climate information on stakeholders	None
Measure 3a: Lead time (minutes), accuracy (%), and false alarm rate (FAR, %) of severe weather warnings for tornadoes	National Weather Service (NWS) field offices	Monthly	NWS headquarters and the Office of Climate, Water, and Weather Services (OCWWS)	<p>Verification is the process of comparing the predicted weather to reported event. Warnings are collected from every NWS office, quality controlled, and matched to confirmed tornado reports. Reports are validated by WFOs using concise and stringent guidelines outlined in NWS Instruction 10-1605. From these data, verification statistics are computed. OCWWS monitors monthly performance throughout the NWS, and the regional headquarters monitor performance within their respective regions.</p> <p>All data is reported on to NWS and NOAA leadership on a monthly basis.</p>	<p>Only confirmed tornado reports are used to verify tornado warnings. Radar reports are not used. If a tornado occurs but is not reported, it doesn't go into the database for verification. Therefore, it is possible for tornadoes to be under-reported, especially in sparsely populated areas.</p> <p>While long-term performance has shown a steady increase in forecast accuracy, inter-annual scores tend to fluctuate due to varying weather patterns from year to year. Some weather patterns are more difficult to forecast than others.</p>	Review all warnings and storm data after each event to learn from past experiences. Use the information learned to improve forecast skill and product quality in the future.

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					<p>Forecasters perform better during large outbreaks due a high level of situational awareness, well defined tornadic radar images, and increased confidence based on tornado reports which verify warnings during these large scale events. These three factors lead to longer lead times, higher accuracy, and lower false alarm rates. The peak level of tornadic activity occurs April through June each year. A secondary peak activity time period is October and November in the southeastern United States.</p>	
<p>Measure 3b: Lead Time (Minutes) and Accuracy (%) for Severe Weather Warnings for Flash Floods</p>	<p>National Weather Service (NWS) field offices</p>	<p>Monthly</p>	<p>NWS headquarters and the Office of Climate, Water, and Weather Services (OCWWS)</p>	<p>Verification is the process of comparing the predicted weather to reported event. Warnings are collected from each NWS office, quality controlled, and matched to confirmed flash flood reports. Reports are validated by WFOs using concise and</p>	<p>While long-term performance has shown a steady increase in forecast accuracy, inter-annual scores tend to fluctuate due to varying weather patterns from year to year. Some weather</p>	<p>Review all warnings and storm data after each event to learn from past experiences. Use the information learned to improve</p>

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				<p>stringent guidelines outlined in NWS Instruction 10-1605. OCWWS monitors monthly performance throughout the NWS, and the regional headquarters monitor performance within their respective regions.</p> <p>All data is reported on to NWS and NOAA leadership on a monthly basis.</p>	<p>patterns are more difficult to forecast than others.</p> <p>Typically, 1st and 2nd Quarters have higher lead times, while the 3rd and 4th Quarters, during the convective season, bring the annual average down. Spring/summer mesoscale events (e.g., thunderstorms) are more difficult to predict than larger synoptic scale systems; hence lower scores are expected in the 3<sup>rd</sup> and 4<sup>th</sup> quarters.</p>	<p>forecast skill and product quality in the future.</p>
Measure 3c: Hurricane Track Forecasts Error (48 Hours)	NWS/Tropical Prediction Center (TPC)	Annual	TPC	<p>Hurricane storm verification is performed for hurricanes, tropical storms, and tropical depressions regardless of whether these systems are over land or water. The TPC issues track and intensity forecast throughout the life of a hurricane. The actual track and intensity are verified through surface and aircraft measurements. NOAA calculates the average accuracy of the</p>	<p>Verification of actual track and intensity versus forecast is very accurate. However, actual annual scores vary up to 20% in some years due to the type and location of the hurricane events. Some types of systems can be more accurately forecasted than others. For example, hurricanes that begin in the</p>	<p>NOAA will report on the tracking of forecasts at 24, 48 and 72-hour intervals.</p>

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
				<p>TPC track and intensity forecasts for the Atlantic basin at the end of each hurricane season. Reported errors are for hurricane and tropical storm stages only because of a more limited historical verification record for tropical depressions.</p> <p>All data is reported on to NWS and NOAA leadership on an annual basis.</p>	<p>northern sections of the hurricane formation zone tend to be much harder to accurately forecast. Out-year measures depend on a stable funding profile and take into account new satellites, improved forecast models, new and continued research activities of the U.S. Weather Research Program (USWRP), and investments in critical observing systems</p>	

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<p>Measure 3d: Accuracy (%) (Threat Score) of day 1 precipitation forecasts</p>	<p>The Hydrometeorological Prediction Center and state agencies</p>	<p>Monthly</p>	<p>World Weather Building</p>	<p>The Hydrometeorological Prediction Center has produced Quantitative Precipitation Forecasts since the early 1960s and has kept verification statistics related to the Quantitative Precipitation Forecast program since that time. HPC forecasters work under the supervisory control of the Senior Branch Forecaster (SBF), who is responsible for the quality and content of all products issued during the shift. The SBF having the additional duty of 24 hour precipitation forecast verification verifies the precipitation forecasts.</p> <p>All data are examined for accuracy and quality control procedures are applied, as described in the Description of Measure section.</p> <p>Verification is the process of comparing the predicted precipitation amounts to the observed amounts over the conterminous U.S.</p> <p>All data is reported on to NWS and NOAA leadership on a monthly basis.</p>	<p>The 40-year record of performance indicates there can be considerable variation in the performance measure from year to year. This variation is heavily dependent on the variation of weather regimes over the course of a year and from year to year. Scores are usually lower, for example, in years with considerable summertime precipitation not associated with tropical cyclones.</p>	<p>NOAA will implement planned weather observation and numerical modeling improvements along with ongoing research projects. The Hydrometeorological Test Bed will be expanded to accelerate the transition of research advancements into the operational prediction of precipitation.</p>

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
Measure 3e: Lead Time (Hours) and Accuracy (%) of Winter Storm Warnings	National Weather Service (NWS) field offices	Quarterly	The regional headquarters, NWS headquarters and the Office of Climate, Water, and Weather Services (OCWWS)	Verification is the process of comparing predicted weather to a reported event. Warnings are collected from each NWS office, quality controlled, and matched to confirmed winter storm reports. Reports are validated by WFOs using concise and stringent guidelines outlined in NWS Instruction 10-1605. OCWWS monitors monthly performance throughout the NWS, and the regional headquarters monitor performance within their respective regions.  All data is reported on to NWS and NOAA leadership on a quarterly basis.	While long-term performance has shown a steady increase in forecast accuracy, inter-annual scores tend to fluctuate due to varying weather patterns from year to year. Some weather patterns are more difficult to forecast than others.	Review all warnings and storm data after each event to learn from past experiences. Use the information learned to improve forecast skill and product quality in the future.
Measure 3f: Cumulative percentage of U.S. shoreline and inland areas that have improved ability to reduce coastal hazard impacts	National Ocean Service (NOS) Coastal Services Center, National Satellite, Data and Information Service (NESDIS) National Coastal Data Development	Quarterly	NOS and NESDIS will collect information, conduct assessments, and store data.	This measure tracks the cumulative percent of shoreline and inland areas with improved ability to reduce the impact of coastal hazards. In the past, the types of projects included in the reported results differed from one year to the next; therefore, the potential for counting a	This measure tracks the development and implementation of the Coastal Risk Atlas as an indicator of improved ability to identify the extent and severity of coastal hazards. Reaching these targets will depend on the	None

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	Center and other federal and state agencies			portion of the shoreline more than once existed. For example, one year a project may improve an area's ability to reduce the impacts of hurricanes, and then another year a separate project may improve the same area's ability to reduce the impacts of another coastal hazard such as inland flooding. To avoid confusion, this measure currently only tracks the development and implementation of the Coastal Risk Atlas. All data used in the Coastal Risk Atlas are quality controlled and the risk assessment methodologies have been peer reviewed; quarterly reporting on performance to NOAA Deputy Under Secretary	activities of other federal and state agencies with management responsibilities in this area.	
Measure 4a: Reduce Hydrographic survey backlog within navigationally significant areas (square nautical miles surveyed per year)	Progress reports on data collected from hydrographic survey platforms	Monthly	National Ocean Service maintains hydrographic survey performance data at NOAA's Office of Coast Survey Hydro Surveys	National Ocean Service applies its established verification and validation methods. The measure has a +/- 50 square nautical mile variance. Targets are set annually based on resources available; monthly reporting on performance to NOAA	NOAA-owned ships and contractor survey assets can be affected by changes in vessel availability or condition. Weather can also affect scheduled surveys.	National Ocean Service maintains hydrographic survey performance data at NOAA's Office of Coast Survey Hydro Surveys

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			Division.	Deputy Under Secretary		Division.
Measure 4b: Percentage of U.S. counties rated as enabled or substantially enabled with accurate positioning capacity (Goal: Increase percentage of counties rated as substantially or fully enabled, with the infrastructure, tools, and demonstrated local capacity for accurate positioning, from 25.34% in 2004 to 90% in 2011).	NOAA's Online Position User Service (OPUS)	Monthly	Automated database at National Ocean Service	NOAA will validate a County's capacity for local positioning through direct coordination with localities, such as OPUS project acceptance by NOAA. By assessing the user needs of county surveyors, counties, and their associations, NOAA will validate that the Geodesy Program is meeting local positioning needs; monthly reporting on performance to NOAA Deputy Under Secretary.	OPUS Customer data is limited and will be expanded through Paperwork Reduction Act-approved surveys of customers who use the OPUS web site for precision positioning.	Analyze OPUS e-mail domain names to categorize and inventory OPUS users. Validate OPUS web site hits as a measure of use and benefit. Conduct a socio-economic analysis to validate OPUS benefits and who OPUS users are. Develop schema based on census data for scaling counties by area, population, and economic activity. Develop "county-based accurate positioning scorecard" with our partners.
Measure 4c: Accuracy (%) and FAR (%) of Forecasts of Ceiling and Visibility (Aviation Forecasts)	NWS field offices	Monthly	NWS headquarters and OCWWS	Forecasts and observations are collected from each airport for which the NWS issues a forecast. The OCWWS stores and	Due to the large volume of data gathered and computed, documentation for	Forecasters within each WFO will continue to monitor their

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
				<p>quality controls all data, compares forecasts to observations, and computes verification statistics.</p> <p>Forecasters within each WFO are able to stratify verification statistics to his/her personal scores on specific days to learn from recent experience.</p> <p>WFO managers regularly monitor forecast performance. The regional headquarters and the OCWWS monitor performance monthly for their respective management areas.</p> <p>All data is reported on to NWS and NOAA leadership on a monthly basis.</p>	<p>this measure cannot be finalized until well into the following fiscal year. Out-year measures depend on a stable funding profile and take into account improved use of the WSR-88D, new satellites, improved forecast models, new and continued research activities of the USWRP, investments in critical observing systems, and implementation of AWIPS.</p> <p>Inter-annual scores tend to fluctuate due to varying weather patterns. Some patterns are more difficult to forecast than others.</p> <p>Year to year variability is plus or minus 3 percent for both Accuracy and FAR. Typically, 3<sup>rd</sup> and 4<sup>th</sup> quarter scores during the convective</p>	<p>recent past forecast performance to learn from experience.</p> <p>The regional headquarters and the OCWWS will continue to monitor performance monthly for their respective management areas.</p>

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
					season have lower accuracy scores and increased FARs than the 1 <sup>st</sup> and 2 <sup>nd</sup> Quarter cool season months.	
Measure 4d: Accuracy (%) of Forecast for Winds and Waves (Marine Forecasts)	NWS field offices	Monthly	The NWS and the National Centers for Environmental Prediction's Ocean Modeling Branch	<p>Verification is the process of comparing the predicted weather with the actual event.</p> <p>Forecasts and observations are collected from each marine zone for which the NWS issues a forecast. The OCWWS stores and quality controls all data, compares forecasts to observations, and computes verification statistics.</p> <p>WFO managers regularly monitor forecast performance. The regional headquarters and the OCWWS monitor performance monthly for their respective management areas.</p> <p>All data is reported on to NWS and NOAA leadership on a monthly basis.</p>	<p>Due to the large volume of data gathered and computed, documentation for the accuracy of forecast for wind and waves cannot be finalized until well into the following fiscal year. Out-year measures depend on a stable funding profile and take into account improved use of the WSR-88D, new satellites, improved forecast models, new and continued research activities of the USWRP, investments in critical observing systems, and implementation of AWIPS.</p> <p>Inter-annual scores tend to fluctuate due to varying weather</p>	NOAA will deploy enhanced versions of AWIPS, upgrade new forecast models, implement new wave forecast models, and improve communication and dissemination techniques to marine users.

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
					<p>patterns. Some patterns are more difficult to forecast than others. Marine wind speed and wave height forecasts scores naturally vary (accuracy +/- 4% per year) due to fluctuations in the number of extreme events measured over NWS marine areas per year.</p>	