USGS- The Science Agency of the U.S. Department of Interior

- **Geology**: Minerals, Energy, Volcanoes, Earthquakes, Coastal-Marine
- **Biology**: Inventory, Monitoring, Research on Species, Populations, and Ecosystems
- **Water Resources**: Lakes, Streams, Glaciers, and Groundwater: Quantity and Quality
- **Geography**: Maps, Remote Sensing, Analysis
- **Global Change Science**: Interdisciplinary with Integration of all the above.
USGS- Climate Change Science Program Level Activities

- DOI Regional Climate Science Center / Wildlife Science Center
- Landscape Conservation Cooperatives
- Changing Arctic Ecosystems
- Climate Effects Network
- USA National Phenology Network – Alaska Node
Sept. 14, 2009- Salazar Launches DOI Climate Change Response Strategy

Secretarial Order Addresses Climate Change Impacts on U.S. Lands and Oceans- “This order establishes a Departmentwide approach for applying scientific tools to understand climate change and to coordinate an effective response to its impacts on tribes and on the land and water and cultural heritage resources that the Department manages.”

A new Climate Change Response Council will coordinate DOI’s response to the impacts of climate change within and among the Interior bureaus and will work to improve the sharing and communication of climate change impact science.

Eight DOI Regional Climate Change Response Centers, serving Alaska, the Northeast, the Southeast, the Southwest, the Midwest, the West, Northwest, and Pacific regions –

A Network of Landscape Conservation Cooperatives will engage DOI and federal agencies, local and state partners, and the public
USGS Global Change Science
National and Regional Climate
“and Wildlife” Science Centers
Regional Climate Science Hubs

Pacific Northwest

Intermountain West

Northeast

Desert Southwest

South Central

South East

Alaska

Hawaii

Department of the Interior Regional Climate Science Centers

USGS science for a changing world
Department of the Interior Regional Climate Science Centers

OBJECTIVES

• Provide land, water, fish and wildlife, ocean, coastal, and cultural heritage resource managers with the tools and information to develop and execute strategies for successfully adapting to and mitigating the impacts of climate change.

• Provide modeling and forecasting information and tools, integrate physical climate models with ecological models, assess climate change vulnerabilities, forecast changes, and develop standardized approaches.

• Provide funding for researchers through cooperative agreements that involve climate change science as a major component.
Alaska Hub-
Regional Climate
(and Wildlife) Science Center

NCCWSC
- National Syntheses
- Standardized Approaches
- New Science & Methodologies
- Communication

Alaska
Regional Hub
- Down-scaling of GCMs
- Regional Response - Eco & Population Models
- Forecasting
- Innovation
- (Scientists and Modelers)

Partnerships
- GIS Applications
- Application of models
- Species/habitat assessment
- Adaptive Mgmt monitoring
- Feedback

Native Alaskan Organizations

U of A
NASA
ADF&G
AKDEC
DOD
NOAA
USFS
MMS
BLM
FWS
NPS

AKDEC

Native Alaskan Organizations

Alaska Hub-
Regional Climate
(and Wildlife) Science Center

NCCWSC
- National Syntheses
- Standardized Approaches
- New Science & Methodologies
- Communication

Alaska
Regional Hub
- Down-scaling of GCMs
- Regional Response - Eco & Population Models
- Forecasting
- Innovation
- (Scientists and Modelers)

Partnerships
- GIS Applications
- Application of models
- Species/habitat assessment
- Adaptive Mgmt monitoring
- Feedback

Native Alaskan Organizations

U of A
NASA
ADF&G
AKDEC
DOD
NOAA
USFS
MMS
BLM
FWS
NPS

AKDEC

Native Alaskan Organizations
Landscape Conservation Cooperatives-(LCC):

**LCC-**

- U.S. Fish and Wildlife Service lead, with USGS Science Support
- LCCs are conservation science partnerships between federal agencies, states, tribes, NGOs, universities, and other entities within a defined geographic area. By working cooperatively with LCCs, partners find common goals, avoid duplication of effort, and draw upon existing strengths to address mutual needs and objectives.
**LCCs**

- USGS Alaska Regional Office Participating in:
  - ACCER Oversight Governance (LCC and RCSC)
  - Arctic LCC
  - Western Alaska LCC
  - North Pacific LCC
FY 2010 Initiative
Changing Arctic Ecosystems (+$4.2M)

Supports DOI need for new approaches to understand climate effects on important biological resources and ecosystems in order to develop successful resource management and conservation strategies.
Design Phase: Identify 2 to 4 large scale, integrated, research efforts of up to 5 years duration, as well as targeted capacity building opportunities.

Approaches will be portable to the broad suite of high latitude ecosystems and the fish and wildlife species they support, which are of DOI interest. This will create an effective science-based arctic wildlife-climate forecasting portfolio for DOI.

Examples of potential study efforts include:

- “Enhancing forecasts of polar bear and walrus population response to a rapidly changing arctic environment.”

- “Measuring and forecasting the response of wildlife populations to changes in ecosystem processes on the Arctic Coastal Plain”
The Climate Effects Network
A vision for a National data integration and early-warning system for detecting the effects of climate change and variability on ecosystems, natural resources, and human health and safety.

A foundation for our assessment capabilities
Possible Collaborative Observation and Research (CORE) Ecoregions

- Northeast Temperate Forest
- Tropical Forest
- Southwest Mountains and Desert
- Pacific Northwest Rainforest
- Yukon River Basin and North Slope
- Grasslands
- Gulf Coast/Florida Wetlands
- Tropical Forest

[Image: Map of North America showing the locations of different ecoregions]
The network fills gaps in existing monitoring to track changes in ecological function.
Collaborative Observation and Research Watersheds (CORe)

Permafrost Temperature
Romanovsky, 1999

(courtesy of B. Riordan)
The USA National Phenology Network:

A Practical Tool for Research, Management and Education in the Face of Climate Change

www.usanpn.org
Phenology

Cause and consequence of seasonal biological events
“Phenology…is perhaps the simplest process in which to track changes in the ecology of species in response to climate change.” (IPCC 2007)
A new data resource—a *national network of integrated phenological observations across space and time*

- Understand how plants, animals and landscapes respond to environmental variation and climate change
- Develop decision-support tools and techniques to facilitate human adaptation to climate change
- Engage the public in scientific discovery and increase the understanding of the changing natural world through phenology monitoring
USA National Phenology Network

What Is the USA-NPN?
The USA National Phenology Network brings together citizen scientists, government agencies, non-profit groups, educators and students of all ages to monitor the impacts of climate change on plants and animals in the United States. The network harnesses the power of people and the Internet to collect and share information, providing researchers with far more data than they could collect alone.

What Is Phenology?
Phenology is the study of the timing of recurring plant and animal life cycle events, or phenophases, such as leafing and flowering of plants, maturation of agricultural crops, emergence of insects, and migration of birds. Many of these events are sensitive to climatic variation and change, and are simple to observe and record. As an USA-NPN observer, you can help scientists identify and understand environmental trends.

Join Us!
We are looking for volunteers to help us monitor some 200 plant species found across the United States. This effort will eventually expand to include animals and physical phenomena, such as bird migrations and ice out on ponds. Please explore our website to learn more about USA-NPN. Better yet, click "Observe" to join us!

www.usanpn.org
USGS- Climate Change Science Program Level Activities

- DOI Regional Climate Science Center / Wildlife Science Center
- Landscape Conservation Cooperatives
- Changing Arctic Ecosystems
- Climate Effects Network
- USA National Phenology Network – Alaska Node

Challenge is to Coordinate and Maximize the outcomes!