

Activity: Climate Change Planning and Adaptive Science Capacity

	2009 Actual	2010 Enacted	2011			Change from 2010 (+/-)
			DOI-wide Changes & Transfers (+/-)	Program Changes (+/-)	Budget Request	
Climate Change Planning (\$000)	0	10,000	0	3,750	13,750	3,750
FTE	0	30	+14*	+15	59	+29
Climate Change Science Capacity (\$000)	0	10,000	0	+5,000	15,000	+5,000
FTE	0	15	+3*	+5	23	+8
Total, Climate Change and Science Capacity (\$000)	0	20,000	0	+8,750	28,750	+8,750
FTE	0	45	+17*	+20	82	+37

*The FTE increases listed in the FY2011 "DOI-wide Changes & Transfers" column represent FTE positions that were funded in FY2010, but were hired later in the year.

Program Overview

In September 2009, Secretary Salazar issued a Secretarial Order 3289 addressing the impacts of climate change on America’s natural resources. In that order, the Secretary announced that the establishment of Department of the Interior Climate Science Centers (CSCs) and multi-partner Landscape Conservation Cooperatives (LCCs) would form the basis of the Department’s strategy for addressing climate change, emphasizing that efforts to help fish, wildlife and their habitats adapt to climate-changed environments must be undertaken and coordinated at landscape-scales.

Secretary Salazar carried this same message to Copenhagen, Denmark, where on December 10, 2009, he addressed almost 200 nations gathered at the United Nation’s Conference on Climate Change, announcing proudly that “across the United States, we are standing up a network of LCCs that – together with other federal agencies, local and state partners, and the public – will craft practical, landscape-level strategies for managing climate change impacts,” and emphasizing that “no one government or one landowner alone can solve these problems.”

The Service will work with partners to develop the shared scientific and technical capacities needed to conduct landscape-scale biological planning and conservation design to inform conservation delivery by expanding the network of LCCs initiated in FY 2010. The Service’s long-term goal is an integrated national network of 21 LCCs (see Figure 1) capable of defining biological objectives and developing landscape conservation strategies for managing climate change impacts. The LCCs will coordinate their work with the eight regional Climate Science Centers (CSCs).

LCCs are staffed and operated by scientific and technical experts from Federal, state, tribal, and local governments, conservation NGOs, and the private sector. The Service is playing a key catalyst role in the development of LCCs by assisting in initial planning, coordinating with partners, assembling core staff and meeting associated needs for operational support.

In 2009, the Service charged its employees, especially its senior executives, to meet with other agencies and organizations to enlist their support for using an integrated, landscape-level approach to address climate change impacts. The Service and its employees:

- Reached out to other federal and state agencies, industry and the conservation community at large to build new alliances and relationships necessary to combat climate change on continental and global scales;
- Worked closely with the U.S. Geological Survey to develop a shared approach for establishing capacity needed to down-scale global climate models and increase their usefulness in predicting climate changes at regional and local scales, and to link those models with other models capable of forecasting changes in the condition, abundance and distribution of species and their habitats;
- Hosted a national forum that brought together a key conservation leaders from across the country to identify ways their organizations can work more together to help fish and wildlife survive in a climate-changed world;
- Carefully examined the Service's science needs in relationship to information gaps and capacity deficits associated with climate change, and develop a detailed, multi-year strategy for building additional science capacity;
- Developed a National Geographic Framework (Figure 1) that is being used to build science capacity at landscape scales and better address climate change and other stressors;
- Released its draft strategic plan and action plan for addressing the impacts of climate change on fish, wildlife and their habitats for public comment; and
- Created key climate change positions in its program offices, and all its Regions, to build additional capacity to lead and manage efforts to address climate change at regional, continental and global scales.

In the first quarter of FY 2010, the Service created at least one LCC (Figure 1) in each Service Region. Initial operating plans have been developed for nine LCCs: Pacific Islands, Great Plains, Plains and Prairie Potholes, Gulf Coastal Plains and Ozarks, South Atlantic, North Atlantic, Great Northern, Arctic, and California (Figure 1).

Position Descriptions have been approved for key LCC positions (including Assistant Regional Director for Science Applications, LCC Coordinator, Science Coordinator, GIS Specialist and Outreach Specialist.) Each Region has appointed an interim LCC Coordinator, and all are in the process of hiring permanent LCC Coordinators and Science Coordinators. All LCCs will be supported to varying degrees with significant funding from other DOI agencies, specifically the Bureau of Land Management, U.S. Geological Survey, and National Park Service.

To improve the management of science activities within the Service, the Office of the Science Advisor is being enhanced. This office will provide the Service with the leadership and direction needed to support science activities and integrity throughout the bureau. This office will assist LCCs in providing scientific and technical support to inform landscape-scale conservation using adaptive management principles. It will provide expertise that can be tapped by programs and partners as the new LCCs develop products that will improve the effectiveness of conservation delivery activities. It will also assist with coordination, communication and cohesiveness among Service Regions as they continue to establish and provide leadership for LCCs and further implement the Service's Strategic Habitat Conservation business model.

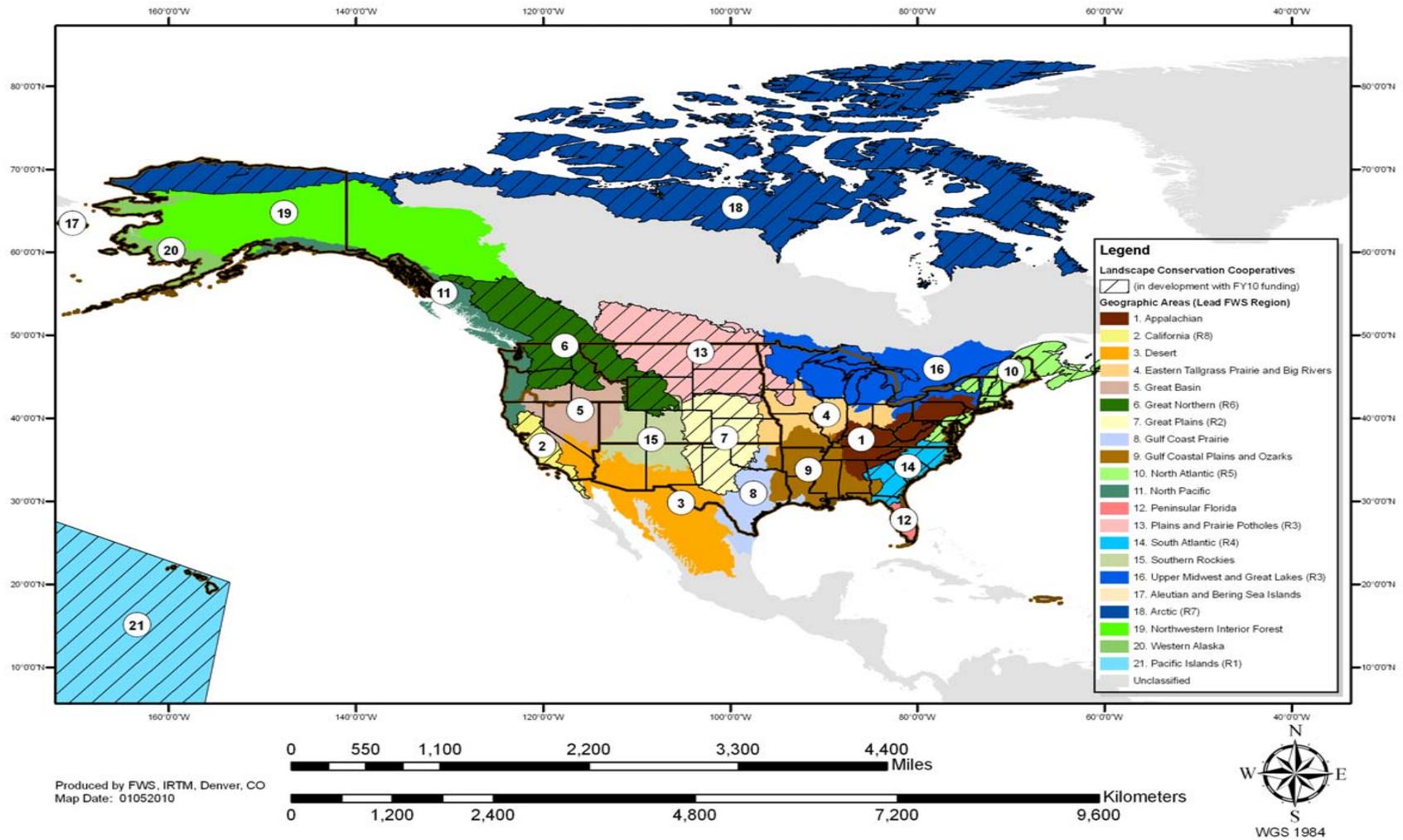
The Service's bold leadership and accomplishments, particularly over the past several years, have positioned the Service, the Department of the Interior, and the broader conservation community to lead the nation in addressing climate change strategically and collaboratively.

In an effort to enhance collaboration, Interior's CSCs and the LCCs will conduct and communicate research and monitoring to improve the understanding of which elements of Interior-managed land, water, marine, fish, wildlife and cultural heritage resources are most vulnerable to climate change impacts. This

research will also help to determine how to make these resources more resilient in the face of climate 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.

The Service, like other Interior bureaus, is committed to providing funding and staff support to the CSCs, beginning in 2011, in order to encourage collaboration which will allow for the sharing of research results and data and provide a direct link with the planning and conservation design taking place in the LCCs. These partners and others will leverage resources available for climate change science. Service employees located at the CSCs and supported by the funding increases in the 2011 budget, will play a significant role in shaping center priorities, directions, and activities.

Figure 1. Geographic Framework and Landscape Conservation Cooperatives in Development with FY2010 Service Climate Change and Science Capacity Funds



Produced by FWS, IRTM, Denver, CO
Map Date: 01052010

Activity: Climate Change Planning and Adaptive Science Capacity
Subactivity: Climate Change Planning

	2009 Actual	2010 Enacted	2011			Change from 2010 (+/-)
			DOI-wide Changes & Transfers (+/-)	Program Changes (+/-)	Budget Request	
Climate Change Planning						
(\$000)	0	10,000	0	3,750	13,750	3,750
FTE	0	30	+14*	+15	59	+29

*The FTE increases listed in the 2011 "DOI-wide Changes & Transfers" column represent FTE positions that were funded in 2010, but were hired later in the year.

Summary of 2011 Program Changes for Climate Change Planning

Request Component	(\$000)	FTE
• Climate Change Planning	3,000	+10
• Climate Change Planning Gulf Coast	750	+5
TOTAL Program Changes	3,750	+15

Justification of Program Changes for Climate Change Planning

The 2011 budget request for Climate Change Planning is \$13,750,000 and 59 FTE, a program increase of +\$3,750,000 and +15 FTE from the 2010 Enacted.

Climate Change Planning General Program Activities (+\$3,000,000/+10 FTE)

The requested funding increase of \$3 million in 2011 will enable the Service to continue working with partners to develop the shared scientific and technical capacities needed to conduct landscape-scale biological planning, conservation design and conservation delivery by expanding the network of Landscape Conservation Cooperatives (LCCs) initiated in FY 2010. The Service’s long-term goal is an integrated national network of 21 LCCs that is capable of defining biological objectives and developing landscape conservation strategies.

The Service will use the requested funding increase to establish and provide leadership for three additional LCCs. These LCCs will inform and facilitate conservation of populations of fish, wildlife and plants at landscape scales through the following actions:

- develop explicit and measurable biological objectives for populations of focal species to guide conservation design and delivery;
- apply and refine dynamic population-habitat models and other decision-support tools to inform various types of plans that will enable partners to manage species more effectively at landscape scales;
- apply down-scaled climate models and landscape scales to predict effects on fish, wildlife, plants and their habitats;
- identify areas of converging climate and non-climate stressors;
- design and evaluate short- and long-term wildlife adaptation approaches that will help conserve populations at landscape scales;
- identify and, when necessary, design protocols and methodologies best suited to monitoring and inventorying species, habitats, and ecological functions and structures at landscape scales; and
- identify high-priority research and technology needs.

In establishing LCCs, the Service utilizes existing facilities and infrastructure, which greatly reduces expenditures for space and associated costs. Scientific and technical personnel contributing to work in the LCCs are taking advantage of communications technology to interact “virtually” via the internet or other electronic means. Furthermore, LCCs are being supported to varying degrees with funding from participating members, such as other federal agencies such as the Bureau of Land Management, U.S. Geological Survey, National Park Service, Bureau of Reclamation, state agencies, private organizations, universities, and other entities involved in conserving fish, wildlife, plants and their habitats at landscape scales.

To coordinate the Service’s climate change planning, three FTEs will be added to the Service’s Office of the Science Advisor. These positions will provide administrative capacity and assist with coordination, communication and cohesiveness among Service Regions as they continue to establish and provide leadership for LCCs and further implement the Service’s Strategic Habitat Conservation business model.

Climate Change Planning Gulf Coast (+\$750,000/+5 FTE)

The requested funding will directly contribute to Service efforts to design and implement an accelerated Gulf Coast restoration program. It will enable the Service to work with partners through the Gulf Coastal Plains and Ozarks LCC to develop shared scientific and technical capacity for biological planning and conservation design to address landscape scale conservation issues and the associated impacts on fish and wildlife resources along the northern Gulf Coast in Louisiana and Mississippi.

With the additional funds, the Service and its partners will analyze available science; formulate population and habitat objectives; develop and use predictive, locally-based models; and effectively and strategically target site-scale conservation delivery. For example, the funding will enable the Service to:

- more fully participate in efforts to evaluate information derived from improved Mississippi River hydrodynamic and sediment availability/transport capability models;
- evaluate coastal wetland and other habitat resources and loss rates under current and projected future scenarios; and
- evaluate species and habitat assessments for use in developing predictive models that will help strategically target on-the-ground restoration activities.

The ability to understand, design and drive conservation across broad scales is fundamental to our ability to successfully restore sustainable ecosystems and address climate change along the northern Gulf Coast in Louisiana and Mississippi.

2011 Program Performance

The Service’s Climate Change performance in FY2011 will be measured using metrics that tie tightly to key conservation planning activities described in this request and to priorities that have been established by the Service Directorate and in the Service’s strategic plan for climate change.

- LCCs will function as the technical core of a large and complex network of partnerships between the Service and partner agencies and organizations. In FY2011, the Service anticipates establishing three additional LCCs with these funds.
- One of the functions of LCCs is to work with managers to develop and provide the science necessary to implement, monitor, and evaluate management and conservation actions. LCCs will also work to develop conservation strategies that include explicit biological objectives and adaptation approaches that can be used to recommend management expenditures based on the greatest effect and lowest relative cost. In FY2011, three additional landscape-scale conservation

strategies will be developed to inform resource management decisions and focus management expenditures.

- Evaluation of conservation delivery strategies and actions for their effectiveness is an important component of climate change planning. The potential for landscapes, habitats, and species to change in response to climate change is high, and the expertise provided by LCCs will be used, in part, to develop models to predict and monitor response and variability in the response. Evaluation of management and conservation actions on a changing landscape is critical for planning to determine the short and long-term effectiveness of the action. In FY2011, a total of 12 conservation delivery strategies and actions will be evaluated for effectiveness.

Program Change Table - Climate Change Planning

Performance Goal	2007 Actual	2008 Actual	2009 Actual	2010 Plan	2011 Base Budget	2011 President's Budget Request	Program Change Accruing in 2011	Program Change Accruing in Out-years
Number of Landscape Conservation Cooperatives established that have begun identifying habitats and species most vulnerable to climate change (Cumulative)	n/a	n/a	1	9	9	12	3	-
Number of landscape-scale conservation strategies developed (including explicit species-specific, scalable population objectives and adaptation approaches) that can direct management expenditures where they have the greatest effect and lowest relative cost (Cumulative)	n/a	n/a	n/a	9	9	12	3	-
Number of decision-support tools provided to conservation managers to inform management plans/decisions and ESA Recovery Plans (Cumulative)	n/a	n/a	n/a	11	11	15	3	-
Number of conservation delivery strategies and actions evaluated for effectiveness (Cumulative)	n/a	n/a	n/a	9	9	12	3	-

Note: 2011 Base Budget is equal to 2010 Plan (enacted level) plus fixed cost (absorbed).

Activity: Climate Change Planning and Adaptive Science Capacity**Subactivity: Climate Change Adaptive Science Capacity**

	2009 Actual	2010 Enacted	2011			Change from 2010 (+/-)
			DOI-wide Changes & Transfers (+/-)	Program Changes (+/-)	Budget Request	
Climate Change Science Capacity (\$000)	0	10,000	0	+5,000	15,000	+5,000
FTE	0	15	+3*	+5	23	+8

*The FTE increases listed in the 2011 "DOI-wide Changes & Transfers" column represent FTE positions that were funded in 2010, but were hired later in the year.

Summary of 2011 Program Changes for Climate Change Adaptive Science Capacity

Request Component	(\$000)	FTE
• Climate Change Science Capacity	4,000	+3
• Climate Change Science Capacity Gulf Coast	1,000	+2
TOTAL Program Changes	5,000	+5

Justification of Program Changes for Climate Change Science Capacity

The 2011 budget request for Climate Change Science Capacity is \$15,000,000 and 23 FTE, a program increase of +\$5,000,000 and +5 FTE from the 2010 Enacted.

Climate Change Science Capacity General Program Activities (+\$4,000,000/+3 FTE)

This funding request will assist the Service in implementing its strategic plan for climate change and executing priority actions to help fish and wildlife adapt to climate change. The Service will use this increase to provide science support for an additional three Landscape Conservation Cooperatives (LCCs) that will be established across the Nation in FY 2011. This will ensure that more than 50 percent of the geographic units in the National Geographic Framework will have LCCs available to assist partners in managing fish, wildlife and plants at landscape scales.

Specifically, the additional funding requested will be used to provide the mission-critical scientific information and science support needed by the additional three LCCs to drive landscape-scale conservation. Because the Service's 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 that represent a broad range of species' vulnerabilities to climate change. In addition to informing biological planning and conservation design at the three new LCCs, the scientific information produced will help to ensure that the Service fulfills its regulatory and management responsibilities, particularly for threatened and endangered species, migratory birds, marine mammals, and inter-jurisdictional fish.

To achieve these critically-important outcomes, the Service will focus on the three additional LCCs by expanding its capacity in six areas of science, through work with USGS and other science partners:

- (1) Species Risk and Vulnerability Assessments – These assessments are the essential first step in deciding where to focus the conservation activities and additional scientific effort necessary to help fish and wildlife adapt to climate change. These assessments will enable the Service and LCC partners to focus their Inventory and Monitoring, Population-Habitat Assessments, Biological Planning and Conservation Design, Management Evaluation and Research, and Conservation Genetics activities on high-risk species and habitats.

- (2) Inventory and Monitoring – The Service will develop additional capacity to participate in inventory and monitoring programs, develop or acquire systems for managing data, and evaluate assumptions and scientific information used in models that link populations to their habitats and other limiting factors. The Service will coordinate its inventory and monitoring programs with other Bureaus, especially the National Park Service, and integrate its data and results with those of other agencies, especially those ones in the DOI Climate Effects Network.
- (3) Population and Habitat Assessments – These assessments will improve the Service’s understanding of the relationship between species and their habitats at various spatial scales as well as among species. This information will be used by LCCs to predict how climate change will affect populations of fish and wildlife and their habitats, and how various management treatments can reduce or avoid those effects.
- (4) Biological Planning and Conservation Design – Science needs for biological planning and conservation design include highly-specialized expertise, training and tools, and the use of complex statistical methods and modeling. This capacity is a critical component of the work of LCCs. Inherent in this capacity is the ability to examine alternative management options, identify their strengths and weaknesses, and ultimately identify a mix of conservation actions that has the greatest likelihood of achieving the desired biological and ecological outcomes.
- (5) Management Evaluation and Research – These critical scientific “learning” activities will provide essential feedback needed for adaptive management. Science funding will support evaluations and research that will assist LCC staff in answering questions that arise from habitat and species responses to management actions. Targeted research will enable the Service to fill information gaps and reduce uncertainty regarding climate change and its likely impacts on species and habitat.
- (6) Conservation Genetics – Conservation genetics research will provide the basic scientific information needed to identify distinct population and management units. Biological assessments, conservation design strategies, and conservation delivery activities are most effective when they recognize the genetic population structure of a given species. Maintaining genetic diversity is essential for maintaining healthy, resilient populations of fish, wildlife and plants that are more able to cope with the stressors of climate change.

Attention in FY 2011 will focus on generating scientific information and knowledge that must be available to the three new LCCs to enable the development of biological plans and conservation design strategies that can inform conservation delivery and ensure that fish, wildlife and plants adapt to climate-changed habitats. As these science activities inform biological assessments, conservation design strategies, and conservation delivery, more attention will be directed to Management Evaluation and Research, which will provide feedback and new information to use to improve and refine the Service’s planning and design processes.

In order to more effectively coordinate the Service’s climate change adaptive science program, two FTEs will be added to the Service’s Office of the Science Advisor. These positions will assist LCCs with managing research funds and provide expertise that can be tapped by programs and partners as the new LCCs develop products that will improve the effectiveness of their conservation delivery activities.

Additionally, in FY 2011 the Service will use \$2,000,000 of the Climate Change Science Capacity funding for staff support and collaboration on land management science priorities at the Department’s Climate Science Centers (CSCs). Service support of and participation in the CSCs will help prioritize research topics to address the most pressing land management needs and provide an interface to step down broad-scale research results to the applied research and monitoring activities of the LCCs, individual Interior bureaus, programs and land managers.

Climate Change Science Capacity Gulf Coast (+\$1,000,000/+2 FTE)

The requested increase is critical to building the additional scientific capacity needed for the Service to accomplish its mission and become a full participant in efforts to design and implement an accelerated Gulf Coast restoration program in Louisiana and Mississippi.

The funds will allow the Service to directly develop, or contract for, the science it needs to support biological planning and conservation design to address landscape scale conservation issues and their associated impacts on fish and wildlife resources along the northern Gulf Coast in Louisiana and Mississippi through the Gulf Coastal Plains and Ozarks LCC. Priority needs include:

- Improved Mississippi River hydrodynamic models to assess the effects of multiple diversions on the River;
- Improved tools to assess Mississippi River sediment availability and transport capacity to determine how much, and under what conditions sediment delivery can be maximized for diversions in various locations;
- Improved tools to assess wetland loss rates across the landscape under current and projected future scenarios, to better identify where land loss is greatest, and in conjunction with other information, where restoration priorities should be focused.
- Information regarding predicted changes under future scenarios for species population and habitat assessments. Vulnerability assessments, for example, depend on the availability of good scientific information about species and their habitats. Only a small percentage of species have been studied sufficiently to have generated the information needed to conduct vulnerability assessments. These funds will enable the Service to contract for studies that answer specific questions needed on strategically important species and habitats; and,
- Information regarding inventory and monitoring protocols which will help measure the success of our actions. The Service will partner with other Interior bureaus such as the National Park Service, U.S. Geological Survey, and Bureau of Land Management, and with partners in LCCs to coordinate our inventory and monitoring protocols so that data may be compared over geographic areas.

Funding will also be used to facilitate development of a spatially-explicit decision-support tool that identifies focused geographic priorities for coastal Louisiana and Mississippi to achieve sustainable landscape level restoration while maximizing the best use of limited human, fiscal, and natural resources. This tool will incorporate key information, including federal lands, fish and wildlife trust resources, and other information that will allow the Service and its partners to identify those areas which exhibit the highest probability for sustainable restoration and greatest contribution to trust resource conservation and protection. From this, the most feasible restoration strategies will be applied across the spectrum of prioritized landscapes for multiple-agency actions.

Efforts will be made to leverage Service resources with those from USGS and others, to capitalize on each others' expertise and capacities to develop information and tools to help ensure restoration efforts maximize ecosystem and fish and wildlife resource sustainability to the extent possible along the northern Gulf Coast.

2011 Program Performance

The Service's Climate Change performance in FY2011 will be measured using metrics that tie tightly to key conservation planning activities described in this request and to priorities that have been established by the Service Directorate and in the Service's strategic plan for climate change.

- Climate change will affect some species more adversely than others. The Service will conduct three additional risk and vulnerability assessments (single or multiple species and habitats) to predict the threats posed to trust species and their habitats.
- The Service will implement five additional scientifically rigorous inventory and monitoring protocols (single or multiple species and habitats) to be used consistently among the regions of the Service. These protocols will enable the Service to collect critically important data needed to detect changes in fish and wildlife populations and their habitats over time resulting from climate change.
- Three additional population and habitat assessments will be conducted to predict changes in the dynamics of populations of species and habitats and to make informed management decisions in the face of uncertainties resulting from climate change. The Service will model the relationships between physical and chemical changes produced by climate change and predict how these changes will affect species and habitats.
- Three biological planning and conservation design projects will be initiated to examine alternative management options, identify their strengths and weaknesses, and ultimately identify a mix of conservation actions that has the greatest likelihood of achieving the desired biological and ecological outcomes.
- Conservation management action and research activities will be evaluated for their effectiveness in assisting fish and wildlife populations to adapt to changes in climate. A total of 21 management actions and research strategies will be evaluated in FY 2011 among the regions of the Service.
- Three additional conservation genetics projects will be initiated in to increase understanding of the genetic relationships among organisms and to predict a species ability to adapt to environmental changes. Genetics research opportunities will be identified and initiated based on guidance from the LCCs.

The information from these projects will provide LCCs fundamental science capacity to: 1) drive landscape-scale planning; 2) produce biological assessments (plans) and conservation designs that incorporate specific strategies and actions that will help fish, wildlife and plants adapt to changing habitats; and 3) position member organizations of LCCs and other conservation organizations to act decisively and confidently to implement those strategies on-the-ground in ways that help fish, wildlife and plants survive in a climate-changed world.

Program Change Table - Climate Change Adaptive Science Capacity

Performance Goal	2007 Actual	2008 Actual	2009 Actual	2010 Plan	2011 Base Budget	2011 President's Budget Request	Program Change Accruing in 2011	Program Change Accruing in Out-years
Number of risk and vulnerability assessments developed or refined for priority species or areas. (Cumulative)	n/a	n/a	n/a	9	9	12	3	-

Performance Goal	2007 Actual	2008 Actual	2009 Actual	2010 Plan	2011 Base Budget	2011 President's Budget Request	Program Change Accruing in 2011	Program Change Accruing in Out-years
Number of inventory and monitoring protocols developed, refined or adopted to capture data on priority species addressed in LCC work plans that are expected to be vulnerable to climate change (Cumulative)	n/a	n/a	n/a	15	15	20	5	-
Number of population and habitat assessments developed or refined to inform predictive models for changes in species populations and habitats as a result of climate change (Cumulative)	n/a	n/a	n/a	9	9	12	3	-
Number of biological planning and conservation design projects developed in response to climate change (Cumulative)	n/a	n/a	n/a	9	9	12	3	-
Number of management actions evaluated for effectiveness in response to climate change and research activities conducted to address information needs in response to climate change (Cumulative)	n/a	n/a	n/a	16	16	21	5	-
Number of conservation genetics projects to improve and enhance conservation design and delivery for fish and wildlife populations in response to climate change (Cumulative)	n/a	n/a	n/a	8	8	11	3	-

Note: 2011 Base Budget is equal to 2010 Plan (enacted level) plus fixed cost (absorbed).