

# Cooperative Landscape Conservation



*Through our Climate Science Centers and Landscape Conservation Cooperatives, Interior is partnering with others to leverage information and develop the tools and strategies needed to help make future land management decisions in the face of a changing American landscape.*

*Ken Salazar, Secretary of the Interior  
January 25, 2011*

The American landscape is changing – impacting lives and livelihoods in communities across the Nation. Some communities face increasing problems with water availability and drought, impacting farming and other uses, while other urban and rural areas are beset by catastrophic flooding. Diseased and infested forests are one of the factors causing fires to be more severe than normal. The fire season is getting longer, increasing the threat to nearby communities, while those who live along the Nation’s coastlines confront accelerated erosion and increasing risks to structures and infrastructure. Those making their living from agriculture and others who depend on the land, increasingly face challenges from new pests and unwanted yet virulent invasive species that have never been a problem before. A key factor contributing to these problems is climate change.

These same challenges also face Interior’s land and wildlife managers who are stewards of America’s



## PRIORITY GOAL

Interior is working to integrate science, adaptation, and mitigation expertise and make this information and best management practices available to public and private land managers across the United States.

The Department’s Priority Goal for this effort is:

**By the end of 2012, for 50 percent of the Nation, the Department will identify resources that are particularly vulnerable to climate change, and implement coordinated adaptation response actions.**

Interior’s strategy for accomplishing the goal is outlined in this chapter.

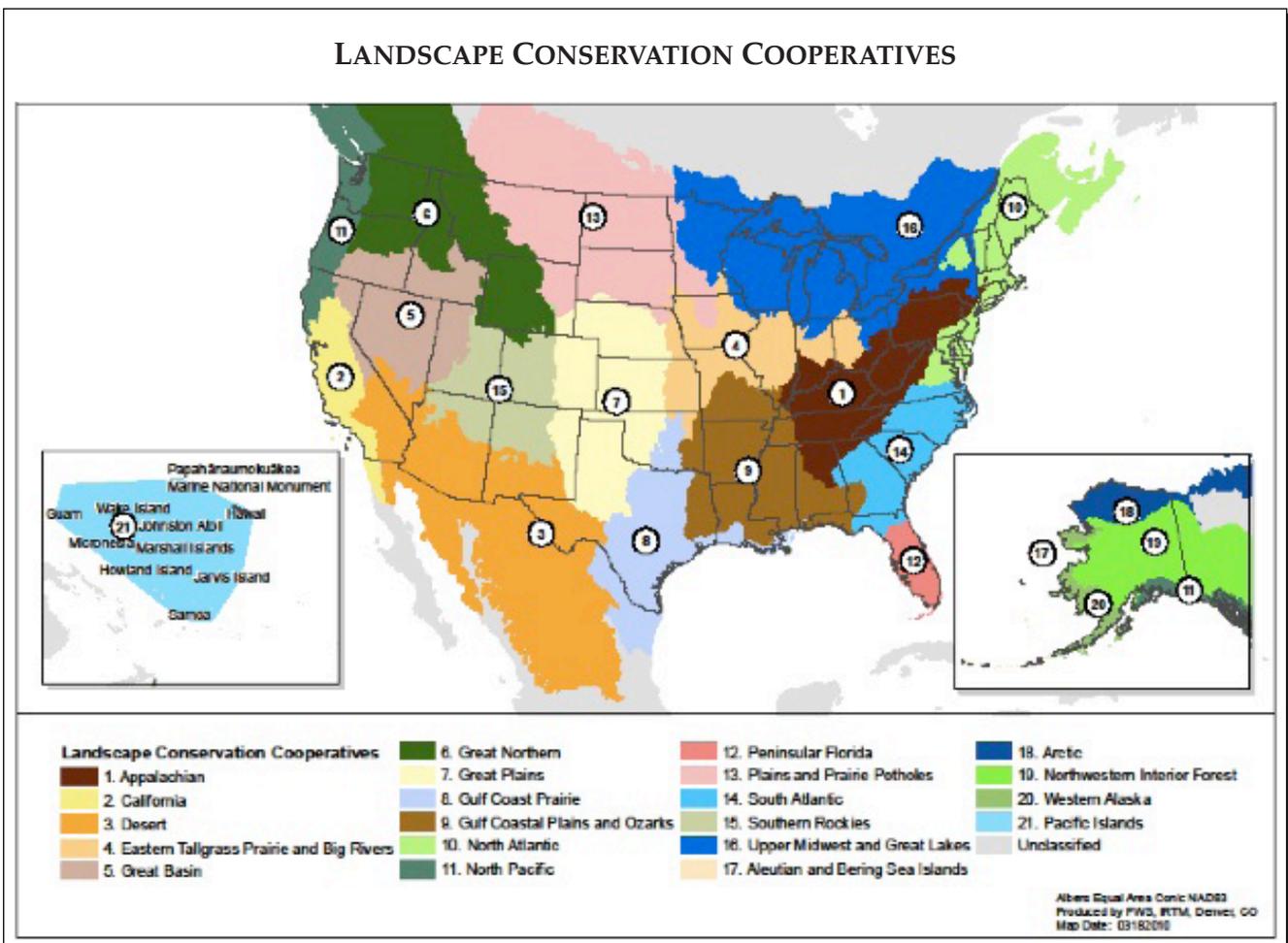
natural and cultural resources. Interior manages 20 percent of the Nation’s lands, about 500 million acres within its 394 national park units, 553 wildlife refuges, 71 fish hatcheries, and 248 million acres of public land that include 21 national conservation areas and 16 national monuments. The Department is also the largest supplier and manager of water in the 17 western States, delivering irrigation to 31 million people, one out of every five western farmers, and ten million acres of farmland.

The Department is making significant progress in developing science capability, conservation cooperatives, and other tools that are being used to manage lands and resources in the face of these challenges. These efforts are assisting Federal, State, tribal, and local decision makers in their efforts to understand, adaptively manage, and reduce adverse impacts from ongoing land and resource management challenges. Interior is maximizing the effectiveness of these efforts by leveraging information, activities, and fiscal resources with other Federal agencies, States, Tribes, and non-governmental partners.

To implement this strategy, Interior will complete a network of Landscape Conservation Cooperatives, where natural resource professionals work collaboratively with others to understand and manage changes in specific ecosystems and landscapes. This network is linking existing programs and leveraging them at the Federal, State and local level through real and virtual connections to facilitate sharing of knowledge and solutions among professionals. The network is supported by science centers that translate global scientific understanding of change into solutions at the landscape level.

As stewards of America’s natural resources, Interior has developed a strategy to keep pace with the changing landscape. The strategy has three important elements – strengthening scientific capabilities and knowledge base, developing connections between natural resource professionals and scientists to develop strategies to meet on-the-ground challenges, and implementing these strategies through ongoing resource management programs.

Science provides the framework for this strategy and plays a large role in addressing challenges to conservation of the Nation’s lands and resources, including climate change. Through Climate Science Centers and Landscape Conservation Cooperatives, Interior is working to translate cutting edge science into hands-on solutions that land and resource managers need to be effective stewards. A science based understanding of these issues and practical



applications have broad benefits for resource managers that are wrestling with the need to find practical and cost effective approaches to conservation in the face of economic challenges. The Interior Department has assessed and refocused its science programs to focus on those that are key to on-the-ground results, and terminated or reduced programs that do not contribute to these efforts.

Interior is working collaboratively across its bureaus, with other Federal agencies, State, and tribal governments, and non-governmental organizations to leverage fiscal resources and expertise and focus them on conservation of the Nation’s different ecosystems. Interior’s strategy recognizes that America’s ecosystems face highly variable challenges that cannot be solved by working species by species or within traditional jurisdictional land boundaries. Instead, these challenges must be identified and addressed by assessing the entire landscape, using landscape-scale data and partnerships to develop workable solutions.

## 2012 BUDGET SUMMARY

The 2012 budget request provides \$175.0 million for activities that contribute to Interior’s landscape management strategy, an increase of \$43.8 million over the 2010 Enacted/2011 CR level. The Department’s approach will ensure that management decisions are grounded in science and coordinated with land and resource managers in other Federal

agencies, States and tribal governments, and private organizations. Key to this strategy is leveraging all available scientific information about resource health and trends, including traditional knowledge from American Indians and Alaska Natives, and developing approaches that maximize benefit and minimize cost.

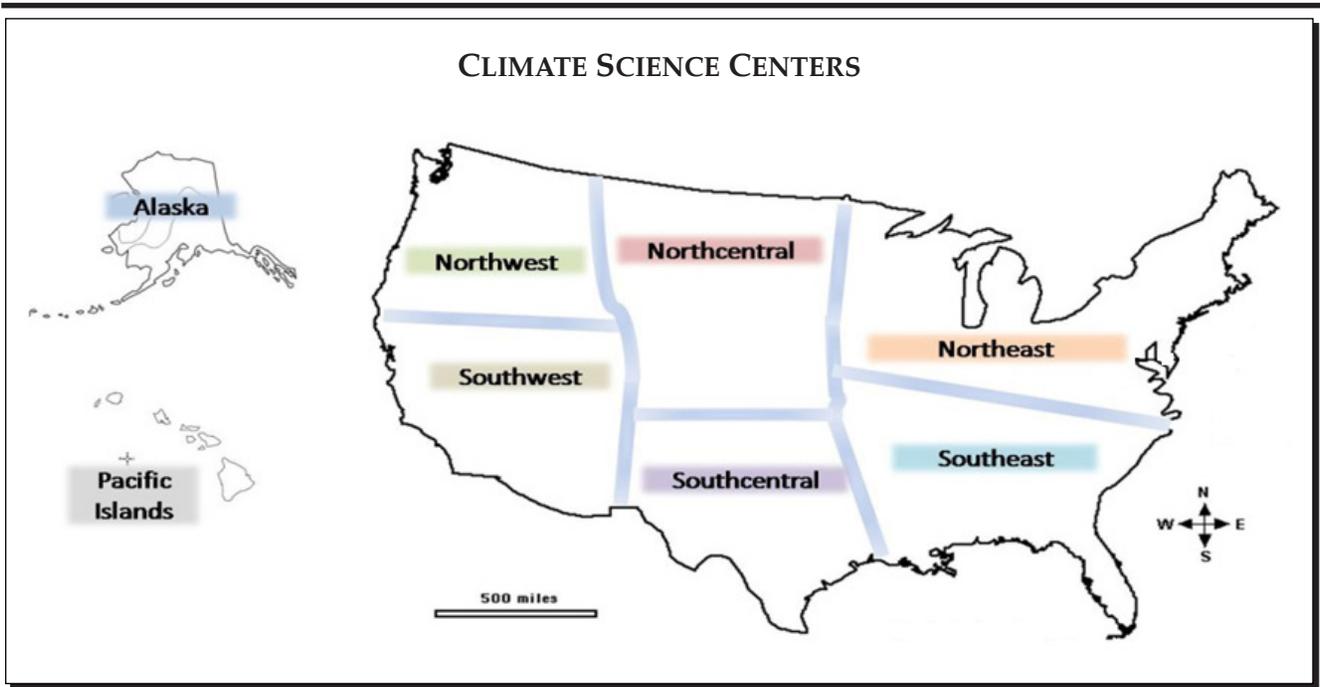
The budget continues investments in climate variability science at the Climate Science Centers and the biologic and geologic carbon sequestration projects underway at the U.S. Geological Survey, as well as in adaptive management with the completion of Landscape Conservation Cooperatives and the support of other adaptive management activities across the Department.

## CLIMATE VARIABILITY SCIENCE

The 2012 budget includes continued investments in climate variability research at USGS, with targeted increases for the Climate Science Centers and the USGS biological carbon sequestration project. In total, the budget includes \$72.9 million for Climate Variability Science, an increase of \$9.7 million over the 2010 Enacted/2011 CR level.

**Climate Science Centers**– The 2012 budget includes \$31.0 million for the Climate Science Centers, an increase of \$12.8 million over the 2010 Enacted/2011 CR level. These centers provide scientific information, tools, and techniques that land, water, wildlife, and

<b>COOPERATIVE LANDSCAPE CONSERVATION</b>			
(dollars in millions)			
	2010 Enacted/ 2011 CR	2012	Change
<b>CLIMATE VARIABILITY SCIENCE</b>			
USGS .....	63.2	72.9	+9.7
<b>ADAPTIVE MANAGEMENT</b>			
BLM .....	15.0	17.5	+2.5
Reclamation.....	3.0	7.0	+4.0
FWS .....	40.0	67.5	+27.5
NPS.....	10.0	9.9	-0.1
BIA.....	0.0	0.2	+0.2
<b>Subtotal.....</b>	<b>68.0</b>	<b>102.1</b>	<b>+34.1</b>
<b>TOTAL .....</b>	<b>131.2</b>	<b>175.0</b>	<b>+43.8</b>



cultural managers can apply to anticipate, monitor, and adapt to climate and ecologically driven changes at regional to local scales. Scientists located at these centers will collaborate with stakeholders to prioritize research projects through a formal Stakeholder Advisory Committee and then synthesize data from existing and new sources. The centers develop monitoring protocols and models to better

understand the extent and impacts of climate change and then work with the Landscape Conservation Cooperatives network to develop products that can be easily translated into solutions. The 2012 budget completes the nationwide network of eight Climate Science Centers serving the Alaska, Pacific Islands, Northwest, Southwest, North Central, South Central, Northeast, and Southeast regions.

CLIMATE SCIENCE CENTERS		
2010	2011	2012
<b>ALASKA</b> University of Alaska - Fairbanks	<b>NORTH CENTRAL</b> Consortium of Colorado State University Colorado School of Mines Iowa State Kansas State University Montana State University University of Colorado University of Montana University of Nebraska - Lincoln University of Wyoming	<b>NORTHEAST</b> To be announced
<b>NORTHWEST</b> Consortium of Oregon State University University of Idaho University of Washington	<b>SOUTHWEST</b> Consortium of University of Arizona University of California - Davis , University of California - Los Angeles University of Colorado Desert Research Institute (Nevada) Scripps Institute	<b>SOUTH CENTRAL</b> To be announced
<b>SOUTHEAST</b> North Carolina State University		<b>PACIFIC ISLANDS</b> To be announced

## EVIDENCE OF A CHANGING CLIMATE

Increasing evidence links the changes seen on the Nation's landscape with climate variability. Scientists began recording global temperatures in the 1880s and found a steady rise in temperatures, particularly since the 1950s. Further investigations have linked the changing climate to real impacts such as melting glaciers, heat waves, rising sea level, flowers blooming earlier, lakes freezing later, and changes in migration patterns of wildlife.



The changing climate is thought to be a significant cause for the size and frequency of wildfires, insect outbreaks, disease outbreaks, and tree mortality in the interior West, the Southwest, and Alaska. Evidence is growing that the changing climate is negatively impacting cold- and cool-water fish populations across the Country. Along the coasts, rising sea levels and increased erosion have begun to affect fish and wildlife habitats, including those used by shorebirds and sea turtles that nest along the shore. In oceans, subtropical and tropical corals in shallow waters have been bleached by increased sea surface temperatures.

In 2010, centers were established in three of these regions: Alaska, the Northwest, and the Southeast. In 2011, the Department announced the locations for centers in the Southwest and North Central regions. The 2012 budget will allow USGS to establish centers in three remaining regions, the Northeast, South Central, and Pacific Islands. The first five centers are located at universities and, with the exception of Alaska, those institutions were selected through a

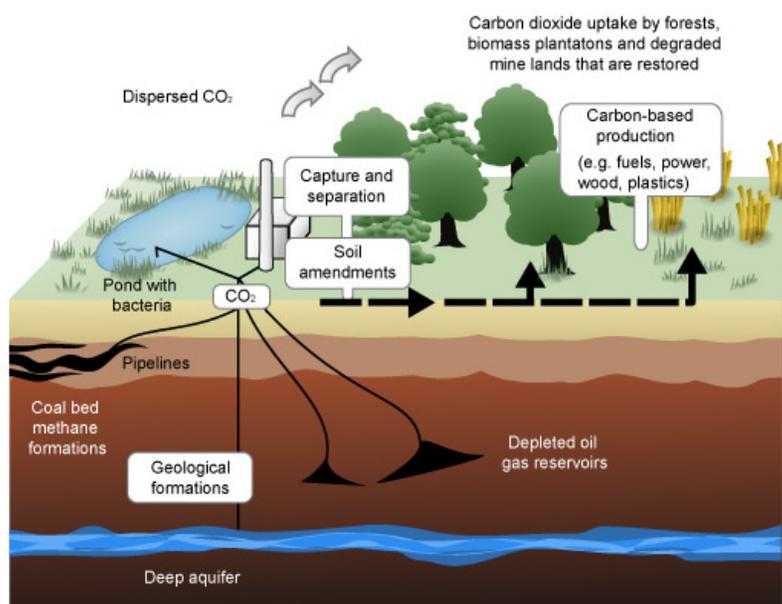
competitive process that requires potential hosts to demonstrate strong scientific capabilities in the area of climate change and established links with natural resource management agencies and organizations. Centers may be hosted by consortia of universities and other partners, as is the case for the Northwest, North Central, and Southwest centers, leveraging the capabilities of multiple institutions.

As a result of collaborative research on climate change impacts, USGS issued a number of reports in 2010 highlighting the potential consequences of human activity and global warming to the Nation's wildlife and ecosystems. One study found that dust caused by human activities in the American southwest desert is a contributing factor in speeding up the melting of snow and reducing runoff in the mountains of the Colorado River Basin. The findings have major implications for the 27 million people in seven U.S. States and Mexico who rely on the Colorado River for consumption and domestic use, agriculture, and industrial water; and can be used by resource managers to identify strategies to lessen these impacts, such as restoring desert soils. This is just one example of the type of work that Climate Science Centers will provide to land and resource managers across all levels of government and the private sector.

**Carbon Sequestration** – The 2012 budget includes \$14.3 million to continue biologic and geologic carbon sequestration research and assessments in USGS, an increase of \$4.3 million from the 2010 Enacted/2011 CR level. The USGS was directed to undertake this research in the 2007 Energy Independence and Security Act, and since that time, the bureau has been working to develop and complete a national assessment of biological and geological storage capacity.



## CARBON SEQUESTRATION



evaluate the Nation's potential resource of geological storage.

The USGS is collaborating with partners and conducting research on a number of other fronts related to carbon sequestration. These efforts include evaluating potential release of greenhouse gases from Arctic soils and permafrost, and mapping the distribution of rocks suitable for potential mineral sequestration efforts.

**Science Support** – The 2012 budget for USGS includes \$8.9 million, an increase of \$3.9 million from the 2010 Enacted/2011 CR level, to provide science support for Interior bureaus with specific research requirements to meet land and wildlife management challenges. The USGS will guide this research to address the

Biological carbon sequestration removes carbon dioxide, or CO<sub>2</sub>, 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 and its storage could play a key role in reducing the rate of greenhouse gas increases. 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 USGS is demonstrating the importance of biological sequestration as part of the carbon cycle. The USGS released a peer-reviewed and comprehensive assessment methodology with participation from the land and resource management community in December 2010, and has recently begun to conduct the assessment.

practical applications that are needed by Interior's bureaus to solve problems including, for example, understanding invasive species expansions and disease outbreaks in wildlife.

**Climate Research and Development** – The increases in Climate Variability Science are offset by an \$9.1 million reduction to the Climate Effects Network. This network, led by USGS, is designed to coordinate and standardize climate monitoring data throughout the Department. Since its inception, the network has facilitated a number of data collection and modeling efforts in pilot projects around the Country. Rather than focus on expanding the network at this time, Interior will refocus its efforts from site-specific studies to an integrated approach among partners at the Climate Science Centers to evaluate what network systems are needed to share climate effects monitoring and adaptation data.

The USGS has also developed a methodology to assess the potential for carbon sequestration in geologic structures, such as oil and gas reservoirs and saline formations. This methodology is designed to assess the mass of carbon that can be stored in the U.S. sedimentary basins. Factors taken into consideration include the accessible pore volume of a storage formation and the location of impermeable rock layers that can trap and hold the carbon in place. The new geological sequestration assessment methodology is being used in a three-year effort to

## ADAPTIVE MANAGEMENT

Interior's focus in the Cooperative Landscape Conservation initiative is to equip resource managers with strategies to protect the Nation's resources and maximize public benefit. In response to increasing and often unpredictable changes in the American landscape, the Department will leverage expertise by building partnerships with other agencies and organizations through the Landscape Conservation

Cooperatives. This approach enables each of Interior’s land management bureaus to better meet individual missions, and in concert with States, Tribes and other partners, utilize each other’s resources and expertise to better identify and address challenges across broad landscapes and impact resource management decisions in parks, refuges, and on public lands.

**Landscape Conservation Cooperatives**

– The 2012 budget includes \$62.5 million, an increase of \$26.0 million from the 2010 Enacted/2011 CR level. The increase will complete the national network of Landscape Conservation Cooperatives, which engage other Federal agencies, States, Tribes, and local partners, as well as the public in crafting practical, landscape-level strategies for managing resource stressors in coordination with the eight regional Climate Science Centers. The cooperatives focus on impacts such as wildlife migration patterns, wildfire risk, drought, coastal erosion, and invasive species. These are management challenges that typically extend beyond the borders of any single national wildlife refuge, public land unit, or national park. The Department supported the establishment of nine cooperatives in 2010 with an additional three planned for 2011. The 2012 budget will fund the remaining, bringing the network to a total of 21 cooperatives across the U.S., extending into Mexico and Canada.

Each Landscape Conservation Cooperative is directed by a diverse steering committee that prioritizes science needs and makes recommendations for the projects that will be implemented each year. Individual Interior bureaus have been designated as leads or co-leads of particular cooperatives, with FWS leading or co-leading the majority of the cooperatives and the Bureau of Reclamation, Bureau of Land Management, Bureau of Indian Affairs, and National Park Service taking leadership roles in a number of cooperatives around the Country.

With resident staff and through connections with partners, these cooperatives develop, test, implement, and monitor conservation strategies that are responsive to the dynamic landscape changes resulting from climate change and other stressors in the regions. The cooperatives facilitate broad availability of data, modeling, and tools to land managers that will allow them to effectively forecast habitat

LANDSCAPE CONSERVATION COOPERATIVES		
<u>2010</u>	<u>2011</u>	<u>2012</u>
Arctic	Southern Rockies	Aleutian/ Bering Sea Islands
California	Great Basin	Appalachian
Great Northern	Desert	Eastern Tallgrass Prairie and Big Rivers
Great Plains		Gulf Coast Prairie
Gulf Coastal Plains and Ozarks		North Pacific
North Atlantic		Northwestern Interior Forest
Pacific Islands		Peninsular Florida
Plains and Prairie Potholes		Upper Midwest and Great Lakes
South Atlantic		Western Alaska

and species changes and to implement conservation actions to address impacts. This same approach facilitates improved management of water resources, historical and cultural resources, and resources of Indian Tribes and Alaska Natives.

The Pacific Islands cooperative for example, which includes partners such as the University of Hawaii are collaborating on a project that downscales statistical climate data to forecast changes in the distributions of native plants in Hawaii. Researchers developed geographic information system models to produce range maps for over 1,000 native plants based on current environmental conditions and projected climate and weather variability. Managers at FWS and other agencies are using this information in designing adaptive strategies for native plants and associated forest birds, many of which are endangered. The cooperative is using this data to evaluate current reserve designs, movement corridors, and forecast seed dispersal in projected conditions. The Pacific Islands cooperative is illustrative of the diversity of groups connected through this development. The Steering Committee for this cooperative includes FWS, USGS, NPS, the Forest Service, National Oceanic and Atmospheric Administration, State of Hawaii, Kameahmeah Schools, Nature Conservancy, and others.

## THE STATE OF THE BIRDS: 2010 REPORT ON CLIMATE CHANGE

The FWS issued *The State of the Birds: 2010 Report on Climate Change* that shows that hundreds of species of birds are facing threats from climate change that along with other factors are resulting in habitat alternation, reducing food supplies, and pushing many species towards extinction. Research for this report was a collaboration of FWS with experts from the Nation's leading conservation organizations and shows that climate change will have an increasingly disruptive effect on bird species in all habitats, with oceanic and Hawaiian birds in greatest peril.

Continued sea-level rise is expected to inundate or fragment existing low-lying habitats such as salt marshes, barrier islands, and mudflats. Beach-nesting black and American oystercatchers and specialized saltmarsh sparrows are among the most vulnerable coastal birds because they rely heavily on limited, low-elevation coastal habitats. Based on projections of marsh habitat loss in the Chesapeake Bay, significant declines of many marsh species are predicted. Birds such as the rare black rail that relies solely on irregularly flooded high marsh could disappear from the Bay if breeding sites are submerged.



Seabirds breeding on coasts may also be unsuccessful in raising chicks if their hatch dates do not match patterns in the availability of food resources. For example, common murres that time their breeding based on temperature cues may fail to raise any young if their chicks hatch at the wrong time, missing the window when food is abundant.

In the northeast U.S., the North Atlantic cooperative is developing a decision support system that will assist managers to make decisions about conservation actions regarding fish. The project will produce tools such as maps of fish habitat and models for eastern brook trout that conservation managers will use to evaluate the effect of different management actions on fish in stream networks and river basins.



These maps and models will identify which conservation actions are going to be the most effective. Managers will use this system together with other modeling information to develop recommendations for comprehensive landscape-scale conservation of aquatic species.

Alaska is another region where the cooperative framework has allowed for increased interagency coordination and outreach to local communities to understand the scope of impacts currently affecting the region. In 2010, cooperative partners, including FWS, BLM, State agencies, and others are assisting the Alaska Native Health Consortium to gather wildlife disease data crucial to understanding the vulnerability of wildlife species and the rural and native communities which depend upon them.

**Bureau of Land Management** – The BLM 2012 budget request for the Cooperative Landscape Conservation initiative is \$17.5 million, an increase of \$2.5 million over the 2010 Enacted/2011 CR level. The requested funding will be used to conduct



assessments, create adaptive strategies, and initiate restoration projects. As a result of drought, 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 participates in cooperatives to gain a better understanding of stressors adversely impacting the health of BLM lands and to develop adaptation strategies, such as implementing broad-scale sage-grouse habitat monitoring to ascertain the effectiveness of habitat management actions as well as the effect of land use authorizations.

The BLM and the Department of Agriculture's Natural Resources Conservation Service, with cooperation from the Western Association of Fish and Wildlife Agencies are developing a landscape approach to monitoring conditions and trends of public and private lands. The project is coordinated with the cooperatives and will include intensified sampling in sage-grouse habitat priority focus areas for up to thirty populations of sage grouse in the West. The NRCS has been monitoring rangelands on private, State, and tribal lands for the past ten years and will now add public lands to those that are monitored. The project uses core indicators and standard monitoring methods and reports will provide a landscape view of the success of management actions taken to improve sage-grouse habitat.

The BLM will focus available funding on regional conservation, restoration, and adaptation priorities identified through Rapid Eco-regional Assessments, including the development of seamless vegetation maps that can be used to measure changes in vegetative communities brought about by land health stressors and to identify where adaptation strategies are needed. The BLM will collect and store native seeds of those plant species determined to be the most vulnerable to the impacts of land health stressors.

**Bureau of Reclamation** – Reclamation's 2012 budget request for the Cooperative Landscape Conservation initiative is \$7.0 million, an increase of \$4.0 million from the 2010 Enacted / 2011 CR level. Among other activities, Reclamation will assess environmental impacts and water shortages through its Basin Studies program and conduct research on water resources through its Science and Technology program.

Through the Basin Studies program, Reclamation will partner with stakeholders to evaluate basin-wide water supply and demand, and identify adaptation strategies to address water shortages; conduct West-wide climate risk assessments to collect baseline projections of risks and impacts to water supplies; and provide leadership for two Landscape Conservation Cooperatives in the Colorado River Basin to develop applied science tools to support adaptation strategies through local cooperative partnerships. In conducting the basin studies, Reclamation will partner with State, tribal, and local partners on a 50/50 cost share basis in 17 western States to analyze the impacts of climate change and other stressors on water resources in key basins and sub-basins, and identify strategies to address imbalances in supply and demand. Basin studies are currently ongoing in the following river basins: Colorado River Basin including all seven basin States; Yakima River Basin; Milk River Basin; Deschutes River Basin; Henry's Fork of the Snake River; Niobrara River Basin; Santa Ana Watershed; and Southeast California Regional Basin.



There are three components to the basin studies, which involve close collaboration with States, Indian Tribes, and local partners. One component is the projection of future water supply and demand by river basin. The basin studies incorporate

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state-of-the-art projections of supply and demand, including projections of the impacts of climate change, which leverage work done through the cooperatives and the climate risk assessments in the WaterSMART Program. The WaterSMART program is further discussed in the Water Challenges chapter.

A second component is the analysis of impacts. Projections of supply and demand will be applied to the basin or sub-basin of interest, taking into account existing facilities, water rights, and key elements of the hydrologic system, to determine how changes in water supplies will impact basin water uses. In addition to any specific issues included by cost-share partners, Reclamation will evaluate the impacts to the Department's ability to deliver water to contractors; hydroelectric power generation facilities; recreation at Reclamation facilities; fish and wildlife habitat; applicable species listed as an endangered, threatened, or candidate species under the Endangered Species Act of 1973; water quality issues; flow and water dependent ecological resiliency; and flood control management. This component will incorporate and build on the information of operations risks developed within the climate risk assessments.

The third component is the identification of adaptation strategies. Once impacts are identified, Reclamation and non-Federal cost-share partners will engage basin stakeholders, through cooperatives for instance, in the process of developing adaptation and mitigation strategies, which may include: structural and non-structural changes; consideration of modifying reservoir storage or operating guidelines; the development of new water management, operating, or habitat restoration plans; water conservation; improved hydrologic models and other decision support systems; and groundwater and surface water storage needs.

Included within Reclamation's Science and Technology program is research on improving capability for managing water resources under multiple drivers, including climate change. This research agenda will be collaborated and leveraged with capabilities of the Interior Climate Science Centers. Reclamation is also working with the Department of Energy and its Power Marketing Administrations to determine the climate change impacts on hydropower generation.

**Fish and Wildlife Service** – The FWS 2012 budget request for the Cooperative Landscape Conservation initiative is \$67.5 million, an increase of \$27.5

million over the 2010 Enacted/2011 CR level. The budget allows for the development of six more cooperatives, an increase of \$10.2 million, to complete the nationwide network of 21 cooperatives, as well as increases to adaptive science, Partners for Fish and Wildlife, the national wildlife refuge system, and Gulf Coast research.



An additional \$7.2 million will continue to build scientific capacity for fish and wildlife. Inventories of fish, wildlife, plants, and their habitats on refuges must be expanded to capture data for adaptive management decisions to better conserve species and habitats, and focus efforts on priority needs. Inventories, such as biodiversity, vegetative communities, and other biotic features that support fish and wildlife populations across a broad range of ecosystems, are used to detect climate-driven changes in these resources and help focus the FWS response at multiple landscape scales and improve management practices. The inventories will include cross-program work with migratory birds, endangered species, fisheries, and habitat conservation.

The 2012 budget includes a \$2.0 million increase for the Partners for Fish and Wildlife program, which provides financial and technical assistance for conservation to private landowners who voluntarily cooperate to conserve fish, wildlife, plants, and their habitats that are affected by climate change. Federal project funds will be leveraged and habitats adjacent to or near refuges will be improved to meet conservation and landowner objectives. Emphasis will be placed on strategic areas that focus on species considered most vulnerable to climate change, and that implement cost-effective measures to restore, enhance, and manage fish, wildlife, plants, and their habitats.

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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 placed 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 with Department-wide efforts to develop a unified monitoring and data collection strategy.

**National Park Service** – The 2012 budget is \$9.9 million, essentially level with the 2010 Enacted / 2011 CR level. The NPS will assess the vulnerability of natural and cultural resources to the effects of climate changes and other stressors at 150 park units and develop adaptation strategies to ensure that these resources are protected. The NPS will work through the Climate Science Centers and Landscape Conservation Cooperatives to develop and implement these plans at the regional and park level.

The NPS provided funding in 2010 to enable parks to implement short-term adaptation actions and



plan for long-term effects. For example, one project will inventory and protect salt marshes from risks of sea level rise at Acadia National Park in Maine. Managers and scientists are partnering to analyze the topography of salt marshes, and upland areas immediately adjacent to those marshes, to determine adaptation potential for salt marshes to migrate inland as sea level rises. Results of the study will inform managers about areas needing additional protection from development and locations where man-made barriers may impede migration.

Another project is a multi-regional evaluation of pollinator response to climate change in habitats critical to survival. The distributions of bee species in areas particularly vulnerable to climate change are being modeled across a minimum of 75 national parks. In 2010, a specimen processing center was set up and sampling protocols were tested, refined, and sent to participating parks. Approximately 2,700 bees were collected over the summer from 14 parks. Early results indicate biodiversity is high, with 36 classes represented, including some rare specimens, suggesting that pollinators in national parks may not currently be vulnerable to climate change and serving to inform researchers and the public about how to protect pollinators.

**Bureau of Indian Affairs** – The BIA 2012 budget request includes \$200,000. With this funding, BIA will co-lead the North Pacific cooperative with FWS and support tribal outreach efforts of other Landscape Conservation Cooperatives, particularly those in the northwestern U.S. In the North Pacific cooperative, BIA will seek tribal input and perspective from Tribes with traditional ecological knowledge, and both Indian Affairs staff and local tribal members will be involved to develop strategies to address adaptation.