Activity: Cooperative Landscape Conservation and Adaptive Science

	2010 Actual	2010 Enacted/ 2011 CR	2012				Change From 2011 CR (+/-)
			Fixed Costs & Related Changes (+/-)	Admin- istrative Cost Savings (-)	Program Changes (+/-)	Budget Request	
Cooperative Landscape Conservation ($000)	10,000	10,000	+1,052	-55	+9,250	20,247	+10,247
FTE	21	41		-	+51	92	+51
Adaptive Science ($000)	10,000	10,000	+1,262	-26	+6,000	17,236	+7,236
FTE	3	15		-	+8	23	+8
Total, Cooperative Landscape Conservation and Adaptive Science ($000)	**20,000**	**20,000**	**+2,314**	**-81**	**+15,250**	**37,483**	**+17,483**
FTE	**24**	**56**		**-**	**+59**	**115**	**+59**

Summary of 2012 Program Changes for Cooperative Landscape Conservation and Adaptive Science

Request Component	($000)	FTE
• Cooperative Landscape Conservation	+9,250	+51
• Adaptive Science	+6,000	+8
Program Changes	**+15,250**	**+59**
Internal Transfer –**Office of the Science Advisor**	+2,312	

Program Overview

The Service uses a science-based, adaptive framework for setting and achieving cross-program conservation objectives that strategically addresses the problems fish and wildlife will face in the future. This framework, called Strategic Habitat Conservation, is based on the principles of *adaptive management* and uses population and habitat data, ecological models, and focused monitoring and assessment efforts to develop and implement strategies that result in measurable fish and wildlife population outcomes. This process uses the best available scientific information to predict how fish and wildlife populations will respond to changes in the environment, thus enabling the Service to focus habitat conservation and other management activities where they will be most effective.

Given that serious, broad and compounding challenges face our Nation's fish, wildlife and landscapes, no one bureau, nor one entity, can work and succeed in isolation. Facing that reality, the Service is working with numerous partners to develop the shared scientific and technical capacities needed to conduct landscape-scale biological planning and conservation design to inform and improve conservation delivery. Working with DOI bureaus and other federal agencies, state fish and wildlife agencies, tribes, non-governmental organizations, universities, industry and the public, the Service has envisioned Landscape Conservation Cooperatives (LCCs) to lay the foundation for an interdisciplinary approach to landscape management. With 9 LCCs already established and staffed, the Service, and the Department, has moved closer to the long-term goal of establishing an integrated national network of 21 LCCs (Figure 1) capable of defining biological objectives and developing the needed resources to create landscape conservation strategies for managing fish and wildlife populations.

The LCCs are landscape-scale applied conservation science partnerships that produce and disseminate applied science products for resource management decisions. The Service's partnership with the U.S. Geological Survey Climate Science Centers (CSCs) is critical to this endeavor. The CSCs provide fundamental scientific information, tools, and techniques that resource managers can apply to anticipate, monitor, and adapt to environmental changes. Much of this information and many of the tools provided by the CSCs, including physical and biological research, ecological forecasting, and multi-scale modeling, will be in response to priority needs identified by the LCCs. This collaboration allows partners to target resources on activities that will produce the greatest benefits for fish, wildlife and for the American people. It also ensures that the data and information developed is disseminated broadly to all interested users.

LCCs will play a significant role in the Service's ecosystem restoration efforts across the nation. For example, in the Chesapeake Bay watershed, Service programs will coordinate efforts with the North Atlantic and Appalachian LCCs to meet the highest priority needs identified by the Service together with EPA and other federal agencies for achieving a healthy watershed and supporting sustainable populations of fish and wildlife. In the Everglades, landscape level partnerships will work to protect Florida panther habitat, sea turtles and other highly imperiled species in the Florida Keys. Furthermore, efforts in the California Bay Delta region will work to address water supply and environmental challenges outlined in the Interim Federal Action Plan for the California Bay Delta. The region will use the LCC and new Strategic Habitat Conservation business model to work in this changing ecosystem, ensuring that our actions are driven by good science, respect for our partners and a focus on outcomes.
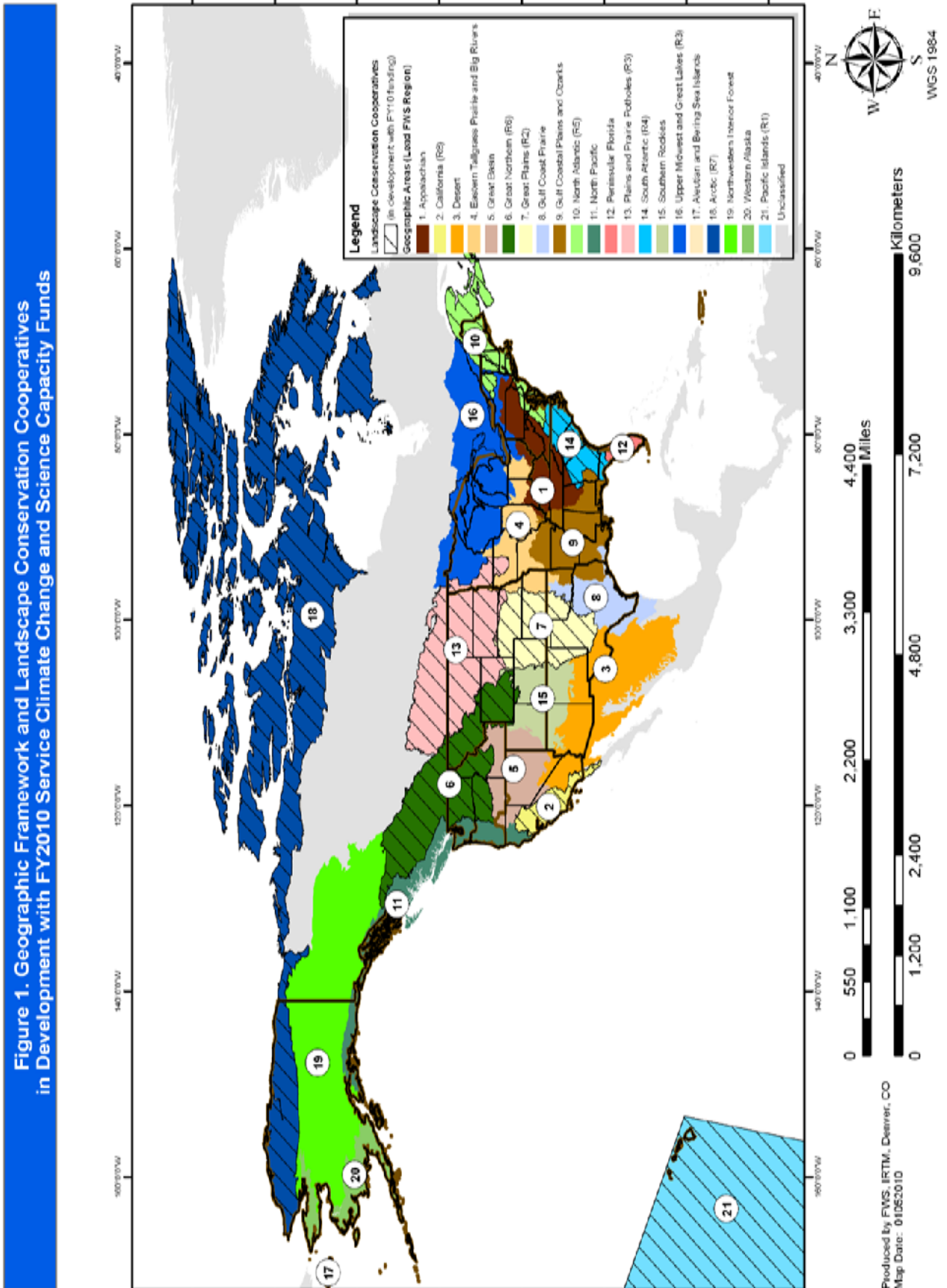
In 2010, the Service continued to reach out to other agencies and organizations to enlist their support for using an integrated, landscape-level approach to fish and wildlife conservation and build the national network of LCCs to address resource management challenges. The Service continues to:

- collaborate with other DOI agencies and partners to establish LCCs. LCCs are working with USGS to identify key science information and data gaps and how to integrate conservation strategies and activities at various spatial scales. LCC Steering Committees are determining highest priority science needs for their LCC. Accomplishments in 2010 are 37 population and habitat assessments to inform predictive models for changes in species population and habitat, 21 biological planning and conservation projects, and 19 inventory and monitoring protocols on priority species.

- work with partners to build a shared view of future conservation needs. In 2010, we funded 20 risk and vulnerability assessments to provide LCCs with a better understanding of the threats posed to trust species and their habitats;

- strategically address the Service's highest-priority needs for science, working with LCC partners to identify their science capacities, priorities and needs. In 2010, science funding focuses on filling specific data gaps in areas such as coastal development, sea level rise, glacier-influenced stream systems and habitat connectivity;

The Service's leadership, hard work, and accomplishments, particularly over the past three years, continue to position the Service, and the Department of the Interior, to lead the nation in addressing conservation strategically, effectively, and collaboratively.

2012 Internal Transfer (+$2,312,000)

The Office of the Science Advisor (OSA) has historically received funding to support science services from the six Service Washington Office resource programs that depend heavily on science to accomplish their missions. The internal transfer eliminates the need to charge programs for science-related activities, and would increase administrative efficiencies for OSA and the six resource programs.

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

Activity: Cooperative Landscape Conservation and Adaptive Science
Subactivity: Cooperative Landscape Conservation

	2010 Actual	2010 Enacted/ 2011 CR	2012				Change From 2011 CR (+/-)
			Fixed Costs & Related Changes (+/-)	Admin-istrative Cost Savings (-)	Program Changes (+/-)	Budget Request	
Cooperative Landscape Conservation							
($000)	10,000	10,000	+1,052	-55	+9,250	20,247	+10,247
FTE	21	41		-	+51	92	+51

Summary of 2012 Program Changes for Cooperative Landscape Conservation

Request Component	($000)	FTE
• Cooperative Landscape Conservation	+8,500	+46
• Ecosystem Restoration Gulf Coast	+750	+5
Program Changes	**+9,250**	**+51**
Internal Transfer –**Office of the Science Advisor**	+1,051	

Justification of Program Changes for Cooperative Landscape Conservation

The 2012 budget request for Cooperative Landscape Conservation is $20,247,000 and 92 FTE, a net program change of +$9,250,000 and +51 FTE from the 2010 Enacted/2011 annualized Continuing Resolution.

Cooperative Landscape Conservation General Program Activities (+$8,500,000/+46 FTE)
As of FY 2010 nine LCCs were established. With the additional funding requested in FY 2011 and 2012, the Service expects to establish and staff an additional nine LCCs. The Desert, Southern Rockies and Great Basin LCCs will be established and staffed by other DOI bureaus, working in concert with the Service, for a total of 21 LCCs. The requested funding increase of $8.5 million will enable the Service to continue working with partners to conduct landscape-scale biological planning, conservation design and conservation delivery by completing the network of Landscape Conservation Cooperatives (LCCs) initiated in FY 2010.

Schedule for Landscape Conservation Cooperative Establishment

FY 2010	FY 2011-2012
Arctic	Appalachian
California	North Pacific
Great Plains	Western Alaska
Great Northern	Upper Midwest and Great Lakes
Gulf Coastal Plains and Ozarks	Aleutian and Bering Sea Islands
North Atlantic	Eastern Tallgrass Prairie and Big Rivers
Pacific Islands	Northwestern Interior Forest
Plains and Prairie Potholes	Peninsular Florida
South Atlantic	Gulf Coast Prairie

LCCs will address a full range of conservation challenges across the nation in collaboration with other federal agencies, state agencies, tribes, industry, NGOs, academic institutions, and the conservation community at large. They promote efficient and effective targeting of federal dollars to obtain and analyze the science necessary for the Service to develop landscape-scale conservation models to protect fish, wildlife and plants and their habitats. This collaborative effort also enhances the Service's ability to collect information that can be used to improve or augment many of the Service's ongoing conservation efforts, such as Endangered Species Recovery Plans, Refuge CCPs, fish passage and habitat restoration.

The LCC network 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 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;
- 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 Department uses existing facilities and infrastructure, greatly reducing expenditures for space and associated costs. Each LCC will have an LCC coordinator and a science and technology coordinator. In addition, all Cooperatives will require expertise in several disciplines, for example: biological, ecological and physical sciences; communications; population, climate and landscape modeling; conservation genetics; data management, and; resource planning and conservation design. Additional staffing will be made based on the particular needs of each LCC. Some complementary scientific and technical personnel contributing to LCC work will interact "virtually" via the internet. Furthermore, LCCs are supported to varying degrees with funding from participating federal members, including the Bureau of Land Management, U.S. Geological Survey, National Park Service, Bureau of Reclamation, Forest Service, the Environmental Protection Agency and the National Oceanic and Atmospheric Administration, along with and state agencies, nongovernmental organizations, universities, and other local entities.

Landscape conservation planning is occurring across the nation. Specific examples include the following:

- LCC meetings in Alaska led to an opportunity for the Alaska Native Tribal Health Consortium to benefit both rural subsistence users and wildlife managers by gathering wildlife disease data across the Alaskan landscape. The Service, BLM, and USGS combined funds to support Science Workshops to help identify the shared science needs. This work is being done in collaboration with the Rapid Ecoregional Assessments started by the Bureau of Land Management (BLM), and the new Alaska Climate Science Center. These projects benefit both the Arctic LCC and the Western Alaska LCC.

- The Arctic LCC is funding projects that bring together environmental physicists, GIS analysts and polar bear biologists to predict locations for polar bear dens given climate and weather variables, such as snowfall, wind, and topography. This decision support tool will increase planners' ability

to route industrial ice roads from oil and gas development to minimize conflicts with denning polar bears. Partners include: FWS Marine Mammal Management, FWS Endangered Species Program, USGS Coastal Studies, USGS Marine Polar Bear Project, DOE North Slope Decision Support Tool project team, UAF Water Environment Research Center, and Alaska Department of Fish and Game.

- The Great Northern LCC Steering Committee serving the Montana and Wyoming area recognized the considerable geographic overlap between multiple entities, including the Western Governors Association, BLM, USFS, and Montana Fish, Wildlife & Parks. A demonstration project was approved to ensure that these entities work closely together, with efforts that are not duplicative. The Great Northern LCC, which counts these entities as partners, can play a primary role in this demonstration project by developing agreed upon tools, systems and assessments which align work and connect the goals of these independent players. Moreover, LCC work assists with data acquisition in the Greater Yellowstone area and provides a centralized body to facilitate communications with stakeholders, managers, and partners.

- The Gulf Coastal Plains & Ozarks (GCPO) LCC has worked on an integrated coastal assessment as part of the Southeast Regional Assessment Project for USGS's National Climate Change and Wildlife Science Center. GCPO LCC funded an expansion of the assessment to the entire coastline within the GCPO geography. Objectives of the assessment include: 1) predicting coastal erosion and inundation under a range of sea level rise scenarios; 2) assessing the impact of potential sea level rise on coastal ecosystems and related wildlife resources, and; 3) developing visual products to help local resource managers anticipate sea level rise, and design adaptations to projected changes.

- The Plains and Prairie Pothole LCC is funding a project to assess the impacts of wildlife habitat protection and restoration on rural communities in the Prairie Pothole Region.   A primary factor contributing to the ongoing decline in rural communities is the lack of economic diversity as increased temperatures and reduced water availability may significantly impact traditional agricultural crop production. This project will analyze the economic significance of agricultural tillage operations and wildlife habitat activities to local communities.

Ecosystem Restoration Gulf Coast (+$750,000/+5 FTE)
The requested funding will provide for the design and implementation of an accelerated Gulf Coast restoration program. The Service will work with partners through the Gulf Coastal Plains and Ozarks LCC to plan and adopt biological goals and design conservation measures to address landscape scale conservation issues that threaten fish and wildlife along the northern Gulf Coast in Alabama, Florida, Louisiana and Mississippi.

The Service will use these funds to analyze available science; formulate population and habitat objectives; develop and use predictive, locally-based models; and strategically target site-scale conservation delivery. Specifically, the Service will:

- participate more fully in the evaluation of new information from improved models of Mississippi River hydrodynamic and sediment availability/transport capability;

- evaluate coastal wetland and other habitat resources and their loss rates under current and projected future scenarios; and
- use species and habitat assessments to develop predictive models to 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 environmental stressors along the northern Gulf Coast.

2012 Program Performance

During FY 2011 and FY 2012, the Service will continue to work to refine its performance metrics for Cooperative Landscape Conservation in light of what the Service and LCC partners have learned in the process of establishing and operating LCCs. LCCs have found there is important work to be done that was not initially envisioned, including training their participants in adaptive resource management and structured decision-making, and in using Strategic Habitat Conservation.

The additional funding will help:

- Develop and use science information to identify key habitats and the most vulnerable species;

- Identify areas of converging environmental stressors;

- Apply and refine dynamic population-habitat models for those species to inform planning;

- Identify and design methodologies for monitoring and inventorying species, habitats they occupy or could occupy, and ecological functions and structures that sustain them;

- Develop 11 additional decision-support tools to facilitate management decisions that focus available resources on priority tasks; and

- Develop seven additional landscape-scale conservation strategies to inform resource management decisions and focus management expenditures. One of the functions of LCCs is 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.

- Evaluate an additional five (for a total of 17) conservation delivery strategies and actions for effectiveness. Evaluation of conservation delivery strategies and actions for their effectiveness is an important component of landscape conservation planning. The potential for landscapes, habitats, and species to change in response to the environment 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 and to determine the short and long-term effectiveness of the actions to be undertaken.

Cooperative Landscape Conservation - Performance Overview Table

Performance Goal	2010 Projects Initiated	2011 Target Projects Initiated	2011 Target Projects Completed	2012 Target Projects Initiated	2012 Target Projects Completed	Change from 2011 to 2012 Initiated	Change from 2011 to 2012 Completed
Number of LCCs formed (Cumulative)	9	12	12	18	18	6	6
Number of LCCs with a management/ operating plan in place (Cumulative)	8	8	8	18	18	10	10
Number of Landscape Conservation Cooperatives established that have begun identifying habitats and species most vulnerable to climate change (Cumulative)	7	8	8	18	18	10	10
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)	0	15	6	22	9	7	3
Number of decision-support tools provided to conservation managers to inform management plans/ decisions and ESA Recovery Plans (Cumulative)	3	25	7	36	11	11	4
Number of conservation delivery strategies and actions evaluated for effectiveness (Cumulative)	0	12	4	17	6	5	2

Activity: Cooperative Landscape Conservation and Adaptive Science
Subactivity: Adaptive Science

	2010 Actual	2010 Enacted/ 2011 CR	2012				Changes from 2011 CR (+/-)
			Fixed Costs & Related Changes	Admin- istrative Cost Savings (+/-)	Program Changes (+/-)	Budget Request	
Adaptive Science ($000)	10,000	10,000	+1262	-26	+6,000	17,236	+7,236
FTE	3	15		-	+8	23	+8

Summary of 2012 Program Changes for Adaptive Science

Request Component	($000)	FTE
• Adaptive Science	+5,000	+6
• Ecosystem Restoration Gulf Coast	+1,000	+2
Program Changes	**+6,000**	**+8**
Internal Transfer – **Office of the Science Advisor**	+1,261	

Justification of Program Changes for Adaptive Science

The 2012 budget request for Adaptive Science is $17,236,000 and 23 FTE, a net program change of +$6,000,000 and +8 FTE from the 2010 Enacted/2011 annualized Continuing Resolution.

Adaptive Science General Program Activities (+$5,000,000/+6 FTE)
This additional funding assists the Service in implementing its strategic plan for wildlife and resource management across changing landscapes. An increase in adaptive science capacity, targeted at our Landscape Conservation Cooperatives (LCCs), ensures that managers have the critical scientific support to develop biological plans and conservation designs for their highest-priority needs.

This funding will be used for risk and vulnerability assessments, inventory and monitoring, population and habitat assessments and models, conservation design using specialized expertise, evaluation of management options for LCC partners, increasing understanding of conservation genetics, and other applicable research. In addition, the Service expects to continue using a small portion of this funding to acquire down-scaled climate information as an input to vulnerability assessments, biological plans, adaptation strategies, and conservation designs.

Mission-critical scientific information support needed by the Service across the nation to drive landscape-scale conservation will be provided. In addition, these funds will help address unmet adaptive science needs of Service programs such as:

- the relationship between fish and wildlife (e.g. golden eagles) and renewable energy development;
- invasive species identification, assessment and control;
- the population distribution and habitats of threatened and endangered species such as polar bear and Stellar's eider, and;
- the identification of distinct population and management units in order to maintain genetic diversity essential to preserving healthy, resilient populations of fish, wildlife and plants.

In addition to informing biological planning and conservation design at the 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 expand 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 conservation activities and where additional scientific information is necessary for conservation. 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 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 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 environmental 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 – Capacity for biological planning and conservation design includes highly-specialized expertise, training and tools, and the use of complex statistical methods and modeling. The Service will 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 – The Service will use scientific "learning" to provide essential feedback for adaptive management. Science funding will support evaluations and research to answer questions that arise from habitat and species responses to management actions. Targeted research will enable the Service to fill information gaps and reduce uncertainty.

(6) Conservation Genetics – Conservation genetics research identifies 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.

Specific examples of the generation of scientific information through the LCCs include:

- The Gulf Coastal Plains & Ozarks (GCPO) LCC and its partners have developed habitat modeling capabilities in its geographic area. Two new working groups, the Alligator Gar Conservation Group and the Louisiana Pearlshell Mussel Group, have begun to model habitat needs for these species, which will characterize their existing habitats, identify potential areas of new or unknown populations, and identify areas with potential for restoring populations. The modeling process will

also be used as a template for aquatic habitat models for similar species within the GCPO and other LCCs with similar habitats and species.

The Plains and Prairie Pothole (PPP) LCC funded a project to complete the National Wetland Inventory for the Northern Great Plains. The PPP partnered with the State of Montana to complete digital maps of wetlands to cover the LCC's entire geographic area. These wetland maps are essential for efficient conservation planning and delivery.

Ecosystem Restoration Gulf Coast (+$1,000,000/+2 FTE)
With these funds the Service will help to design and implement an accelerated Gulf Coast restoration program in Alabama, Florida, Louisiana and Mississippi.

The Service will develop 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 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 wetland restoration and creation in coastal Louisiana;
- Improved tools to assess wetland loss rates under current and projected future scenarios, to better identify where land loss is greatest, and where restoration priorities should be focused.
- Coordination of inventory and monitoring protocols, with other Interior bureaus such as the National Park Service, U.S. Geological Survey, and Bureau of Land Management, and with LCC partners so data may be compared over geographic areas.

Funding will also be used to develop a spatially-explicit decision-support tool to focus LCC priorities for coastal Louisiana and Mississippi. This tool will help identify areas that exhibit the highest probability for sustainable restoration and the greatest contribution to conservation.   From this, the most feasible restoration strategies will be applied across the spectrum of prioritized landscapes for multiple-agency actions.

We will leverage Service resources with those from others, to capitalize on each partner's expertise and capability.

2012 Program Performance

During FY2011 and FY 2012, the Service will continue to work to refine its performance metrics for Adaptive Science in light of what the Service and LCC partners have learned in the process of establishing and operating LCCs.

The six additional LCCs will use the funding increase to initiate:
- Nine additional risk and vulnerability assessments (single or multiple species and habitats) to predict the threats posed to trust species and their habitats.
- 14 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 changing environments.
- 16 additional population and habitat assessments 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 changing environments. The Service will model the relationships between physical and chemical changes produced by environmental change and predict how these changes will affect species and habitats.

- 13 biological planning and conservation design projects 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.

- an evaluation of conservation management action and research activities for their effectiveness in assisting fish and wildlife populations to adapt to changes in their environment. Six management actions and research strategies will be initiated in FY 2012 among the regions of the Service.

- Two additional conservation genetics projects 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 changing world.

Great Northern LCC (GNLCC) Assists Bull Trout Recovery

Bull Trout require the coldest water temperature of any native northwest salmonid; clean stream bottoms for spawning and rearing; and complex, connected habitats between rivers, lakes and headwater streams for annual spawning and migration. This species is listed as threatened under the Endangered Species Act because, while once found in about 60% of the Columbia River Basin, today occur in less than half of their historic range The GNLCC, established in FY 2010, is working towards landscape conservation across the middle to northern Rocky Mountains and interior Columbia Basin. In April 2010, the GNLCC Steering Committee convened and established three initial priorities for funding the necessary science for this landscape: habitat connectivity, aquatic resource vulnerability and data integration. To better understand the primary factors influencing the decline in native Bull Trout, the impact of rapid human development and habitat fragmentation on spawning and migration, rising water temperature,   and invasive species needed to be studied. In FY 2010, funding was provided for two scientific studies to examine these threats as they pertain to the aquatic ecosystems of the Columbia River Basin. Findings such as how to restore and improve fish habitat connectivity and diversity will be critical for conservation and recovery programs aimed to enhance resiliency and adaptation in native populations. Through these projects and this unprecedented coordination effort, the data collected by the GNLCC will be strategically applied to help inform landscape conservation within various government, private and public land management efforts to protect fish, wildlife and plants. To accomplish this, GNLCC funding is leveraged with other Federal, State and community dollars and in-kind contributions.
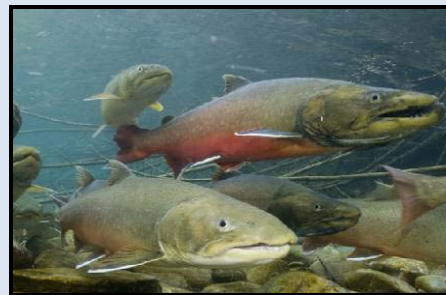
Bull Trout Credit: J. Sartore and W. Fredenberg

Adaptive Science - Performance Overview Table

Performance **Goal**	2010 Projects Initiated	2011 Target Projects Initiated	2011 Target Projects Completed	2012 Target Projects Initiated	2012 Target Projects Completed	Change from 2011 to 2012 Initiated	Change from 2011 to 2012 Completed
Number of risk and vulnerability assessments developed or refined for priority species or areas. (Cumulative)	20	20	9	29	13	9	4
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)	37	37	9	53	15	16	6
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)	19	32	12	46	17	14	5
Number of biological planning and conservation design projects developed in response to climate change (Cumulative)	21	29	8	42	12	13	4
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)	5	14	6	20	9	6	3
Number of conservation genetics projects to improve and enhance conservation design and delivery for fish and wildlife populations in response to climate change (Cumulative)	2	5	2	7	4	2	2

This page intentionally left blank.