

Climate Change Adaptation



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*Ken Salazar, Secretary of the Interior
December 10, 2009*

Climate change is affecting every corner of the American continent. Shifting precipitation patterns are occurring up and down the seven-State Colorado River basin. The glaciers in Montana's Glacier National Park are melting and are expected to disappear in the next two decades. The world's first wildlife refuge—Florida's Pelican Island, which President Theodore Roosevelt set aside in 1903—is being consumed by rising seas.

Land and resource managers are confronting longer and hotter fire seasons, new incursions of invasive species, the early impacts of sea level rise, and changes in wildlife migration habits and species interactions. Water managers are experiencing new precipitation patterns, diminished snow packs, and more extreme wet and dry periods. Scientists are observing droughts that are drier and longer, floods that are more dangerous, and hurricanes that are more severe. Scientific evidence indicates that many of these transformations are likely to be due to, or enhanced by, climate change.

These are the symptoms of a large-scale problem that requires a comprehensive approach that integrates the talents of government at all levels, the private sector, and others. The United Nations Climate Change Conference held in Copenhagen in December 2009 reinforced the imperative to work collaboratively on a global scale to address the causes and solutions to climate change.

Carbon pollution is putting our world – and our way of life – in peril. The places we love... the resources on which we rely... the peoples of the world who are most vulnerable... are all at risk if we do not act.

*Secretary Ken Salazar
December 10, 2009*

A CLIMATE CHANGE ADAPTATION HIGH-PRIORITY PERFORMANCE GOAL

The Department of the Interior's Climate Change Adaptation initiative is an effort to gain effective and broad collaboration to determine the causes, formulate solutions, and implement changes to reduce or reverse climate impacts to lands, waters, natural and cultural resources. This initiative reflects Interior's leadership as the primary land and wildlife manager for the Nation. The Department's resource managers will make science-based climate change adaptation and mitigation decisions using data and other resources provided by Interior bureaus and other governmental and non-governmental partners. Working at the national, regional, and landscape scales, the initiative integrates science,



adaptation, and mitigation expertise with the expertise of partners and makes this information and best management practices available for application on both public and private lands across the United States and internationally.

The Department’s High-Priority Performance Goal for this initiative is:

By 2012, the Department will identify the areas and species ranges in the US that are most vulnerable to climate change, and begin implementing comprehensive climate change adaptation strategies in these areas.

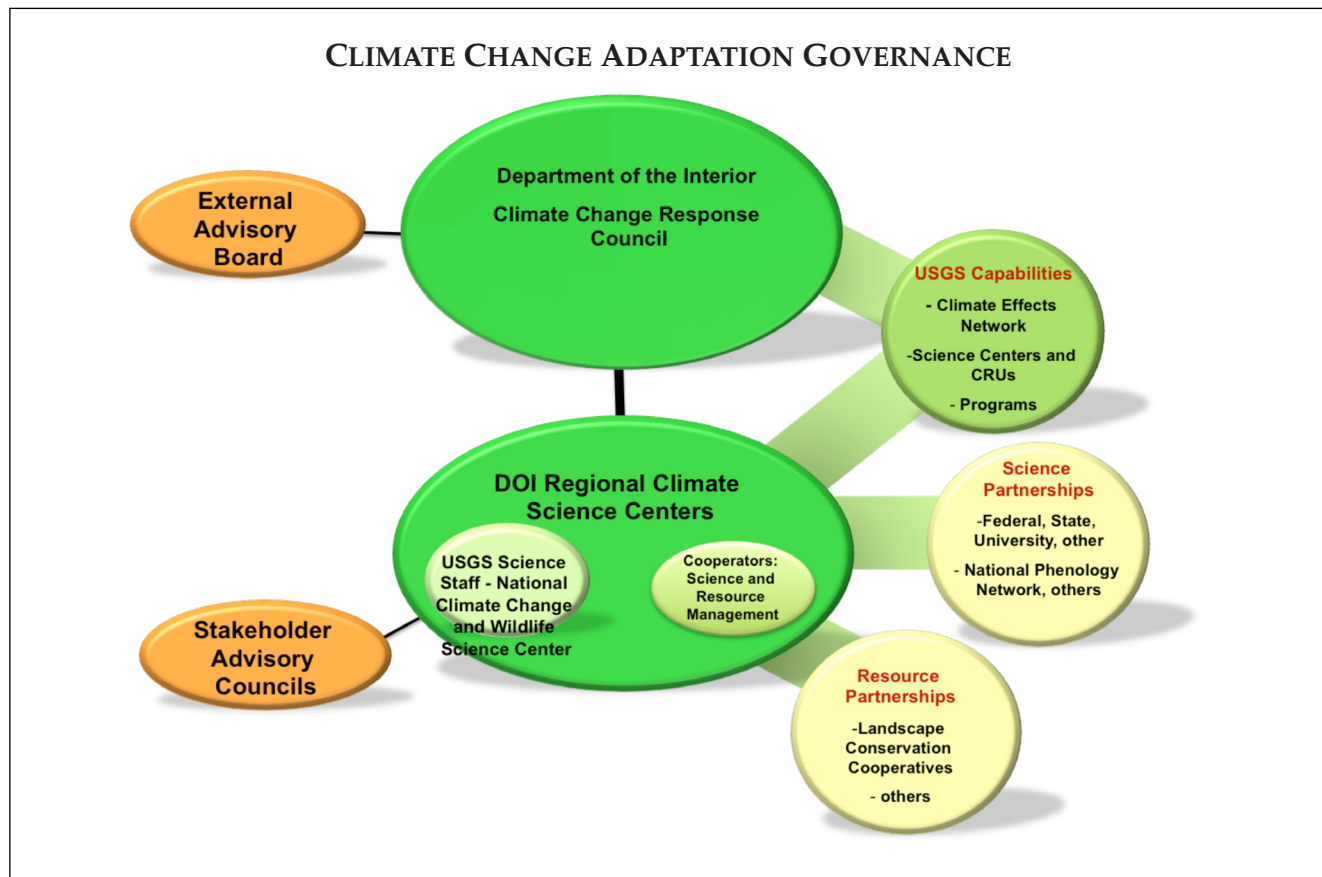
This initiative provides several new approaches that will provide significant resources for Interior land, fish, wildlife, water, marine, tribal, and cultural heritage managers, and leverage the resources of Federal, State, local, tribal, nongovernmental organizations, and private landowner partners.

Climate Change Impact Science – Interior’s Climate Science Centers and Landscape Conservation Cooperatives will conduct and communicate research and monitoring to improve the understanding and forecasting of which elements of Interior-managed land, water, marine, fish and wildlife, and cultural

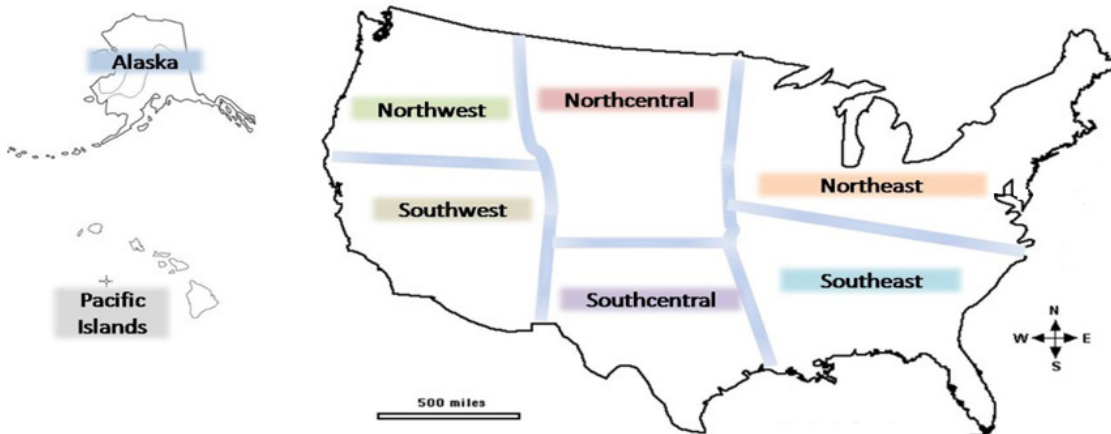
heritage resources are most vulnerable to climate change impacts and how to make them more resilient in the face of those impacts. The CSCs will provide basic climate change science associated with broad regions of the country and LCCs will focus more on applied science at the landscape-level. Both CSCs and LCCs will be involved in integrating and disseminating data and helping resource managers develop adaptation strategies.

Data Integration and Dissemination – The Interior Department will improve the Nation’s scientific database integration and management and the ability for both natural and cultural resource managers to access and apply climate change impact data. The Department will improve the availability and dissemination of climate change impact data with analytical information and decision-support tools to scientists, resource managers, decisionmakers, and the general public through www.data.gov and other appropriate mechanisms.

Enabling Science-Based Adaptation Strategies – Interior will provide scientific and technical capacities to cultural and natural resource managers to help them design and implement adaptive management strategies in the face of a changing climate.



DOI Climate Science Centers



These new approaches form the foundational elements for Climate Science Centers that Interior is establishing on a regional basis around the country and for Landscape Conservation Cooperatives. In these geographically-based cooperatives, Interior bureaus will work with other agencies and outside partners to expand the understanding of the impacts that climate change is having on natural and cultural resources and will facilitate appropriate and coordinated responsive actions.

This initiative will enable each of the bureaus to better meet their individual missions while, at the same time, taking advantage of synergies with other Interior bureaus as well as governmental and non-governmental partners to implement integrated climate change science, adaptation, and mitigation strategies across broad landscapes.

CLIMATE CHANGE ACTIONS UNDERWAY

Secretary Salazar set the framework for Interior's climate change program with issuance of Secretarial Order No. 3289 on September 14, 2009. The Department's implementation of a \$90.5 million program expansion that was funded in the 2010 Interior, Environment and Related Agencies Appropriations Act is based on this framework. The Department is also integrating its actions as closely as possible with other Federal agencies and is

participating actively in the interagency process on adaptation policy led by the Council on Environmental Quality.

Climate Change Response Council – Leadership for this initiative is provided by Interior's Climate Change Response Council. The Council is chaired by the Secretary and is directing the execution of a coordinated Department-wide strategy to increase scientific understanding and the development and implementation of natural and cultural resource adaptive management strategies. The Council is composed of senior leaders throughout the Department's bureaus and offices.

Climate Science Centers – The strategy includes the establishment of eight regional Climate Science Centers, serving the Alaska, Pacific Islands, Northwest, Southwest, Northcentral, Southcentral, Northeast, and Southeast regions. These centers will synthesize existing climate change impact data and management strategies, help resource managers put them into action on the ground, and engage the public through education initiatives. The centers will maximize collaboration with academia, other Federal agencies, and partners and will prioritize their work based on the needs of the land managers.

In 2010, centers will be established in three locations: Alaska, the Northwest, and the Southeast. The 2011 budget includes an increase of \$8.0 million for the U.S. Geological Survey to establish two additional



centers, which will be located in the Southwest and Northcentral regions. As there are multiple universities with the potential to be hosts, locations will be determined through a competitive process that involves program announcements to solicit proposals from potential hosts. In setting up the Alaska Center, no competition was conducted, as there is only one dominant university or institution that has the necessary scientific and technical capabilities to host the CSC.

The Bureau of Land Management, Fish and Wildlife Service, National Park Service, Bureau of Reclamation, and Bureau of Indian Affairs have committed funding and staff support beginning in 2011 to the centers in order to encourage collaborative sharing of research results and data and to provide a direct link with the on-the-ground work taking place in the Landscape Conservation Cooperatives. These partners and others will leverage resources available for climate change science, and the National Advisory Board and Regional Advisory Councils will ensure that partners play a significant role in shaping center priorities, directions, and activities.

Landscape Conservation Cooperatives – The network of Landscape Conservation Cooperatives will engage other Federal agencies, local and State partners,

and the public in crafting practical, landscape-level strategies for managing climate change impacts in coordination with the eight regional CSCs. The cooperatives' focus is on impacts such as wildlife migration patterns, wildfire risk, drought, or invasive species that typically extend beyond the borders of any single national wildlife refuge, BLM unit, or national park, but not encompassing an area as large as an entire region.

All of Interior's land management agencies will be investing in the development of an integrated network of LCCs, with FWS taking the lead in standing up nine LCCs in 2010 including an LCC that will be formed from the Lower Mississippi Joint Venture, and with the Bureau of Reclamation, BLM and the BIA initiating the formation of additional LCCs in 2010. In order to maximize the leverage of the LCCs, all bureaus will be working closely with the bureau that is leading the investment, so that the LCCs can help address the mission needs of all Interior bureaus. The USGS will place scientists at LCCs to integrate science and adaptive management and ensure coordination with regional Climate Science Centers.

The LCCs will facilitate coordination among land and resource managers within the region that is

The National Climate Change and Wildlife Science Center provides a nexus for the DOI Climate Science Centers. The NCCWSC will focus on providing habitat and population modeling and forecasting information and tools, integrating physical climate models with ecological models, assessing vulnerabilities and forecasting changes, and developing standardized approaches. The NCCWSC capacity for wildlife-oriented science will be leveraged with the other Federal scientists from BLM, FWS, NPS, BOR, and BIA, other disciplines in USGS; other Federal agencies; State and local agencies; and academia.

defined by the LCC boundary. The LCCs are not limited by hard boundaries but will serve as catalysts for the identification and prioritization of key climate impact issues, modeling needs, and data needs.

With resident staff and through connections with partners, LCCs will develop, test, implement, and monitor conservation strategies that will be responsive to the dynamic landscape changes resulting from climate change. The LCCs will facilitate broad availability of data, modeling, and tools to land managers that will allow them to effectively predict habitat and species changes and to implement conservation actions to address impacts. This same approach will facilitate improved management of water resources, historical and cultural resources, and resources that are needed by Indian Tribes and Alaska Natives.

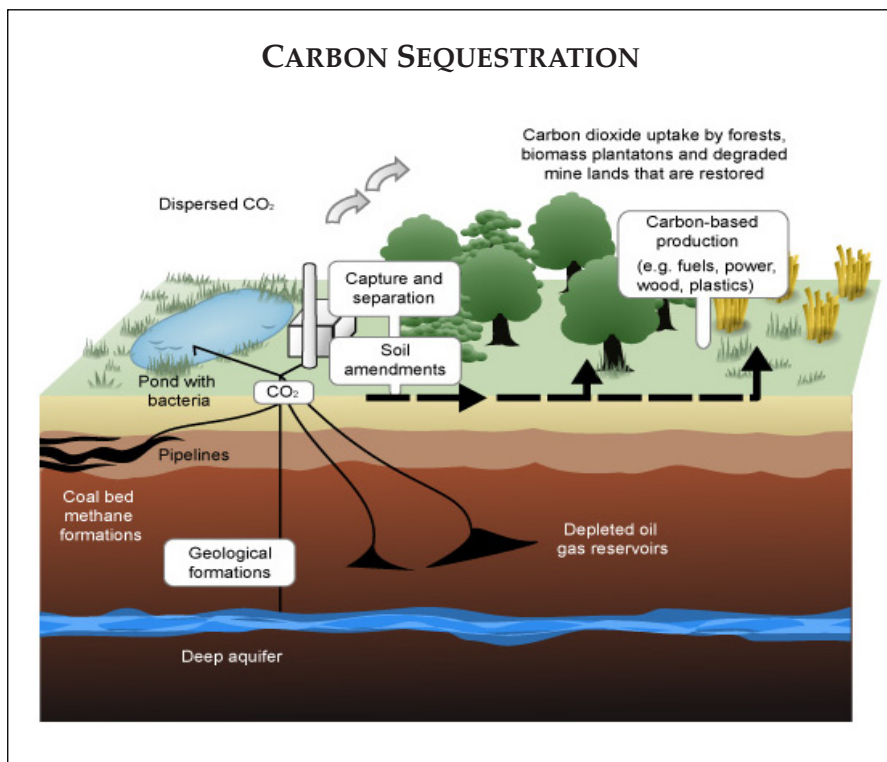
Global Change Effects Network – The Climate Change Council is developing a strategy to put in place a unified climate change monitoring network. Currently, Interior bureaus collect valuable data from numerous monitoring networks; however, the information cannot easily be integrated and shared. In addition, the protocols for collection, storage, and analysis

are not consistent. The Department’s integrated strategy for the collection, management, and use of monitoring information – the Global Change Effects Network – will unify monitoring approaches and make information more relevant and readily available for sharing.

Through this effort, environmental indicators linked to climate change causes and effects will be tracked and can be used to improve understanding of the changes and the efficacy of the responses. Science applications and related data from this effort will support the development of scenario and forecast-based decision-support tools.

Carbon Sequestration – Interior’s carbon storage project is developing methodologies for assessing the geological and biological carbon sequestration potential of various U.S. resources. With USGS leadership, the project will provide information about the potential for carbon storage in geologic formations and in plants and soils.

There are challenges to understanding the Nation’s potential for carbon sequestration, both geological and biological. Biological carbon sequestration removes carbon dioxide, or CO₂, from the atmosphere for storage in vegetation, soils, and sediments. Deliberate biological sequestration can be accomplished through forest and soil conservation practices including restoring and



establishing forests, wetlands, and grasslands. There are challenges to long-term biological storage, but increased biological sequestration of carbon in the coming decades, as the Nation and world transition to a clean energy economy, potentially could play a key role in reducing the rate of greenhouse gas increases in the meantime. Interior's extensive land and resource management experience provides a practical context for assessment of rates and capacity for carbon storage in ecosystems. Early scientific analysis completed by the USGS already is demonstrating the importance of biological sequestration as part of the carbon cycle.



The Energy Independence and Security Act of 2007 called for a comprehensive assessment of geological and biological carbon sequestration as the basis for evaluation of the full range of sequestration options. The USGS Energy Resources program has developed a methodology to assess the potential for carbon sequestration in oil and gas reservoirs and saline formations.

THE CLIMATE CHANGE BUDGET

The 2011 budget request includes \$171.3 million for the Climate Change Adaptation initiative, an increase of \$35.4 million over 2010. The budget includes continued investments in the USGS National Climate Change and Wildlife Science Center, which will serve as the nexus for eight Climate Science Centers; expansion of monitoring in USGS and FWS that will be integrated, standardized, and accessible; expansion of the USGS carbon sequestration project; expanded FWS science and planning capacity, which will support additional

LCCs; and BLM and FWS adaptive management activities. Beginning with the 2011 budget, the Bureau of Reclamation budget includes dedicated climate change funding including basin studies and scientific support; and the Bureau of Indian Affairs will participate in a LCC.

CLIMATE CHANGE ADAPTATION INITIATIVE BY BUREAU

Bureau of Land Management – The BLM 2011 budget request for the Climate Change Adaptation initiative is \$17.5 million, an increase of \$2.5 million over the 2010 enacted level. The requested funding will be used to conduct assessments, create adaptive strategies, and initiate restoration projects. As a result of drought, global climate change, altered fire regimes, invasive plant and animal species, and changes in land use associated with energy development and urban growth, BLM lands are experiencing a period of unprecedented environmental change. The BLM will participate in LCCs and develop climate change adaptation strategies based on assessments of conditions, develop strategies to reduce vulnerability caused by climate change impacts, and implement conservation and restoration actions on the ground.

Bureau of Reclamation – The 2011 budget request for the Climate Change Adaptation initiative is \$7.0 million, an increase of \$3.5 million over the 2010 enacted level. Reclamation will assess climate change impacts and water shortages through its Basin Study program. The program will evaluate basin-wide water supply and demand; conduct West-wide risk assessments; collect baseline climate change information; and provide leadership for two LCCs in the Colorado River Basin to develop climate change adaptation strategies through local cooperative partnerships.

CLIMATE CHANGE ADAPTATION INITIATIVE (dollars in millions)			
<u>Bureau</u>	<u>2010</u>	<u>2011</u>	<u>Change</u>
BLM.....	15.0	17.5	+2.5
Reclamation	3.5	7.0	+3.5
USGS	67.5	77.9	+10.4
FWS	40.0	58.8	+18.8
NPS.....	10.0	10.0	+0.0
BIA.....	<u>0.0</u>	<u>0.2</u>	<u>+0.2</u>
TOTAL	136.0	171.3	+35.4

U.S. Geological Survey – The USGS 2011 budget request for the Climate Change Adaptation initiative is \$77.9 million, a net increase of \$10.4 million over the 2010 enacted level. This includes \$8.0 million to support the National Climate Change and Wildlife Science Center, and \$2.0 million for the Biological Carbon Sequestration program. An increase of \$1.0 million for science applications and decision support will be used to develop decision-support tools and strategies for resource managers and policy makers.

Fish and Wildlife Service – The FWS 2011 budget request for the Climate Change Adaptation initiative is \$58.8 million, an increase of \$18.8 million over the 2010 request. Included are increases for climate change planning, science capacity, Partners for Fish and Wildlife, and the national wildlife refuge system.



An increase of \$3.8 million for the climate change planning and science capacity will enable FWS to establish three new LCCs; this includes \$750,000 that will be allocated for Gulf Coast Conservation activities. An increase of \$5.0 million for Climate Change Science Capacity will be allocated to the Gulf Coast for mission-critical scientific information and science support needed for landscape-scale conservation. Because the highest priority science needs relate to biological assessments and conservation design, work will focus mostly on the species and habitats that are most vulnerable to climate change or which represent broad species' vulnerabilities to climate change.

Important fish, wildlife, and plant habitats that are affected by climate change are often located on private land. The 2011 budget includes a \$2.0 million increase for the Partners for Fish and Wildlife program. The FWS will provide financial and technical assistance to landowners who voluntarily cooperate. Federal project funds will be leveraged

and habitats adjacent to or near refuges will be improved. Emphasis will be placed on strategic areas that focus on species that FWS considers most vulnerable to climate change, and that implement cost-effective measures to restore, enhance, and manage fish, wildlife, and plants and their habitats.

An increase of \$8.0 million is requested for the national wildlife refuge system to continue building its landscape-scale, long-term inventory and monitoring program. A primary emphasis will be on building a data architecture that can store and serve the necessary large datasets. The FWS will coordinate its efforts to tie this data architecture to the Department-wide Global Change Effects Network and will work with other bureaus to develop a unified monitoring and data collection protocol.

The number of inventories of fish, wildlife, plants, and their habitats on refuges will be expanded. The FWS has identified 100 new inventories that need to be completed, including biodiversity, vegetative communities, and the abiotic features that support fish and wildlife populations. Detecting climate-driven changes in these resources is important to help focus the FWS response to climate change at multiple landscape scales. Species at risk occur across a broad range of terrestrial, coastal, marine, and arctic ecosystems, and these inventories are necessary to focus adaptation efforts on those species most in need. The inventories will include cross program work with migratory birds, endangered species, fisheries, and habitat conservation.



National Park Service – While no new funding is requested in the 2011 budget for NPS climate change activities, \$10.0 million is programmed in base

funds for work on projects begun in 2010. The NPS will assess the vulnerability of natural and cultural resources to the effects of climate changes at 150 park units and develop mitigation and adaptation strategies to mitigate these effects as needed. The NPS will work through the CSCs and LCCs to develop and implement these plans at the regional and park level.

Bureau of Indian Affairs – The budget includes \$200,000 to support the Northwest LCC. The BIA will seek tribal input and perspective from Tribes in traditional ecological knowledge. Both Indian Affairs staff and local tribal members will be involved with the LCC to develop strategies to address adaptation.