NOAA Climate Service

*Science Serving Society*

Mary M. Glackin
NOAA Deputy Under Secretary
The Rising Demand for Climate Services

- Commerce
- Coasts
- Recreation
- Ecosystems
- Hydropower
- Farming
- Wind Energy
- Private Sector
External and Internal Reports*


- **Miles et al.,** *An approach to designing a National Climate Service,* PNAS (2006) vol. 103 no. 52 19616-19623

- **NOAA’s Climate Service Development Team Strategic Plan,** an Accenture report (2008)

- **NOAA Science Advisory Board (2009),** *Options for Developing a National Climate Service.* Climate Working Group, Climate Services Coordinating Committee


*Reports listed in chronological order
1. NOAA’s existing framework for climate was established before climate services were recognized as essential, and is not optimized for climate service delivery.

2. While NOAA has continued to build its suite of climate services within its existing framework, including our interagency approach to delivering drought information services, much of the demand remains unmet.

3. To meet climate service demands, NOAA must direct efforts to develop a framework that will:
   – Connect users to existing climate products and services, while continuing to develop new authoritative, reliable services;
   – Transform current science and data into understandable, usable and accessible information;
   – Actively engage users in service development.

4. NOAA’s climate framework must deliver needed climate services while maintaining leadership in observing, research, modeling and assessments.

“If America is to avoid the most damaging effects of climate change, we have to first understand it – and that is where the Department of Commerce is instrumental.” - Secretary of Commerce, Gary Locke
NOAA Envisions an Informed Society Anticipating and Responding to Climate and its Impacts

Vision

Mission

Advance understanding and communication of climate to inform decisions about mitigation and adaptation *

- Support decision makers regionally to globally, on time scales of weeks to decades, in areas including public policy, resource management, infrastructure investment, business development, and decisions of individuals in their daily lives

Goals

Continue to Grow, Evaluate and Evolve NOAA’s Core Competencies in Three Key Areas:

- Deliver Sustained & Effective Services
- Promote Partnerships
- Ensure Communication
- Advance Climate Science

* Still under development.
NOAA’s Role in a National Strategy

International:
• *All nations* must recognize the need for climate services, and continue on the progress made at the WCC-3.
• *NOAA* is internationally recognized as advancing the state of climate knowledge, for leadership in GEOSS, and is viewed as critical to developing regional scale impact assessments.

National:
• *All agencies* must consider climate change impacts as it relates to their mission areas, and commit to work within a cooperative and collaborative *interagency strategy*.
• *NOAA provides core capabilities* to national climate services through NOAA’s decades of expertise in observing, monitoring, research, modeling, assessments, and existing service delivery structures.

Regional:
• *All agencies* must engage in a *Regional Climate Service Enterprise* to ensure users have the climate information they need.
• *NOAA’s regional service capacity*, with over two centuries of experience, is delivering services today through public and private partnerships, and is ready to engage in the national climate service strategy.
NOAA commits to providing critical assets in science and service to a Federal partnership.

Information Delivery and Decision Support
NOAA uses its national and regional infrastructure to deliver climate services today.

Assessments of Climate Change and Impacts
NOAA is a leader in national and regional climate impact assessments. Over 70% of Federal IPCC AR4 WG1 authors were from NOAA.

Climate Change Research and Modeling
Internationally recognized models of the global climate.

Climate Observations and Monitoring
NOAA operates over 90 observation and monitoring systems. NOAA is mandated to monitor and provide access to climate data and information.
Living Marine Resources and Ecosystem Issues

- Climate Impacts on Ecosystems/Fisheries
- Endangered Species Act Requirements
- Attribution of Climate Signals impacting ecosystems: Long Term Change & Natural Variability
- Ocean Warming: Impacts on Distribution & Productivity (phenology, production, invasives)
- Physical and Chemical Changes to the ocean (Ocean Acidification Impacts on Marine Biota)
- Impacts of Loss of Sea Ice on Living Marine Resources

NOAA Products and Services

- Ocean Warming: Impacts on Distribution & Productivity of Coastal Ecosystems & Fisheries
- Impacts of Loss of Sea Ice on Living Marine Resources
- Physical and Chemical Changes to the Ocean
- Ecosystem Habitat Monitoring and Restoration

Key Federal Agencies

NOAA, DOI, EPA
NOAA Climate Service Leadership in Coastal Regions

Coastal Issues
- Sea level rise and inundation
- Precipitation patterns and associated effects on freshwater, nutrient, and sediment flow
- Ocean temperature
- Circulation patterns
- Frequency, track and intensity of coastal storms
- Levels of atmospheric CO2 and ocean acidification

NOAA Products and Services
- Coastal Inundation Modeling
- Observations and Monitoring of Coastal Areas
- Forecasting of Coastal Storms
- Information for Adaptation Planning
- NOAA sea-level standards have been adopted by the U.S. Army Corps of Engineers for civil works programs.

Key Federal Agencies
NOAA, DOI, NASA, DOE, Army Corps of Engineers, FEMA
NOAA Climate Service Leadership in 
Water

Water Issues

- Precipitation Patterns; Drought and Floods
- Changes in snowpack (quantity and timing)
- River stream flow
- Fire outlooks
- Physical Infrastructure (i.e., dams, reservoirs, water delivery systems)
- Planning (e.g., urban, agriculture, health)

NOAA Products and Services

- Monitor and Forecast Drought and Flood Related Conditions
- National Integrated Drought Information System (www.drought.gov, NIDIS) (Including Stakeholder Engagement)

Key Federal Agencies

NOAA, DOI, Army Corps of Engineers, USDA, EPA

www.drought.gov
# NOAA’s Enabling Contributions to Climate Services

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<th>Issue</th>
<th>Key Federal Agencies</th>
<th>NOAA’s Products and Services</th>
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<tr>
<td><strong>Energy:</strong></td>
<td>DOE, NASA, EPA, NOAA</td>
<td>• GHG Monitoring&lt;br&gt;• Seasonal Forecasts&lt;br&gt;• Information on Wind and Solar Climatology for Renewable-Energy Infrastructure Planning&lt;br&gt;• Precipitation and Water Resource Information for Hydroelectric</td>
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<tr>
<td>Carbon Emissions Issues&lt;br&gt;Renewable-Energy Development&lt;br&gt;Seasonal Energy Use</td>
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<td><strong>Transportation:</strong></td>
<td>DOT, FAA, NOAA</td>
<td>• Navigation Charts&lt;br&gt;• Real-time Tides and Currents for Safe Navigation of Ports&lt;br&gt;• Aviation Sector Planning and Support</td>
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<td>Impacts of a Changing Climate&lt;br&gt;Infrastructure&lt;br&gt;Transportation Corridors</td>
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<td><strong>Agriculture:</strong></td>
<td>USDA, NOAA</td>
<td>• Forecast of Seasonal Precipitation and Extreme Temperatures&lt;br&gt;• Monitor and Forecast Drought&lt;br&gt;• Climate Normals</td>
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<td>Crop Yields&lt;br&gt;Drought &amp; Flood Information&lt;br&gt;Seasonal Crop Forecast</td>
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<td><strong>Health:</strong></td>
<td>HHS, EPA, NOAA</td>
<td>• Observing and Understanding of Air Quality Processes&lt;br&gt;• Extreme Weather Forecasts and Predictions</td>
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<td>Environmental Stressors&lt;br&gt;Oceans and Human Health</td>
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Federal Regional Climate Service Enterprise

Connecting Science, Services and People

State and Local Engagement, Education & Service Delivery

- Weather Forecast Offices
- Sea Grant Education & Extension
- Marine Sanctuaries, Monuments & Estuarine Reserves
- River Forecast Centers
- Data Centers
- DOC Commerce Connect (in development)

- Other agencies (e.g., National Science Foundation, Dept. of Education, Health & Human Services, Dept. of Energy, Dept of Interior, Dept of Agriculture)
- Dept. of Agriculture Extension
- State Climatologists
- Federal Protect Area Programs
- USGCRP Climate Literacy Partners
- Etc...

Regional Climate Services Partnerships

- NOAA Regional Climate Service Programs
- Weather Service Regions
- Regional Climate Centers
- Coastal Services Center
- River Forecast Centers
- Regional Collaboration Teams
- Data Centers

- Relevant Regional Offices from other agencies (e.g., Environmental Protection Agency, Dept. of Agriculture, Dept. of Interior, Health and Human Services, Dept. of Transportation, Dept of Energy, etc.)

Regional Climate Science

- Regional Integrated Science & Assessments (RISA)
- NOAA Labs
- Sea Grant
- Cooperative Institutes
- Applied Research Centers
- Data Centers

- Other agencies (e.g., National Aeronautics and Space Administration, Dept. of Interior, Dept. of Agriculture, National Science Foundation & other USGCRP agencies)
- Etc...

USER ENGAGEMENT

- Development, Delivery & Evaluation of Products & Tools
- Understanding and Translating User Needs
- Informing Program Requirements

Government
Private Sector
Academia
NGO's
# Design Criteria for NOAA’s Reorganization

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<tr>
<th>Goals</th>
<th>Organizational Design Criteria</th>
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| Establish A Climate Service         | Establish Climate Leadership  
• Create a single line of accountability and responsibility for performance  
• Create a senior advocate for climate policy, strategy and budget within NOAA  

Enhance Climate Program Coordination  
• Develop effective mechanisms that leverage program execution for climate services from across the agency and with our partners  

Promote User Engagement on Climate  
• Create clear points of access for users  
• Facilitate and improve stakeholder engagement  
• Integrate user input into service development  

Strengthen NOAA Science              | Establish Science Leadership  
• Ensure the NOAA Chief Scientist is able to effectively coordinate and integrate NOAA’s research  
• Establish positions and accountability within the line offices for contributing to NOAA’s science strategy  

Enhance Cross Line Science Coordination and Engagement  
• Develop mechanisms to address key research problems requiring cross disciplinary expertise and coordination  

Implement the Administration’s Priorities | Promote Efficient Implementation and Operation  
• Minimize organizational complexity  
• Utilize existing programs to the greatest extent possible  

Position NOAA to meet Current and Future Challenges to NOAA’s Critical Mission Functions and Long Term Strategy  
• Limit disruptions to the agency during the reorganization  
• Promote internal and external engagement and support for NOAA’s mission areas and strategy
Proposed NOAA Climate Service

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**NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**

**NESDIS DATA CENTERS**
- National Climatic Data Center
- National Oceanographic Data Center
- National Geophysical Data Center

**OAR PROGRAM & LABORATORIES**
- Earth System Research Lab
  - Office of the Director
  - Chemical Sciences Division
  - Global Monitoring Division
  - Physical Sciences Division
- Geophysical Fluid Dynamics Laboratory
- Climate Program Office

**NWS FUNDING TO MANAGE NETWORKS (NO STAFF CHANGE)**
- Climate Observing Network
  - Tropical Atmosphere Ocean (TAO)
- Historical Climate Network Modernization (HCN-m)
- Modernization of the Hourly Precipitation Rain Gauges

*The physical location of these facilities will not change*
Note: Remaining OAR offices, programs and labs may be reorganized for mission focus and organizational efficiencies.
“NOAA’s fundamental responsibility is to ensure that complex policy choices are informed by the best available science. **In every dimension of its work, NOAA will exemplify scientific excellence and integrity.**”

“**Social and natural systems are inextricably linked.** Human health, prosperity, and well-being depend upon the health and resilience of natural ecosystems; human activities modify the coupled human-natural systems. At the broadest level, **NOAA must seek to advance more holistic approaches** to understand and balance human use, sustainability, and preservation of ecosystem resources and functioning.”

Dr. Jane Lubchenco, NOAA Administrator

1. What are the grand challenges for NOAA science?
2. What are the best practices for encouraging, promoting, and protecting healthy science at NOAA?
3. What is the optimal alignment to address those challenges?
Climate Advisory Bodies

• External Climate Service Advisory Board
  – A board to ensure the NCS is informed by broader stakeholder and partner interests
  – A board that can provide input from external stakeholders, partners and experts

• Internal NOAA Corporate Climate Board (Intra-Agency coordination)
  – Functions to ensure NOAA’s climate science and services are aligned in support of NOAA’s broader mission areas and strategic goals
Key Questions for the NAPA Study:

- How to provide information at the global, regional, and State levels over varying timescales;
- Support interaction among the government and various users, stakeholders, researchers, and information providers of climate information in both the private and public sectors;
- Develop and distribute products and information that will support decision-making to better prepare the Nation for climate variability and climate change;
- Coordinate and align existing programs and resources internal and external to NOAA to reduce duplications and leverage existing climate-related resources; and
- Provide estimates on projected funding levels.

Proposed Time Frame for NAPA Study

- 120 Days (July 17) - Interim Report From NAPA (preliminary findings and early recommendations)
- 180 Days (September 14) – Final NAPA Report
Next Steps...

- Continued engagement with partners and stakeholders to develop implementation plans
- Recruitment of Regional Climate Services Directors (May/June)
- Evolution of NOAA Climate Portal: [www.CLIMATE.gov](http://www.CLIMATE.gov)
- Consideration of NAPA’s interim findings to inform development of a reprogramming package
  - Submission to Congress in Fall 2010