NOAA Climate Service Initiative

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Outline

• Why climate?
• Why now?
• Why NOAA?
• What’s next?
Presents opportunities and challenges...

http://www.geographyalltheway.com/ks3_geography/environmental_issues/imagesetc/sea_level_rise.jpg
Impacts Are Why Climate Change Matters

- Infrastructure
- Ocean Life & Ecosystems
- Sustainable Food
- Coastal Inundation
- Water
- Weather (Extreme Events)
- Security
- And Many Others
Climate information needs to be considered in environmental, economic, and social decisions.
“While every mode of transportation in the U.S. will be affected as the climate changes, potentially the greatest impact on transportation systems will be flooding of roads, railways, transit systems, and airport runways in coastal areas because of rising sea levels and surges brought on by more intense storms”

- The National Academies 2008
Tourism/Recreation

- **Skiing, Northeast**
  - 20% reduction in length of ski season
  - $800M/yr in potential ski resort closures

- **Beaches, Southeast**
  - Many beaches are eroded, and some lost by 2080
  - Reduced opportunities for beach and fishing trips without additional costs for adaptation measures

- **Warm weather recreation**
  - Expansion of the season is good for hiking and bicycle riding

[Images of skiing and beaches]
• Coastal towns and villages vulnerable to sea level rise and more frequent and intense storms.

• Cost estimates of shoreline protection and village relocation continue to rise.

• Estimates by the US Army Corps of Engineers are up to $450 million in relocation costs for Shismaref, Kivalina and the village of Newtok.

View of Newtok from the air
www.farnorthscience.com
• U.S recreational + commercial fishing = ~$40 billion/yr

• Climate change will very likely alter the distribution and abundance of major fish stocks.
  
  – several species of Pacific salmon are likely to have reduced distribution and productivity
  
  – species that thrive in warmer waters, such as Pacific sardine and Atlantic menhaden, are likely to have increased distribution
"From a national security perspective, climate change has the potential to affect lives (for example, through food and water shortages, increased health problems including the spread of disease, and increased potential for conflict), property (i.e. through ground subsidence, flooding, coastal erosion, and extreme weather events), and other security interests."

- Congressional Testimony
Chairman, National Intelligence Council
“I [have] heard first-hand from businesses and state and local governments in communities all across this country about the need for reliable information and predictions about the impacts of climate change …there is real hunger for more and better information.”

—Dr. Jane Lubchenco, NOAA Administrator, May 5, 2009
Our nation needs a climate service….

…that will serve and provide authoritative climate information and services to assist the nation’s citizens in making climate-related decisions that enhance their lives and livelihoods.

“Decision makers at all levels of government and in the private sector need reliable and timely information to understand the possible impacts and corresponding vulnerabilities that are posed by climate change so that they can plan and respond accordingly.”

– Western Governor Association statement to the House Committee on Science and Technology, May 3, 2007
No single agency can address the climate challenge on its own.
The nation has made progress in understanding climate change.
Climate services are an evolving enterprise

Over the last year, several key reports have examined the concept of a National Climate Service as a single point of accountability for providing climate services to the nation.

• “Options for Developing a National Climate Service” by the Climate Working Group of NOAA’s Science Advisory Board

• “Restructuring Federal Climate Research to Meet the Challenges of Climate Change” report by the National Research Council

• “Informing Decisions in a Changing Climate” report by the National Research Council

NOAA is responsive.
These findings guide NOAA in the development of guiding principles for NOAA’s climate services and those for a National Climate Service.
Some Important Attributes

• Provide balanced, credible, cutting edge scientific and technical information

• Engage a diversity of users in meaningful ways to ensure their needs are being met

• Focus on human-caused climate change, but link human-caused climate change and changes in natural variability (e.g., frequency and duration of droughts), to meet broad user needs

• Provide and contribute to science-based products and services to minimize climate-related risks
Some Important Attributes

• Provide predictions and projections of climate at scales relevant to decision support

• Strengthen observations, standards, and data stewardship

• Ensure timely assessments

• Improve regional and local projections of climate change

• Inform policy options

• Inform decisions and management options of others

• Foster climate literacy and workforce development
Climate Service Case Study: Coastal Regions

Solution and problem focused:

- Sea level
- 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

![Recent Sea Level Rise](image_url)

![Map of coastal regions](image_url)
Climate Service Case Study: Water

Problem and People focused:

- Drought
- 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)
Climate Service Case Study:
Living Marine Resources

NOAA-centric and Problem focused:

- Attribution of Climate Signals impacting ecosystems: Long Term Change & Natural Variability
- Ocean Warming: Impacts on Distribution & Productivity (phenology, production, invasives)
- Impacts of Loss of Sea Ice on Living Marine Resources (at both poles)
- Physical and Chemical Changes to the ocean (Ocean Acidification Impacts on Marine Biota)
- Severe Weather
- Water Quality and Quantity
- Freshwater Supply & Resource Management
- Sea Level Rise (Natural Resource Implications)
Who’s Paying Attention?

• The White House
  – Office of Energy and Climate Change and Climate Czar
  – Office of Science and Technology Policy
  – Council on Environmental Quality
  – Council of Economic Advisors

• Congress

• Federal Agencies (DOC, DOE, EPA DOI, etc.)

• State and Local Governments

• Sectors

• The public...
LEGISLATIVE MANDATES

Existing statutes give NOAA:

the Authority

- National Climate Program Act of 1978
- Global Change Research Act of 1990*
- National Integrated Drought Information Services Act of 2006
- Hydrographic Services Improvement Act 1998
- National Weather Service Organic Act of 1890
- Marine Mammal Protection Act, Amended 2007
- National Marine Sanctuaries Act, Amended 2000*
- Coastal Zone Management Act, Amended 1996*
- Endangered Species Act of 1973, Amended 1988*
- Magnuson-Stevens Fishery Conservation and Management Act, Amended 2007
- Coral Reef Conservation Act of 2000*

* = current attempt to reauthorize

1978 National Climate Program Act

“It is the purpose of the Congress in this Act to establish a national climate program that will assist the Nation and the world to understand and respond to natural and man-induced climate processes and their implications."

“The Secretary shall establish within the Department of Commerce a National Climate Program Office . . .”
Jun 26, 2009: Waxman-Markey bill passed in the House; The totals were 219 Ayes, 212 Nays, 3 Present/Not Voting

- **HR.2454** – Sec. 452/Interagency
  - OSTP-led process; initiate within 30 days
  - Plan in two years; establish an NCS in three years

- **HR.2454**—Sec. 452/NOAA
  - Establish Climate Service Office
  - Network of regional and local partnerships
  - Utilize assets of all NOAA programs & partners

- Senate
  - Six Committees to act by end of Sept. 2009
  - Commerce Committee hearing on July 30

**A BILL**

To create clean energy jobs, achieve energy independence, reduce global warming pollution and transition to a clean energy economy.

1. Be it enacted by the Senate and House of Representa-
2. tives of the United States of America in Congress assembled,
3. SECTION 1. SHORT TITLE; TABLE OF CONTENTS.
4. (a) SHORT TITLE.—This Act may be cited as the
5. “American Clean Energy and Security Act of 2009”.

**CLEAN ENERGY**
- US$190 billion investment in clean energy technologies.
- Emissions performance standards for new coal-fired power stations, which would make CCS mandatory by 2028.
- Development of smart grid technologies and infrastructure.

**GLOBAL WARMING POLLUTION**
- National cap-and-trade scheme - 17% reduction in emissions by 2020, 43% reduction by 2050 (ref. 2005).
- Support for energy intensive industries and electricity utilities.
- Favourable allocations for new coal power stations that implement CCS by 2025.
- Incentives for up to 3 billion domestic emissions offsets per year.

**ENERGY EFFICIENCY**
- Energy efficiency standards for lighting products, commercial furnaces and appliances.
- Fuel standards for heavy vehicles.
- Subsidies for improvements in household energy efficiency.

**TRANSITION TO CLEAN ECONOMY**
- Funding to reduce impacts on low- and medium-income earners.
- Funding to offset energy price increases.
- Funding for domestic adaptation, prevention of tropical deforestation, international technology transfer.
- Entitlements and retraining for displaced workers.
NOAA's contribution: Building on a strong foundation

NOAA’s has a unique breadth of mandates and responsibilities for managing coastal and marine ecosystems, and resources and communities.

NOAA has a long history of building sustained partnerships with other federal agencies, the private sector, all levels of government, NGOs and the public.

NOAA has a commitment to and demonstrated leadership in the science programs that form the basis for a service
NOAA's climate services infrastructure

Maintain the programs that form the basis for services including:

- Observing systems;
- Data management, stewardship and delivery systems;
- Problem focused and fundamental climate research;
- Climate modeling, predictions and projections; and
- Climate assessments, products and services.

Delivery infrastructure and established partnerships.
“Experience has shown that connections between climate scientists and stakeholders are most effective at the local, regional, statewide, and multistate scales at which the stakeholders operate.”– Ed Miles (PNAS, 2006)
## Climate Goal Strategy

**Mission:** Understanding climate variability and change to enhance society’s ability to plan and respond

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<thead>
<tr>
<th>Program</th>
<th>Performance Objective</th>
<th>Outcome</th>
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<tr>
<td>Climate Observations and Monitoring</td>
<td>Describe and understand the state of the climate system through integrated observations, monitoring, and data management</td>
<td>A predictive understanding of the global climate system on time scales of weeks to decades to a century with quantified uncertainties sufficient for making informed and reasoned decisions.</td>
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<tr>
<td>Climate Research &amp; Modeling</td>
<td>Understand and predict climate variability and change from weeks to decades to a century</td>
<td>Climate-sensitive sectors and the climate-literate public effectively incorporating NOAA’s climate products into their plans and decisions.</td>
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<tr>
<td>Climate Service Development</td>
<td>Improve the ability of society to plan for and respond to climate variability and change</td>
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Climate Observations and Monitoring

Describe and understand the state of the climate system through integrated observations, analysis, and data management

Data Management and Information
- Data Management Services
- Data Stewardship

Climate System Observations
- Oceans
- Atmosphere
- Forcing

Slide Image
- State of the Climate in 2007
Climate Research and Modeling

Understand and predict climate variability and change from weeks to decades to a century with quantified uncertainties sufficient for making informed and reasoned decisions on issues related to drought, water resources, ecosystems, health, energy, and extreme events.

Understanding Climate Processes

• Understanding of past and present climate change, and projections and predictions of future climate change
• Understanding and prediction of ozone layer recovery
• Research and development for predictive understanding of the climate system

Earth System Modeling, Predictions, and Projections

• Improved estimate of climate forcings and understanding their causes
• Measurements and understanding of non-CO2 radiative forcing agents
• Making use of observations for advancing climate modeling and research
• Operational forecasts and assessments

Climate Analysis and Attribution

• Attribution of past and present climate variations and change
Climate Service Development
Assessing evolving user needs and context

Assessing Climate, Impacts and Adaptation
- Regional Integrated Sciences and Assessments (RISA)
- North Pacific Climate Regimes and Ecosystem Productivity (NPCREP) Program
- Sectoral Applications Research Program (SARP)
- International Institute for Climate and Society

Climate Services Development and Delivery
- National Integrated Drought Information System (NIDIS)
- Operational Climate Services
- Transition of Research Applications to Climate Services (TRACS)
- Climate Test Bed
- Precipitation Frequency Estimates
- Coastal Services Center (CSC)
- Regional Climate Centers (RCCs)
How NOAA’s Climate Program Office & Climate Mission Goal work in tandem

Oceanic and Atmospheric Research (OAR)
- Air Resources Lab
- Atlantic Ocean, & Meteorological Lab
- Earth System Research Lab
- Climate Program Office
- Geophysical Fluid Dynamics Lab
- Pacific Marine Environmental Lab

National Environmental Satellite Data & Info Service (NESDIS)
- National Climatic Data Center
- Office of Systems Development

National Weather Service (NWS)
- Climate Prediction Center
- Nat’l Ctr for Environmental Prediction
- Office of Climate, Water, & Weather Services

National Marine Fisheries Service (NMFS)
- Office of Science & Technology

National Ocean Service (NOS)
- Coastal Services Ctr.

Climate Mission Goal
Recent Activities

June 2008: NOAA completed a draft strategic plan, which was reviewed by an external group.

December 2008: NOAA began considering organizational options. An external report for the Science Advisory Board was commissioned.

January 2009: Established a National Climate Service (NCS) leadership team.

March 2009: Refined strategic goals and principles using external review and NRC reports (revised in April).

May 2009: Dr. Lubchenco testified on a National Climate Service to the House Subcommittee on Energy and Environment.

• July 2009: The House passed National Climate Service legislation

• July 30: Secretary Locke will testify on Climate Services to the Senate Commerce Committee

• Aug 31 – Sept 4: World Climate Conference – 3 (WCC-3)

• Dec 7-18: UN Framework Convention on Climate Change/Conference of Parties 15 (UNFCCC/COP 15)

• Fall 2009: NOAA Climate Portal
Goal: Provide one location for finding and accessing NOAA climate data & information

Status: Prototype to be delivered Fall 2009
Climate Portal Concept
Centralized Access, Decentralized Process

Data & Services Page
For Peers & Users
NOAA Data, Models, & Services

Climate Education Page
For Educators, Students & Publishers

Climate Science Magazine
For Public Continuum, Media & Peers

Climate Progress Page
For Policy Leaders & Peers

Climate Portal Page
For everyone
Office/Center Home Pages

Audience Expert
Subject Expert
Medium Expert

Climate Science Community
Partnerships

NOAA Comm, Ed Council, Public Affairs, Leg Affairs, etc.
Internal Collaborations
Next steps...

Continue to enhance the climate services NOAA already provides

Support OSTP in their leadership to determine the best arrangement for federal agencies to work in partnership to maximize delivery of climate services to the nation

Participate in an interactive process that engages federal agencies, states, partner institutions and individuals from across the spectrum of climate research, service provision, users, partners and stakeholders
“Climate change is one of the greatest challenges of our time.”

- President Barack Obama

“Our focus is to ensure that there is a strong science and policy basis for our environmental policy, to move the nation to greater reliance on clean energy and increase energy security, to combat global warming while growing the green economy, to protect public health and the environment, especially in vulnerable communities, and to protect and restore our great ecosystems.”

– Chair Nancy Sutley, White House Council on Environmental Quality