

The National Climate Assessment: Briefing for U.S. CLIVAR

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with slides from

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Assessments and Adaptation, OSTP

July 18, 2012



US Global Change Research Program

GCRA Mandate:

“To provide for development and coordination of a comprehensive and integrated United States Research Program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.”



United States
Global Change
Research Program



The USGCRP Strategic Plan 2012-2021



<http://www.globalchange.gov>

Goals:

- Advance Science
- Inform Decisions
- Sustained Assessments
- Communicate and Educate



United States
Global Change
Research Program



U.S. Global Change Research Program
**National Climate
Assessment**

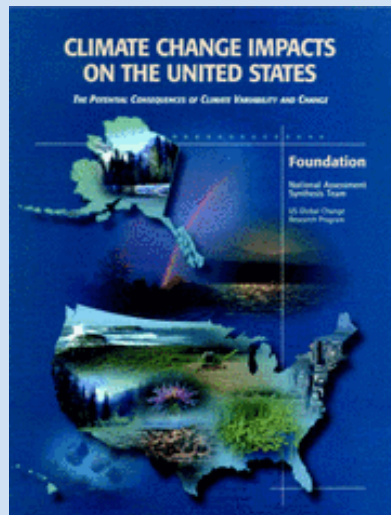
National Climate Assessment: GCRA (1990), Section 106

...not less frequently than every 4 years, the Council... shall prepare... an assessment which –

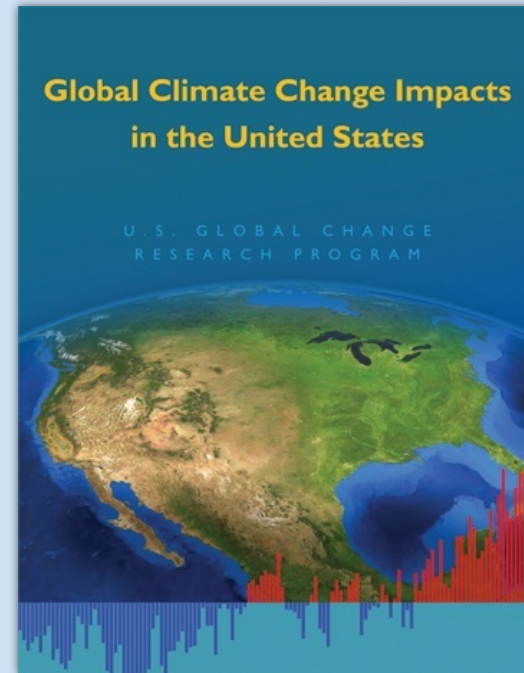
- **integrates, evaluates, and interprets** the findings of the Program (USGCRP) and discusses the scientific **uncertainties** associated with such findings;
- **analyzes the effects of global change** on various key sectors
- analyzes current trends in global change, both human-induced and natural, and **projects major trends for the subsequent 25 to 100 years.**

Previous National Climate Assessments

Climate Change Impacts on the United States (2000)



Climate Change Impacts in the United States (2009)



<http://nca2009.globalchange.gov/>

The “New” National Climate Assessment



Goal

- Enhance the ability of the United States to **anticipate, mitigate, and adapt** to changes in the global environment.

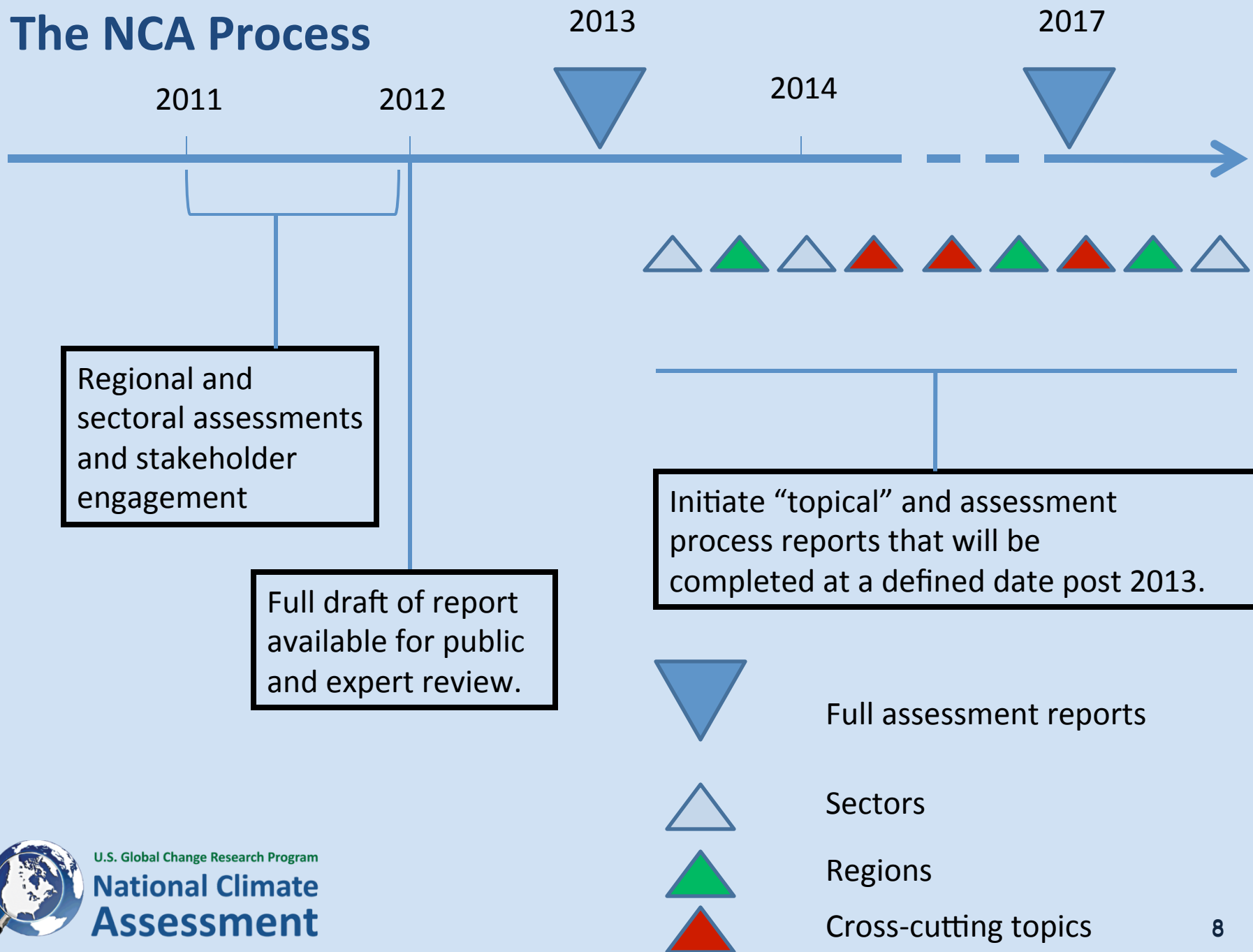
Vision

- Advance an **inclusive, broad-based, and sustained process** for assessing and communicating scientific knowledge of the impacts, risks, and vulnerabilities associated with a changing global climate in support of decision-making across the United States.

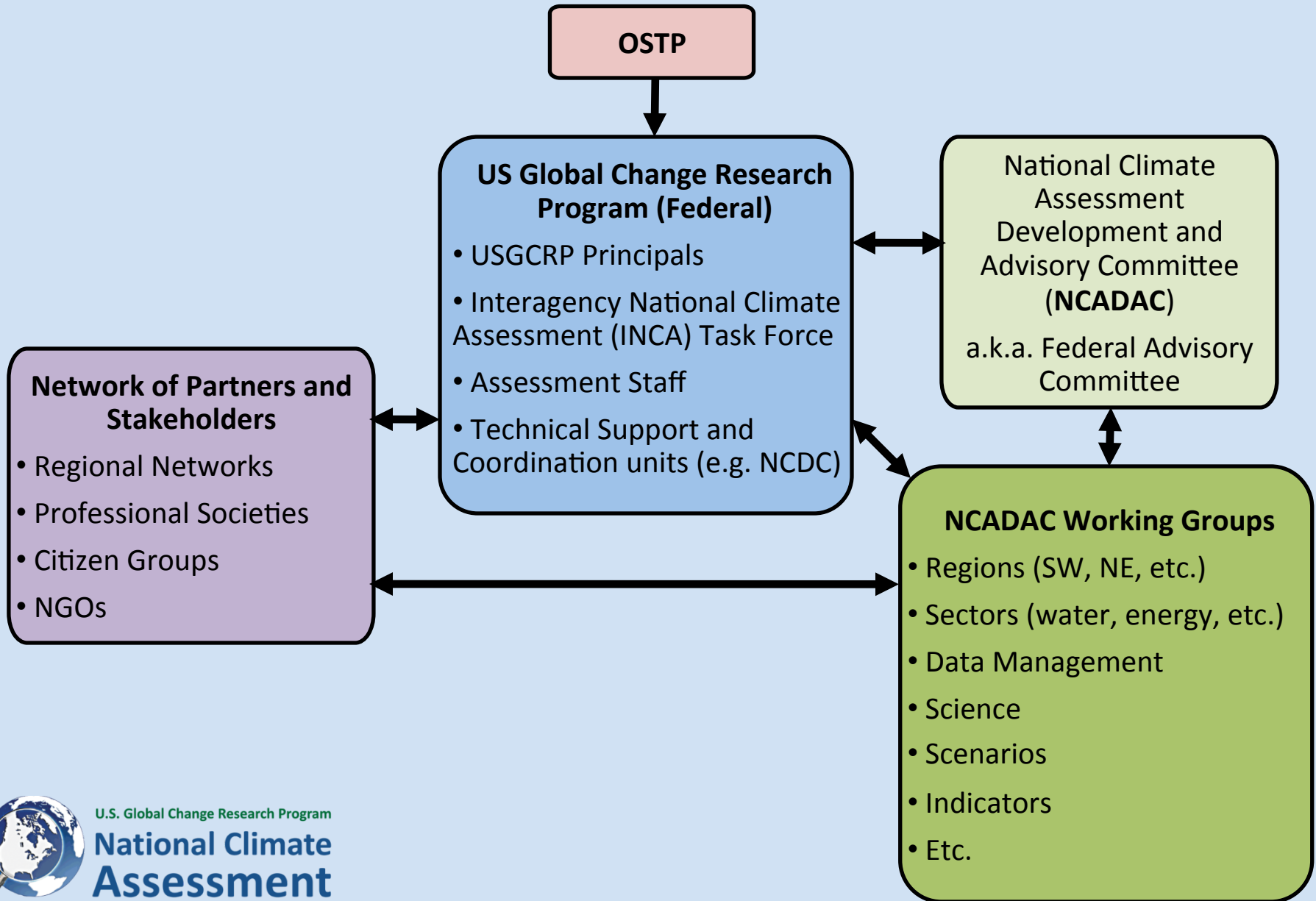
Goals for the 2013 National Climate Assessment and the Sustained Process

- **Sustainable process** with multiple products over time
- New topics, **cross-sectoral studies**, **risk-based framing**
- Consistent national matrix of **indicators**
- Central coordination, multiple **partners**
- Regional and sectoral **networks** building assessment **capacity**
- Recognizes **international context**
- **Engagement** and communications focus
- Web-based data and **tools for decision support**
- Process workshops to establish **methodologies**

The NCA Process



Assessment Structure



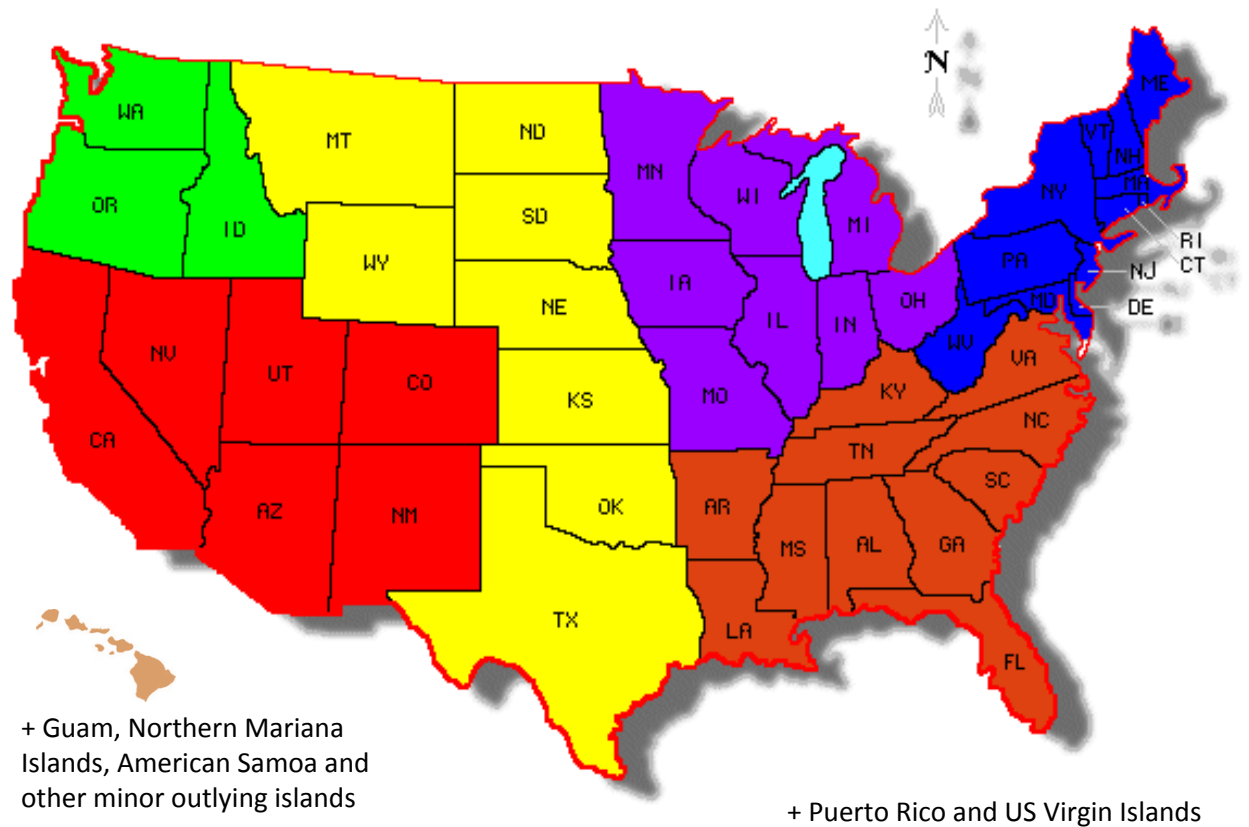
Sectors

- Water resources
- Energy supply and use
- Transportation
- Agriculture
- Forestry
- Ecosystems and biodiversity
- Human health



Regions

- Northeast
- Southeast and Caribbean
- Midwest
- Great Plains
- Northwest
- Southwest
- Alaska and Arctic
- Hawaii and Pacific Islands



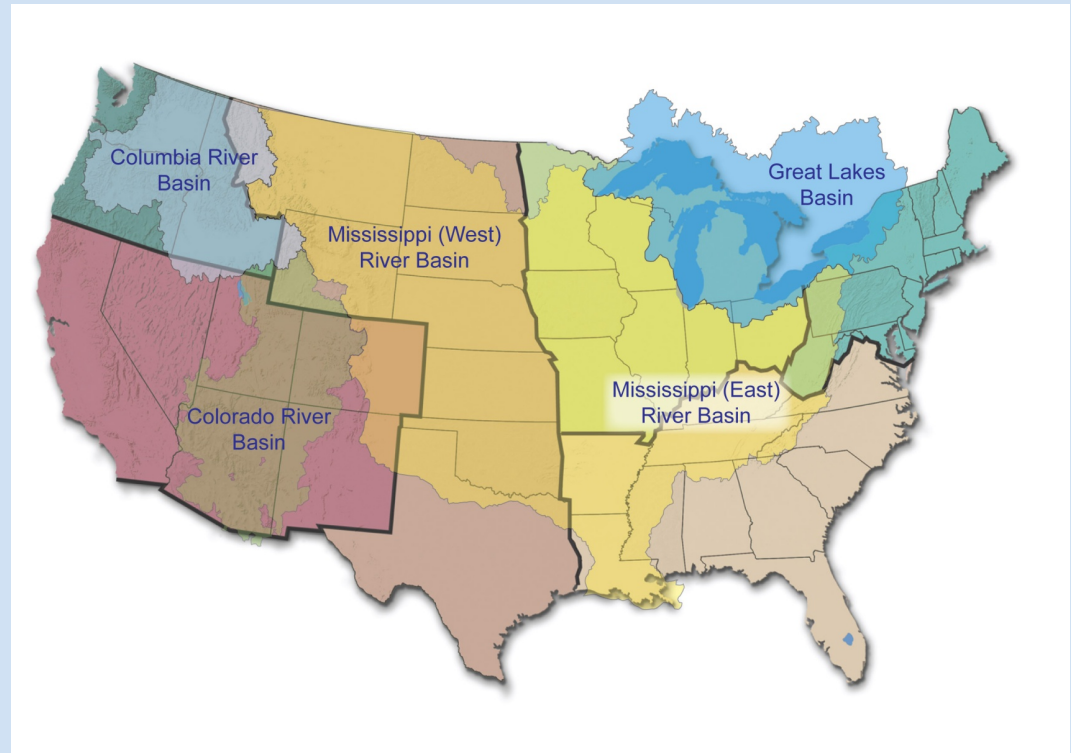
Sectoral Cross-Cuts



- Water, energy, and land use
- Urban, infrastructure, vulnerability
- Impacts of climate change on tribal, indigenous, and native lands and resources
- Land use and land cover change
- Rural communities and development
- Impacts on biogeochemical cycles

Biogeographical Cross-Cuts

- Oceans and marine resources
- Coastal zone, development, and ecosystems, e.g.,
 - SF Bay Delta
 - Chesapeake Bay
 - Gulf Coast
- Watersheds, e.g.,
 - Great Lakes
 - Colorado River
 - Columbia River



Building the Infrastructure: NCADAC Working Groups



1. Scenarios and Regional Summaries
2. Engagement and Communication
3. Regional Coordination /Sustained Assessment
4. Sectoral Coordination/Sustained Assessment
5. Report Integration Team
6. Adaptation, Mitigation and Decision Support
7. Indicators Development and Evaluation
8. International Implications
9. Sustained Process and Evaluation

NCA Progress

- Established a 13+ agency Interagency Working Group (INCA), that plans and manages the federal components
- Hosted over 40 workshops focused on assessing impacts and vulnerabilities in 8 regions and 13 sectors, evaluating the state of climate science, and identifying research needs; multiple listening sessions (70 meetings total)
- Established consistent methodologies, models, scenarios and approaches to be used in Assessment processes;

NCA Progress

- Developed new regional climatologies and projections for all 8 regions
- Developed a volunteer network of organizations to support the Assessment outside the government: NCAnet
- Initiated development of the first national indicator system to evaluate global change and the ability to adapt/respond;
- Established a highly diverse 60 member federal advisory committee that is responsible for developing the 2013 report and providing advise on the ongoing NCA process; conducted four meetings in the last year

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Physical and Climate Indicators

- Extremes/Hazards
- Biophysical
- Hydrologic
- Timing
- Coastal
- Snow/Ice

Indicator Category	Number of Groups	What d
Extremes/Hazards	4	Flooding
		Drought/Heat Waves
		Tornadoes/Severe Weather
Biophysical	4	Movement of Species
		Temperature Zones
		Plant Hardiness Zone
Hydrologic/Freshwater	3	Water Supply
		Water Quality
		Lakes and Rivers
Timing	3	Growing Season Length
		Heating/Cooling Degree Day
		Ice-in/Ice-out
		Snow Melt
Coastal	2	
		Sea Level
		Sea Surface Temperature
		Erosion
Snow/Ice	2	
		Snow Cover Extent and Volume
		Sea Ice Extent and Volume



Indicator Category	Number of Groups	What do people care about?	
Extremes/Hazards	4	Flooding	Wildfire
		Drought/Heat Waves	Air Quality
		Tornadoes/Severe Weather	Temperature/Precipitation
Biophysical	4	Movement of Species	Desertification
		Temperature Zones	Fall Color
		Plant Hardiness Zone	Ice Band/Snow Cover
Hydrologic/Freshwater	3	Water Supply	Irrigation
		Water Quality	Soil Moisture
		Lakes and Rivers	
Timing	3	Growing Season Length	Length of Hurricane Season
		Heating/Cooling Degree Days	Phenology (first bloom, leaf-out)
		Ice-in/Ice-out	First and last (heat wave, freeze)
		Snow Melt	Peak run-off
Coastal	2	Sea Level	Ocean Acidification
		Sea Surface Temperature	Saltwater Intrusion
		Erosion	
Snow/Ice	2	Snow Cover Extent and Volume	Permafrost Extent and Volume
		Sea Ice Extent and Volume	Glacier Extent and Volume

Societal Indicators

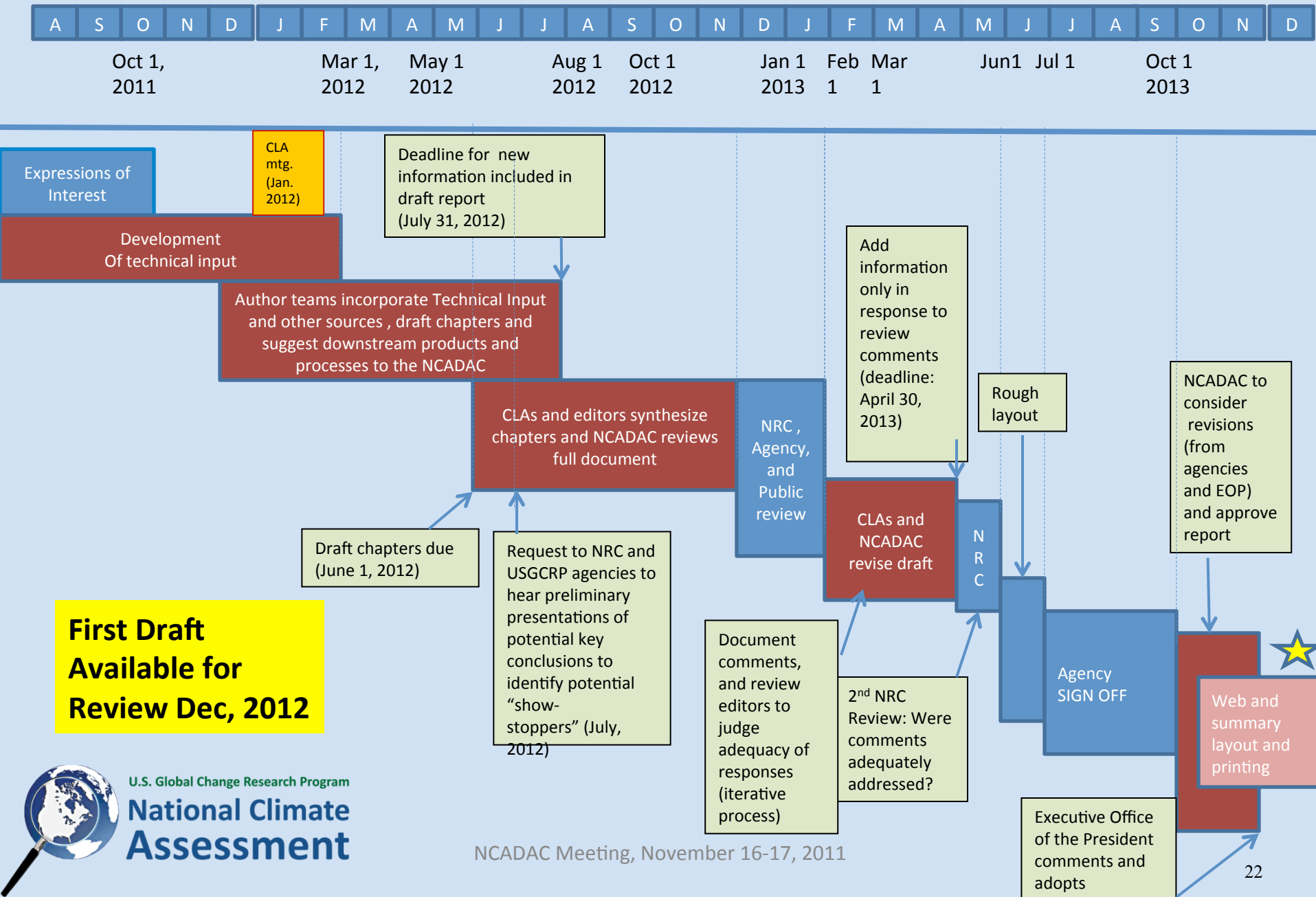
- Health & Safety
- Population Dynamics
- Equity & Justice
- Community Capacity
- Cultural Impacts
- Economy
- Institutions/Governance
- National Security
- Tipping Points
- Resource Supply

Category	Indicator
Health & Safety	<p>Weather-related mortality (e.g., heat, floods, and wind)</p> <p>Weather related illness (e.g., hospital admissions for heat stress or heat stroke)</p> <p>Vectors (which ones and how they change)</p> <p>Chronic health conditions (e.g., asthma)</p> <p>Health in vulnerable populations</p> <p>Healthcare access</p> <p>Healthcare systems</p> <p>Birth rate</p> <p>Mental illness</p> <p>Subjective well-being (e.g., “happiness”; includes social cohesion, civil society, and occupation structure)</p> <p>Quality of life</p> <p>Infectious disease risk/geographic extent (e.g., malaria; potential and actual)</p> <p>Number of people experiencing heat waves multiplied by the number of days</p> <p>Air quality</p> <p>Safety (e.g., crime rates)</p>
Population Dynamics	<p>Socioeconomic dynamics, raw population, demographics, race and ethnicity (as associated data set)</p> <p>Human well-being (composite indicator – sense of place; stability, feel like living in risky environment; health; cost of living; community habitability; effects on recreational opportunities; how much time spent outside)</p> <p>Vulnerability (populations, regions; exposure, sensitivity, and adaptability; socioeconomic vulnerability; population sensitivity; elderly and family structure)</p> <p>Settlement and movement (displacement, migration, location of populations; population density; population change; population distribution; e.g., natural amenities scale, which includes climate, topography, and access to water to understand depopulation in rural communities)</p> <p>Social network mapping</p> <p>Persons in 100- and 500-year floodplains and coastal storm surge zones</p> <p>“Special needs” populations in those zones</p> <p>Social capital, connectivity and networks (includes population learning/literacy/attitudes; knowledge, action, and practice)</p> <p>Societal awareness of climate change (understanding; communication; education; attitudes; climate literacy)</p> <p>Behavioral shifts in transportation (alternative transportation; e.g., indicator by Department of Transportation about how long we sit in traffic and congestion patterns, which lends to greenhouse gas emissions and affects quality of life)</p> <p>Intergenerational</p> <p>Social disruption (e.g., communities affected by hurricanes; long-term consequences)</p>
Equity & Justice	<p>Socioeconomic inequalities (spatial/place-based; who can move; social networks; access to services, infrastructure, institutions; middle class crunch; ability to cope post-disaster)</p> <p>Environmental justice (exposure, vulnerability, resiliency; subsistence practices; housing; e.g., subsistence practices that are being modified, impacts on livelihoods)</p>
Community Capacity	<p>Risk</p> <p>Stress</p> <p>Community habitability (displacement of entire populations from an area)</p> <p>Response capacity (potential vs. action)</p> <p>What is actually being done for mitigation and adaptation (e.g., money spent on flood proofing and other hazard mitigation spending)</p> <p>Transformational adaptation (anticipatory)</p>
Cultural Impacts	<p>Aesthetic environment (e.g., color lost in leaves in Smoky Mountains)</p> <p>Cultural richness of communities (i.e., Richard Florida’s “Creative Class”)</p> <p>Impacts on cultural practices</p> <p>Cultural processes</p> <p>Cultural icons (e.g., maple tree)</p> <p>Cultural identity</p> <p>Human social systems, ways of life</p>

NCA Progress

- Selected 240 authors from the public and private sectors and universities to write the 30 chapters of the 2013 report.
- Initiated multiple kinds of engagement activities, website, communications and engagement plan, e-newsletters, workshops, FRNs, “Climate Conversations” and the first ever Request for Information from the public
- First draft of all of the chapters of the Assessment in hand

2013 Report Production Timeline



U.S. CLIVAR-Specific Considerations



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The National Climate Assessment



U.S. Global Change Research Program

National Climate Assessment

The next National Climate Assessment is scheduled to be completed in 2013. Information about the current assessment can be found on this site by following the links here and in the sidebar.

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What We Do

Adaptation Science

Climate Services

Communication and Education

Fundamental Research

Integrated Observations

Modeling

National Climate Assessment

Overview

Newsletter

NCA Development and Advisory Committee

→ **NCA Activities**

Workshop and Meeting Reports

Opportunities for Engagement

Guidance for Technical Input and Author Teams

Available Technical Inputs

NCA Activities

Please view the links below to find out more about upcoming and past National Climate Assessment activities.

- [Workshop and Meeting Reports](#)
- [Opportunities for Engagement](#)
- [Guidance for Technical Input and Author Teams](#)
- [Available Technical Inputs](#)



The United States National Climate Assessment

NCA Report Series, Volume 5b

Monitoring Climate Change and its Impacts:
Physical Climate Indicators

March 29-30, 2011
Washington, DC



**National
Climate
Assessment**

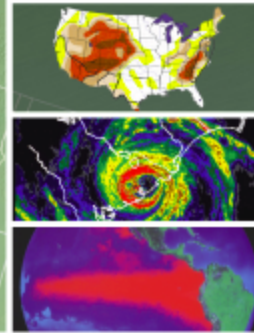
U.S. Global Change Research Program

Climate Change Modeling and Downscaling

NCA Report Series, Volume 7

ISSUES AND METHODOLOGICAL PERSPECTIVES
FOR THE U.S. NATIONAL CLIMATE ASSESSMENT

December 8-10, 2010
Arlington, VA



**National
Climate
Assessment**

U.S. Global Change Research Program



U.S. Global Change Research Program

**National Climate
Assessment**

The Science of Climate Change

- **Convening Lead Authors**

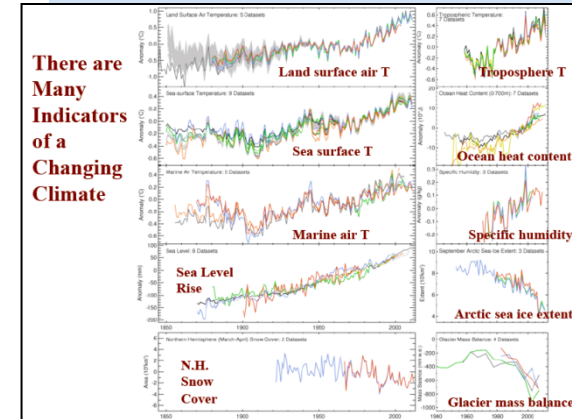
- John Walsh (Univ. Alaska) and Don Wuebbles (U. Illinois)

- **Lead Authors**

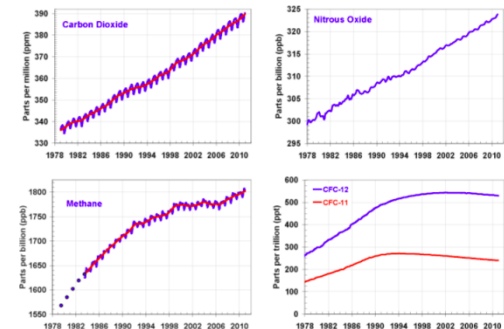
- Katharine Hayhoe (Texas Tech University)
- Ken Kunkel (NOAA NCDC / NCSU)
- Richard Somerville (Univ. Calif, san Diego)
- Graeme Stevens (NASA Jet Propulsion Laboratory)
- Peter Thorne (NOAA NCDC / NCSU)
- Russ Vose (NOAA NCDC)
- Michael Wehner (Lawrence Berkeley Laboratory)
- Josh Willis (NASA Jet Propulsion Laboratory)

- **Contributing Authors**

- Paula Hennon, Dave Anderson, Tom Knutson, and others



Changing Atmospheric Concentrations of Greenhouse Gases

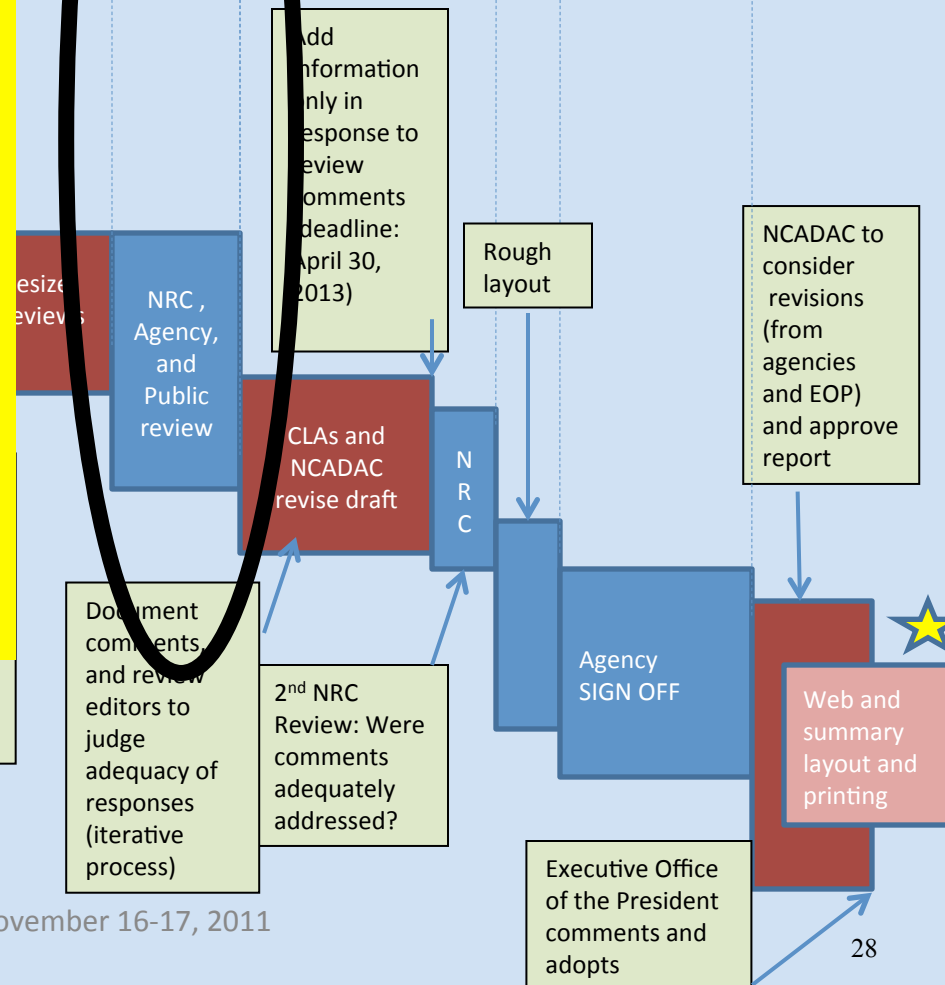


2013 Report Production Timeline



**First Draft
Available for
Review Dec,
2012**

identify potential
"show-
stoppers" (July,
2012)





Search this site

▼ **NCAnet: Building a network of networks to support the National Climate Assessment**

What is the National Climate Assessment?

What is NCAnet?

What are the benefits of joining NCAnet?

What contributions will NCAnet partners make?

How does my organization join NCAnet?

▼ **Partners in NCAnet**

► NCAnet Partner Activities

NCAnet Partners Toolkit

Sitemap

NCAnet: Building a network of networks to support the National Climate Assessment



U.S. Global Change Research Program

National Climate Assessment

We invite you join the National Climate Assessment (NCA) in **NCAnet**, a **network of organizations working with the NCA to engage producers and users of assessment information across the United States.**

Partners extend the NCA process and products to a broad audience through the development of assessment-related capacities and products, such as collection and synthesis of data or other technical and scientific information relevant to current and future NCA reports, dissemination of NCA report findings to various users of assessment information, engagement of assessment information producers and users, supporting NCA events, and producing communications materials related to the NCA and NCA report findings.

Recruitment for NCAnet began in Fall 2011, and the first meeting of NCAnet partners was held in January 2012. On April 13, 2012, the National Oceanic



100%

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NCAnet: Partners in Assessment



- A network of organizations that extend the NCA process and products
- Building long-term capacity to conduct and use assessments
- Cultivating partnerships with organizations that will participate in the sustained assessment process

50 organizations so far

<https://sites.google.com/a/usgcrp.gov/nca-net>

NCAnet Partners

<http://ncanet.usgcrp.gov/partners>

- [American College and University Presidents' Climate Commitment](#)
- [American Geosciences Institute](#)
- [American Meteorological Society Policy Program](#)
- [American Planning Association*](#)
- [American Public Health Association](#)
- [American Society of Adaptation Professionals](#)
- [American Society of Civil Engineers](#)
- [American Statistical Association](#)
- [American Water Works Association*](#)
- [Association of Climate Change Officers*](#)
- [Association of Metropolitan Water Agencies*](#)
- [Association of Natural Resource Extension Professionals](#)
- [Association of State and Territorial Health Officials](#)
- [Association of Zoos and Aquariums](#)
- [BCC Planning](#)
- [Broward County \(Florida\)*](#)
- [California Ocean Science Trust](#)
- [Carolinas Integrated Sciences and Assessments*](#)
- [Center for Climate and Energy Solutions](#)
- [Climate Communication](#)
- [Climate Literacy Partnership in the Southeast \(CLIPSE\)](#)
- [Climate Nexus](#)
- [Consortium for Ocean Leadership](#)
- [Council of State and Territorial Epidemiologists Climate Change Workgroup*](#)
- [Crop Science Society of America](#)
- [Ducks Unlimited, Inc.](#)
- [Ecological Society of America*](#)

NCAnet Partners

<http://ncanet.usgcrp.gov/partners>

- [Electric Power Research Institute](#)
- [Florida Climate Institute](#)
- [Geological Society of America*](#)
- [Greater Washington Interfaith Power and Light](#)
- [IAPMO](#)
- [Mississippi-Alabama Sea Grant Consortium](#)
- [National Academy of Engineering Center for Engineering, Ethics, and Society](#)
- [National Association of County and City Health Officials](#)
- [National Ecological Observatory Network, Inc.*](#)
- [National Federation of Regional Associations for Coastal Ocean Observing](#)
- [National Wildlife Federation](#)
- [New York City Department of Environmental Protection](#)
- [Pacific Northwest Tribal Climate Change Network](#)
- [Resource Media](#)
- [Soil Science Society of America](#)
- [Southeast Climate Consortium*](#)
- [Sustainable Northwest](#)
- [Sustainable Rangelands Roundtable*](#)
- [The Keystone Center](#)
- [Union of Concerned Scientists*](#)
- [US CLIVAR](#)
- [USA National Phenology Network](#)
- [USGCRP Climate Change and Human Health Working Group](#)
- [University of South Carolina Environment & Sustainability Program](#)
- [Water Utility Climate Alliance*](#)
- [World Wildlife Fund - US](#)

Benefits for Partners



- Organized access to the NCA process and products for members, stakeholders, and the organization as a whole
- Point of contact within NCA staff for questions, concerns, and comments about participation
- Create and sustain relationships with other organizations interested in the NCA and climate change
- Share ideas, wisdom, and best practices within and across disciplines

Contributions: Technical Inputs



- Literature reviews, discussion papers, and other review papers
 - Synthesize recent work in relevant field(s)
 - Consider assessment methods
 - Highlight important questions for future study
- Case studies of a particular community
 - Climate change vulnerabilities or impacts
 - Planning for and responses to climate change
- Data, modeling results, interpretation, and topical reports
 - Analysis, synthesis, and interpretation
 - Metadata and quality assurance information

Technical Inputs

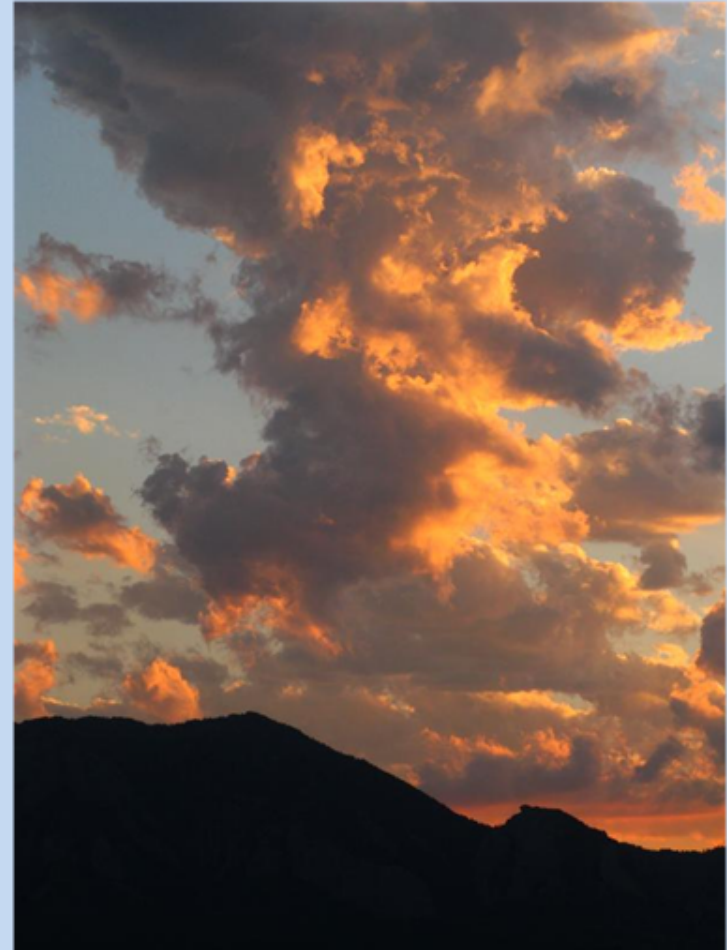
ORNL, 2012. **Climate Change and Energy Supply and Demand**. Technical Report to the U.S. Department of Energy in Support of the National Climate Assessment, February 20, 2012.

ORNL, 2012. **Climate Change and Infrastructure, Urban Systems, and Vulnerabilities**. Technical Report to the U.S. Department of Energy in Support of the National Climate Assessment, February 29, 2012.

Skaggs R, K Hibbard et al. 2012. **Climate and Energy-Water-Land System Interactions**: Technical Report to the U.S. Department of Energy in Support of the National Climate Assessment. Report No. PNNL-21185, Pacific Northwest National Laboratory, Richland, WA.

Contributions: Assessment Capacities

- Meetings, workshops, and other dialogues
 - Discussions among producers and users of assessments
 - Throughout assessment process
- Supporting indicator systems
 - Identifying / maintaining key observation & monitoring systems
 - Integrating across data sets to create indicators
- Stakeholder analyses
 - Knowledge and attitudes
 - Communication pathways
 - Network analyses
- Communicating with stakeholders
 - Outreach and educational materials
 - Evaluating effectiveness and use



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Contributions of the NCA

- **Ongoing, relevant, highly credible analysis** of scientific understanding of climate change impacts, risk, and vulnerability
- Enhanced timely **access to Assessment-related data** from multiple sources useful for decision making
- **Systematic evaluation** of progress towards reducing risk, vulnerability, and impacts
- **National indicators** of change and the capacity to respond



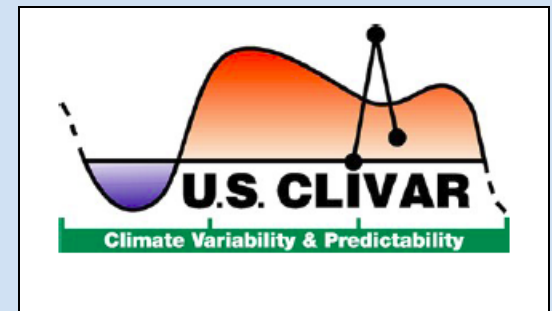
Contributions of the NCA

- A **sustained process** for **informing an integrated research program**
- New approaches to development and use of **scenarios at multiple scales**
- **Evaluation** of the implications of alternative **adaptation and mitigation options**
- **Community building** within regions and sectors that can lead to enhanced resilience
- **Building the foundation for adaptation networks** that can support regional applications of science and services



SUMMARY: US CLIVAR Opportunities

- **Report Review:** December 2012
- **Off-cycle Technical Inputs:**
 - Topical report, synthesis reports
 - Indicator monitoring, data access
 - Community building, workshops
 - Communicating science
- **Positioning for 2017 Assessment:**
 - Technical input leadership
 - Pool of expert authors
 - Topical reports and state of knowledge



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U.S. CLIVAR - PPAI

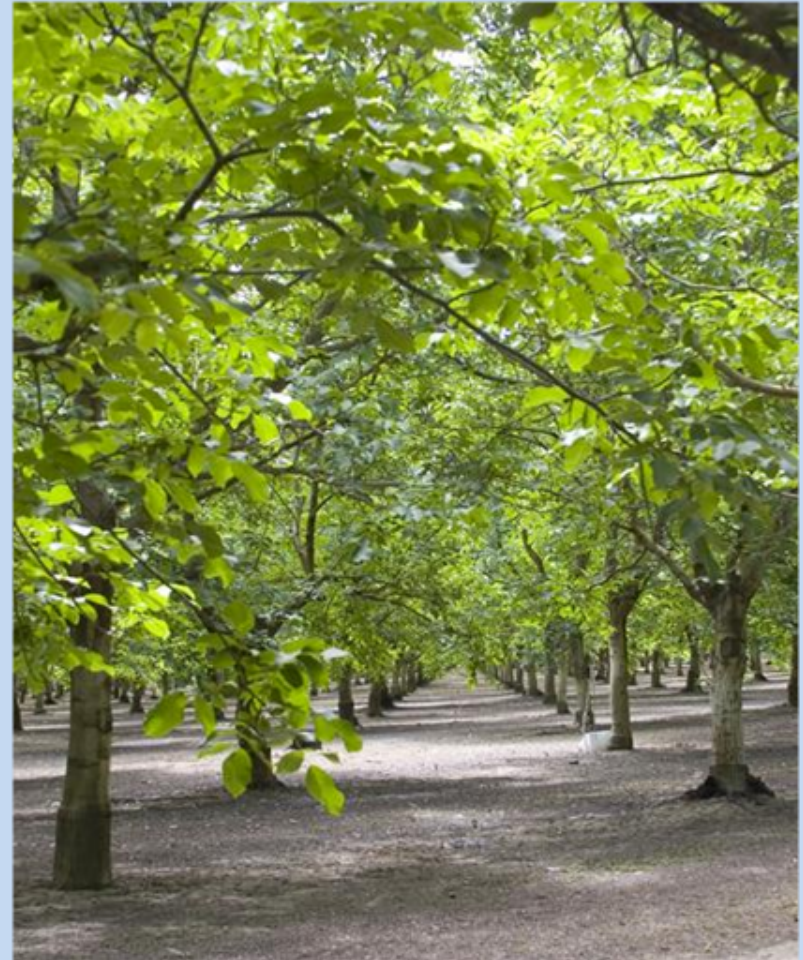
What Makes a Good Partner?

- Able to support own participation
- Interest in climate-related issues
- Support NCA objectives
- Able to contribute knowledgeably and meaningfully to the NCA
- Provide links to key regions, sectors, and stakeholder groups
- Responsive point of contact
- Able to meet deadlines and participate collaboratively



Sustained Process Partners

- Establish and facilitate ongoing dialogue between producers and users of assessments
- Produce and update technical inputs and provide long-term assessment capacities
- Intention to remain a part of the sustained assessment process



Contributing Partners



- Facilitate conversations between producers and users of assessments
- Provide specific contributions of technical inputs or assessment capacity
- Not yet able or willing to make a sustained commitment to the NCA

Communication Partners

- Serve primarily as an information conduit between the NCA and a larger group of stakeholders
- Work with the NCA to identify opportunities to engage stakeholders via newsletters, websites, social media, etc.
- Primarily partner on an *ad hoc* basis



What to Expect

The NCA will...

- Develop and decide on the overall NCA strategy
- Provide information about the NCA process, including guidelines for information quality
- Create processes to integrate multiple sources of inputs
- Build the core infrastructure to support ongoing engagement, dialogues, and information exchange

NCAnet Partners will..

- Receive information from the NCA and disseminate it within their own networks
- Gather and provide synthesized information and inputs from their stakeholders to the NCA
- Help identify individuals and groups within their networks actively contribute to the NCA
- Provide feedback to the NCA about additional needs

B.1 Organizing Committee

Tony Janelos, Joint Global Change Research Institute
 Don Wuebbles, University of Illinois
 Bill Collins, Lawrence Berkeley National Laboratory
 Noah Diffenbaugh, Stanford University
 Katharine Hayhoe, Texas Tech University
 Kathy Hibbard, Pacific Northwest National Laboratory
 George Hurlt, University of Maryland

B.2 Workshop Participants

Don Anderson, National Oceanic and Atmospheric Administration
 Jeff Arnold, U.S. Army Corps of Engineers
 Raymond Arritt, Iowa State University
 Dave Bader, Oak Ridge National Laboratory
 Venkatramani Balaji, National Oceanic and Atmospheric Administration
 John Balbus, National Institutes of Health
 Anjali Bamzai, National Science Foundation
 Dan Barrie, University of Maryland
 David Behar, San Francisco Public Utilities Commission
 Levi Brekke, U.S. Bureau of Reclamation
 Jim Buizer, Arizona State University
 Lawrence Buja, National Center for Atmospheric Research
 Dan Cayan, Scripps Institution of Oceanography
 Leon Clarke, Pacific Northwest National Laboratory
 Bill Collins, Lawrence Berkeley National Laboratory
 David Considine, National Aeronautics and Space Administration
 Ben DeAngelo, U.S. Environmental Protection Agency
 Eric DeWeaver, National Science Foundation
 Noah Diffenbaugh, Stanford University
 Keith Dixon, National Oceanic and Atmospheric Administration
 James Edmonds, Pacific Northwest National Laboratory
 Ron Ferek, U.S. Navy
 Gerald Geernaert, U.S. Department of Energy
 Aris Georgakakos, Georgia Tech University
 Bryce Golden-Chen, U.S. Global Change Research Program
 Anne Grambsch, U.S. Environmental Protection Agency
 John Hall, U.S. Department of Defense
 Murali Haran, Penn State University
 Katharine Hayhoe, Texas Tech University
 Isaac Held, National Oceanic and Atmospheric Administration
 Kathy Hibbard, Pacific Northwest National Laboratory
 Justin Hnilo, National Oceanic and Atmospheric Administration
 George Hurlt, University of Maryland
 Kathy Jacobs, Office of Science and Technology Policy
 Tony Janelos, Pacific Northwest National Laboratory
 Renu Joseph, U.S. Department of Energy
 Thomas Karl, National Oceanic and Atmospheric Administration
 Paul Kirshen, Battelle Memorial Institute

Dorothy Koch, U.S. Department of Energy
 Kenneth Kunkel, National Oceanic and Atmospheric Administration
 Dennis Lettenmeier, University of Washington
 L. Ruby Leung, Pacific Northwest National Laboratory
 Maxine Levin, U.S. Department of Agriculture
 Xin-Zhong Liang, University of Illinois
 Fred Lipschultz, U.S. Global Change Research Program
 Mike MacCracken, Climate Institute
 Julie Maldonado, U.S. Global Change Research Program
 Ed Maurer, Santa Clara University
 Linda Mearns, National Center for Atmospheric Research
 Jerry Melillo, Marine Biological Laboratory
 Richard Moss, Pacific Northwest National Laboratory
 Philip Mote, Oregon Climate Change Research Institute and Oregon Climate Services
 Ramakrishna Nemani, NASA Ames Research Center
 Sheila O'Brien, U.S. Global Change Research Program
 Robin O'Malley, U.S. Geological Survey
 Dennis Ojima, Colorado State University
 Zailao Pan, St. Louis University
 Sara Pryor, Indiana University
 Richard Rood, University of Michigan
 Cynthia Rosenzweig, NASA Goddard Institute for Space Studies
 Edmond Russo, U.S. Army Corps of Engineers
 Glenn Rutherford, National Oceanic and Atmospheric Administration NCDC
 Marcus Sarofim, U.S. Environmental Protection Agency
 Elena Shevliakova, Princeton University
 Benjamin Sleeter, U.S. Geological Survey
 Ronald Stouffer, National Oceanic and Atmospheric Administration
 Max Suarez, National Aeronautics and Space Administration
 Adam Terando, North Carolina State University
 Bob Vallario, U.S. Department of Energy
 Cameron Wake, University of New Hampshire
 Dan Walker, Computer Science, Corp.
 Anne Waple, National Oceanic and Atmospheric Administration
 Michael Wehner, Lawrence Berkeley National Laboratory
 Tom Wilbanks, Oak Ridge National Laboratory
 Don Wuebbles, University of Illinois
 Kandis Wyatt, National Oceanic and Atmospheric Administration
 Zhaoqing Yang, Pacific Northwest National Laboratory

Existing Toolkit of Materials

- Completed products
 - Reports from workshops and other meetings
 - Previous NCA reports
 - Handout introducing the NCA
 - Brochures and fact sheets highlighting key findings from previous assessments
- Information about ways to engage with the NCA process
 - Engagement strategy
 - Requests for information and guidelines for inputs
 - Calendar of upcoming events

Impacts of Climate Change

Climate change is expected to have a range of impacts on the United States, including increased frequency and intensity of extreme weather events, sea level rise, and changes in the amount and timing of snow melt. These impacts are expected to have a range of effects on the environment, the economy, and society. The following are some of the key findings from the NCA report series:

- Sea Level Rise:** Sea level rise is expected to have a range of impacts on the United States, including increased flooding, erosion, and damage to infrastructure. The following are some of the key findings from the NCA report series:
 - Sea level rise is expected to have a range of impacts on the United States, including increased flooding, erosion, and damage to infrastructure.
 - The following are some of the key findings from the NCA report series:
- Extreme Weather:** Extreme weather events are expected to become more frequent and intense due to climate change. The following are some of the key findings from the NCA report series:
 - Extreme weather events are expected to become more frequent and intense due to climate change.
 - The following are some of the key findings from the NCA report series:
- Snow Melt:** Changes in the amount and timing of snow melt are expected to have a range of impacts on the United States, including increased flooding, erosion, and damage to infrastructure. The following are some of the key findings from the NCA report series:
 - Changes in the amount and timing of snow melt are expected to have a range of impacts on the United States, including increased flooding, erosion, and damage to infrastructure.
 - The following are some of the key findings from the NCA report series:

Widespread climate-related impacts are occurring now and are expected to increase

Northeast:

- Increasing temperatures, precipitation, and drought
- Increasing coastal erosion and sea level rise
- Increasing wildfire risk
- Increasing water scarcity and drought
- Increasing air pollution and smog
- Increasing health risks from heat and air pollution
- Increasing economic losses from extreme weather events
- Increasing damage to infrastructure from sea level rise and coastal erosion

Great Plains:

- Increasing temperatures and drought
- Increasing wildfire risk
- Increasing water scarcity and drought
- Increasing air pollution and smog
- Increasing health risks from heat and air pollution
- Increasing economic losses from extreme weather events
- Increasing damage to infrastructure from sea level rise and coastal erosion

Midwest:

- Increasing temperatures and drought
- Increasing wildfire risk
- Increasing water scarcity and drought
- Increasing air pollution and smog
- Increasing health risks from heat and air pollution
- Increasing economic losses from extreme weather events
- Increasing damage to infrastructure from sea level rise and coastal erosion

Southwest:

- Increasing temperatures and drought
- Increasing wildfire risk
- Increasing water scarcity and drought
- Increasing air pollution and smog
- Increasing health risks from heat and air pollution
- Increasing economic losses from extreme weather events
- Increasing damage to infrastructure from sea level rise and coastal erosion

The United States National Climate Assessment
NCA Report Series, Volume 4
Planning Regional and Sectoral Assessments for the National Climate Assessment
November 15-17, 2010
Reston, Virginia

National Climate Assessment
U.S. Global Change Research Program

Viewing: NCAnet Intro

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NCA Structure

