

Climate Services



Dr. Chet Koblinsky

Director, NOAA Climate Program Office
National Oceanic and Atmospheric Administration

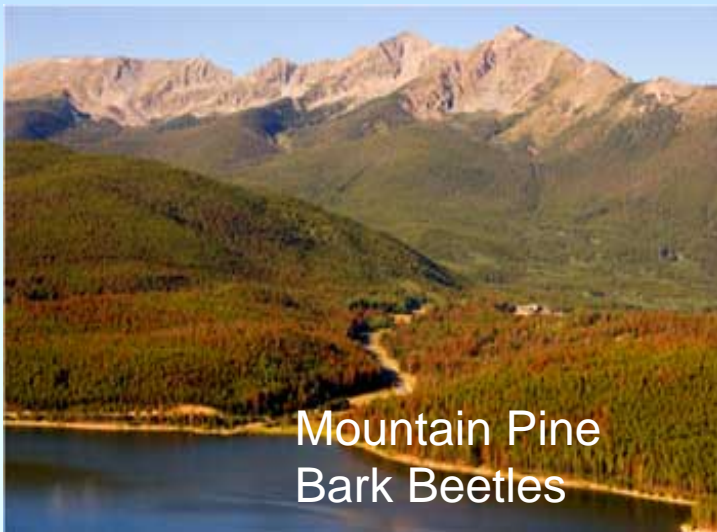
March 7, 2008

Outline

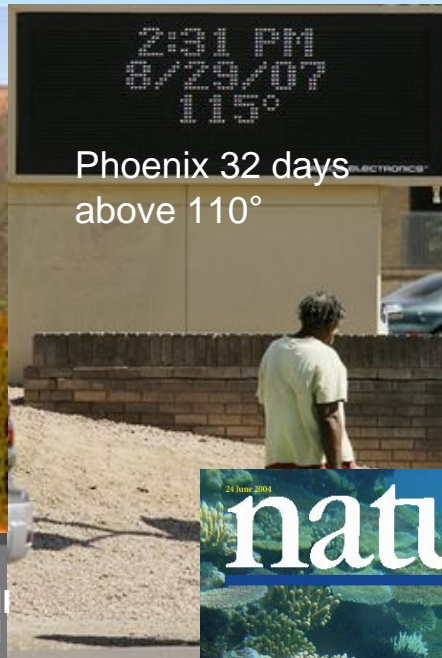
- **Background of Climate Services**
- **Legislative Response to Emerging Demand**
- **NOAA's Strategy**
- **NOAA's Current Capabilities**
- **Path Forward**

Background

Major weather/climate events



Mountain Pine Bark Beetles



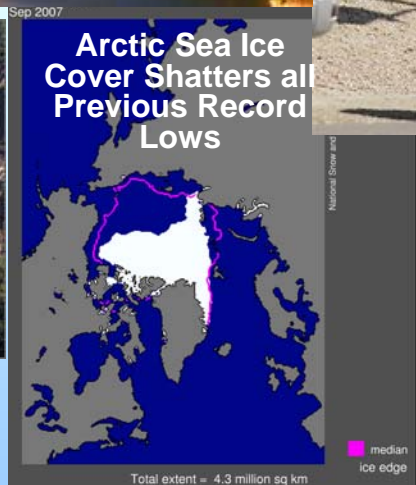
Phoenix 32 days above 110°



Utah largest fire in history



Record drought in the southeast

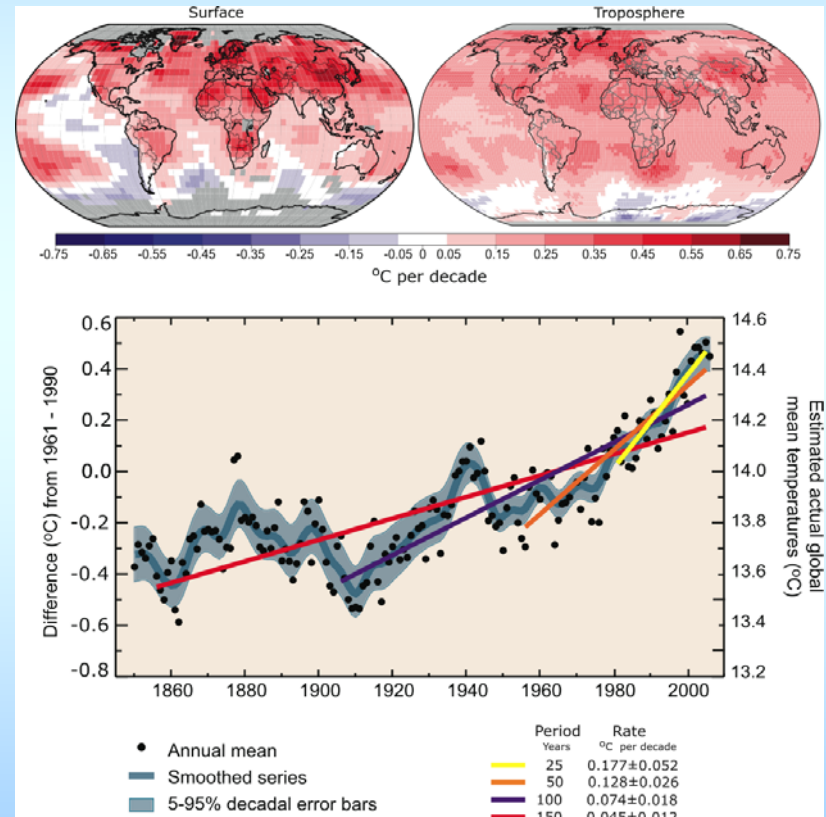
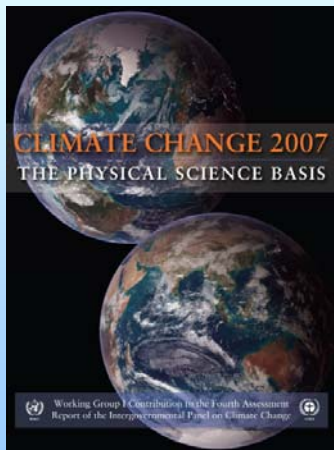


January Tornadoes

Background

Role of IPCC Fourth Assessment

“There is now higher confidence in projected patterns of warming and other regional-scale features, including changes in wind patterns, precipitation and some aspects of extremes and of ice.” WG1 SPM



Background

Role of IPCC Fourth Assessment

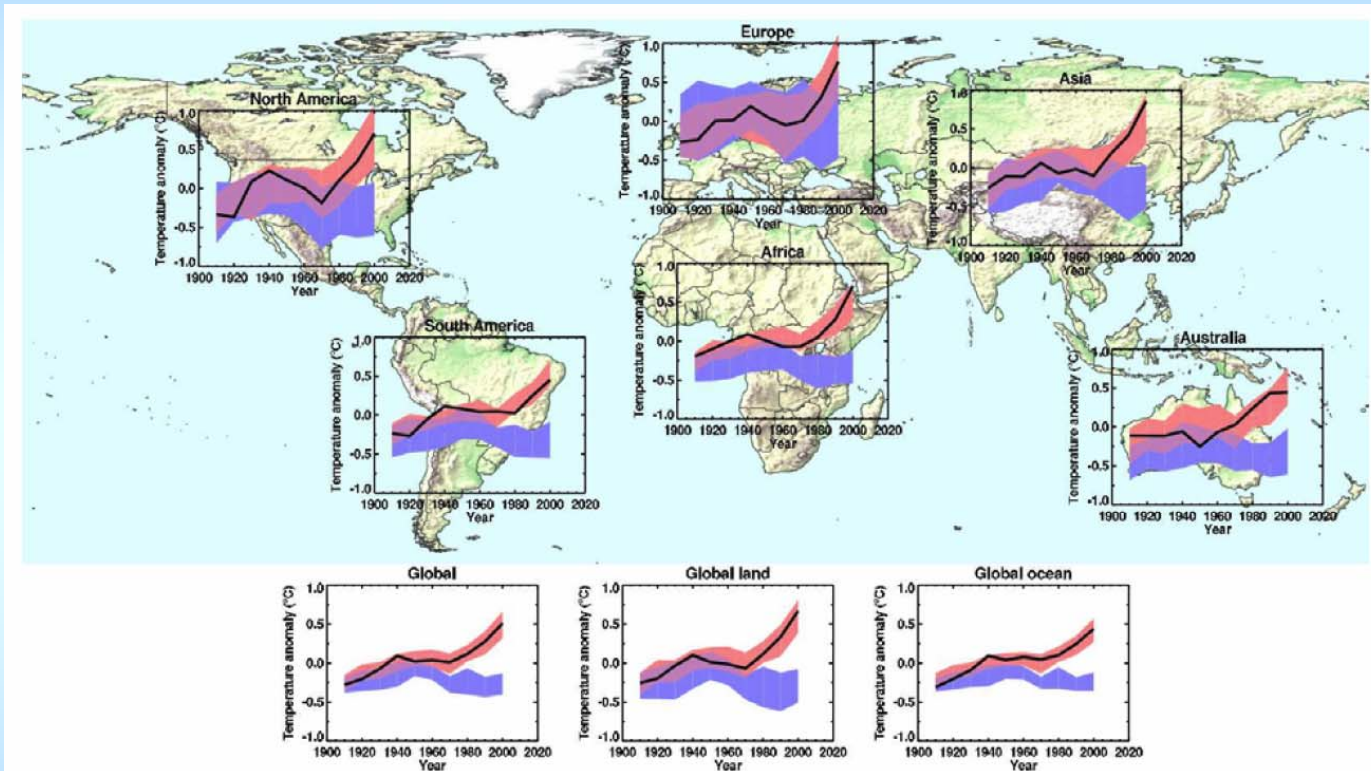
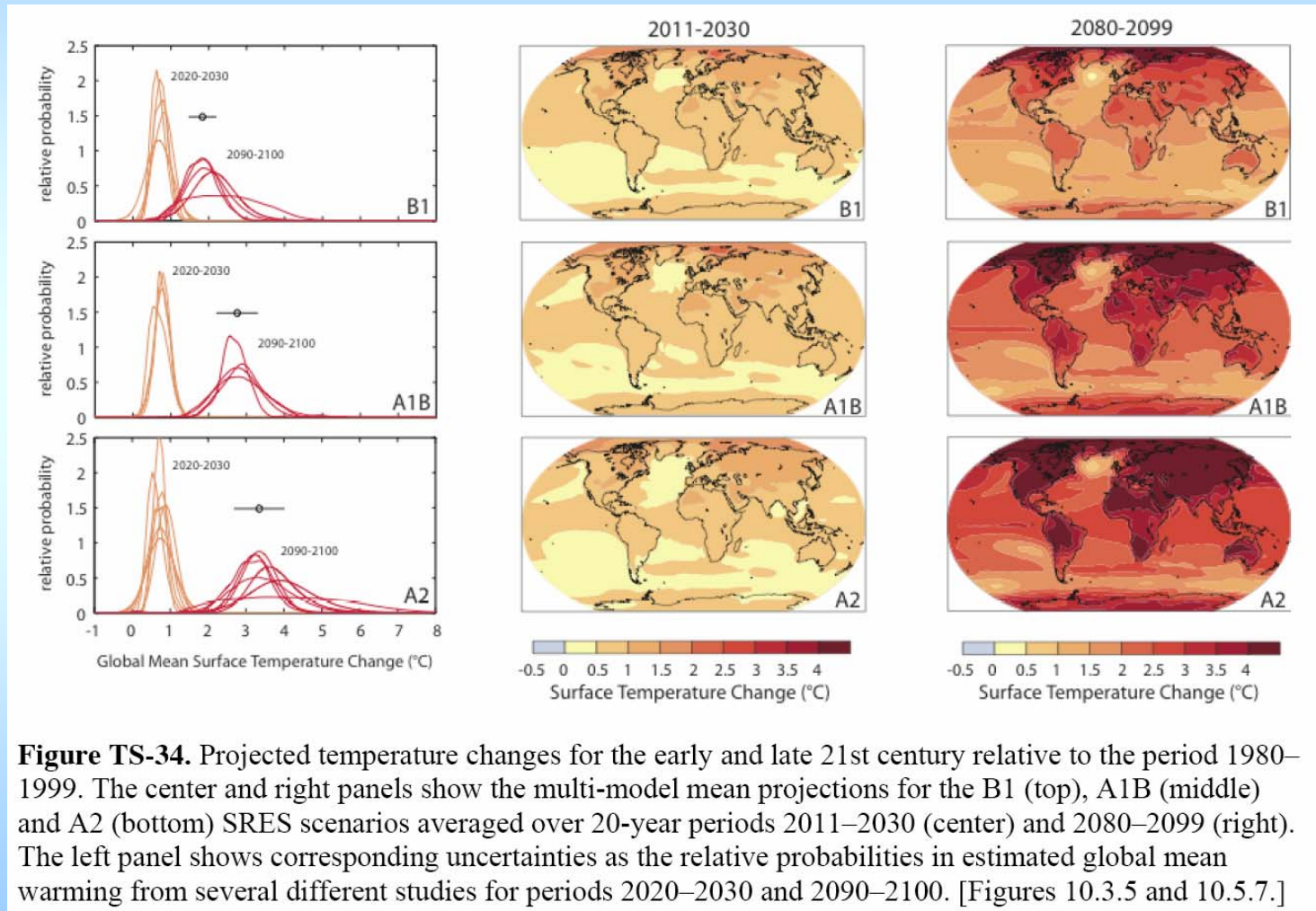


Figure TS-25. Continental- and global-scale decadal surface air temperature anomalies for 1906–2005, relative to the 1901–1997 period, compared to model simulations. Black lines indicate observed changes. Blue bands show the 5–95% range for 19 simulations using only natural forcings and red bands show that range for 51 model simulations using both natural and anthropogenic forcings. [Question 9.2, Figure 1]

Background

Role of IPCC Fourth Assessment



Background

Social and Economic Context

Increased Vulnerability

- 9 billion people by 2050 (50% increase)
- Increasing urbanization into mega-cities – 4 billion new city dwellers, aging populations, overdevelopment in coastal regions, and regions with limited water supply
- Income inequality growing within nations and between nations



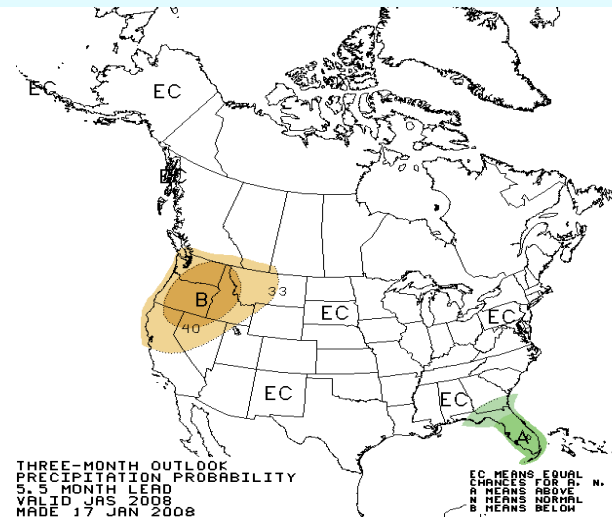
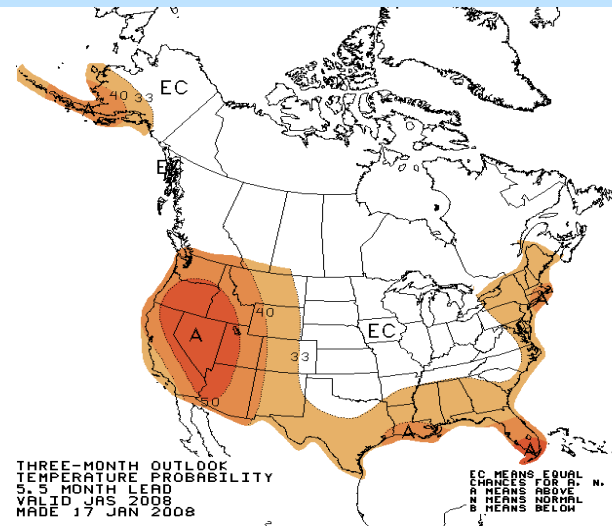
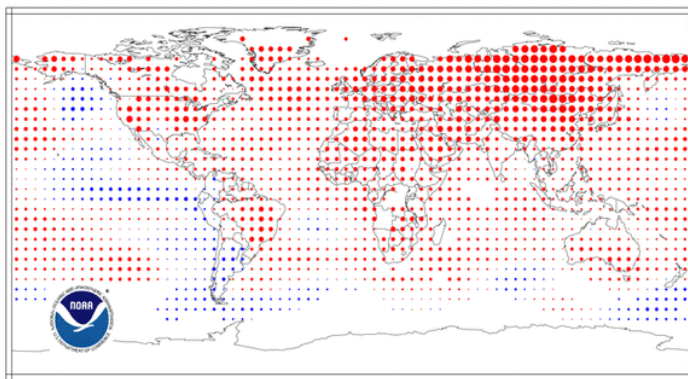
Background

NOAA Products and Services

Temperature Anomalies Jan-Dec 2007

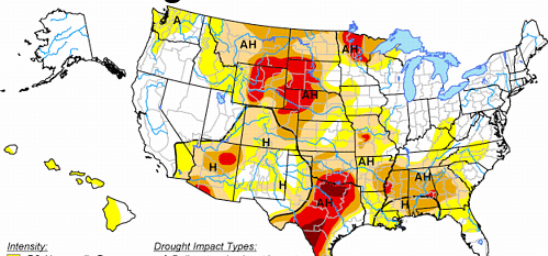
(with respect to a 1961-1990 base period)

National Climatic Data Center/NESDIS/NOAA



U.S. Drought Monitor

September 5, 2006
Valid 8 a.m. EDT



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

Drought Impact Types:
 A = Agricultural (crops, pastures, grasslands)
 H = Hydrological (water)

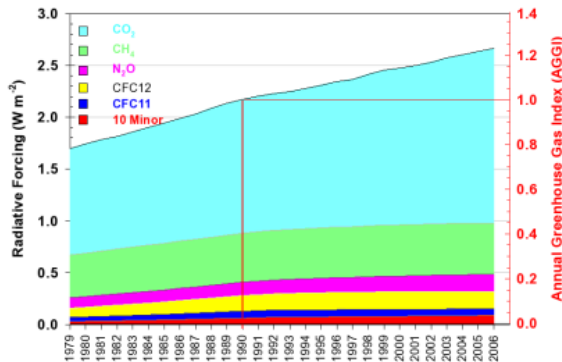


Released Thursday, September 7, 2006

Author: Brian Fuchs, National Drought Mitigation Center

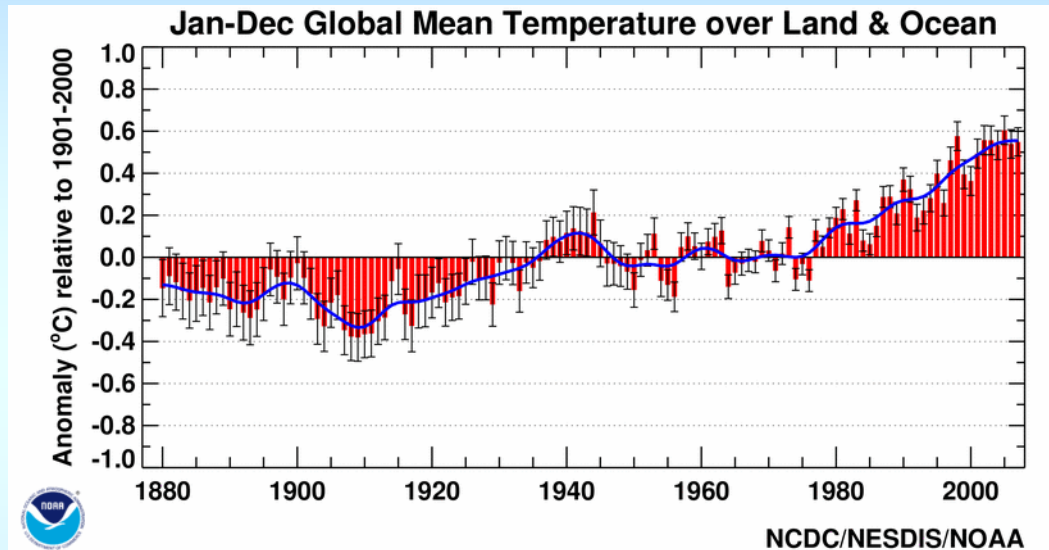
<http://drought.unl.edu/dm>

NOAA Annual Greenhouse Gas Index



Background

Challenges of a changing climate



POLICYFORUM

CLIMATE CHANGE

Stationarity Is Dead: Whither Water Management?

Climate change undermines a basic assumption that historically has facilitated management of water supplies, demands, and risks.

P. C. D. Milly,^{1*} Julio Betancourt,² Malin Falkenmark,³ Robert M. Hirsch,⁴ Zbigniew W. Kundzewicz,⁵ Dennis P. Lettenmaier,⁶ Ronald J. Stouffer⁷



Background

The growing demand for climate information

US Conference of Mayors Policy Statement, August, 2007

National Governors Policy Statement, 2007

Western Governors Association Congressional Testimony, 2007

Lehman Brothers Report on Climate and the Private Sector, 2006

University of Maryland Conference: Climate Information: Responding to User Needs, 2007

NCDC Workshop with Energy, Insurance and Transportation Sectors, 2007

National Intelligence Estimate: Climate and National Security

GAO Report on Climate needs of Federal Resource Managers, 2007



Background

The growing demand for climate information

- “Business executives around the globe increasingly see climate change as a major issue they must address if they are to achieve and sustain high performance into the future.”
- “59% believe that climate change will be a major issue for them within five years”
- “More than half of the businesses (53 percent) surveyed are struggling to understand the implications of climate change”

Source: "Achieving High Performance in an Era of Climate Change," Accenture 2008



National Research Council View



“Climate Services: A Vision (2001)”

- Climate Service: “*The timely production and delivery of useful climate data, information, and knowledge to decision makers.*”
- The term *decision maker* is intended to be generic, including anyone who uses climate information in the decision process - government or business planners, small business persons, farmers, the general public, etc.

National Research Council View

“Climate Services: A Vision (2001)”



Guiding Principles

1. The activities and elements of a climate service should be user-centric.
2. If a climate service function is to improve and succeed, it should be supported by active research.
3. Advanced information (including predictions) on a variety of space and time scales, in the context of historical experience, is required to serve national needs.
4. The climate services knowledge base requires active stewardship.
5. Climate services require active and well-defined participation by government, business, and academe.

National Research Council View

“Climate Services: A Vision (2001)”



Recommendations

1. **Promote more effective use of the Nation’s weather and climate observation systems.**
2. **Improve the capability to serve the climate information needs of the Nation.**
3. **Interdisciplinary studies and capabilities are needed to address societal needs.**

Legislative Response to Emerging Demand

- **S. 2355 - the Climate Change Adaptation Act**
 - a national strategic plan for climate change adaptation
 - regional assessments of the vulnerability of coastal and ocean areas and resources to hazards associated with climate change, climate variability, and ocean acidification.
- **S. 2307 - the Global Change Research Improvement Act of 2007**
 - establishes a National Climate Service within NOAA.



Developing NOAA's Climate Service Strategy

In response to the emerging demand for climate information and a need for a coordinated service, NOAA has established an internal working group with representatives from each line office to begin to:

1. Define climate services and a National Climate Service
2. Define NOAA's role for the provision of climate services
3. Assess evolving user needs for climate information
4. Assess other private and public sector involvement in climate services
5. Begin to develop a draft Climate Services strategy for NOAA
6. Engage external community



Climate Service Strategy

Vision:

Informed societies implementing the best available responses to a changing climate.

Mission:

Providing world-class research, information and services that enhance society's ability to understand, anticipate, mitigate, and adapt to a changing climate.

NOAA's Climate Mission

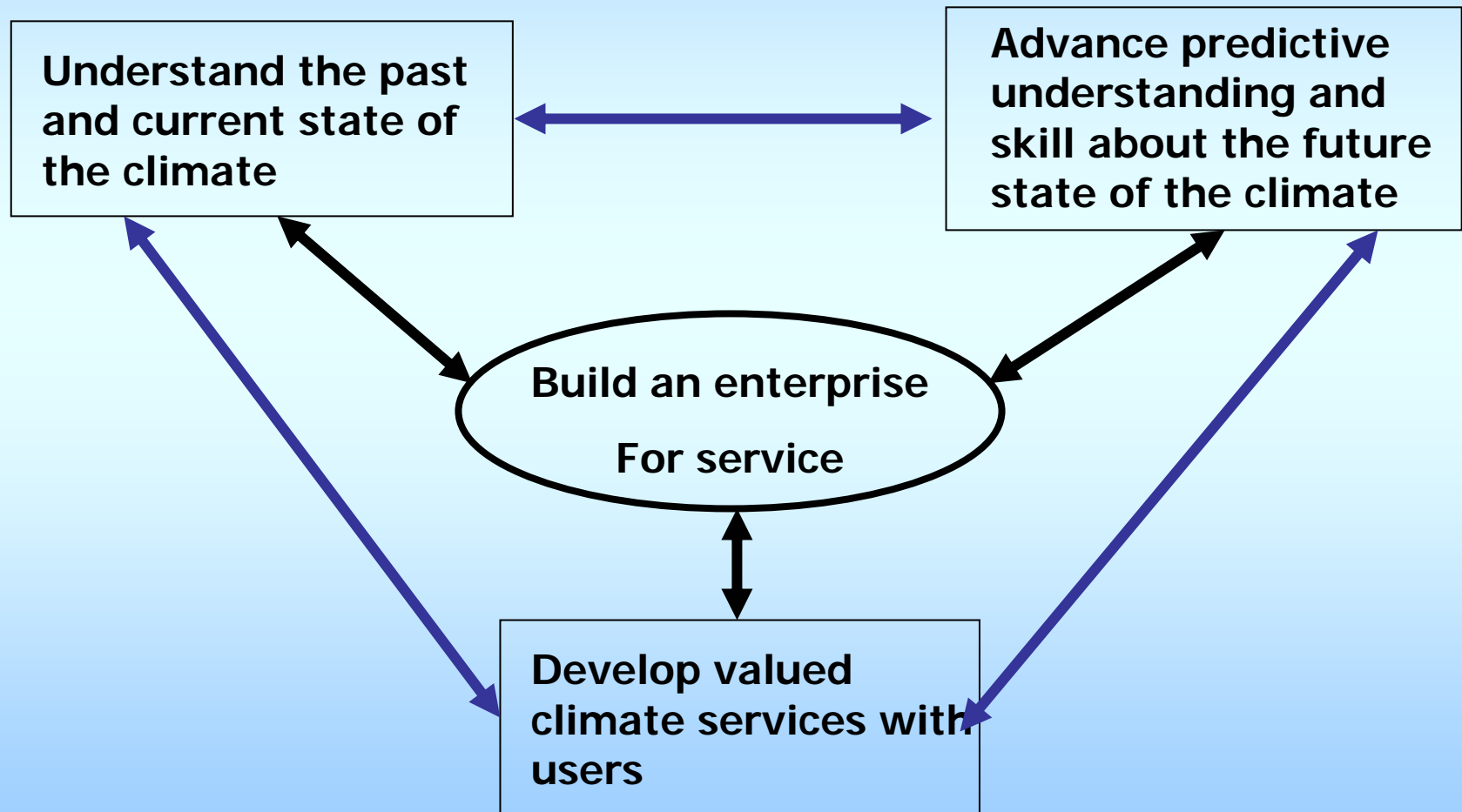
*Understand Climate Variability and Change to
Enhance Society's Ability to Plan and Respond*

OUTCOMES

- A predictive understanding of the global climate system on time scales of weeks to decades with quantified uncertainties sufficient for making informed and reasoned decisions
- Climate-sensitive sectors and the climate-literate public effectively incorporating NOAA's climate products into their plans and decisions



NOAA Strategy for the Development of Climate Services



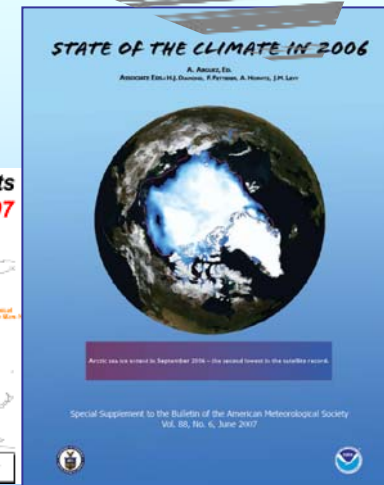
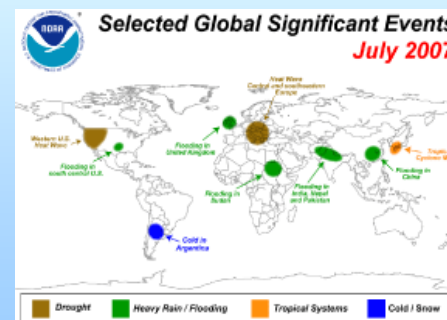
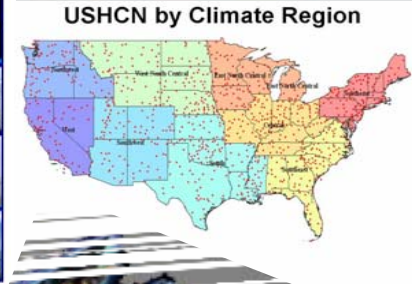
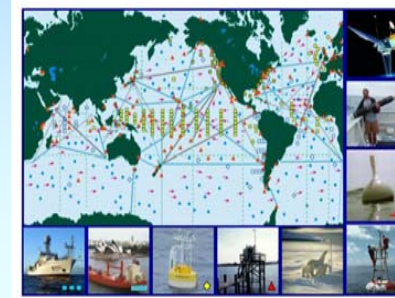
Understand the Past and Current State of the Climate

• Climate System Observations

- Ocean
- Atmosphere
- Arctic
- Carbon

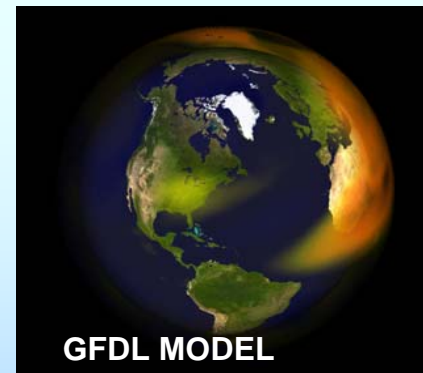
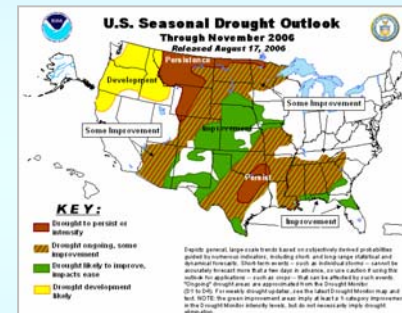
• Data Management and Information

- NOAA's Comprehensive Large Array-data Stewardship System
- State of the Climate Report
- Climatological Statistics and Summaries

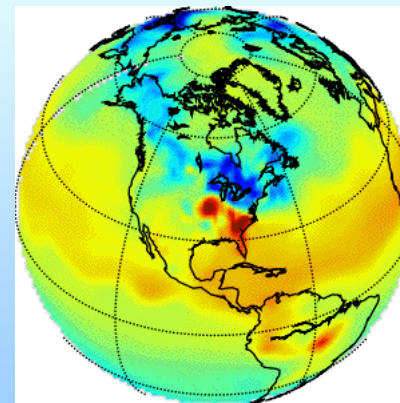


Advance Predictive Understanding and Skill about the Future State of Climate

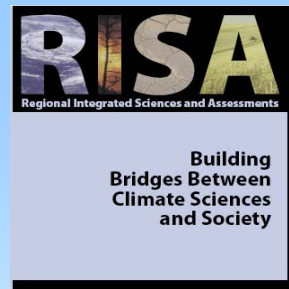
- **Understanding Climate Processes -**
 - NOAA's Research Laboratories,
 - Centers, and Cooperative
 - Institutes
 - Competitive Grants
- **Earth System Modeling, Predictions, and Projections -**
 - GFDL and NCEP coupled climate models
 - Earth system model development
- **Analysis and Attribution -**
 - Reanalysis
 - Emerging focus on Integrated Earth System Analysis and attribution



Capturing the global distribution of the short-lived Aerosols spreading out from the source regions



Assessing Evolving User Needs and Context



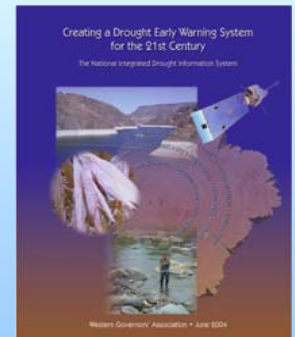
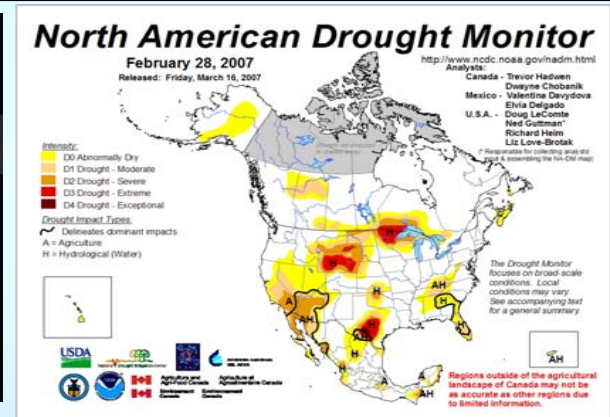
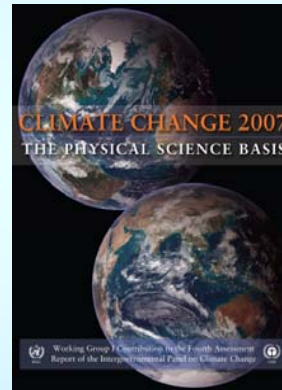
- **Assessing Climate, Impacts and Adaptation -**

- Global, national, regional, sectoral assessments of vulnerability, impacts and adaptation

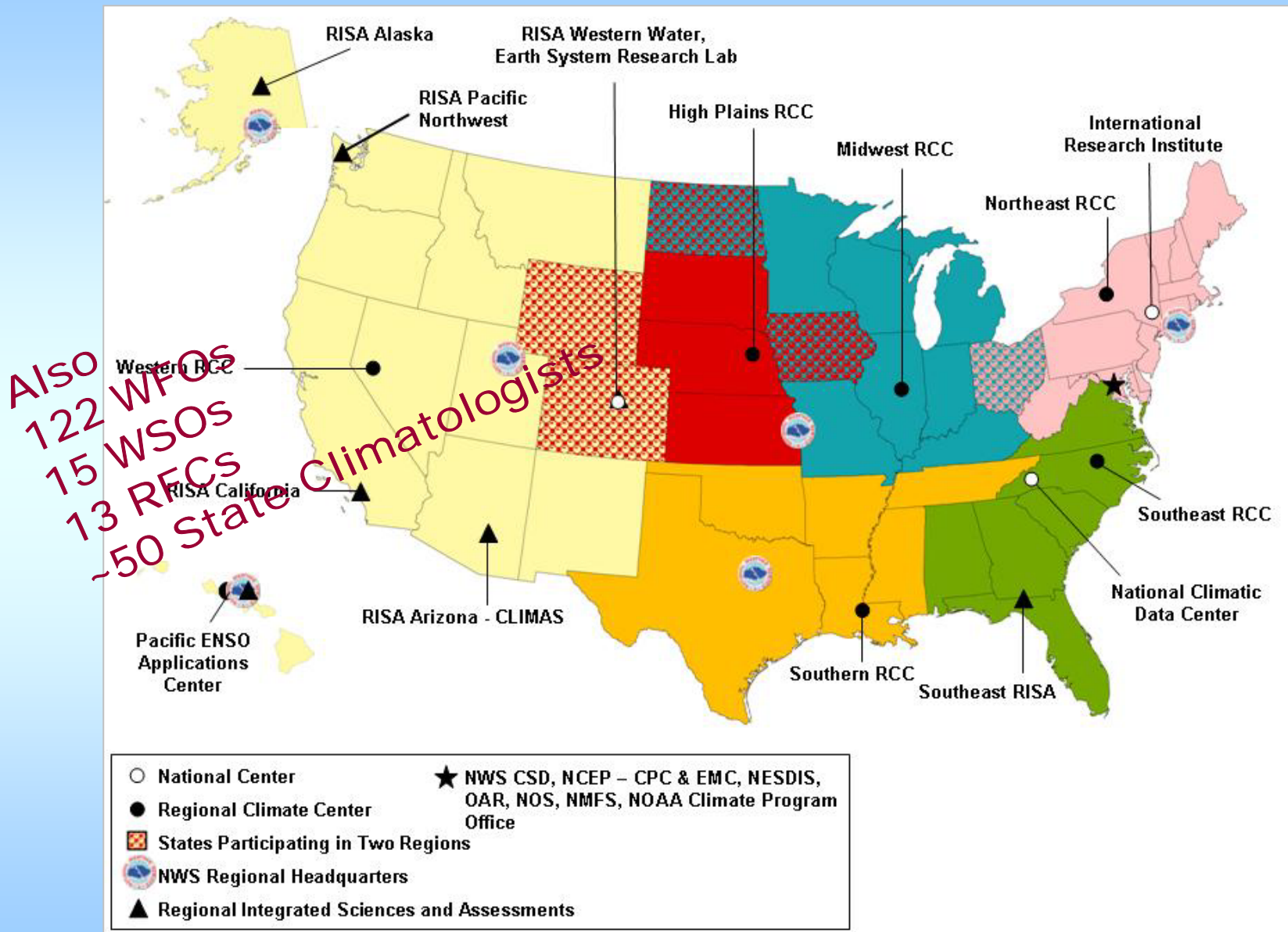


- **Climate Services Development and Delivery -**

- National Integrated Drought Information System (NIDIS)
- Emerging foci on Coasts, Arctic, Fisheries,...
- Regional
- International



NOAA's Regional Climate Services



National Integrated Drought Information System

A result of requests by the Western Governors Association and the NIDIS act of 2006

- NIDIS is an example of a national effort led by NOAA to coordinate across federal agencies the monitoring, data, and models needed to provide:
 - Ongoing information on current and future drought conditions across the nation
 - And
 - Region specific products for drought management, planning and adaptation, and education and outreach tools



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)*
- Ocean Acidification Impacts on Marine Biota*
- Freshwater Supply & Resource Management*
- Sea Level Rise (Natural Resource Implications)*

Climate Service Case Study: Coastal Regions

Enterprise 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



Thank you

Questions?

