

# U.S. Global Change Research Program: Interactions with the Arctic



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[www.globalchange.gov](http://www.globalchange.gov)

# The Global Change Research Act and USGCRP

- USGCRP was mandated by Congress in the Global Change Research Act (GCRA) of 1990 (P.L. 101 – 606)
  - *“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.”*
- Every 10 years, the USGCRP must produce a decadal National Global Change Research Plan (i.e. a Strategic Plan)
  - *“The Plan shall establish, for the 10-year period beginning in the year the Plan is submitted, the goals and priorities for Federal global change research which most effectively advance scientific understanding for global change and provide usable information on which to base policy decisions relation to global change.”*



# The Global Change Research Act and USGCRP

- “promote international, intergovernmental cooperation on global change research;
- involve scientists and policymakers from developing nations in such cooperative global change research programs; and
- promote international efforts to provide technical and other assistance to developing nations which will facilitate improvements in their domestic standard of living while minimizing damage to the global or regional environment.”



# USGCRP and Global Change Science

## *The Program:*

- Coordinates Federal research to better understand and prepare the nation for global change
- Prioritizes and supports cutting edge scientific work in global change
- Assesses the state of scientific knowledge and the Nation's readiness to respond to global change
- Communicates research findings to inform, educate, and engage the global community

## *USGCRP Agencies and Departments:*

	Department of Agriculture
	Department of Commerce
	Department of Defense
	Department of Energy
	Department of Health and Human Services
	Department of the Interior
	Department of State
	Department of Transportation
	Environmental Protection Agency
	National Aeronautics and Space Administration
	National Science Foundation
	Smithsonian Institution
	United States Agency for International Development

# The USGCRP Vision and Mission

**Vision** - “A nation, globally engaged and guided by science, meeting the challenges of climate and global change.”

**Mission** - “To build a knowledge base that informs human responses to climate and global change through coordinated and integrated federal programs of research, education, communication, and decision support.”



# The USGCRP Decadal Strategic Plan



- The Strategic Plan outlines how the program will advance fundamental, use-inspired research to address the present and future challenges of climate and global change
- The Strategic Plan provides
  - Direction for USGCRP for the next ten years
  - Guidance for USGCRP to be an integrated “end-to-end” program: from fundamental global change research to societal decision support
  - Links the Program’s vision and mission to its goals, objectives and outcomes
- The Strategic Plan speaks to various stakeholders
- The next Strategic Plan emphasizes
  - Human-natural systems
  - End-to-end science: from basic research to decision support

# Strategic Planning Process and Timeline

- The Plan was developed through a **transparent**, multiyear process that included engagement with interagency working groups and stakeholders
- Between 2007-2009, USGCRP held over **20 listening sessions** with various regional and sectoral stakeholders
- A mandated **public comment period** was held Sept. 30<sup>th</sup>, 2011 – November 29<sup>th</sup>, 2011
- The draft plan went through review by the **National Research Council**
- An electronic release and rollout of the Plan will be the week of **March 19<sup>th</sup>** with a hard copy to follow
  - **Available at [GlobalChange.gov](http://GlobalChange.gov)**

# USGCRP Strategic Plan Goals and Objectives

Goals	Objectives
1. Advance Science	<ul style="list-style-type: none"><li>1.1 Earth System Understanding</li><li>1.2 Science for Adaptation and Mitigation</li><li>1.3 Integrated Observations</li><li>1.4 Integrated Modeling</li><li>1.5 Information Management and Sharing</li></ul>
2. Inform Decisions	<ul style="list-style-type: none"><li>2.1 Inform Adaptation Decisions</li><li>2.2 Inform Mitigation Decisions</li><li>2.3 Enhancing Global Change Information</li></ul>
3. Sustained Assessment	<ul style="list-style-type: none"><li>3.1 Scientific Integration</li><li>3.2 Ongoing Capacity</li><li>3.3 Inform Responses</li><li>3.4 Evaluate Progress</li></ul>
4. Communicate & Educate	<ul style="list-style-type: none"><li>4.1 Strengthen Communication and Education Research</li><li>4.2 Reach Diverse Audiences</li><li>4.3 Increase Engagement</li><li>4.4 Cultivate Scientific Workforce</li></ul>



## Example Challenges, Objective 1.1: Earth System Understanding

- Roles of aerosols on regional variations and change
  - Direct, indirect effects
- Role of short-lived radiative forcing agents
  - Quantify contributions & uncertainties
- Stratosphere & surface climate
- Interface and boundary layer interactions
  - Clouds, land surface feedbacks
  - Climate-biology feedbacks
- Integration of observations into models
  - Moving toward coupled data assimilation
- Process study approach to looking at climate system
- Thresholds and tipping points



# Example Challenge, Objective 1.2: Science for Adaptation and Mitigation

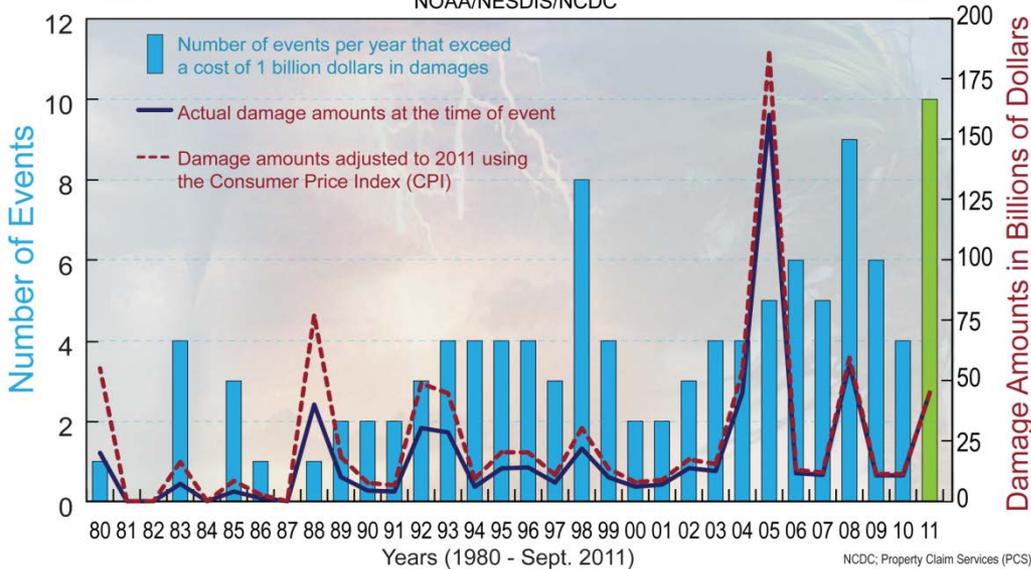
## Weather and Climate Extremes

- Since 1980, 110 billion-dollar weather and climate disasters in U.S.
- Total losses since 1980 of billion-dollar disasters exceeds \$750 billion.
- Are Nations becoming more exposed and/or sensitive to severe events?

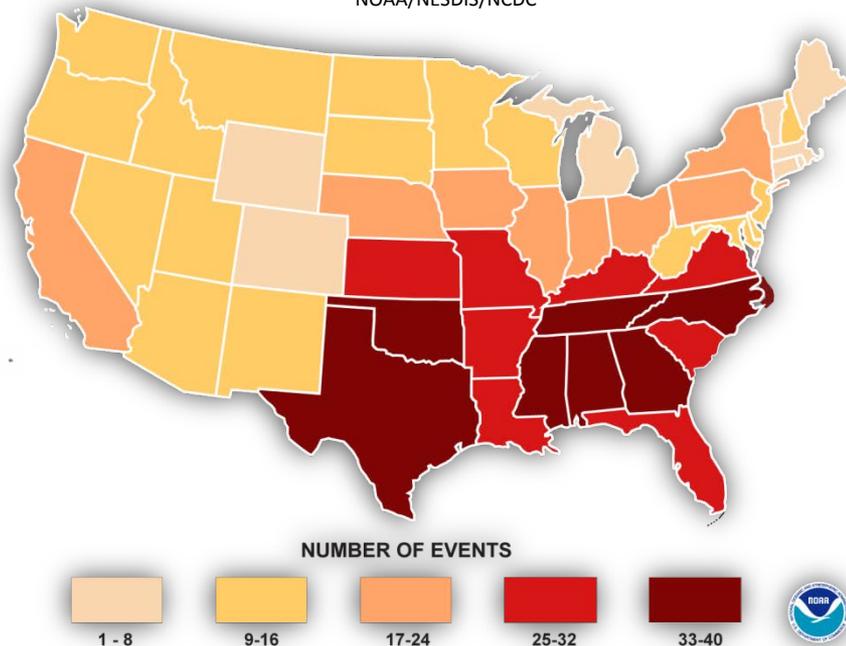
A record 10 Disasters in the U.S. in 2011 to date



**Billion Dollar Weather/Climate Disasters**  
1980 - September 2011  
NOAA/NESDIS/NCDC



**Number of Billion Dollar U.S. Weather/Climate Disasters**  
1980 – September 2011  
NOAA/NESDIS/NCDC



# Example Challenges, Goal 2:

## Inform Decisions

Provide the scientific basis to inform and enable timely decisions on adaptation and mitigation.



Why do people choose to live in high-risk areas?



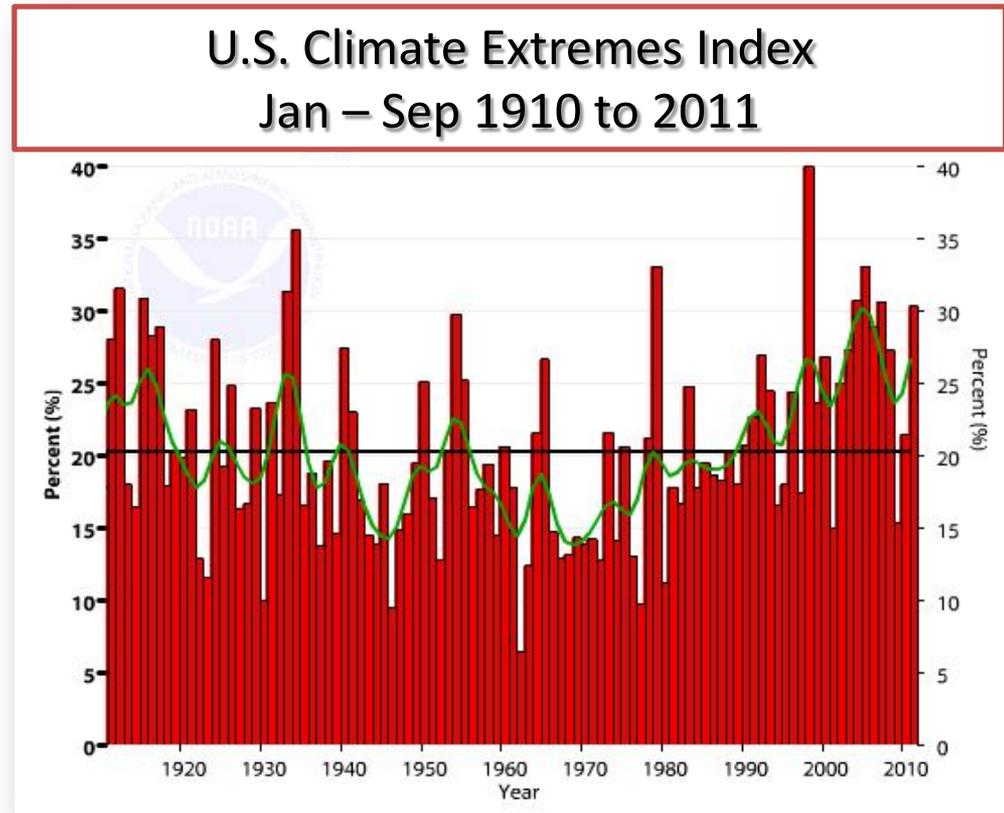
Rising sea level resulting in decreasing wildlife habitats



# Example Challenges, Goal 3:

## Sustain Assessments

- Sustainable process with multiple products
- Indicators
  - Physical
  - Ecosystem
  - Socioeconomic
- Assessing and communicating confidence levels
- Regional and sectoral focus

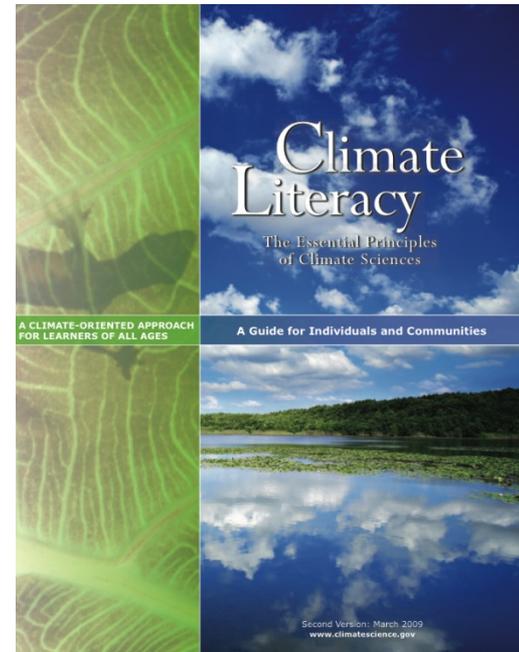


## Example Challenges, Goal 4: Communicate and Educate

- Advance communications and education to broaden public understanding of global change, and empower the workforce of the future.



High school students attending a “Science Careers in Search of Women” conference.  
Credit: *NSF image.*



The Essential Principles of Climate Science (2009). USGCRP.

# USGCRP Cross-cutting Interagency Programs

- Encourage a conscious focus on a variety of disciplines and methods
- The cross-cutting groups support USGCRP areas of focus that pertain to multiple Strategic Plan goals and Program needs
  - ***Programmatic:*** Connects USGCRP research and activities with Program support needs
    - *Example: International*
  - ***Societal:*** Connects USGCRP research and activities with societal needs
    - *Example: Climate Change and Human Health Group*

# Interagency Group on International Research Cooperation

- The goals of the cross-cutting Interagency Group on International Research Cooperation include:
  - Fostering cooperation between U.S. Scientists, scientific institutions and agencies and their counterparts across the globe in order to advance understanding of and inform responses to global change.
  - Fostering the development scientists and scientific institutions in less developed countries in order to improve understanding of and responses to global change.
  - Promoting international efforts to develop standards for data quality and access to that data at the lowest possible cost.
  - Supporting efforts to sustain and improve observations of the Earth system globally
  - Supporting international negotiations and overseas development assistance



# Examples of Ongoing International Research Cooperation Activities

- Supporting global research coordination through WCRP, IHDP, DIVERSITAS, and IGBP
- Supporting research-driven capacity development through START
- Hosting the IPCC Working Group II Technical Support Unit (TSU) and formerly, the IPCC Working Group I TSU
- Coordinating U.S. author selection, government and expert reviews for IPCC and other global assessments (e.g.- ACA) in cooperation with the Department of State
- Coordinate work in the Arctic, including: AMAP, SAON and USGCRP Arctic Assessment





# An Overview of The National Climate Assessment

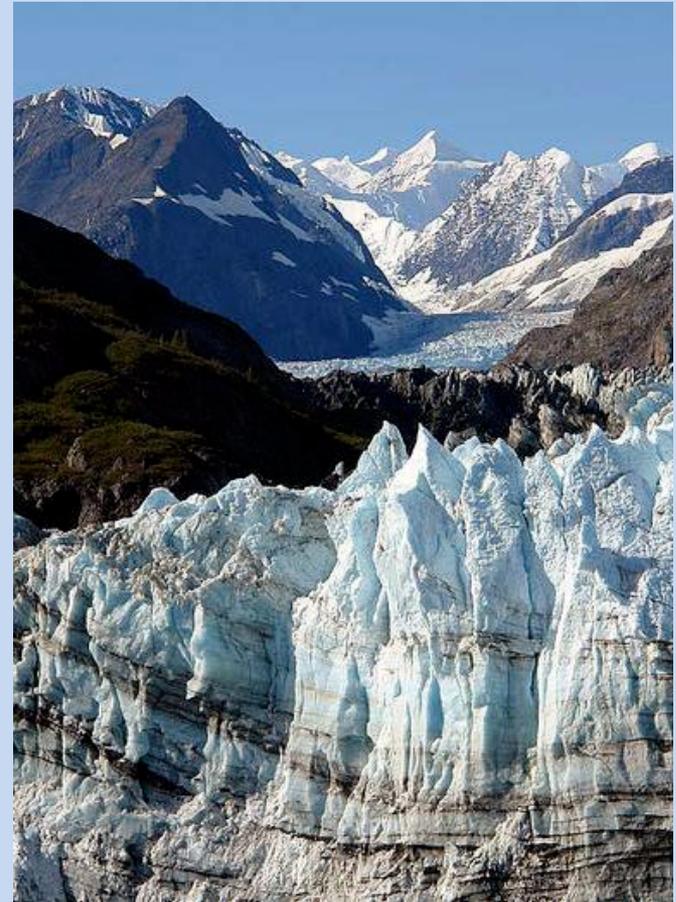
<http://assessment.globalchange.gov>



# Global Change Research Act (1990), Section 106

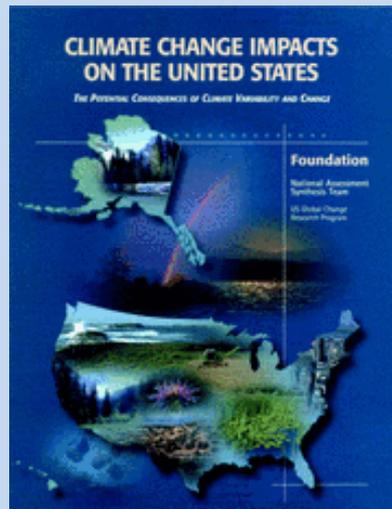
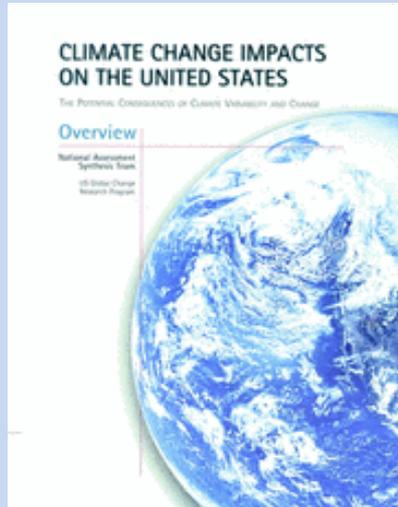
...not less frequently than every 4 years, the Council... shall prepare... an assessment which—

- integrates, evaluates, and interprets the findings of the Program and discusses the scientific uncertainties associated with such findings;
- analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and
- analyzes current trends in global change, both human- induced and natural, and projects major trends for the subsequent 25 to 100 years.

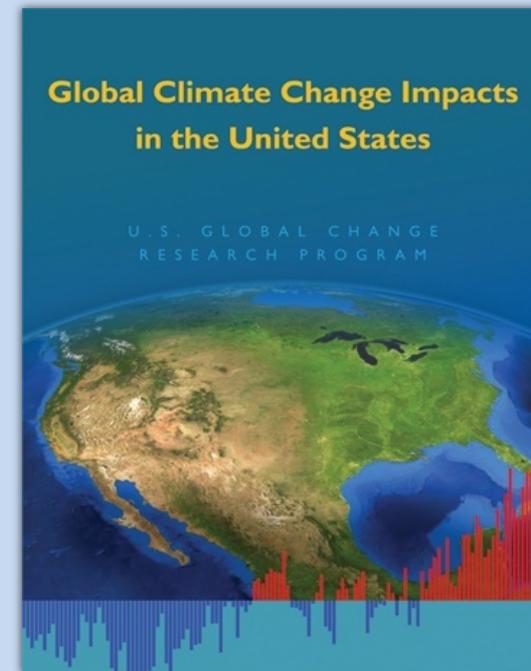


# Previous National Climate Assessments

## Climate Change Impacts on the United States (2000)



## Climate Change Impacts in the United States (2009)



Target date for next NCA: 2013



**National  
Climate  
Assessment**

U.S. Global Change Research Program

# 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.



**National  
Climate  
Assessment**

U.S. Global Change Research Program

# What is New About the 2013 National Climate Assessment (NCA)

- **Sustainable process** with multiple products over time
- New topics, **cross-sectoral studies**
- 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

