

**COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES**

HEARING CHARTER

*Expanding Climate Services at the National Oceanic and Atmospheric Administration (NOAA):
Developing the National Climate Service*

Tuesday, May 5, 2009
10:00 a.m. to 12:00 p.m.
2318 Rayburn House Office Building

Purpose

On Tuesday, May 5, 2009 the Subcommittee on Energy and Environment of the Committee on Science and Technology will hold a hearing on *Expanding Climate Services at the National Oceanic and Atmospheric Administration (NOAA): Developing the National Climate Service*.

The purpose of the hearing is to hear expert testimony on options for expanding the delivery of climate services by the National Oceanic and Atmospheric Administration (NOAA). The hearing will also explore the role of other federal agencies in building a national infrastructure to deliver climate information to support the development of national, regional and local strategies to adapt to climate variability and change.

Witnesses

Panel I

Dr. Jane Lubchenco, Under Secretary, National Oceanic and Atmospheric Administration, U.S. Department of Commerce. Dr. Lubchenco will discuss the current climate services available through NOAA's various programs and offices; the agencies' plan for internally organizing a National Climate Service; and how and to whom services are delivered.

Panel II

Dr. Arthur DeGaetano, Director, Northeast Regional Climate Center (NRCC). Dr. DeGaetano will discuss the products and services of the regional climate centers, specifically the Northeast Regional Climate Center. Dr. DeGaetano will also discuss regional data users and give examples of how the NRCC services influence regional management and climate decisions.

Dr. Eric J. Barron, Director, National Center for Atmospheric Research. As Chair of the Climate Service Tiger Teams Coordinating Committee, Dr. Barron will discuss how current climate services are organized and the potential impact of a coordinated, national climate service. In addition, Dr. Barron will discuss different organizational scenarios for a national climate

service, as outlined in the Tiger Team Coordinating Committee and the National Academy of Sciences (NAS) Report.

Dr. Philip Mote, Director, Oregon Climate Change Research Institute and Oregon Climate Services and Professor, College of Oceanic and Atmospheric Sciences, Oregon State University. Dr. Mote will discuss the role of the Regional Integrated Sciences and Assessments (RISAs) in delivering climate services. Dr. Mote will also discuss how the RISAs interface with NOAA, other agencies, Regional Climate Centers, state climatologists, NGOs, and the private sector.

Mr. Richard J. Hirn, General Counsel and Legislative Director, National Weather Service Employees Organization. Mr. Hirn will discuss the National Weather Services' role in delivering climate service to the nation and how these services are coordinated with other agencies, the private sector, Regional Integrated Science and Assessments (RISAs), Regional Climate Centers, state climatologists, and NGOs.

Panel III

Dr. Michael L. Strobel, Director, National Water and Climate Center, Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA). Dr. Strobel will discuss NRCSs role in delivering climate services and products to the nation and how this interfaces with the services of NOAA and other agencies. Dr. Strobel will also discuss the users of the services USDA provides and how a national climate service would impact USDAs climate service.

Mr. David Behar, Deputy to the Assistant General Manager, San Francisco Public Utilities Commission and Staff Chair, Water Utility Climate Alliance. Mr. Behar will discuss what climate services and products the San Francisco Public Utilities Commission utilizes; how these services are delivered; and how these climate services and products influence the city's operations and management decisions.

Mr. Paul Fleming, Manager, Climate and Sustainability Group, Seattle Public Utilities. Mr. Fleming will discuss how the Regional Integrated Sciences and Assessments (RISAs) deliver climate services and products to the Seattle Public Utilities, and how these climate services and products then influence their operations and management decisions.

Dr. Nolan Doesken, State Climatologist for Colorado, and Senior Research Associate, Colorado State University. Dr. Doesken will discuss the climate services and products produced at state climate offices and explain who uses this information. He will also discuss the state climate offices' relationship with the Regional Climate Centers, the Regional Integrated Sciences and Assessment (RISA) program, and the NOAA Climate Program office.

Background

Multiple actors in society, from individuals to businesses to the government, rely on weather and climate information to make decisions. The United States recognized that that a well functioning society needed this kind information and in 1890, the first law was passed to authorize the creation of a weather bureau to track the weather and provide warnings and forecasts. Since that time, our ability to monitor and forecast the weather and, therefore to understand the climate has expanded dramatically, and the need for information about weather and climate has also expanded. Satellite-based information, improvements and expansion of ground-based and ocean-based observation networks, availability of faster, more advanced computers, and improved models of climate and weather phenomenon allow the National Weather Service (NWS) to provide more accurate weather forecasts, longer lead times for severe storms, and more reliable information about fluctuations and patterns of weather over intra-annual and inter-annual, decadal and longer time scales – or climate.

Weather is the short term variation in the state of the atmosphere that occurs in periods from minutes to weeks at specific locations. It results from the combination of temperature, humidity, precipitation, cloud cover, visibility and wind speed. Climate is the average weather conditions for a location over a period of decades (30 years, commonly) plus statistics of weather extremes. Over these decadal periods, scientists look for patterns of variability and cycles in climate. One of the best known cycles is associated with shifts in the winds and ocean temperatures in the equatorial Pacific Ocean that result in the El Niño and La Niña cycles. Climate change is discussed in the context of years, decades or centuries. Cycles of variability are monitored and studied to determine possible shifts in long term climate that are more permanent.

Increasing impacts of a changing climate demonstrate the need for information to support adaptation decisions. Climate variability and change are important for a wide range of human activities and natural ecosystems. Federal resource managers, state, local, and tribal governments, and the private sectors all recognize that a changing climate greatly impacts their ability to plan for tomorrow.

The National Oceanic and Atmospheric Administration (NOAA) is the leading provider of weather and climate information to the nation and the world. Climate sciences have made major advances during the last two decades. NOAA has begun to extend climate science to address decision-relevant questions and build capacity to anticipate, plan, and adapt to climate variability and change. NOAA is providing climate forecasts and support for planning and management decisions by other federal agencies and by state, local and tribal governments, the private sector and the public. Through programs such as the National Integrated Drought Information System (NIDIS), NOAA is expanding its delivery of climate information. Forecasts of El Niño and La Niña cycles, production of seasonal hurricane outlooks, production of monthly wildfire outlooks, and projections of snow-pack and snow-melt are all examples of climate products that different user-groups are requesting and relying upon to respond to conditions that impact a wide array of economic and social activities including agriculture, the need for emergency management resources, resource management, and projections of energy demand.

The Bush Administration announced its intention to create a National Climate Service in 2008, and requested the NOAA Science Advisory Board (SAB) examine four options for organizing a

National Service. Two options focused on creating the Service at NOAA and the other two options examined other organizational structures with a NOAA role, but not a NOAA lead. Some of the key issues going forward are: the consideration of how services will be provided at the regional, state, and local levels to all potential users of climate information; what role will NOAA play in a National Climate Service; what type of interagency structure should coordinate the development and delivery of climate services by federal agencies; what is the role of other climate service providers including state and local governments; the private sector; universities; and other non-governmental organizations.

Production and Delivery of Climate Services by NOAA

The current structure at NOAA providing climate services is essentially the same structure that provides weather forecasting services. As discussed earlier, information about climate is built upon repeated, comparable observations of the weather in a given location over time. Information about climate has also grown as the number, distribution, type and quality of observations have grown. The primary line offices at NOAA that support climate services are the National Weather Service, the National Environmental Satellite, Data and Information Service and the Office of Oceanic and Atmospheric Research. Observations and information provided by other NOAA line offices and by other federal agencies and the academic community also contributes to these efforts. The roles of each of these are described briefly below.

National Weather Service (NWS)

The National Weather Service (NWS) provides a wide array of weather and climate services every day for the U.S. and other nations in accordance with its fundamental missions to support: “the forecasting of weather, the issue of storm warnings, ..., the distribution of meteorological information in the interests of agriculture and commerce, and the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States”¹

NWS operates and maintains a network of observing stations and provides operational weather and climate services through its regional centers and the 122 Weather Forecast Offices (WFO) and the River Forecast Offices (RFO) distributed throughout the nation. The National Center for Environmental Prediction (NCEP) develops weather and climate forecast models and tools and is responsible for transitioning new models and tools to operations. The Climate Prediction Center (CPC) provides weather and climate products that span time scales from days (e.g. 6-10 day Outlook) to months (90 Day Outlook). CPC also provides the U.S. Hazards Assessment and Drought Assessments and the El Niño and La Niña predictions.

NWS provides information to other federal agencies to support their weather and climate-related work and to private sector weather providers who develop specialized forecast products for distribution to businesses and the public. NWS also interacts with the international community through cooperative programs of the World Meteorological Organization.

National Environmental Satellite, Data and Information Service (NESDIS)

¹ 15 U.S. Code Section 313 from the 1890 Organic Act establishing the National Weather Service.

The National Environmental Satellite, Data, and Information Service (NESDIS) operate the geostationary and polar weather satellites from which we obtain a wide array of observations. NESDIS receives data from the satellites, analyzes these data, provides the accompanying metadata (i.e. supporting information that describes key characteristics of data and how they were collected), and distributes data products to NWS and other NOAA line offices and non-federal users for use in weather and climate models. NESDIS provides data services and support for all of NOAA and for other federal agencies. The National Climatic Data Center provides for the long term archiving of weather and climate data. NESDIS supports data product development to improve final weather and climate forecast products.

Office of Oceanic and Atmospheric Research (OAR)

The Office of Oceanic and Atmospheric Research (OAR) conducts the majority of NOAA's in-house research through its seven laboratories. The research is organized under three major categories: weather and air quality, climate, and ocean and coastal resources. In addition to their in-house research, many of the laboratories work collaboratively with universities and other non-governmental research organizations through formal agreements. OAR's research supports the operational missions of the other line offices at NOAA, and they work cooperatively with other federal research agencies. The advanced computational work, model development, observations, atmospheric and oceanic research done by OAR has enabled NOAA to expand the types and improve the quality of climate services they deliver.

Climate Program Office

The 1978 National Climate Program Act directed the Secretary of Commerce to establish a National Climate Program Office. The operation and scope of duties of this office have varied since that time. Currently, the Climate Program Office (CPO) is located in the Ocean and Atmospheric Research line office and it provides strategic guidance and oversight of the Agency's climate programs.

NOAA Partnership Programs

NOAA supports programs in partnership with other governmental and non-governmental organizations here in the U.S. and internationally that develop and deliver climate services. In addition to NOAA's in-house research done through OAR and through the other line offices, NOAA supports research through grants and cooperative agreements with universities. NOAA currently supports 21 Cooperative Institutes in 17 states. A number of these are engaged in weather and climate research (e.g. Cooperative Institute for Climate Studies – Univ. of MD; Cooperative Institute for Meteorological Satellite Studies – Univ. of WI). Some of the other organizations that are working with NOAA to develop and deliver climate services are described briefly below.

Regional Climate Centers

There are six Regional Climate Centers (RCCs) overseen by the National Climate Data Center of NESDIS. The Centers are a federal-state partnership to provide climate data and information at the state and local level. The RCCs work with NESDIS to maintain the national climate data record archive and support regional climate monitoring and applied climate research. They maintain and provide access to the Applied Climate Information System, a climate data management system that facilitates collection and dissemination of climate data. The Centers often work with the network of state climatologists to facilitate exchange of data and to develop and deliver local and regional climate services.

Regional Integrated Sciences and Assessments (RISA) Program

The Regional Integrated Sciences and Assessments (RISA) Program was established by NOAA through OAR about 10 years ago. There are nine RISA offices located throughout the country. The offices are based at universities and are designed to deliver applied research on climate to decision makers in formats that are readily applicable to regional and local situations. They provide assessments of impacts on the transportation sector, agriculture, coastal communities and human health. Feedback on current products and requests for new products come from the stakeholder community to the RISA offices and help to shape the research agenda to deliver what is needed.

Other Federal Agency Partnerships

NOAA is the primary provider of weather and climate information for the nation; however, there are many other federal agencies that provide climate services through their own network of field offices. The specific climate services provided are developed by these other agencies with support from NOAA. The distributed inter-agency system that has developed provides a wide array of services delivered at the local and regional level. However, the coordination for this system is not formalized in a holistic way. Several examples of programs for delivering climate services by federal agencies other than NOAA are provided below.

NOAA provides information to many other federal agencies and in some cases, receives data and information from the observing equipment and stations maintained by other federal agencies. USDA's Natural Resource Conservation Service (NRCS) operates the **National Water and Climate Center** to provide support for natural resource management at the level of river basins, watersheds and farm fields. NRCS is both a recipient of information from NOAA and a provider. They collect data on snowpack and soil characteristics through the Snowpack Telemetry and Soil Climate Analysis Network that is shared with other federal agencies including NOAA. NRCS utilizes data from these sources to develop climate services tailored to the needs of their traditional constituencies.

The Joint Agricultural Weather Facility is located in the Chief Economists Office at USDA. The World Board on Agriculture and NOAA established this Facility in 1977 to monitor the weather and climate and to assess the potential impacts on the yield of major crops around the world. They provide a number of climate products including a monthly review of weather highlights, an annual crop production review, and weekly soil temperature maps.

NOAA also provides support for the National Interagency Fire Center (NIFC) in Boise, ID in cooperation with eight other agencies of USDA and the Department of Interior (DOI). The NIFC provides support to federal agencies, state and local governments and the public in the preparation and mobilization of resources to prevent and fight wildfires. The Center produces monthly and 3-month seasonal trend forecasts of fire potential for the U.S. The Center holds workshops each year to develop their assessments.

Private Sector Climate Services

Private Sector weather providers play a vital role in weather and climate forecasting. Their extensive radio and television outlets are the primary source of weather and climate information for the public. Private weather providers also deliver specifically tailored forecast products to individual customers using a combination of publicly available weather and climate data from NOAA augmented with observations and information from their own networks. As in the case of current weather and climate forecasting, private sector weather providers will continue to play an important role in refining and expanding the array of climate services available to specific customers and to the public.