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HEARING ON
"TURNING IDEAS INTO ACTION: ENSURING EFFECTIVE CLEAN UP AND RESTORATION IN THE GULF"

BEFORE THE
SUBCOMMITTEE ON OCEANS, ATMOSPHERE, FISHERIES AND COAST GUARD
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
U.S. SENATE

JULY 21, 2010

Thank you, Chairwoman Cantwell and Members of the Committee, for the opportunity to testify on the Department of Commerce's National Oceanic and Atmospheric Administration's (NOAA) role in the response to the Deepwater Horizon BP oil spill and NOAA's ideas for activities to improve future response and resource assessment efforts.

My name is Doug Helton and I am the Incident Operations Coordinator for the Emergency Response Division in NOAA's Office of Response and Restoration (OR&R). I appreciate the opportunity to discuss the critical roles NOAA serves during oil spills and the importance of our contributions to protect and restore the resources, communities, and economies affected by this tragic event. Before I move on to discuss NOAA's efforts, I would first like to express my condolences to the families of the 11 people who lost their lives in the explosion and sinking of the Deepwater Horizon platform.

NOAA's mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs. NOAA is also a natural resource trustee and is one of the federal agencies responsible for protecting, assessing, and restoring the public's coastal natural resources when they are impacted by oil spills, hazardous substance releases, and impacts from vessel groundings on corals and seagrass beds. As such, the entire agency is deeply concerned about the immediate and long-term environmental, economic, and social impacts to the Gulf Coast and the Nation as a whole from this spill. NOAA is fully mobilized and working tirelessly to lessen impacts on the Gulf Coast and will continue to do so until the spill is controlled, oil is cleaned up, natural resource injuries are assessed, and restoration is complete.

My testimony today will discuss NOAA's role in the Deepwater Horizon response and natural resource damage assessment process associated with the Deepwater Horizon oil spill, for which

BP is a responsible party, and opportunities to strengthen the Federal response to future events through research and development.

NOAA'S ROLES DURING OIL SPILLS

NOAA has three critical roles mandated by the Oil Pollution Act of 1990 and the National Contingency Plan:

1. During the emergency response, NOAA serves as a conduit for scientific information to the Federal On-Scene Coordinator. NOAA provides trajectory predictions for spilled oil, conducts overflight observations of oil on water, identifies highly valued or sensitive environmental areas, and conducts shoreline surveys to determine clean-up priorities.
2. As a natural resource trustee, NOAA conducts a joint Natural Resource Damage Assessment (NRDA) with co-trustees to assess and restore natural resources injured by the oil spill. NRDA also assesses the lost uses of those resources, such as recreational fishing, canoeing, and swimming, with the goal of implementing restoration projects to address these injuries.
3. Finally, NOAA represents the Department of Commerce in spill response decision-making activities through the National Response Team.

Response

The U.S. Coast Guard (USCG) is the Federal On-Scene Coordinator and has the primary responsibility for managing coastal oil spill response and clean-up activities in the coastal zone. During an oil spill, NOAA's Scientific Support Coordinators deliver technical and scientific support to the USCG. NOAA's Scientific Support Coordinators are located around the country in USCG Districts, ready to respond around the clock to any emergencies involving the release of oil or hazardous substances into the oceans, shorelines and related areas. Currently, NOAA has all of its Scientific Support Coordinators located throughout the country working on the Deepwater Horizon oil spill.

With over thirty years of experience and using state-of-the-art technology, NOAA serves the Nation by providing its expertise and a suite of products and services critical for making science-based decisions. Examples include trajectory forecasts on the movement and behavior of spilled oil, overflight observations, spot weather forecasts, emergency coastal survey and charting capabilities, aerial and satellite imagery, and real-time coastal ocean observation data. Federal, state, and local entities look to NOAA for assistance, experience, local perspective, and scientific knowledge. NOAA's Office of Response and Restoration (OR&R) was called upon for scientific support 200 times in 2009.

Natural Resource Damage Assessment

Stewardship of the Nation's natural resources is shared among several federal agencies, states, and tribal trustees. NOAA, acting on behalf of the Secretary of Commerce, is the lead federal trustee for many of the Nation's coastal and marine resources, and is authorized by the Oil Pollution Act of 1990 (OPA) to recover damages on behalf of the public for injuries to trust resources resulting from an oil spill. Regulations promulgated by NOAA under the Oil Pollution Act encourage compensation in the form of restoration of the injured resources, and appropriate

compensation is determined through the NRDA process. Since the enactment of OPA, NOAA, together with other federal, state, and tribal co-trustees, has recovered approximately $500 million for restoration of natural resources injured by releases of oil or hazardous substances, as well as injuries to national marine sanctuary resources, including vessel groundings.

National Response Team

The National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan, is the federal government's blueprint for responding to both oil spills and hazardous substance releases. The purpose of the National Contingency Plan is to develop a national response capability and promote overall coordination among the hierarchy of responders and contingency plans. NOAA represents the Department of Commerce on the National Response Team and works closely with regional response teams and local area committees to develop policies on dispersant use, best clean-up practices and communications, and to ensure access to science-related resources, data, and expertise.

NOAA'S RESPONSE AND DAMAGE ASSESSMENT EFFORTS

NOAA's experts have been assisting with the response to the Deepwater Horizon oil spill from the beginning, providing coordinated scientific services when and where they are needed most. NOAA's support includes daily trajectories of the spilled oil, weather data to support short- and long-range forecasts, and hourly localized 'spot' forecasts to determine the use of weather dependent mitigation techniques such as oil burns and chemical dispersant applications. NOAA uses satellite imagery and real-time observational data on the tides and currents to predict and verify oil spill location and movement. To ensure the safety of fishermen and consumer seafood safety, NOAA scientists are in the spill area taking water and seafood samples, and NOAA has put fisheries closures in place to maintain consumer confidence in the safety of consuming seafood from the Gulf of Mexico region. In addition, NOAA experts are providing expertise and assistance regarding sea turtles, marine mammals, and other protected resources such as corals.

To facilitate on-the-ground understanding of the spill's impacts, NOAA is awarding grants for rapid response projects to monitor the impacts of the oil spill on Louisiana's coastal marshes and fishery species through the Sea Grant Program. To support the local communities as they deal with the economic, social, and environmental impacts of the spill, the Gulf Coast Sea Grant Programs are hosting a series of open forums across the Gulf where citizens have the opportunity to interact with industry, government, and university representatives. NOAA-organized volunteer beach clean-ups to remove debris from state beaches are helping to facilitate the cleanup of oil along the shoreline.

With multiple agencies supporting a diverse array of research projects in response to the Deepwater Horizon oil spill in the Gulf of Mexico, it is important to coordinate research activities to ensure the best use of limited resources. NOAA's Gulf Coast Sea Grant Programs developed a website (http://gulfseagrant.tamu.edu/oilspill/index.htm) to serve as a central database listing ongoing research activities and identifying funding opportunities for oil-spill related research, whether conducted by government, academic, or privately-supported scientists. The website's intent is to provide a single, comprehensive view of research activities in the Gulf

that are being undertaken in connection with the Deepwater Horizon oil spill and to foster coordination of these efforts.

At the onset of this oil spill, NOAA quickly mobilized staff from its Damage Assessment Remediation and Restoration Program to begin coordinating with federal and state co-trustees and the responsible parties to collect a variety of data that are critical to help inform the NRDA. NOAA is coordinating the NRDA effort with the Department of the Interior (another federal co-trustee), as well as co-trustees in five states and representatives for at least one responsible party, BP. NOAA and the co-trustees are in the initial phase of this process and are currently gathering data on resources such as fish, shellfish, birds, and turtles, and mammals; their supporting habitats such as wetlands, beaches, and corals; and human uses of affected resources, such as fishing and recreational uses across the Gulf of Mexico. The trustees will then quantify the total losses and develop restoration projects that compensate the public for their losses.

NOAA is also involved in many activities to assess the presence of subsurface oil from the Deepwater Horizon spill. Since the beginning of May, NOAA has been conducting and coordinating sampling of the sub-surface region around the Deepwater Horizon well-head and beyond to characterize the presence of subsurface oil. The sub-surface search involves the use of sonar, UV instruments called fluorometers, which can detect the presence of oil and other biological compounds, submersible laser-scattering instruments to determine oil concentration and distribution and collection of water samples from discrete depths using a series of bottles that can be closed around a discrete water sample.

NOAA, federal partners, academics, and others in the research community have mobilized to research and quantify the location and concentration of subsurface oil from the spill. NOAA Ships *Gordon Gunter Thomas Jefferson, Nancy Foster, Delaware II, and Pisces* have conducted and continue to conduct missions to collect water samples from areas near the wellhead as well as further from the wellhead and in the coastal zone. Water samples from many of these missions are still being analyzed and additional missions are in progress or being planned to continue the comprehensive effort to define the presence of oil below the surface and understand its impacts.

For both the response and the NRDA, offices throughout NOAA are mobilized and hundreds of NOAA personnel are dedicating themselves to assist with this unprecedented effort.

OPPORTUNITIES TO STRENGTHEN FEDERAL RESPONSE THROUGH RESEARCH AND DEVELOPMENT

When passed in 1990, OPA envisioned a robust oil spill research and development program coordinated by the Interagency Coordinating Committee (ICC) on Oil Pollution Research. OPA recognized the need for research and created the ICC to coordinate and direct a dedicated program on oil pollution research, technology development, and demonstration among industry, universities, research institutions and federal agencies, state governments and other nations, if appropriate. To date, funding has been provided through various state and federal agencies and industry for oil pollution research. While coordinated interagency research activities are occurring, important research questions remain.

Achievement of the comprehensive and collaborative research and development program envisioned by OPA can only increase the effectiveness of our Nation's oil spill response and restoration capabilities. While existing research has resulted in advancement of some research technologies, more must be done to strengthen our Nation's response capabilities. A renewed commitment of the ICC to focus on the most pressing research needs — particularly deepwater releases and releases in cold/icy waters — is one place to start. The Administration is committed to this effort.

ACTIVITIES TO IMPROVE FUTURE RESPONSE AND RESOURCE ASSESSMENT EFFORTS

The Deepwater Horizon oil spill is a grave reminder that spills of national significance can occur despite the many safeguards and improvements that have been put into place since the passage of OPA. Although the best option is to prevent oil spills, the risk of oil spills remains a concern given the offshore and onshore oil infrastructure, pipes, and vessels that move huge volumes of oil through our waterways. If a spill does occur, responders must be equipped with the appropriate tools and information. An effective response, based on solid science and smart decision-making reduces environmental and socioeconomic impacts, as well as clean-up costs. Research and development and technological innovation by the public or private sector in the following areas would greatly enhance the tools and technologies available in the event of a spill.

- ***Oil Fate and Behavior from Deepwater Releases***
  Our ability to know where the oil is located is limited by what we can see and detect. As the Deepwater Horizon oil spill is demonstrating, there is a need to understand how oil behaves and disperses within the water column when released at deep depths. The emerging advancement in modeling three dimensionally can greatly enhance response operations and mitigation efficacy. NOAA's surface trajectory models predict where the oil on the surface is going based upon wind, currents, and other processes, and visual overflights validate where it is now. NOAA is currently employing facets of deep water oil spill models that were developed in part from the findings of the MMS DeepSpill Joint Industry Research Project done in 1999-2000 with international participation. However, we still understand little about the movement of oil deep in the ocean or the movement of dispersed oil that is suspended in the water column. The enhancement of three dimensional models will improve our ability to predict the movement of oil at depth and allow us to direct precious resources to validate the model's accuracy. Currently, NOAA is working to implement FY 2010 funds to enhance three-dimensional models.

- ***Technology for Oil Detection in the Water Column and on the Seafloor***
  Research on new technologies for rapid and accurate detection of oil in deep water and plumes in the mid-water is needed. This would include the development of technologies to enhance our understanding of the fate and transport of oil, and to better understand the effects of oil on benthic habitat. There also appears to be some utility in applying existing technologies in a new and unique way to reach these same goals. For example, in limited research applications, modern multibeam echo sounders have been able to detect oil in the water column and on the seafloor. In addition, sensors on autonomous underwater vehicles and gliders are capable of detecting the presence of oil and gas in the

water column. Whether provided by new technologies, or through re-examining the capabilities of current technologies, highly accurate information on the precise location of spilled oil would be of significant benefit to a spill response, such as Deepwater Horizon oil spill. Timely understanding of the precise location of the spilled oil would allow responders to position their activities and better utilize limited resources to maximize our contributions to protect and restore the resources, communities, and economies affected by these tragic events.

- ***Surface Observations and Trajectory Models***
  Real-time data on currents, tides, and winds as well as sustained observations of physical and chemical parameters of the whole water column are important in driving the models that inform the trajectory forecast for the spilled oil. As the Integrated Ocean Observing System generates more data from technological advances like high frequency radar, the prediction of oil location can be improved by pulling these observations into trajectory models quickly. Through the collaborative efforts of the U.S. Integrated Ocean Observing System (IOOS), two of the three radars along the northern Gulf of Mexico coast were quickly re-established and made operational and now all three are delivering surface current data. Because we cannot predict where a spill will occur, data delivery from high frequency radars is envisioned to be part of a seamless national system.

  Data collected by space-based synthetic aperture radar can be used to produce high resolution images of the Earth's lands and oceans and can also be used in all types of weather, as it can "see through" clouds and darkness. Current use of NOAA-generated experimental products suggest that data from space-based synthetic aperture radar can assist in detecting and refining the areal extent of oil, which would provide valuable information to help determine where response efforts and resources should be deployed.

  Current hydrographic surveys carry out sustained observations of the whole water column in the Gulf of Mexico, Florida Bay, and Florida Keys, and will be extended if the oil or dispersant spread through the Strait of Florida and into the Gulf Stream. These surveys, along with satellite observations and numerical models, allow monitoring of currents and features responsible for the transport of oil and dispersant. A sustained observing system for this region would allow NOAA to provide predictive information about how the spill may impact the East Coast of the United States.

- ***Long-Term Effects on Species and Habitats***
  Spilled oil can remain in the sediments along the shoreline and in wetlands and other environments for years. More than twenty years later, there are still toxic levels of sub-surface oil in Prince William Sound from the Exxon Valdez spill. Research is needed to improve our understanding of the long-term effects of oil on sensitive and economically important species and habitats. Continued research is also needed to determine the effects of oil and dispersants that are suspended in the water column on pelagic species, as well as research on the effects of oil on deep water corals, chemosynthetic communities (animal communities living in the deep sea on dissolved gases and benthic habitats) and benthic habitats. Important interagency studies are currently underway that

will provide valuable information on the sensitivity and resilience of these deepwater communities, and will inform response actions.

- ***Data Management Tools for Decision Making***
  The key to effective emergency response is efficiently integrating current science, information technology, and real-time observational data into response decision-making. NOAA has developed the Emergency Response Management Application (ERMA), a web-based information management application, to facilitate preparedness, response, and restoration decision-making for oil spills and for other coastal hazards. ERMA integrates observations (e.g., NOAA National Buoy Data Center data, weather data, shoreline data, vessel traffic information, etc.) with archived data sources (e.g., NOAA's National Oceanographic Data Center's historical data) in an easy to use, Google-based format to aid in evaluating resources at risk, visualizing oil trajectories, and planning rapid tactical response operations, injury assessment and habitat restoration. Having access to retrospective data is critical to bring value to real-time observational data being collected. NOAA is working with the Department of the Interior (DOI) and state trustees to assure that data management tools can be integrated.

  NOAA is currently using the Gulf of Mexico ERMA for the Deepwater Horizon oil spill response to help manage the common operational picture for all command posts (http://www.geoplatform.gov/gulfresponse/). The Gulf of Mexico ERMA is updated daily to provide a dynamic and automated tool allowing for greater access, more layers of data, and high-resolution photography. ERMA allows users to navigate through different layers of information to reveal actual data and magnify areas of geographic interest – ultimately improving decision making. In addition to the Gulf of Mexico, ERMA is operational in the U.S. Caribbean and New England.

- ***Natural Resource Protection Tools***
  Environmental Sensitivity Index (ESI) database and map products provide information that helps reduce the environmental, economic, and social impacts from oil and hazardous substance spills. ESI maps include information on biological resources (such as birds, shellfish beds, and endangered species), sensitive coastal and nearshore habitats (such as marshes, tidal flats, and sea grass beds, National Estuarine Reserves and National Marine Sanctuaries), and human-use resources (such as public beaches, parks, and drinking water intakes). ESI maps are one tool that spill responders can use to identify priority areas to protect from the spreading oil, develop cleanup strategies to minimize impacts to the environment and coastal communities, and reduce overall cleanup costs. NOAA's goal is to update ESI maps approximately every 10 years to ensure responders have up-to-date information.

- ***Research to Improve Tools for Assessment and Restoration***
  Current techniques to assess and restore injured natural resources need to be constantly updated and refined. As our understanding of complex ecosystems evolves, so should our modeling tools and restoration techniques. For example, currently, site-specific protocols for assessing injuries to unique, high-value habitats such as those found in the Arctic are needed. In addition, research and tools to better assess and quantify natural resource

services — such as water filtration and capture, flood protection, carbon sequestration, recreation, and education — across a range of habitat types can help ensure the public is fully compensated and the environment is fully restored.

- ***Air Quality Impacts***
  In addition to its marine responsibilities, NOAA assists in predicting the air quality impacts from oil and hazardous substance spills. The characteristics of pollution released from large areas of burning oil and the widespread evaporation of oil are significantly different from routine air quality/atmospheric dispersion scenarios. Research and development of improved tools to estimate the characteristics of compounds entering the atmosphere, and integration of those tools with NOAA's existing atmospheric modeling capabilities, would significantly improve NOAA's ability to predict smoke and chemical concentrations in the atmosphere resulting from such incidents.

- ***Oil in Arctic Environments***
  Continued acceleration of sea-ice decline in the Arctic Ocean as a consequence of global warming may lead to increased Arctic maritime transportation and energy exploration that in turn may increase the potential of oil spills in the Arctic. Recent studies, such as the Arctic Monitoring and Assessment Programme's Oil and Gas Assessment, indicate that we currently lack the information to determine how oil will behave in icy environments or when it sinks below the surface. We also lack a basic understanding of the current environmental conditions, which is important for conducting injury assessments and developing restoration strategies. Research is needed to better understand the challenges of spill response in Arctic waters and the most effective tools and techniques to utilize in such environments.

- ***Human Dimensions***
  Research is needed on how to incorporate impacted communities into the preparedness and response, restoration and recovery processes to help to address the human dimensions of spills, including social issues, community effects, risk communication methods, and valuation of natural resources. Transparency and communications can be improved to share information with impacted communities on how and why decisions are made, and the breadth of response and NRDA activities that have been and will be undertaken for the Deepwater Horizon oil spill.

CONCLUSION

As this Committee is well aware, research takes time. A major research cruise can take a year to plan. A model can take years to develop and validate. A report can take months to get right. The Deepwater Horizon oil spill is causing harm that will impact coastal environments for years to come. Applying the latest science and continued research and development efforts in the public and private sectors can improve our response decisions, thereby reducing injury to our Nation's economy and environment.

I would like to assure you that we will not relent in our efforts to protect the livelihoods of affected Gulf Coast residents and mitigate the environmental impacts of this spill. In the wake of such an event, we are reminded of the fragility of our coastal ecosystems and the dependence of coastal economies on the health and prosperity of our seas. Thank you for allowing me to testify on NOAA's response and damage assessment efforts and areas for future research. I am happy to answer any questions you may have.