

# Tackling Climate Impacts



*Now is the time to confront this challenge once and for all. Delay is no longer an option. Denial is no longer an acceptable response.*

*President-elect Barack Obama  
November 18, 2008*

The scientific community studying the impacts of climate change on natural systems and resources has increasingly verified changes that are impacting natural systems, including altered precipitation patterns that are affecting water supplies, and changes in temperature that are affecting wildlife and habitat.

In its 2007 Synthesis Report, the Intergovernmental Panel on Climate Change reported observational evidence showing that many natural systems are being affected by regional climate changes, particularly in temperature. In terrestrial ecosystems, earlier timing of spring events and shifts in plant and animal ranges are linked to recent warming. Similarly, in marine and freshwater systems, shifts in ranges and changes in the abundance of algae, plankton, and fish are associated with rising water temperatures, as are related changes in ice cover, salinity, oxygen levels, and circulation.

The IPCC's findings are consistent with scientific findings of the U.S. Geological Survey, the National

Oceanic and Atmospheric Administration, and observations made by Interior's land managers. Reports document significant glacial melting resulting from temperature change, and scientists note that significant impacts associated with global climate change are likely to include:

- Changes in precipitation.
- Higher water temperatures that affect plant and animal life.
- Rises in sea level.
- Destabilization of the permafrost in northern latitudes.
- Greater incidence and intensity of fires.
- Altered vegetation patterns and distribution of wildlife.

**CLIMATE IMPACTS FUNDING INCREASES**  
(dollars in millions)

Strategy	BLM	USGS	FWS	NPS	BIA	Total
Climate Impacts Science		15.0				15.0
Monitoring and Adaptation	15.0		40.0	10.0		65.0
Assist Others in Adaptation			40.0		6.0	46.0
Carbon Sequestration		7.0				7.0
<b>Total</b>	<b>15.0</b>	<b>22.0</b>	<b>80.0</b>	<b>10.0</b>	<b>6.0</b>	<b>133.0</b>

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These impacts are significant. They present a major challenge to the Department, given the scope of the its responsibilities. Interior has direct responsibility over 20 percent of the land mass of the United States, is the largest water provider in the western United States, and has wildlife responsibilities that extend across all public lands, and into private lands as well. Interior's presence along the Nation's coastlines is significant, with extensive areas of shoreline managed by parks and refuges. The Department also has a special role with Indian Tribes to protect trust resources, and with the State of Alaska and rural and Native Alaskan populations to maintain fish and wildlife needed for subsistence harvests.

Given these duties, Interior is uniquely qualified to address climate impacts and has a significant role to play in the Nation's response to these impacts. The analysis of climate change-related impacts to natural resources, and potential responses to such impacts, is often referred to as climate change "adaptation." Interior's bureaus are staffed with preeminent scientists and resource managers with the expertise to strengthen climate change monitoring systems; develop land, water, and wildlife adaptation strategies; and develop and implement stewardship principles and practices to enhance the potential climate change mitigation benefits of the public lands.

**Overview**—The 2010 budget request equips Interior for an expanded role in addressing climate change impacts on natural resources and responses to such impacts. The 2010 budget includes increases totaling \$133.0 million to:

- Expand climate change science to improve understanding of climate impacts.
- Monitor and assess climate change impacts and develop management strategies to address the impacts of climate change on wildlife and habitat, including strategies for wildlife corridors and other land uses.
- Assist others in similar efforts and serve as a repository for science relating to climate change impacts on natural resources and public lands.
- Assess the Nation's carbon sequestration capacity.

- Develop strategies regarding wildlife corridors and other land uses to respond to the impacts of climate change on wildlife and other habitat.

The 2010 budget includes \$15.0 million to invest in scientific assessments of climate impacts and \$65.0 million to conduct site specific monitoring and adaptive management activities on Federal lands. Interior land management bureaus will work with USGS to develop a cohesive monitoring strategy to determine the impacts that climate change is having on Interior lands and the Nation's wildlife resources. Based on that data, USGS will assist land and water managers to devise strategies that respond to such impacts and anticipate additional changes.

#### EXAMPLES OF CLIMATE IMPACT STRATEGIES

- Changes in precipitation patterns may suggest operational changes in Reclamation's water storage facilities.
- Impacts on wildlife ranges may point to the importance of identifying and protecting new wildlife corridors.
- Sea rise and storm surges may require new strategies for managing coastal and low-lying parks, refuges, and national seashores.

Interior also will work with its State and tribal partners to develop and implement strategies to adapt to climate impacts with an increase of \$40.0 million for State and Tribal Wildlife grants and \$6.0 million for Indian Affairs programs. The emphasis would be to develop scientific data on climate impacts that occur and those predicted to occur and to translate this scientific input into on-the-ground strategies for land and water managers.

Interior's large land portfolio also presents opportunities to reduce greenhouse gases through geological carbon sequestration in underground formations and through biological carbon sequestration in planting trees and other land management practices. An increase of \$7.0 million is requested to assess potential sequestration resources.



## CLIMATE IMPACT SCIENCE

The USGS is a national leader in climate science. They have the expertise in geological, hydrological, and biological science that is needed for Interior's land management responsibilities and for local and regional adaptation strategies for climate impacts.

The 2010 budget includes an increase of \$15.0 million for the climate change science program at USGS. Included within this budget are targeted increases to:

- Expand climate impacts monitoring.
- Develop collaborative research hubs through the National Climate Change and Wildlife Science Center.
- Collaborate on climate impact science.

**Climate Impacts Monitoring** — The Climate Impacts initiative includes an increase of \$5.0 million to track environmental indicators linked to climate impacts. An integrated Departmental network will provide land and water managers throughout the Country the data that are needed to better understand changes in ecosystems related to climate. This network will collect detailed information at high priority locations on a regular basis so that all of the potential causes of environmental change can be identified and measured in multiple regions throughout the U.S.

The Department's monitoring network will be strategically located to collect information and utilize existing monitoring infrastructure including existing USGS research capabilities. In 2009, USGS established a major research node in Alaska. In 2010, USGS will expand monitoring and research in Alaska to address the impacts of accelerated global warming on native communities, energy resources, and Federal trust resources. Research activities will include studying permafrost, geologic, hydrologic,

and biologic interactions and monitoring key physical and biological indicators of climate change in order to better understand its causes and effects on the Arctic and sub-Arctic regions. In 2010, USGS will outline plans and funding requirements for full deployment of the research nodes in other regions.

**National Climate Change and Wildlife Science Center** — Building on standardized approaches developed at the national level by the National Climate Change and Wildlife Science Center, \$5.0 million of the increase will be used to develop regional collaborative research hubs according to the national strategy. The Center will coordinate research and modeling at these regional hubs to ensure uniformity of models and standardization of information provided to fish and wildlife managers. The Center will gather, incorporate, and disseminate updated information from new models, applications, and forecasts developed by the regional hubs. Assessment and synthesis of this body of work is essential to build regional scenarios that can be used for coordinated conservation planning by Interior bureaus and other national and regional efforts.



**USGS Science Coordination** — The budget request includes an increase of \$5.0 million for USGS support of Fish and Wildlife Service climate change efforts including development of a monitoring network. The 2010 budget will allow FWS, working in close coordination with USGS, to begin biological monitoring, technology transfer to wildlife managers, and more expansive adaptive management that will benefit endangered species, wetlands, migratory birds, fisheries, and plants.

The USGS biologists will assist FWS in developing monitoring protocols and integrated modeling of current and projected physical and biological change

across extensive landscapes and aquatic systems and habitats with studies of ecosystem and population processes. This approach will integrate large-scale global change information with local information more relevant to resource managers, to better support adaptive management for fish and wildlife in the face of climate change. The USGS will provide ecological and population modeling capacity to FWS Landscape Conservation Cooperatives and information to FWS for use in strategic habitat conservation.

## MONITORING AND ADAPTATION



Grounded in science, Interior can develop adaptation strategies for effects associated with climate change and equip managers with decisionmaking tools. For example, managers in northern Alaska may need to tailor engineering specifications for roads and other infrastructure to accommodate melting permafrost. Resource managers along the Gulf coast responsible for infrastructure, recreation, and energy production need information to guide long-term development and response plans for storm surge, sea-level rise, and coastal erosion resulting from hurricanes. The 2010 budget includes an increase of \$65.0 million for this climate change program component.

**Fish and Wildlife Service** — The 2010 budget request includes an additional \$40.0 million to enhance existing core capacity in biological planning and conservation design needed to identify landscapes, habitats, and species that are most vulnerable to climate impacts. This increase will enable FWS to acquire key scientific information needed to properly inform planning and design; define clear conservation objectives; and focus management actions where they will have the most effect on the landscape.

Within the 2010 increase is \$20.0 million for FWS to obtain the scientific knowledge and information needed for sound biological planning, conservation design, and monitoring; \$14.0 million to deliver on the ground mitigation and adaptive measures at national wildlife refuges and fish hatcheries; and \$6.0 million to provide technical assistance to private landowners through the Partners for Fish and Wildlife program.

With the \$20.0 million included in the request for scientific knowledge and information, FWS will develop a monitoring strategy, including monitoring protocols, in concert with USGS and Interior's other land management bureaus. The increase will provide resources to strengthen population and ecosystem modeling capacities at the regional and local levels, better integrate remotely-sensed and other existing datasets, standardize monitoring protocols, improve large-scale synthesis, and emphasize analytical support for FWS and other Federal, State, and tribal managers. As part of these efforts, BLM, USGS, FWS, NPS and BIA will work with other Federal partners, including the Department of Agriculture, NOAA, States, and Tribes to design and implement new monitoring programs and refine existing ones to improve conservation actions.



Over the next several years, the focus of FWS's climate impact related efforts will shift from initial biological planning and conservation design to the strategic delivery of conservation across key landscapes. The FWS efforts, as well as Interior's other bureaus, will follow this same general progression over the next five years, with a steady shift of effort from planning and design to delivering conservation on the ground and monitoring of conservation actions.

In collaboration with USGS, universities, and States, FWS will use scientific results to link actions at project sites to outcomes on broader scales, including landscapes, major ecoregions, and entire species' ranges. FWS and other Interior land management bureaus will manage to measurable biological objectives with sustainable population goals and specific habitat outcomes, such as water quality measurements. Biological objectives will be met by applying the Strategic Habitat Conservation Framework in conjunction with conservation biology principles to enhance ecological conditions at a landscape scale.

The FWS will help reduce levels of greenhouse gases in the atmosphere by actively engaging in habitat restoration projects that sequester carbon. The 2010 budget includes increases for refuges, fisheries, and Partners for Fish and Wildlife programs that will allow accelerated habitat restoration, and ameliorate or mitigate climate change impacts. By targeting restoration of habitats such as bottomland hardwood forests or tallgrass prairie, FWS will restore



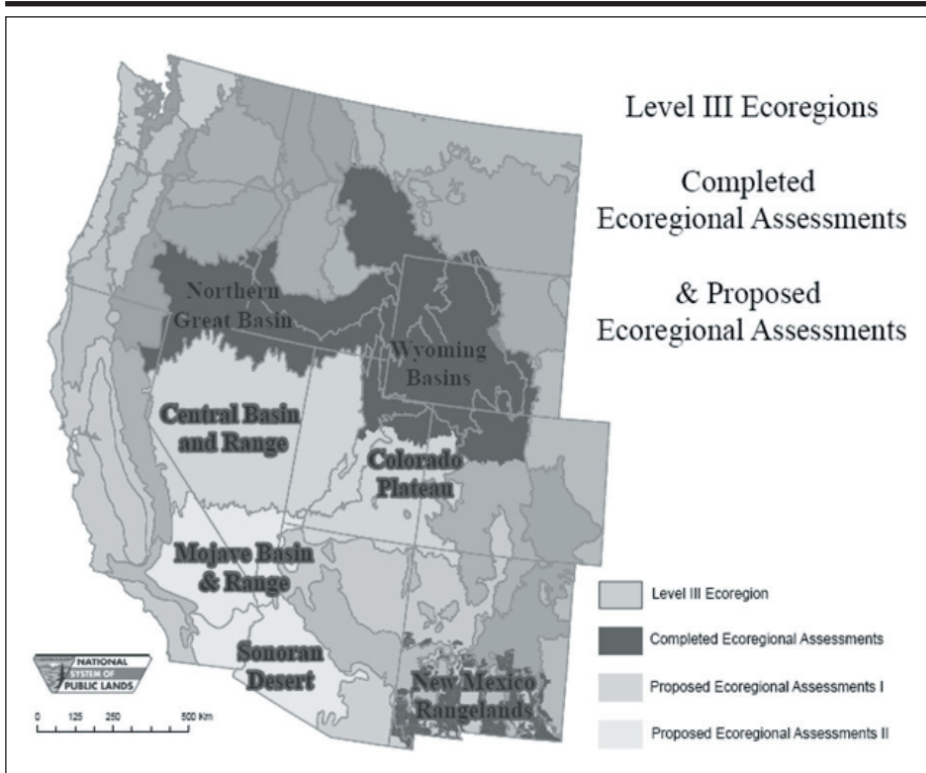
habitat of direct benefit to fish and wildlife, while also sequestering carbon in vegetation.

**Bureau of Land Management** — Changes in temperature and precipitation are allowing invasive weeds to flourish, increasing the threat of wildfire, and leading some wildlife populations to change historic habitat range. In addition, the availability

### SEARS POINT WETLAND RESTORATION PROJECT

The Fish and Wildlife Service is working with partners to ensure that the San Pablo Bay ecosystem in California is more sustainable and resilient to climate change to support the myriad of fish and wildlife species that depend on it. Through the Coastal program, Partners for Fish and Wildlife program, Coastal Wetland Grant program, and ongoing cooperation of the San Pablo Bay National Wildlife Refuge, FWS will complete the 2,327 acre Sears Point Restoration project to restore tidal marsh, provide public access, and provide a resilient buffer from rising sea levels.

The Sears Point Restoration project incorporates several measures that address climate change. The project focuses on enhancing the transition that connects tidal marshes to seasonal wetlands and an upland watershed. Maintaining transition habitats between tidal marshes and uplands will allow fish and wildlife species to migrate and adapt as sea levels rise. The restored marsh plain and tidal wetland restoration at Sears Point will be especially helpful in reducing the effects of sea level rise in the Sonoma Baylands region because of its proximity to the exceptionally large sources of mobile sediment at the mouth of the Petaluma River. These higher concentrations of available sediment will translate to restored marshes that evolve at higher elevations, which in turn allow the site to build up in tandem with rising sea levels.



source management practices and strategies to reflect the knowledge gained from these condition assessments and the projected future impacts of climate change.

The ecoregions will be selected from the following: the Colorado Plateau, Yukon Flats, Central Basin and Range, Mojave Desert, Sonoran Desert, Chihuahuan Desert and the Middle Rockies. Each of these ecoregions has NLCS resources and, given the ecological importance of conservation landscapes within the regions, an estimated \$2.3 million of the total will benefit the NLCS. The BLM will also work with partners to develop a multi-year plan to assess all ecoregions in the West to better

of water for domestic use, irrigation, industry, and livestock is changing, further challenging access to limited water supplies for natural ecosystems.

The 2010 budget request includes an increase of \$15.0 million for BLM to develop and implement strategies to help native plant and animal communities adapt to climate impacts and related stressors. The focus will be on maintaining an environment that allows for adaptation, promotes habitat connectivity, protects habitat, and maintains biodiversity. To centralize planning, coordinate efforts, and maximize efficiency, funding will be provided through the BLM Soil, Water, and Air Management program. An estimated \$7.3 million of the \$15.0 million request will target projects and activities in National Landscape Conservation System units in recognition of the critical ecological importance of NLCS landscapes.

The \$15.0 million request includes \$4.5 million for BLM to initiate and complete three priority ecoregional assessments and three adaptation strategies. The assessments will inform land managers about the current condition of wildlife habitat and clearly identify and articulate the needs of native plant and animal species and communities across ecoregions. These assessments and evaluations will be used to identify specific areas to focus conservation and restoration projects. The BLM will adapt its re-

understand existing conditions as well as identify potential impacts and desired outcomes.

An additional \$3.0 million of the requested \$15.0 million increase will allow BLM to collect and store native seed to support conservation and restoration activities of multiple State, Federal, and tribal partners. The BLM seed purchases provide many of the native seeds used throughout the Nation for emergency watershed protection after fire and other natural disasters, erosion control and stabilization, rangeland improvement, and restoration of native plant communities. The BLM will target \$1.5 million for seed collection and storage for the benefit of the NLCS.



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The Climate Impacts initiative includes \$7.5 million to allow BLM to support on-the-ground restoration activities and help native plant and animal communities adapt to climate impacts. The BLM will target \$3.5 million to actions and projects benefiting the NLCS. Specific actions include:

- **Reviewing Land Use Plans and Use Authorizations** — The BLM will review and potentially modify existing land use plans, previously initiated assessments, and current use authorizations to clearly articulate desired outcomes to better achieve the results of the ecoregional assessments and adaptation strategies. This is necessary because these documents define the scope of project work that can be done as well as to identify monitoring requirements.
- **Implementing Projects** — The BLM will pool resources with partners to fund restoration and adaptation projects to achieve desired outcomes. Projects will directly benefit native plant and animal communities, by protecting landscapes and restoring habitat.
- **Initiating Monitoring and Adaptive Management** — The BLM will implement site and landscape scale programs to monitor changes and evaluate the effectiveness of mitigation. Monitoring and evaluation allows BLM to gauge success, learn from experience, and establish best practices to share among the bureaus.

**National Park Service** — An increase of \$10.0 million is requested for NPS to develop wildlife adaptation strategies, incorporate them into land management and Endangered Species Act recovery plans, and implement priority short-term wildlife adaptation plans.

Within the 2010 increase is \$3.0 million, which NPS will use to work in concert with USGS and other bureaus to build a monitoring system and integrate it into a climate impacts network. The system will initially focus on conditions in the parks that are most vulnerable to the impacts of climate change, including those parks with high elevation, high latitude, coastal/marine areas, and arid lands. The NPS will leverage existing monitoring efforts with those of other Federal and State agencies. Working with USGS and other Interior bureaus, NPS will

use data and link it to regional and national scale indicators of climate change.

The request includes an increase of \$5.5 million to develop adaptation strategies for climate impacts. The NPS will work with BLM, USGS, BIA, other Federal partners, States, and Tribes to assess risks to park resources, establish vulnerability and significance, and prioritize climate change adaptation



or mitigation requirements necessary to meet park purposes and the NPS mission. Specifically, the funding would be used to:

- Evaluate and employ climate change decision support tools for land management; implement threatened and endangered species recovery actions; and conduct terrestrial, freshwater, and marine resource stewardship planning, including the use of carbon accounting and sequestration toolkits at parks.
- Develop and implement climate change communications products focused on NPS and the visiting public.
- Enhance collaboration across parks and programs and with partners in other agencies to build understanding and coordinate landscape-scale adaptation and mitigation actions necessary to meet the NPS mission.

An additional \$1.5 million included in the request will allow NPS to establish an office that would develop and implement a coordinated strategy to understand, communicate, and cope with the effects of climate change on park resources and structures. The office would lead NPS climate change manage-

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ment approaches in seven areas: law and policy, planning, science, resource stewardship, greenhouse gas mitigation, sustainable operations, and communications. Of the \$1.5 million requested, \$700,000 will provide project money to the parks.

The NPS climate impacts program will work with other bureaus on management actions providing resilience, sustainability, and mitigation of the effects of climate change; science-based decisionmaking informed by subject matter experts from academia; as well as leading basic research agencies like USGS and NOAA.

## ASSIST OTHERS IN ADAPTATION

**Fish and Wildlife Service**— To enable fish, wildlife, and their habitats to survive in the face of climate change, conservation organizations and agencies at all levels of government should collaboratively develop the capacity to deliver conservation strategies across connected networks of habitat. These strategies should be based on scientific understanding and assessments of the species' needs. The 2010 budget includes \$40.0 million in new funding to provide grants to States, Tribes, and Territories to incorporate climate impacts into their comprehensive wildlife action plans created under the State and Tribal Wildlife Grants program, and enable them to implement responsive actions in cooperation with partners.

The FWS will work with States to build shared climate change adaptation capacity, implementing projects that focus on biological planning, conservation design, conservation delivery, biological inventory and monitoring, and targeted research. The FWS will allocate \$36.0 million in grants to States, Territories, and the District of Columbia to support landscape-scale, cooperative assessment, and conservation programs that benefit wildlife and their habitats, including species not hunted or fished. Priority will be placed on revising or modifying State wildlife action plans to reflect challenges of climate change. States may fund projects that benefit species of greatest conservation need in State wildlife action plans that address climate change stressors threatening species through adaptation, mitigation or education strategies, and actions. Implementation projects will tie to or flow from State wildlife action plans.

An allocation of \$4.0 million in grants will be made to Tribes to strategically address landscape-scale

impacts of climate change on fish and wildlife resources in coordination with partners as part of a cohesive national effort to help fish, wildlife, and their habitats adapt to climate change.

**Bureau of Indian Affairs** — As one of the largest land managers in the world, Interior has an enormous stake in understanding the impacts that climate change is having on all these resources, and in adopting management and planning strategies that take those trends into account. This is especially true for BIA, which manages a 56 million acre land trust, and has witnessed the degradation of trust land. Consequently, the land has been degraded and Tribes and individual Indians are not able to benefit from economic development opportunities.

The 2010 budget includes an increase of \$6.0 million for BIA to work with USGS and other Interior bureaus in cooperation with tribal, State, and other Federal partners to design and implement new monitoring programs and refine existing ones to improve conservation actions. The BIA will apply these adaptive management approaches resulting from these activities in its agriculture, invasive species eradication, and fish hatchery programs. These new investments will allow the BIA to better understand and manage for the impacts of a changing climate.

A program increase of \$2.0 million in the Agriculture program will accelerate the implementation of resource management plans to guide restoration and conservation efforts on tribal lands. Funding will support development of approximately ten agricultural resource management plans annually that incorporate climate change adaptation strategies.

The spread of invasive species has caused millions of dollars of damage to rangelands and farmlands over the past several decades, and it is widely believed that climate impacts will only make the problem worse. A program increase of \$2.0 million for invasive species and noxious weed eradication will support at least 100 tribal invasive species programs through cost-shared contributions to weed control projects; expand awareness and use of integrated pest management approaches to invasive species control; and expand the availability and use of biological weed control agents. Invasive plants affect the productivity of over 12 million acres of Indian lands. The BIA estimates the additional funding would allow it to participate in weed control projects on an additional 90,000 acres.



Climate impacts contributes to fish habitat destruction by changing the hydrology of streams, severe flooding events, and the warming of water. It is believed that warming trends will lead to dwindling fish populations, which raises the importance of fish hatcheries. Hatcheries can serve as a vital tool to help maintain and restore fish populations. One of the groups most impacted by declining fish populations are Indian Tribes, who rely on salmon and steelhead trout for not only subsistence and ceremonial needs, but also for commercial fishing operations which are an important tool for economic development. An increase of \$2.0 million in the 2010 budget will allow BIA to fund projects with Tribes in the Pacific Northwest and the Great Lakes States that apply climate change adaptation strategies in the hatching, rearing, and stocking of fish.

## CARBON SEQUESTRATION

The 2010 budget request includes \$10.0 million for geological and biological carbon sequestration research, an increase of \$7.0 million above the 2009 enacted level. As mandated in the Energy Independence and Security Act of 2007, USGS is currently developing a methodology to assess geological carbon sequestration capabilities and will use this methodology to conduct a national assessment of carbon dioxide storage potential beginning in 2010. In 2010, as also mandated by the Energy Independence and Security Act, USGS will begin to develop methodologies to measure and assess biological carbon sequestration and greenhouse gas fluxes.

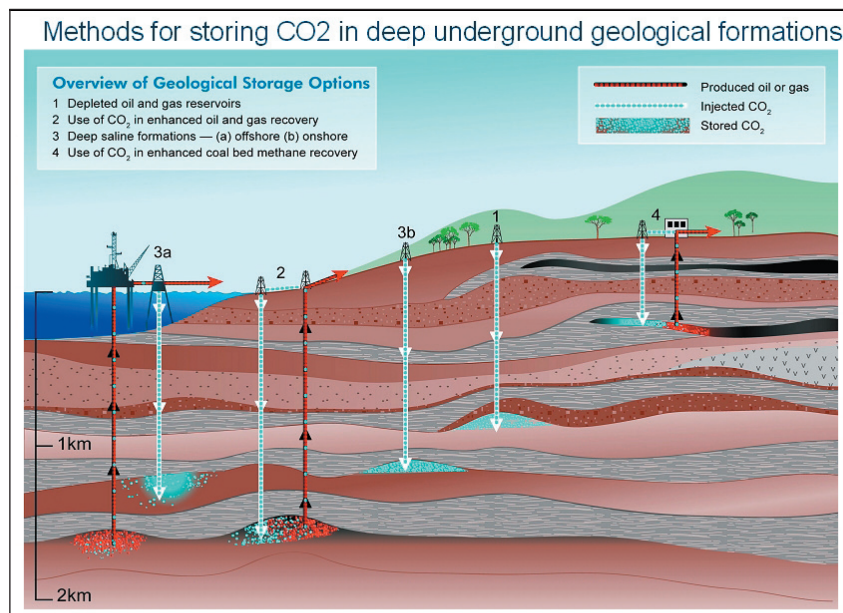
Forest and range lands, wetlands, and other landscapes managed by Interior play a vital role in the carbon cycle. These natural systems soak up carbon dioxide and reduce the harmful effects that carbon dioxide and other heat-trapping gases can otherwise cause. Interior bureaus will work with States, Tribes, localities, private landowners, and other stakeholders to execute on-the-ground restoration projects that biologically sequester carbon.

**Geologic Carbon Sequestration** — In 2009, USGS completed a 12-month project to develop a methodology to assess the geologic resources for carbon dioxide storage in physical (oil and gas) traps and saline formations. The final report was released March 16, 2009.

The 2010 budget request funds the first of a three-year national assessment of potential for geologic sequestration of carbon dioxide in saline formations and oil and gas reservoirs. The request also includes funding to conduct research on technical issues and data gaps that impact the USGS's ability to assess carbon dioxide storage resources, and to coordinate Federal and State work on the assessment.

The national assessment will be conducted in coordination with a number of organizations, in order to maximize its usefulness. This effort will be coordinated with the Department of Energy's National Energy Technology Laboratory and Energy's regional sequestration partnerships program. Particular emphasis will be placed on collaborative activities with partnerships to build on progress to date in storage assessment and to eliminate duplication of effort.

Assessment activities will also be coordinated with the Environmental Protection Agency, as EPA has jurisdiction over a number of issues related to geological carbon sequestration including the potential impact on ground water availability and contamination; regulatory issues related to the Underground Injection Control program; and input to criteria for evaluation of Environmental Impact Statements for carbon dioxide sequestration projects. The USGS will work closely with other Interior bureaus and States, to evaluate the potential for geologic sequestration on their lands.



**Biological Carbon Sequestration** — In accordance with responsibilities mandated in the Energy Independence and Security Act, USGS will develop methodologies to measure and assess biological

carbon sequestration and greenhouse gas fluxes, and implement a national assessment of ecosystem carbon storage and greenhouse gas fluxes. With the increased funding, USGS will streamline methodologies developed in 2009 and pilot them in three different ecosystems, including forest land in the Southeast, grasslands in North Central U.S., and coastal regions.



Scientists, using geospatial data, remote sensing applications, and ecosystem modeling, have developed research and working models to describe storage and fluxes of carbon in relationship to climate change and land use for large-scale landscapes. These efforts will be expanded into a national framework that is adaptive, incorporating new information about carbon cycling as it becomes available. Priority systems where carbon process information is particularly needed include saline and fresh-water wetlands, soil and sediments, permafrost areas, hardwood and coniferous forests, and rangelands.

## WATER CONSERVATION

The prolonged drought in the western States, population growth in areas with existing water supply challenges, increased need for water for energy purposes, such as ethanol production, is exacerbating the demand for water and challenging traditional water management approaches.

**Bureau of Reclamation** — The 2010 budget includes a total of \$46.0 million for water conservation efforts through competitive cost-share grants, basin studies, and water reclamation and reuse programs. Within this total is an increase of \$26.0 million for competitive cost-share grants to fund the following types of on-the-ground projects:

- Water marketing projects with willing sellers and buyers, including water banks that transfer water to other uses to meet critical needs for supplies.
- Water efficiency and conservation projects that allow users to decrease diversions and use or transfer the water saved.
- Projects that improve water management by increasing operational flexibility such as constructing aquifer recharge facilities or making system optimization and management improvements.
- Pilot projects that demonstrate the technical and economic viability of treating and using brackish groundwater, seawater, or impaired waters within a specific locale.



With the funding requested in 2010, Reclamation will be able to fund at least 110 new water conservation projects to be completed within two years from the date of funding to encourage near-term impacts on water savings. Reclamation believes that water conservation, use of water markets, and improved efficiency are crucial elements of any plan to address western water issues. With leveraged water conservation grants, Reclamation will take an important step towards increasing conservation and efficiency in the West.



All grant proposals will be evaluated using criteria that give priority to projects that save the most water, facilitate transfers to new uses, address endangered species and other environmental issues, improve energy efficiency, conserve Reclamation project water, and exceed the minimum 50 percent non-Federal cost-share requirement.

This initiative also uses the Basin Studies Program to partner with State and local entities to initiate comprehensive water supply and demand studies in the West. Such efforts are critical to dealing with the impacts of climate change coupled with record droughts and population increases. Each study includes state-of-the-art projections of future supply and demand by river basins; analysis of how the basin's existing water and power operations and infrastructure will perform in the face of changing water realities; and recommendations on how to optimize operations and infrastructure in the basin to supply adequate water in the future.

Finally, the initiative uses the Title XVI, Water Reclamation and Reuse program, to identify and investigate opportunities to reclaim and reuse wastewaters and naturally impaired ground and surface water in the 17 western States and Hawaii.

**Enhanced Streamgage Network** — Increased and improved streamgage information will help scientists to fully understand the changes that climate variability exerts on watersheds and the natural hydrologic system and how humans change the system with water usage.



The 2010 budget request includes an increase of \$5.0 million for the USGS National Streamgage Information program to enhance the streamgage network. The streamgage network is funded in partnership with over 800 Federal, State, and local agencies. In recent years, funding for streamgages has been uncertain because of changing economic conditions at the State and local levels.

The USGS will provide funds to re-establish up to 50 recently discontinued streamgages and offset anticipated reductions in State and local funding to support the operation and maintenance of approximately 188 existing streamgaging stations. The National Streamgage Information program and the USGS Global Change program will collaborate on the priorities for this effort with emphasis on stations with the greatest potential to support the State and local governments and measurements in climate-stressed ecosystems.