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# Adapting to Changing Climate in the Southeast
# National Oceanic and Atmospheric Administration (NOAA)
# Southeast Natural Resource Leadership Group Workshop
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## Overview of NOAA Climate Programs

An old saying expresses the thought that "climate is what you expect, weather is what you get." But what can we expect from the climate of the U.S., and the world, in the coming decade -- or even the next century? As all life on Earth depends on a favorable climate to survive, this is an important question that researchers in NOAA and worldwide are trying to answer. NOAA's research laboratories, Climate Program Office, and research partners conduct a wide range of research into complex climate systems and how they work. These scientists want to improve their ability to predict climate variation in both the shorter term, like cold spells or periods of drought, and over longer terms like centuries.

NOAA researchers conduct consistent and uninterrupted monitoring of the Earth's atmosphere and oceans that gives us clues about both long-term and short-term changes in the global climate. Work is being done to improve understanding of the human and natural drivers of climate change, observe climate change, gain better insight into climate processes and attribution, and estimate projected climate change. The data collected worldwide by NOAA and other researchers aids our understanding of, and ability to, forecast changes in climatic systems. Using ever more powerful computer systems, researchers are working on numeric modeling of climate systems that will help improve the accuracy of climate forecasts.

NOAA's goal is to *understand and describe climate variability and change to enhance society's ability to plan and respond*. NOAA works in collaboration with federal, academic, private, and international partners to achieve this goal so that our climate services can provide decision makers with a predictive understanding of the global climate system and to translate this information so the public can incorporate climate considerations into decision making.

## The Regional Connection: Profile of NOAA's Climate Assessments and Services Division (CASD) and NOAA Regional Collaboration Teams

NOAA's Climate Program Office established a Regional Decision Support (RDS) effort to accelerate interactions with users of climate information and forecasts at multiple spatial and geographical scales. The CASD portfolio helps NOAA identify and serve the nation's needs for climate information to support decision making through an integrated program of: 1) research and assessment related to impacts and decision making needs; 2) transition of research to operations; and 3) experimental production and delivery of local and regional climate services that can be utilized to enhance adaptive management options. NOAA's CASD activities include efforts managed by the research and operational entities of the agency, and involve partnerships with other agencies, universities and stakeholders. Programs within this division include:

- Regional Integrated Sciences and Assessments (RISA) – The RISA program supports research that addresses complex climate sensitive issues of concern to decision-makers and policy planners at a regional level. Eight regional RISAs currently exist.

- Sectoral Applications Research Program (SARP) – Designed to build an interdisciplinary and applicable knowledge base and mechanism for the creation, dissemination and exchange of climate-related research findings critical for understanding and addressing resource management challenges in vital social and economic sectors.

- Transition of Research Applications to Climate Services (TRACS) – TRACS transitions experimentally mature climate information tools, methods and processes, including computer related applications (e.g. web interfaces, visualization tools), from research mode into settings where they may be applied in an operational manner. TRACS goal is to generate sustained delivery of useful climate information products and services to local, regional, national, and international decision and policy makers.

In addition, NOAA has in the last year established a regional collaboration initiative. Eight regional teams have been formed in response to multiplying external drivers citing regional efforts as a means to execute national priorities (e.g. drought, marine protected areas, climate services, hazards resilience, integrated ecosystem assessments). NOAA established the regional collaboration effort to foster integrated, regionally-tailored implementation of NOAA-wide programmatic priorities and a systematic approach to internal and external communications. Regional collaboration will encourage multi-Line program execution on regional needs, mobilizing knowledge and capabilities across the agency, and engaging partners in order to:

- Address NOAA mission priorities at appropriate geographic scales
- Address distinct regional challenges related to NOAA's mission
- Leverage current and emerging regional partnerships to respond to stakeholder needs
- Enhance NOAA's value to and impact within regions

## Perspective on a National Climate Service

Climate variability and change profoundly influences economic prosperity, human health, and national security, and presents a substantial challenge to the nation and the world. Evidence of a changing climate – droughts, heavier downpours, warmer global surface temperatures, accelerating sea level rise, decreasing Arctic sea ice, retreating glaciers, changing ocean chemistry, and shifts in ecosystems all demonstrate the critical need to support the nation's capabilities to plan and adapt.

Given the breadth of the climate challenge and the imperative to think in terms of how to build a closer relationship between societal outcomes and a stream of information services, discussions are underway in NOAA concerning plans for a national climate service, involving relevant federal agencies and drawing on their relationships with state, local and private entities. There are a number of federal agencies with missions critical to producing earth system information, others whose missions will be influenced substantially by the effects of climate change, and

those who are essential to strategies to reduce dependence on fossil fuels. All need to be involved in ensuring the nation has the information it needs to respond and manage.

NOAA is home to the nation's Weather Service, Ocean Service, Fisheries Service and Environmental Satellite and Data Information Service, but also sponsors, through Oceanic and Atmospheric Research, a significant portion of the federal governments' investment in the science of climate and global change directed at achieving societal benefits. The culture of NOAA is shaped by the responsibility for service and to ensure that needs are met with the highest quality of scientific investigation in the climate system, information delivery, extension, and outreach possible. NOAA's interest in this task is evidenced across the agency, from the work being done to ensure that new knowledge about climate change is built into state-of-the art weather and short-term climate forecasts, to the working groups considering what climate change means to shoreline development, fisheries, and drought early warning and risk management. Discussions to date have suggested the need for a two-pronged approach:

1. Proposed establishment of a *national climate services partnership across federal agencies,* to become the mechanism through which the nation's goals with regard to managing risks associated with climate variability and change are identified, and investments and activities relevant to the production and application of climate information are coordinated. The focus of the partnership is on ensuring that highly usable, actionable, and issue-focused information is produced and evaluated. An intention is that the distributed sets of resources throughout the nation (including universities, federal, state and local science and management agencies, tribal governments, and non-governmental organizations) work in close collaboration with a national climate service.

2. Proposed establishment of a *national climate service* to be the nation's identified, accessible, authoritative, and centralized point of entry (e.g. portal) for regular and timely climate information, as mandated by both the National Climate Program Act of 1978 and emerging legislation for a national climate service. This includes, for example, historical and real-time data, monitoring and assessments, research and modeling, predictions and projections, decision support tools, and development and delivery of climate services.

## The Southeast Region: Insights and Sample Activities

A number of significant climate-sensitive issues exist in the southeast in which NOAA is playing a key role and working to address in coordination with partners. Illustrations include:

- *Planning for development of a drought early warning information system for the southeast* – A workshop was held April 29-30, 2008, in Peachtree City, GA, sponsored by the National Integrated Drought Information System (NIDIS), in which NOAA participates with other agencies. The workshop brought together providers of drought-related data and information with planners and resources managers involved in selected drought-sensitive management decisions. Specific goals were to assess the present level coordination and delivery of drought early warning information services by federal, state, regional, and local agencies, and to identify opportunities for improvements in information sharing. Participants addressed existing mechanisms in state and regional drought planning and demonstrated existing datasets and risk reduction tools. Participants

also identified critical monitoring and forecasting gaps, described drought risk management triggers and needs in key sectors and planning processes, and outlined the specific activities needed to further the development of drought early warning information systems on a regional basis.

- *Southeast coastal climatology project* – The Southeast Coastal Climatology Project ( http://www.coastalclimate.org/), developed to provide access to climate information was designed for commercial and recreational fishers in the Southeast; however the utility expands beyond this group to include coastal managers in general. Having access to marine and terrestrial climate data in one location as well as information on the phase of ENSO and its implications provides decision makers with scientifically sound information for economic development, environmental management, and education.

- *Climate change adaptation guidebook* – **Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments** ( http://www.cses.washington.edu/db/pdf/snoveretalgb574.pdf), co-authored by the Regional Integrated Sciences and Assessments (RISA) Climate Impacts Group at the University of Washington, King County Executive Ron Sims (Washington State), and King County's global warming team. The guidebook is a part of the ICLEI-Local Governments for Sustainability Climate Resilient Communities program designed to help decision makers prepare for climate change using a detailed and easy to understand process for climate change preparedness that incorporates familiar resources and tools and existing hazard mitigation plans.

- *Coastal state program initiatives to address Sea Level Rise* – Many state and local officials are determining how best to prepare for the anticipated impacts of climate change. A smart initial step in this process is determining which states already have policy and legislation in effect to address sea level rise. Knowing who to contact can greatly assist states that are at the beginning of this process. A Summary of Coastal Program Initiatives that can address Sea Level Rise as a result of Global Climate Change has been developed by Rhode Island Sea Grant, and is intended to provide an information base for dialogue among managers, policy makers and researchers. ( http://seagrant.gso.uri.edu/ccd/slr/SLR_policies_summary_Mar6_final.pdf)

- *Management of natural resources in the marine and coastal environment* – Two near-term workshops should help inform how to address such issues in the southeast: 1) a living marine resources workshop (week of May 12) to advance understanding of climate-related management challenges and develop new collaborative activities related to climate change and variability on living marine resources relevant to NOAA's mission (e.g. fisheries, marine mammals and turtles, corals and their habitats); and 2) a coastal workshop to develop a strategy for cooperation and integration in the development, communication, and application of science- and place-based information about the role of climate impacts and adaptation in coastal communities and ecosystems.

- *Fostering hazard resilient communities* – Climate is a stressor with impacts for which communities must plan. Climate also provides for a longer planning time horizon given

the slow onset of many climate stressors. As communities undergo the process of bouncing back and recovering from hazard events, they must consider rebuilding based on climate conditions we may not have seen in the past. More frequent extreme events will lead to increased incidence of drought and flooding. Through NOAA's *Risk-Wise* efforts, climate will be incorporated into education and training programs for community leaders and public officials. In addition, visualization and mapping efforts in some states have proven successful in engaging policy makers and coastal managers on the need to address long term climate change impacts in the short term. By leveraging current inundation and storm surge hazards work, inundation visualization efforts can be modified to demonstrate the potential impacts from inundation hazards under future climate conditions.

- *Ecological effects of sea level rise* – Led by NOAA's Center for Sponsored Coastal Ocean Research (CSCOR), this investigation is conducting research and seeking to fill information gaps to develop ecological models to forecast habitat response to the long term effects of sea level rise. A first pilot project is currently underway in North Carolina, with planning for a second project in the Florida Panhandle.