

## Weathering Change: Need for Continued Innovation in Forecasting and Prediction

### *Witnesses*

#### Panel I

**The Honorable Mary M. Glackin**

Deputy Under Secretary for Operations, National Oceanic and Atmospheric Administration

**The Honorable Todd J. Zinser**

Inspector General, U.S. Department of Commerce

**David C. Trimble**

Director, Natural Resources and Environment, Government Accountability Office

**Rear Admiral Cari B. Thomas**

Director of Response Policy, U.S. Coast Guard

#### Panel II

**Tom Iseman**

Program Director, Water Policy and Implementation, Climate Adaptation, Western Governors' Association

**Peter P. Neilley**

Vice President, Global Forecasting Services, The Weather Channel Companies

**Robert Marshall**

President and Chief Executive Officer, Earth Networks

### *Subcommittee Members Present*

Mark Begich, Chairman (D-AK)

Olympia Snowe, Ranking Member (R-ME)

John Boozman (R-AR)

On November 16, 2011, the Senate Committee on Commerce, Science and Transportation Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard held a hearing to discuss the need for continued innovation in weather forecasting and prediction. A record-high number of natural disasters in the U.S. occurred in 2011, thus improved technology for weather forecasting and mitigation is of the utmost importance. The National Polar-orbiting Operational Environmental Satellite System (NPOESS), jointly operated by the National Oceanic and Atmospheric Administration (NOAA), the National Aeronautics and Space Administration (NASA), and the Department of Defense (DOD), was designed as a means for cost savings by combining military and civil remote-sensing efforts. Cost-savings were not achieved, and in 2010 the White House Office of Science and Technology dismantled NPOESS and replaced it with the Joint Polar Satellite System (JPSS), managed by NOAA and NASA, and the Defense Weather Satellite System. Although the NPOESS Preparatory Program (NPP) was designed to bridge the gaps between the two systems, NOAA is aware of a potential "data gap" in 2016 due to technological setbacks transitioning NPOESS to JPSS.

The Government Accountability Office (GAO) produced a report that examined NOAA's current satellite programs and its efforts to improve its technological innovation and prevent such a data gap. On November 17, 2011, the Consolidated and Further Continuing Appropriations Act for 2012 (P.L. 112-55) was passed into law, funding \$924 million for NOAA's JPSS.

Chairman Mark Begich (D-AK) opened the hearing by providing a brief recap of a very intense storm that devastated the Alaskan coast on November 9, and praised NOAA's weather forecasting information for mitigating the harmful effects on Alaskans. He heralded NOAA's weather service as a "critical program" that improves the lives of all Americans and stressed the need for reliable weather information. After highlighting his negative views on the last administration's funding priorities for weather technology, he said he wants to make sure this administration is "a better steward of taxpayer funding."

Ranking Member Olympia Snowe (R-ME) introduced the importance of the Gulf of Maine Ocean Observing System to her state and provided a background on the current transition of satellite systems. She argued it is "crucial to preserve the continuity" of weather

information between the two systems and referenced GAO's report that stated there is a "lack of interagency strategy for environmental observation between NOAA, NASA, and DOD." Snowe praised the innovation of the private sector to ensure data continuity and stressed that weather infrastructure must be a national priority.

Mary Glackin of NOAA told the committee that there is "much to be done" to spur innovation within NOAA. Specifically she mentioned the need for improved weather radar, including precipitation data, and flood and thunderstorm warnings, as well as consolidating their polar satellites. According to Glackin, NOAA is working diligently with other federal agencies, weather organizations in the private sector, academic institutions, and state and local governments. She mentioned a new method of combining technology with social science advancements to create a more "weather-ready nation." Glackin said there is "a nearly 100 percent chance" of the long-term data gap in 2016 occurring.

Todd Zinser, Inspector General of the Department of Commerce read from his testimony three oversight observations from the recent audit report of JPSS, which examined the adequacy of the JPSS development. First, he noted that JPSS is a "critically important program... that must overcome years of setbacks from its NPOESS predecessor." While NPOESS was originally created to reduce duplication and overlaps between NOAA, NASA, and DOD, it was unsuccessful in its efforts due to cost overruns. Second, he noted two challenges ahead for JPSS: a potential short term data gap in eighteen months as the NOAA-19 satellite transitions to NPP, and a likely long term data gap in 2016 when NPP reaches the end of its life and JPSS-1 begins operation. Finally, Zinser told the committee that NOAA's senior officials need to make sure there is no "additional slippage" in their schedule by creating a program baseline and coordinating across agencies more efficiently.

David Trimble of GAO briefly described the importance of climate change adaptation and recognition, more site-specific weather data, and collaboration between various organizations. Rear Admiral Cari Thomas of the U.S. Coast Guard told the committee that NOAA and the Coast Guard have a successful and beneficial partnership, citing two specific examples of their collaboration that saved lives.

During the question and answer period of the first panel, Chairman Begich asked Glackin what steps NOAA is taking to prepare for the likely data gap in 2016. She responded that NOAA is strengthening its international partnerships and using all available data both on-ground and from satellites. Begich asked Zinser if NOAA is prepared to fill that gap "if funding is flat." It will "obviously be more difficult," Zinser replied, but he suggested NOAA put its satellite data into a "larger formula" database so that all agencies can contribute to the effort. This was a suggestion from the Office of Inspector General's audit report that NOAA is not currently implementing. Begich encouraged Glackin that NOAA should develop a report for Congress to stress the importance of satellite data. Ranking Member Snowe asked Zinser if funding is an issue for the short and long term data gaps. He replied that it is much more of an issue for the long-term 2016 data gap, which has an 80 percent likelihood. A short-term gap "may not even exist" according to Zinser, if NOAA takes the necessary actions to prevent it. Regarding search-and-rescue (SAR) data, Snowe asked Rear Admiral Thomas if the lack of an SAR sensor on JPSS-1 will negatively affect the Coast Guard's efforts. Thomas replied that they can get similar SAR satellite data from other sources until it becomes available in the JPSS-2.

John Boozman (R-AR) and Begich asked Glackin if NOAA is working diligently with other federal agencies. She replied that NOAA is partnering with the U.S. Navy, the U.S. Air Force, NASA, and the Department of Energy (DOE), but using its own "high performance resources." Regarding the lifetime of NPP, Boozman asked Zinser for clarification on its lifetime. Because NPP was designed as a "contingency satellite," Zinser explained, it was not designed with NASA standards and may not perform its functions for more than three years. However, the satellite has a normal life expectancy is five years and has enough fuel to power it for seven years.

Tom Iseman of the Western Governor's Association (WGA) began the second panel by providing some information about WGA and its interest in weather-related disasters in the western states, such as floods, droughts, and coastal disasters. He told the committee that WGA has created a Memorandum of Understanding (MOU) with NOAA to target "disaster risk reduction" for the western states. He encouraged the collaboration of NOAA with state governments and the private sector. Peter Neilley of the Weather Channel Companies (WCC) presented some compelling statistics about weather services during his testimony. According to WCC, 40 percent of the nation's economy is "sensitive to weather," and there have been fourteen \$1 billion weather disasters so far in 2011 in the U.S. Regarding the importance of funding for weather services, he noted that the \$5 billion spent this year on weather data has prevented \$30 billion that would have been spent on weather-related losses. Neilley stressed that the private sector should "strategically be relied upon" by NOAA to develop next-generation weather services and foundational datasets. Robert Marshall of Earth Networks told the committee about the 2008 National Academy of Sciences report, *Observing Weather and Climate from the Ground Up: A Nationwide Network of Networks*, that recommended NOAA take advantage of its mesonet program and incorporate it into the National Weather Service. Marshall argued that six lives "quite possibly" could have been saved during the Indianapolis State Fair tragedy in August 2011, when a severe thunderstorm caused a stage collapse, had NOAA implemented this program. He argued for mesonets to be fully funded and completed. Marshall described a new innovative Total Lightning technology that provides more lead times before disasters without significant costs. Like the two witnesses before him, Marshall stressed the need for NOAA to embrace public-private partnerships to utilize new cost-effective technologies.

During the second question and answer period, Begich asked Iseman if NOAA has the capacity to function at the regional level. Iseman said NOAA does have that capacity, and it can be seen in the MOU partnership with WGA, the National Integrated Drought Information System, and NOAA's regional integrated science and assessments. Neilley told the senator that NOAA needs to develop a system to filter out its "tremendous" amount of information so that the appropriate data can reach the public and the remaining, equally-important data can be organized. When asked to elaborate by Snowe, Neilley added that NOAA currently does not have a method of communication to filter through all the information that is processed by its supercomputers. Filtering the data, Neilley said, can enhance the frequency and accuracy of daily weather data. Snowe inquired about NOAA's reaction to the report that recommended the use of the nation's mesonet networks. Marshall said NOAA was responsive to the report, but he is disappointed that the networks have not been mentioned in the President's budget request. He reiterated that creating a national mesonet would be relatively "very, very" cheap compared to the billions of dollars spent on weather satellites and would significantly benefit weather data organization and acquisition.

Witness testimonies and a webcast of the hearing can be found on the committee web site.