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**OVERSIGHT HEARING ON
NOAA BUDGET AND PRIORITIES FOR FY 2010**

**BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES**

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Mr. Chairman and Members of the Subcommittee, thank you for inviting me to appear today to discuss FY 2010 budget request plans and priorities for National Oceanic and Atmospheric Administration (NOAA) programs of interest to this Subcommittee. My name is Jack Dunnigan and I am the Assistant Administrator for NOAA's National Ocean Service.

At NOAA, we work to protect the lives and livelihoods of Americans, and provide products and services that benefit the economy, environment, and public safety of the Nation. Today, I will highlight programs that help fulfill NOAA's responsibilities for understanding, protecting and restoring coastal and marine resources. Before I discuss the details of our FY 2010 budget request, I would like to briefly highlight some of NOAA's notable successes from the past fiscal year (2008).

FY 2008 ACCOMPLISHMENTS

Critical Information and Support Before and After Hurricanes

The 2005 Hurricanes, Katrina, Rita, and Wilma, taught us many lessons that have helped improve our responses to such disasters. In 2008, we experienced another active hurricane season with Hurricanes Gustav and Ike impacting the Gulf Coast States of Texas, Louisiana, Alabama and Mississippi. NOAA again responded immediately:

- The National Geodetic Survey provided more than 6,600 color aerial images, aiding emergency responders of all types to save lives and make crucial assessments as well as prompting over 32 million views/downloads of NOAA hurricane damage assessment imagery over the last 12 months;

- The Office of Coast Survey's Navigation Response Teams surveyed waterways for obstructions, facilitating the delivery of relief supplies and resumption of maritime commerce; and
- Four of NOAA's new hurricane hardened "Sentinels of the Coast" tide stations in NOAA's National Water Level Observation Network (NWLON) provided real time storm tide data throughout the hurricanes and provided emergency responders with real time data for nautical charting and recovery.

NOAA assets continue to support the impacted areas with the removal of thousands of vessels, drums, tanks, cylinders, and other potentially hazardous containers in marshes and along shorelines. NOAA is also working to provide accurate geodetic height information for hurricane prone areas. Accurate land and water level heights are important for determining effective highway evacuation routes, levee heights, storm surge modeling, flood plain mapping, sea level rise calculations, vessel under-keel and bridge clearance, subsidence monitoring, and restoration of coastal habitats. I will discuss an important related FY 2010 budget increase for improving geodesy and heights later in my testimony.

Office of Response and Restoration

Federal, state, and local agencies rely on NOAA's support in oil and chemical spills and other emergencies that threaten life, property, and natural resources. Our interdisciplinary scientific response team provides the U.S. Coast Guard and other response agencies with the best scientific information to prepare for and respond to spills. NOAA forecasts the movement and behavior of spilled oil and chemicals, evaluates the risk to natural resources, and recommends cleanup actions. NOAA is on call 24/7 and is able to provide scientific support within 15 minutes of notification of a spill and to respond on scene within 4 hours of notification of a spill. NOAA's expertise is critical to making science-based response decisions that prevent further harm, restore adverse impacts to natural resources, and promote effective planning for future incidents.

NOAA's Office of Response and Restoration (OR&R) provided scientific response to two significant spills in FY 2008: The *Cosco Busan* in San Francisco Bay and the New Orleans barge collision of the "DM932" on the Mississippi River. In both cases NOAA scientists provided trajectory predictions, prioritized cleanup activities, performed injury assessment and initiated restoration planning. OR&R also worked with the National Ocean Service's International Program Office, and National Marine Fisheries Service's Restoration Center to support the Republic of Korea in their assessment and restoration planning activities after the 3.3 million gallon *Hebei Spirit* oil spill in December 2007. This was the largest spill on record in South Korea.

As a natural resource trustee, NOAA regional coordinators, scientists, and economists work in partnership with government agencies, the public, and industry to assess the impact to NOAA trust resources from oil and hazardous materials releases. They also plan and implement restoration at these same sites. In FY 2008, OR&R scientists worked with the National Marine Fisheries Service's Restoration Center, the NOAA Office of General Counsel, and co-trustees in the State of Washington and the US Fish and Wildlife Service to secure a \$12.9 million settlement for restoration in the Hylebos Waterway, one of the major waterways in

Commencement Bay, which serves as the harbor for Tacoma, Washington, and is located at the southern end of Puget Sound. Those responsible for the contamination will also construct a wetland restoration project on Hylebos Creek, which will enhance and restore salmon spawning and rearing habitat, restore riparian vegetation and provide habitat for birds. These settlements will be used to further NOAA's long term strategic vision for watershed restoration in Puget Sound.

The NOAA Marine Debris Program began the first series of forums and workshops on efforts, technologies and resources to address marine debris in U.S. waters in 2008. They also chaired the Interagency Marine Debris Coordinating Committee in the submission of a Report to Congress on Marine Debris Sources, Impacts, Strategies and Recommendations. New Fishing for Energy Project partnerships with Covanta Energy Corp, National Fish and Wildlife Foundation, and Schnitzer Steel were developed and implemented to provide a no-cost incentive to the fishing community to dispose of their old and derelict gear which is then turned into energy. The 2008 effort took place on the east coast of the US, and estimates indicate that for every one ton of nets processed, enough electricity is created to power one home for 25 days.

Harmful Algal Blooms and Hypoxia

Harmful algal bloom (HAB) and hypoxic events (i.e., severe oxygen depletion) are some of the most complex phenomena currently challenging the management of aquatic and marine ecosystems. Impacts have affected almost every coastal state, including the Great Lakes, and have included the devastation of important coastal habitats, loss of economically and culturally vital shellfish resources, illness and death in populations of protected marine species, and serious threats to human health. The occurrence of HABs has expanded to all coastal states and more than 60 percent of the estuaries in the U.S. now experience hypoxia on a seasonal or chronic basis. In FY 2008, two intense and widespread harmful algal bloom events occurred along the eastern Florida coast and along the Florida Panhandle extending into coastal regions of Alabama and Mississippi. Both events necessitated the closure of shellfish beds, and were implicated in numerous respiratory distress reports and fish mortality events. Four additional harmful algal blooms, with associated public health impacts, were also identified and monitored along the southwest Florida coast and in the Florida Keys region. The combined extent of these harmful blooms impacted more than 55 percent of the coastal counties located in the eastern Gulf of Mexico and east coast of Florida. These events were monitored by NOAA's Harmful Algal Bloom Operational Forecast System and reported to the public in bulletins on a bi-weekly basis.

NOAA's mandate to address national issues related to HABs and hypoxia in the Nation's coastal waters is primarily provided by the Harmful Algal Bloom and Hypoxia Research and Control Act of 1998 (HABHRCA). In 2008 NOAA led the interagency efforts and submitted to Congress the last three interagency reports mandated by HABHRCA. These reports assessed marine and freshwater HABs, described federal research programs, and recommended new strategies for management and response. NOAA research and leadership were instrumental in the development of the 2008 Gulf Hypoxia Action Plan which was signed by federal and state members of the Mississippi River Gulf of Mexico Watershed Nutrient Task Force. The Action plan calls for reductions in both nitrogen and phosphorus loadings to the Gulf to reduce the size of the hypoxic zone.

In addition, in 2008 NOAA:

- provided the first-ever seasonal HAB forecast in the Gulf of Maine;
- developed a rapid, simple, and inexpensive test for one of the major HAB toxins that accumulate in shellfish;
- completed a first-of-its-kind analysis of California's sea lions poisoned during pregnancy from the algal toxin domoic acid;
- trained scientists from the Korean National Fisheries Research and Development Institute to conduct sensitive analytical methods for domoic acid detection in phytoplankton and seawater; and
- developed a technique that will improve understanding of the fish killing behavior of some dinoflagellates in the Chesapeake Bay and other coastal areas, leading to better predictions and management of fish kill events.

In coordination with our federal partners, NOAA has made considerable progress in the ability to detect, monitor, assess, and predict HABs and hypoxia in coastal ecosystems. This progress has been accomplished through a mix of extramural and intramural research, long-term regional ecosystem-scale studies supported by short-term targeted studies, collaborations between academic and federal scientists, and multiple partnerships with federal, state and tribal managers. These advances are helping coastal managers undertake short- and long-term efforts to reduce, and ultimately to prevent, the detrimental effects of these phenomena on human health and valuable coastal resources.

Invasive Species

NOAA made progress in reducing the impacts of invasive species and preventing new species invasions. In FY 2008 NOAA:

- Improved understanding of the ballast water management practices of ships with ballast and No Ballast On Board (NOBOB) and identified a number of procedures that can further increase the effectiveness of these practices against invasive species in the Great Lakes and other areas;
- Partnered with other agencies and the private sector to initiate the "Habitattitude" public awareness campaign, to reach millions of aquarium and water garden hobbyists and vendors with an invasive species message;
- Made progress in documenting the status and trends of invasive Indo-Pacific lionfish populations and in determining possible ecological impacts and established an early detection/rapid response program to prevent future invasions of marine ornamental fish in South Florida and Caribbean coral reef ecosystems;
- Collaborated with tribal agencies to increase capacity to detect and monitor the arrival and dispersal of non-indigenous species in Oregon estuaries and partnered with the State of Hawaii Department of Interior at the Papahānaumokuākea Marine National Monument to identify, prioritize, and implement management actions for invasive species;
- Integrated NOAA's National Benthic Inventory (NBI) web site (a quantitative database on distributions, abundances, and diversity of benthic species) with US Geological Survey's nonindigenous aquatic species database to expand coastal managers' knowledge of the distribution of native and non-native aquatic species;

- Initiated the development of a regional strategic plan to address the increased threat of aquatic invasive species that may result from trade associated with the 2004 Central America-Dominican Republic Free Trade Agreement; and
- Determined invasive tunicate species are fouling shellfish aquaculture operations along much of the US East Coast, causing decreased growth rates, increased mortality and high maintenance costs.

Ballast water is a significant pathway for the introduction of aquatic invasive species into coastal waters and the Great Lakes. NOAA recognizes its responsibilities to develop new ballast water treatment technologies. Using test and development data generated by a NOAA research grant, NEI Treatment Systems LLC became the first ballast water treatment technology to receive a ‘Type Approval Certificate of Ballast Water Management System’ from the International Maritime Organization, under the new ballast water convention.

In 2008, the St. Lawrence Seaway management agencies added saltwater flushing to their regulations for Seaway entry. This was a direct transition of NOAA's NOBOB research into operations (regulations). It forms the basis for the present U.S. and Canadian ballast management regulatory structure for the Great Lakes. The Great Ships Initiative research facility in Superior, WI also became operational in 2008. This collaborative research and development facility, supported by NOAA, provides research capabilities at bench, land and shipboard scales to accelerate research, development and implementation of effective ballast treatment systems for ships that visit the Great Lakes from abroad.

NOAA is leading research and monitoring to understand the consequences of the recent Indo-Pacific lionfish invasion in the southeast Atlantic shelf of the United States through its National Centers for Coastal Ocean Science (NCCOS). NOAA plans to continue research and monitoring to help elucidate the impacts as well as expand efforts to include public education and outreach directed in particular to anglers, scuba divers, and the health care community. NCCOS is also supporting efforts by NOAA’s Chesapeake Bay Office to assess environmental, economic, and human health risks of introducing the non-native asian oyster (*Crassostrea ariakensis*) into the Chesapeake Bay and supporting a research based effort to demonstrate that green crabs on the west coast might be effectively controlled locally by intensive trapping techniques.

Coastal Nonpoint Pollution

NOAA has invested in monitoring, research, and modeling to support state nonpoint pollution source management programs. We believe it is important to link coastal growth and development management with water quality protection by fostering a greater emphasis on community development and planning efforts to address growth issues in a sustainable manner. Existing Coastal Zone Management Act funding mechanisms can be used to support these efforts.

During FY 2008, NOAA, working with EPA and other partners, began developing “Smart Growth for Coastal and Waterfront Communities,” to guide communities on ways to develop that are compatible with their traditional assets, while expanding economic opportunity, protecting public health and the environment, and creating great places for residents, visitors, and

businesses alike. Together, NOAA and EPA also fully approved South Carolina's and Florida's Coastal Nonpoint Pollution Control Programs, which are backed by enforceable authorities, to implement a suite of management measures that will control coastal runoff.

Through the Coastal Zone Management Program, NOAA works with state partners to ensure development is planned and sited in a sustainable manner to protect water quality and other coastal resources. In FY 2008, with support of CZM funding, Rhode Island's Coastal Management Program developed a "Coastal Greenway" as part of its Aquidneck Island Special Area Management Planning effort to guide development and redevelopment of the western side of Aquidneck Island. The Greenway will preserve and restore natural shoreline vegetation while providing storm water control benefits and public access.

NOAA's National Estuarine Research Reserves System (NERRS) continues to collect long term monitoring data that serves as a valuable data set for nonpoint source pollution research. The NERRS System Wide Monitoring Program tracks short-term variability and long-term changes in estuarine waters to understand how human activities and natural events can change ecosystems. It provides a valuable long-term, consistently collected data on water quality and weather at frequent time intervals. Coastal managers use this monitoring data to make informed decisions on local and regional issues, such as "no-discharge" zones for boats and measuring the success of restoration projects.

Through the Coral Reef Conservation Program (CRCP), NOAA is providing specialized assistance to coastal managers and other stakeholders to enhance the effectiveness of local management and planning for addressing land-based sources of pollution that threaten coral reefs ecosystems. In FY 2008, the CRCP held training in Guam to improve watershed management efforts and provided technical guidance on implementing better site design practices to control polluted runoff and Initiated Watershed Pilot Projects in St. John, USVI and Puerto Rico through a collaborative effort of multiple local and Federal agencies, community groups, and other local stakeholders.

Navigation and Positioning

NOAA's Mapping and Charting Program is carried out by the Office of Coast Survey, which has a long history of supporting and facilitating maritime commerce. NOAA is responsible for surveying and charting U.S. and territorial waters to the limits of the Exclusive Economic Zone (EEZ), an area of about 3.4 million square nautical miles (SNM). Over 500,000 SNM of this area is considered navigationally significant; it is this area that has become NOAA's primary survey priority. On average NOAA can survey roughly 3,000 SNM a year.

NOAA's Center for Operational Oceanographic Products and Services provides tide and current data, products and services that support safe and efficient marine navigation, emergency response efforts, storm surge and tsunami warnings and forecasts, long-term sea level rise monitoring, marine boundary determination, habitat restoration, coastal zone management and other NOAA strategic mission goal outcomes. In FY 2008, NOAA installed four new Physical Oceanographic Real-Time Systems (PORTS[®]) in Pascagoula and Gulfport, Mississippi; Sabine-Neches, Texas; and Cherry Point, Oregon. By the end of FY 2009, NOAA will have a total of 20 systems nationwide, with systems added in Lake Charles, and New Orleans Louisiana. PORTS[®]

support safe, cost-efficient marine transportation by providing accurate real-time oceanographic and meteorological data. A 2007 economic study revealed that the Houston Galveston Bay economy receives more than \$15 million a year in benefits from the operation of its PORTS[®], and that groundings were reduced by over 50 percent. NOAA also operates over 200 NWLON stations, with a number of stations being hardened along the Gulf Coast so that real time data is available when most needed. Four NWLON stations, called Sentinels of the Coast, were designed and constructed on single pile platforms to withstand category 4 hurricanes and went operational just in time for Hurricanes Gustav and Ike.

Precise positioning is needed for the safe navigation of our waterways, roads and air space. NOAA's National Geodetic Survey maintains the National Spatial Reference System (NSRS), which provides the foundation for transportation; mapping and charting; and a multitude of scientific and engineering applications. NOAA provides many models and tools that allow the public to obtain highly accurate positions relative to the NSRS. In 2008, NOAA registered the one millionth use of the Online Positioning User Service (OPUS) after only six years of OPUS operation. OPUS allows users, such as professional surveyors, to submit their GPS observations to NOAA, where the data is processed to determine a position using the NGS-managed and maintained continuously Operating Reference Station (CORS) network. A 2009 socio-economic scoping study estimated the \$758 million in estimated annual benefits from the OPUS and the CORS network.

FY 2010 BUDGET REQUEST

Office of Response and Restoration (OR&R)

The FY 2010 request of \$19.1 million will support planned OR&R activities and is a program change of an additional \$1.4 million. These additional funds will enable NOAA to develop innovative tools and techniques to increase effectiveness of spill response. These funds will be focused particularly on developing a three dimensional modeling capability to predict contaminant movement in the environment. The FY 2010 President's request will enable NOAA to support natural resource damage assessment, coastal protection and restoration, and emergency response activities, and will ensure that NOAA continues to meet its responsibilities under Comprehensive Environmental Response, Compensation, and Liability Act and the Oil Pollution Act.

In FY 2010, NOAA will continue its focus on the Nation's capability to respond to oil and hazardous substance releases through the most cost effective methods. NOAA will increase pre-spill and post-spill planning and coordination and training for national preparedness and response, develop tools and techniques to improve response efficiency, increase scientific accuracy, and decrease harm to life, property, and the environment. Funding in FY 2010 will continue to support damage assessment and restoration efforts for sites around the Nation and enable NOAA to continue to provide technical assistance, training, and support to states and communities to strengthen local and regional capabilities to restore or redevelop contaminated sites.

Harmful Algal Blooms and Hypoxia

In FY 2010, NOAA requests \$8.9 million for external research to maintain NOAA's longstanding investments in research to develop HAB and hypoxia ecological forecasting and response capabilities. These efforts are conducted through NOAA's competitive research programs, which have a proven track record of developing the understanding and tools necessary for managers to respond to and predict HAB and hypoxia events that now occur in all coastal areas. NOAA's FY 2010 request includes funding that will:

- 1) help to maintain and strengthen the suite of NOAA competitive, peer-reviewed programs focused on HAB and hypoxia research;
- 2) accelerate the development and transition to operations of tools and forecasts for the prediction, control, and mitigation of HABs and hypoxia;
- 3) facilitate the assessment of and response to HAB and hypoxia events; and
- 4) help to deliver the biological components key to making developing regional ocean observing systems relevant to coastal resource and public health managers.

In addition, the FY 2010 President's Request includes an increase of \$2.7 million to develop and implement operational HAB forecasts by creating a national system of forecasts and a national HAB event response capability. The funds will build on the capabilities developed through the current operational forecast system for the eastern Gulf of Mexico. The forecast system will be a collaborative effort among several NOAA offices, along with state, local and federal management agencies, and the research community. This system will be implemented regionally starting with the western Gulf of Mexico (operational in 2010), the lower Great Lakes (operational in 2011), the Gulf of Maine (operational in 2012), California (operational in 2013), and the Pacific Northwest (operational in 2014), and will provide twice weekly comprehensive forecasts and support. The HAB forecasts and associated models, data, and analysis will permit coastal managers and emergency responders to make sound decisions on reducing the direct human health risk, protecting shellfisheries and shellfish industries through timely changes in management strategies, and reducing economic loss by designing mitigation strategies that are not possible without advance planning.

Aquatic Invasive Species

The FY 2010 President's budget requests a total of \$2.7 million for ongoing aquatic invasive species research. NOAA requests funding to continue our work to prevent the spread of invasive species through efforts of the Aquatic Invasive Species Program (AISP), Sea Grant, the Great Lakes Environmental Research Lab (GLERL), and NCCOS.

Of this funding request, \$1.6 million would support GLERL's research on prevention and control of invasive species from ballast water introductions and modeling the impacts of invasive species on the Great Lakes food web. GLERL's No Ballast on Board (NOBOB) research led to the passage of U.S. and Canada regulations of NOBOB ships entering the Great Lakes. \$988,000 of the FY 2010 budget request would support the AISP, which focuses on prevention, detection, monitoring and control of aquatic invasive species. The program's overarching goal is to target priority efforts to proactively assess and effectively manage the threats posed by invasive

species.

Coastal Nonpoint Pollution

States can receive assistance from NOAA for coastal nonpoint pollution efforts through funding from section 306 of the Coastal Zone Management Act or through NOAA's ongoing development and dissemination of management tools and scientific research on nonpoint source pollution problems and responses. In addition, the FY 2010 President's Budget includes nonpoint source pollution control funding in the requests for the U.S. Environmental Protection Agency and the U.S. Department of Agriculture. NOAA continues to support state Coastal Nonpoint Source (NPS) Management Programs by fostering program integration, and by helping coastal states focus on managing the cumulative and secondary impacts of development to prevent NPS pollution.

Navigation and Positioning

The FY 2010 President's Budget Request includes an increase of \$4.0 million for a new vertical enhancement to the National Spatial Reference System, which is the system that defines latitude, longitude, height, scale, gravity, and orientation throughout the United States and territories. With the requested increase, NOAA will begin a multi-year effort to improve elevation and height information through collecting airborne gravity data to produce a new national vertical datum. Updating the nation's gravity-based geoid model from 40 centimeters of accuracy to 2 centimeters of accuracy across the nation will allow GPS to efficiently establish accurate elevations to improve commerce, to promote economic efficiencies, and to better protect against inundation from storms, flooding, and sea level rise. The 2007 Gravity for the Redefinition of the American Vertical Datum (GRAV-D) plan laid out an efficient process to acquire gravity measurements across the nation and redefined the geoid model based on areas of most critical need. A 2009 socio-economic benefits study estimated benefits to the nation of the completed GRAV-D effort funded by this increase to be \$4.8 billion over 15 years, including \$2.2 billion in avoidance costs from improved floodplain management.

The FY 2010 President's Budget Request includes an increase of \$1.2 million to increase our capacity to conduct hydrographic surveys of critical areas to support safe and efficient navigation. NOAA's charting mandate authorizes NOAA to provide nautical charts and related hydrographic information for the safe navigation of maritime commerce for U.S. territorial waters and the U.S. EEZ, a combined area of 3.4 million SNM, which extends 200 nautical miles offshore from the nation's coastline. The requested funds will augment NOAA's resources focused on surveying the most critical areas laid out in the "NOAA Hydrographic Survey Priorities" document. NOAA is responsible for surveying the entire 3.4 million SNM of the EEZ, but the priority for commerce and safe transportation consists of 500,000 SNM of navigationally significant areas. Of the total navigationally significant area, about 4 percent (~20,000 SNM) has been identified as critical areas in need of survey. These 20,000 SNM are NOAA's highest survey priority. Mariners rely on NOAA's decision support tools to reduce risk and provide a complete understanding of the marine environment in which they must operate.

Conclusion

NOAA has made great progress to address our mandates and fulfill our missions in FY 2008. Our efforts will continue in the remainder FY 2009, and we ask the committee to support the President's FY 2010 Budget Request for NOAA's programs. NOAA's programs provide products and services that benefit the economy, environment, and public safety of the Nation.

Mr. Chairman and Members of the Subcommittee, I thank you for the opportunity to testify before you.