

Activity: Cooperative Landscape Conservation and Adaptive Science

	2011 Actual	2012 Enacted	2013			Change From 2012 Enacted (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Cooperative Landscape Conservation (\$000)	14,727	15,475	+66	0	15,541	+66
FTE	43	62	0	0	62	0
Adaptive Science (\$000)	16,243	16,723	+20	+770	17,513	+790
FTE	12	17	0	0	17	0
Total, Cooperative Landscape Conservation and Adaptive Science (\$000)	30,970	32,198	+86	+770	33,054	+856
FTE	55	79	0	0	79	0

Program Overview

Secretarial Order 3289 established a Department-wide approach for applying scientific tools to increase the understanding of climate change and other landscape scale stressors on resources the Department manages and to coordinate effective adaption and mitigation strategies. The Service’s response in FY 2009 was to begin developing a seamless national network of interdependent Landscape Conservation Cooperatives. Strengthening and expanding this foundation in each subsequent fiscal year, the Service, with its highly diverse and actively engaged partners, continues to implement this scientifically-based cooperative landscape conservation approach to address key conservation challenges that threaten the nation’s fish and wildlife resources. Threats such as habitat loss and degradation from various development activities, climate change and its myriad direct and indirect impacts, invasive species, energy and agricultural development, and ever-increasing demands for clean abundant water, are occurring on such a scale that no single organization, agency, or level of government acting in isolation can successfully address them. Using Strategic Habitat Conservation (SHC) as a guiding framework, the Service is focusing its leadership and resources on three activities that are critically important to its mission, and which help the larger conservation community sustain fish, wildlife and plants across the nation:

- Operationalizing a network of Landscape Conservation Cooperatives (LCC);
- Helping build a National Fish, Wildlife and Plants Climate Adaptation Strategy (NFWPCAS); and
- Implementing the Service’s Climate Change Strategic Plan.

Each of these high-priority activities uses three fundamental approaches that are proving increasingly effective and efficient in helping the broader conservation community sustain fish and wildlife and address today’s threats and challenges.

- They are highly **collaborative** and take advantage of the contributions of many partners;
- They emphasize a **landscape scale approach** to conservation which the conservation community embraces as holding the greatest promise of succeeding today and in the future; and

- They utilize an **adaptive management framework** that integrates science and management in a way that increases effectiveness in an environment of limited fiscal resources and unforeseen changes.

Collaboration

The Service is working with a diverse suite of partners to establish a national network of Landscape Conservation Cooperatives (LCC). The LCCs are landscape-scale conservation partnerships that produce and disseminate applied science products for resource management decisions, and that lay the foundation for a collaborative interdisciplinary approach to landscape management. Each LCC is guided by a steering committee comprised of its key partners. These partners may include representatives from academia, non-governmental organizations, local conservation groups as well as all principle federal land management agencies such as the National Wildlife Refuge System, National Park Service, Bureau of Land Management (BLM), Bureau of Reclamation, Department of Defense, National Oceanic and Atmospheric Administration (NOAA), Natural Resources Conservation Service, and U.S. Forest Service. Representatives from fish and wildlife agencies in all 50 states and the District of Columbia are also engaged with the LCCs. In the South Atlantic, Appalachian, Desert, North Atlantic, Gulf Coast Prairie, Prairie Plains and Potholes, Gulf Coastal Plains and Ozarks, and Western Alaska LCCs, representatives from state fish and wildlife agencies are serving as chairs, vice-chairs, or co-chairs of their LCC steering committees.

The importance that state fish and wildlife agencies place on establishing LCCs is also evident in that their directors, regional directors, program leads, and senior scientists are personally engaged and provide invaluable support and leadership. LCCs complement and build upon existing cooperative science and conservation entities such as fish habitat partnerships and migratory bird joint ventures as well as other efforts which focus on water resources and land protection. LCCs also benefit from their work with the U.S. Geological Survey's Climate Science Centers, and Cooperative Fish and Wildlife Research Units, as well as the National Park Service's Cooperative Ecosystem Studies Units. LCCs are unique in that one of their primary purposes is integration of existing work and providing new information or coordination to connect the current array of resource management partners. The value of LCCs is demonstrated in the Northern Rockies, an area already rich with effective landscape-scaled conservation partnerships. Here, the Great Northern LCC reached out to existing partnerships and determined the best way to support them is to focus on shared priorities and specific objectives, such as the work of Federal agencies and the Western Governors Association on integrating quality data about wildlife and habitats, and ensuring that separate conservation initiatives are not duplicative.

Similarly, the Service is working closely with partners within the federal government and the broader conservation community to develop a National Fish, Wildlife and Plant Climate Adaption Strategy (NFWPCAS). Development of this strategy is being led by the Service, NOAA, and the Association of State Fish and Wildlife Agencies, and is being coordinated with the President's Council on Environmental Quality (CEQ) and key Congressional personnel. This Strategy will prove valuable in terms of developing a common understanding between the three levels of government (federal, state and tribal) that have authority and responsibility for fish and wildlife resources, and the major strategies and actions that must be undertaken to maintain landscapes capable of sustaining abundant, diverse and healthy populations of fish, wildlife and plants in the face of climate change.

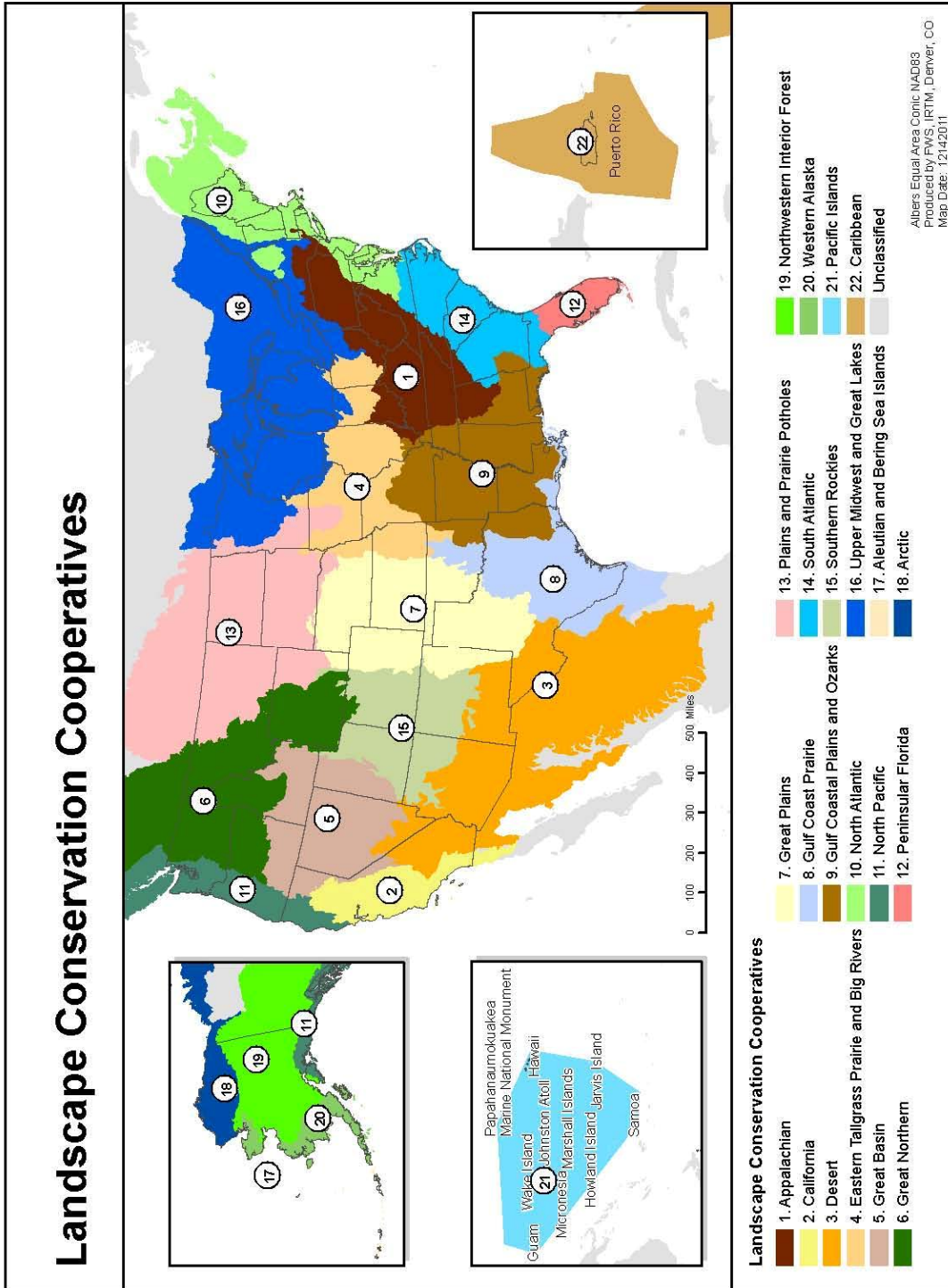
Landscape Approach

Members of the conservation community are confronted with management challenges. Many of the species and habitats they manage and the threats that impact resources occur on broad landscape scales and

across jurisdictional boundaries. To address these realities, they are finding it very effective to engage in landscape-scale approaches to fish and wildlife management through LCCs. The collaborative partnerships provided by LCCs allow organizations and agencies to use their limited fiscal resources, personnel and real property assets more effectively and efficiently.

Adaptive Management Framework

The National Research Council defines adaptive management as flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes advances scientific understanding and help adjust policies or operations as part of an iterative learning process. While adaptive management has been embraced by the Service for many years, its use today is even more essential as the challenges to successful conservation of fish and wildlife are compounded by the uncertainties of future climatic conditions. An adaptive management framework includes setting measurable objectives, making resource management investments and decisions, systematically assessing results against expected outcomes, then making adjustments for future strategies and actions. Building an adaptive management framework ensures that future decisions are not made simply by “trial-and-error” but on the basis of the best available science.



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

	2011 Actual	2012 Enacted	2013			Change From 2012 Enacted (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Cooperative Landscape Conservation (\$000)	14,727	15,475	+66	0	15,541	+66
FTE	43	62	0	0	62	0

Justification of Program Changes for Cooperative Landscape Conservation

The 2013 budget request for Cooperative Landscape Conservation is \$15,541,000 and 62 FTE, no net program change from the 2012 Enacted.

Program Overview

Landscape Conservation Cooperatives (LCC) will address a full range of conservation challenges across the Nation as they work collaboratively with other federal agencies, state agencies, Tribes, industry, non-governmental organizations (NGO), academic institutions, and the conservation community at large. Without duplicating the effort of existing partnerships, they promote efficient and effective targeting of federal dollars to obtain and analyze the science necessary for the Service and its partners to develop landscape-scale conservation models protecting fish, wildlife, plants and their habitats. This collaborative effort also enhances the Service’s ability to collect information which can be used to improve or augment many of the Service’s ongoing conservation efforts, such as Endangered Species Recovery Plans, National Wildlife Refuge Comprehensive Conservation Plans (CCP), Joint Ventures, and fish passage and habitat restoration.

As the LCC network becomes operational it 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 at 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.

LCCs use existing facilities and infrastructure and that of several conservation partners, thereby greatly reducing expenditures for space and associated costs. For example, in the North Pacific LCC and the Gulf Coastal Plains and Ozarks LCC, the Coordinator is working out of offices provided by the key state agency partners. In the South Atlantic LCC, the entire LCC staff is housed in the main office of the North Carolina Wildlife Resources Commission.

In FY 2012, the Service will focus funding and support on those LCCs that are best able to deliver priority conservation outcomes as defined by LCC partners while maintaining others at- a reduced level. Targeting funding in FY 2013 will provide for continued development of critical partnerships associated with more established LCCs and will focus resources so they are used effectively to benefit fish, wildlife, plants and their habitats.

Schedule for Landscape Conservation Cooperatives

FY 2010-FY 2012 Established	FY 2013 Focus
Arctic	Arctic
California	California
Great Plains	Great Plains
Great Northern	Great Northern
Gulf Coastal Plains and Ozarks	Gulf Coastal Plains and Ozarks
North Atlantic	North Atlantic
Pacific Islands	Pacific Islands
Plains and Prairie Potholes	Plains and Prairie Potholes
South Atlantic	South Atlantic
FY 2011-2012 Established	
Appalachian	Appalachian
North Pacific	North Pacific
Western Alaska	Western Alaska
Upper Midwest and Great Lakes	Upper Midwest and Great Lakes
Aleutian and Bering Sea Islands	
Eastern Tallgrass Prairie and Big Rivers	
Northwestern Interior Forest	
Peninsular Florida	
Gulf Coast Prairie	Gulf Coast Prairie

Key Examples and Accomplishments

Northeast Regional Conservation Framework

The North Atlantic LCC worked with the Northeast Association of Fish and Wildlife Agencies (NEAFWA) in FY 2011 to bring together conservation partners in a collaborative effort to develop a Northeast Regional Conservation Framework (NRCF). As a result of the leadership and impetus provided by the LCC and NEAFWA, partners gathered at a workshop in June and later the same year produced a shared conservation framework (NRCF). This framework has been invaluable in informing the efforts of states in the Northeast to identify and fund priority work through the Regional Conservation Needs program. This effort has improved management of terrestrial and marine species and their habitats, and has enabled land managers to improve habitat linkages and connectivity.

Through its work with partners, the North Atlantic LCC is developing a cohesive science strategy that identifies and prioritizes key data and information needs that are critical to supporting and informing the LCCs ecological planning, conservation design, monitoring and evaluation, and research activities. Few, if any, of these benefits would have been possible without the existence of the North Atlantic LCC and the importance states and other members of the conservation community now place on working together to improve fish and wildlife conservation at landscape scales.

Southeast Conservation Adaptation Strategy

At the invitation of the directors in the Southeast Association of Fish and Wildlife Agencies (SEAFWA), the South Atlantic, Gulf Coastal Plains and Ozarks, Gulf Coast Prairie, Appalachian, and Caribbean LCCs, are leading a concerted effort to develop a comprehensive and integrated strategy for helping fish and wildlife adapt to climate-changed habitats. When completed in FY2012, this document will identify strategies and actions partners can use at landscape scales, within and across agency boundaries, to sustain

fish and wildlife populations at desired levels. This strategy is expected to improve the effectiveness and efficiency of resource management throughout the Southeast in addressing threats to natural resources from climate change, human population growth, energy development, and increasing demand and competition for water. Identification and compilation of key geospatial information on conservation priorities from states, federal agencies, and NGOs in the Southeast supports and informs the development of this strategy.

The Pacific Islands Climate Change Cooperative (PICCC)

Sea level rise in the Pacific Islands threatens low-lying wetlands, estuaries, beaches, and many human settlements through accelerated coastal erosion and saltwater intrusion into streams and groundwater. Unfortunately, the capacity to support, coordinate and accomplish critical conservation research in the Pacific Islands is severely underdeveloped. To address this, PICCC partnered with University of Hawai'i researchers, U.S. Geological Survey (USGS), and local FWS National Wildlife Refuge staff to model and develop sea level rise maps under best- and worst-case scenarios. The resulting maps and timetables will assist partners, coastal land managers, and stakeholders in developing potential management strategies, assessing habitat acquisition needs, and identifying gaps for future work. Results of this work will be applicable to conservation strategies for four endangered Hawaiian waterbirds (Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, and Hawaiian duck) and migratory birds coming from Alaska, Siberia, and Asia. This collaborative effort is the first of its kind in Hawai'i to focus sea level rise impacts research and mapping on coastal wetland habitats and endangered species.

The Gulf Coastal Plains and Ozarks LCC (GCPO)

In conjunction with the US Forest Service's Northern Institute of Applied Climate Science (NIACS) and Northern Experiment Station, the Gulf Coastal Plains and Ozarks LCC is working on a joint project with the Appalachian LCC to forecast landscape change in the entire Central Hardwoods region. Using the Landis model to simulate future landscapes influenced by climate change, urbanization, and other landscape stressors, this project will conduct initial assessments of the implications of these altered landscapes on fish and wildlife species. The LCC is working closely with the Central Hardwoods Joint Venture to ensure this effort is useful to their conservation planning for migratory birds (including the cerulean warbler and Henslow's sparrow, regional Species of Concern, and resident gamebirds (wild turkey, ruffed grouse, and northern bobwhite). The LCC also provides valuable input for the development of regional conservation adaptation strategies for many bat species, including the federally endangered Indiana bat, the northern long-eared bat (another regional Species of Concern) and the red bat – all species dependent on forested landscapes and potentially susceptible to White Nose Syndrome (the leading edge of which is squarely in the GCPO geography). The sustainability of a number of other mammal (bobcat, black bear, and gray squirrel), amphibian (southern redback salamander) and reptile (timber rattlesnake) species will also be immediately assessed in light of anticipated changes across the region's forests and grasslands. Expansion to other species representative of healthy landscapes in this region is also planned.

2013 Program Performance

Delivering Priority Conservation Outcomes Defined by LCC Partners

The Service will continue to strategically build the National LCC Network. In FY 2012, the Service is working with its LCC partners to complete administrative underpinnings and work plans for each LCC and identify conservation outcomes. Each LCC will establish explicit objectives and targets and then prepare biological plans and conservation designs capable of achieving those targets. In FY2013 more attention will be directed toward establishing landscape-scale conservation targets and objectives for the priority species and habitats collaboratively identified by LCC steering committees. As a result, partners can better align their funding and personnel to implement or complement specific activities laid out in the

conservation designs. As these transitions occur, LCCs will stimulate, inform, and leverage resources for the conservation delivery activities of partners which will provide significant benefits for fish and wildlife and help sustain those resources in critical landscapes across the country. As this occurs, LCCs will devote more time and resources to designing and implementing monitoring and evaluation efforts capable of determining the extent of those successes, while refining and improving science and planning tools which will benefit future biological planning and conservation delivery.

Cooperative Landscape Conservation - Performance Change and Overview Table

Performance Goal	2010 Actual	2011 Plan	2011 Actual	2012 Target	2013 President's Budget	Change from 2012 to 2013 PB
Number of LCCs formed	9	15	15	18	18	0
Number of LCCs operational	7	9	14	14	14	0
Number of LCCs with a management/operating plan in place	8	12	10	14	14	0
Comments: In FY 2012, the Service will focus funding and support on those LCCs that are best able to deliver priority conservation outcomes as defined by LCC partners while maintaining others at a reduced level. Targeting funding in FY 2013 will provide for continued development of critical partnerships associated with more established LCCs and will focus resources so they are used effectively to benefit fish, wildlife, plants and their habitats. The four remaining LCCs (Eastern Tallgrass Prairie & Big Rivers; Peninsular Florida; Aleutian & Bering Sea Islands; Northwestern Interior Forest) that FWS is establishing will not be fully operational until at least FY 2014.						
Number of decision-support tools provided to conservation managers to inform management plans/decisions and ESA Recovery Plans (Cumulative) INITIATED	21	25	35	54	71	17
Number of decision-support tools provided to conservation managers to inform management plans/decisions and ESA Recovery Plans (Cumulative) COMPLETED	2	7	15	23	30	7
Number of conservation delivery strategies and actions evaluated for effectiveness (Cumulative) INITIATED	11	12	17	23	28	5
Number of conservation delivery strategies and actions evaluated for effectiveness (Cumulative) COMPLETED	1	4	5	8	12	4
Number of landscape-scale conservation strategies developed that can direct management expenditures where they have the greatest effect and lowest relative cost (Cumulative) INITIATED	13	15	20	25	29	4
Number of landscape-scale conservation strategies developed that can direct management expenditures where they have the greatest effect and lowest relative cost (Cumulative) COMPLETED	1	6	5	6	9	3

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

	2011 Actual	2012 Enacted	2013			Change From 2012 Enacted (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Adaptive Science (\$000)	16,243	16,723	+20	+770	17,513	+790
FTE	12	17	0	0	17	0

Summary of 2013 Program Changes for Cooperative Landscape Conservation and Adaptive Science

Request Component	(\$000)	FTE
• Cooperative Recovery	+770	0
Program Changes	+770	0

Justification of Program Changes for Adaptive Science

The 2013 budget request for Adaptive Science is \$17,513,000 and 17 FTE, a net program change of +\$770,000 and +0 FTE from the 2012 Enacted.

Adaptive Science Cooperative Recovery (+\$770,000/+0 FTE)

Working under the Strategic Habitat Conservation framework and in consultation with Landscape Conservation Cooperatives (LCCs), the Cooperative Recovery program will consider and prioritize competitive project submissions for endangered species recovery projects on refuges or in surrounding ecosystems. The participating Service programs, Endangered Species, Migratory Birds, National Wildlife Refuge System, Partners for Fish and Wildlife and Fisheries and Aquatic Resource Conservation, will be supported by the science acquired with the additional funding requested.

Program Overview

These funds support adaptive science capacity, largely targeted at our LCCs, which encompass 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. The Service will also use 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 is needed by the Service across the nation to drive landscape-scale conservation. These funds will address unmet adaptive science needs of Service programs such as:

- the relationship between fish and wildlife (e.g. bats and golden eagles) and renewable energy development;
- the identification, assessment and control of invasive species;
- 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 to maintain genetic diversity essential to preserving healthy, resilient populations of fish, wildlife and plants.

In addition to informing biological planning and conservation design for the LCCs, the scientific information produced will help ensure that the Service fulfills its regulatory and management

responsibilities for threatened and endangered species, migratory birds, marine mammals, and inter-jurisdictional fish. To achieve these critically-important outcomes, the Service will maintain 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.

(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 management options, identify their strengths and weaknesses, and ultimately identify the mix of conservation actions that have 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.

Key Examples and Accomplishments

- The Western Alaska LCC held an April, 2011 workshop in Anchorage that brought together 150 land and resource managers, field specialists, researchers and local knowledge experts to identify and prioritize climate change related science and information requirements for land and resource management in western Alaska and outline important areas for future collaboration. The workshop highlighted the necessity for data management, integration, and analysis, along with a need for studies integrating physical processes, ecological processes, and notable species. The outcomes will inform the development of the Western Alaska LCC Science Strategy. As an outgrowth of the workshop, the LCC is initiating a pilot program to address critical science needs and information gaps. The LCC will concentrate its efforts on one area at a time to make sure the science generated has a significant impact. The first year of this pilot program will focus on processes and responses to climate change in coastal systems. The goal is to strategically identify

key questions and leverage resources toward addressing the resulting issues. Short term projects focus on caribou and tundra; long-term projects are focusing on understanding permafrost and the Integrated Ecosystem Model which takes data from three different climate models and incorporates new hydrology data.

- The Arctic LCC leveraged \$3.6 million in partner contributions to further its understanding of arctic ecosystems, which are facing the effects of a warming and drying ice-dependent climate. Work on habitat modeling for polar bears integrates snow physics, terrain modeling, and polar bear biological information to predict current and future den locations. This research will have an immediate impact on land management and will facilitate avoidance of polar bear den sites during development along the Beaufort Coast. Other projects include work on collaborative partnerships, geophysical processes, biological assessments, human dimensions, geospatial data acquisition and synthesis, and landscape level monitoring and modeling.
- The California LCC focused on building decision support for climate adaptation, ecosystem response, and species and habitat information. Among the projects is the development of a climate adaptation commons, an online site for sharing climate adaptation information among land managers and technical experts and a project analyzing the potential impacts of sea level rise on tidal marshes in the San Francisco estuary. Sea level rise will impact a range of sensitive tidal marsh species including the listed California clapper rail and salt marsh harvest mouse. The California LCC also supported work on the potential impacts of climate change on inland fish in California and a decision support system that integrates fire risk, species distribution models, and population models with future scenarios for climate change and land use. Sensitive species to be addressed in these fire-prone ecosystems include the southwestern willow flycatcher, big-eared woodrat and a range of native plant species. The information will support management decisions in southern California, one of the most highly threatened biodiversity hotspots nationwide.
- The Great Northern LCC has undertaken a project to predict the effects of climate change on aquatic ecosystems in the Great Northern Landscape. This project applies new and existing techniques for combining downscaled climate spatial data with fine-scale aquatic species vulnerability assessments, population genetic data and remotely sensed riparian and aquatic habitat analysis. Results may be used to identify populations and habitats of native salmonids (cutthroat trout, bull trout) most susceptible to the impacts of climate change; develop monitoring and evaluation programs; inform future research needs; and develop conservation delivery options in response to climate change and other stressors (e.g., habitat loss and invasive species) that are often complicated or exacerbated by climate change. Data will be made available to resource managers dealing with aquatic systems, including the Crown Managers Partnership, USGS, FWS, USFS, BLM, state management agencies, and private organizations (e.g., Trout Unlimited). Workshops will be held in 2012-2014 to present the results and decision support tools to managers and to provide hands-on training.
- The Upper Midwest and Great Lakes LCC (UMGL LCC) provides a venue for the conservation community to explore how and where to sustain landscapes for natural and cultural resources. In FY 2011, the LCC supported projects to improve conservation delivery in priority areas, such as

adaptation to climate and other landscape change for the tropic structures of Great Lakes fisheries, stream aquatic communities, focal bird species, natural resources on tribal lands, ecological connectivity, and the social dimensions of natural resource management. One project used models of climate change scenarios to identify vulnerabilities across UMGL LCC systems, conducted workshops to demonstrate decision support tools and develop management strategies, and developed a web-based decision support system to integrate available information. Such work will improve managers' and stakeholders' ability to identify potential management scenarios and adaptation strategies.

2013 Program Performance

In FY 2013 the Service will focus on implementation of the National Fish, Wildlife, and Plant Climate Adaptation Strategy (NFWPCAS) through a dual course of action. At the national scale, the Service proposes to work with partners at NOAA and state wildlife agencies to develop a NFWPCAS Implementation Committee. This body will provide a venue for promoting awareness of the issue, present a forum for agencies to identify opportunities for programmatic coordination and integration, and align natural resource sector adaptation activities with other efforts (e.g., agriculture, energy, transportation, etc.). This level of work is essential to mitigate duplication and redundancy among agency programs, establish a level of consistency across sectors and agencies and provide the level of coordination essential to success.

At the same time, the Service will place major emphasis on using LCCs to address the “who, what, when and where” of the many strategies and actions identified in the NFWPCAS. For instance, the number one action recommended in the draft strategy is to “identify high priority areas for protection using species distributions, habitat classification, land cover and geophysical settings”. This is why LCCs were developed and provide an ideal venue to bring together the many partners necessary to accomplish this work.

Gulf Coastal Plains and Ozarks (GCPO) LCC Increases Coordination of Indiana Bat Conservation

Bats provide invaluable ecosystem services by consuming insects that cause over a billion dollars in annual damage to agricultural crops. The endangered Indiana bat, like many bat species, is an excellent indicator of ecosystem health. The Indiana bat is a social species that concentrates in large numbers in caves during winter hibernation and otherwise resides in forests. Within these broad habitat associations, Indiana bats use very specific microhabitats. In winter the caves must be slightly above freezing and in spring the Indiana bats need to roost in wooded areas under loose tree bark on dead or dying trees. These habitats are threatened by a multitude of stressors, such as urbanization and fragmentation; the species is also highly susceptible to White Nose Syndrome – an emerging infectious disease caused by a fungus that is likely exotic in origin. The caves and mines in the Central Hardwoods region of the United States where the GCPO LCC operates support the vast majority of the hibernating population of Indiana bats.

Recognizing these problems are bigger than any individual agency, organization, region, or program, the GCPO LCC is providing part of the staffing and funding necessary to better understand and address these issues in a concerted and coordinated multi-partner manner within this region. Working in collaboration with the U.S. Forest Service's Northern Institute of Applied Climate Science, USGS's Northeast Climate Science Center, the Gulf Coast Cooperative Ecosystem Studies Unit, the Appalachian LCC, and the Central Hardwoods Joint Venture (and each of the constituent partners), the GCPO LCC is using Landis to model what the future landscape of the Central Hardwoods would look like in light of expected changes in urbanization, forest fragmentation and other land use patterns. This information is enabling assessment of the cumulative impact of these changes on endangered Indiana bats as well as other species and is the first step in drafting an appropriate management response. The GCPO LCC is also working closely with the Service's National Wildlife Refuge Inventory and Monitoring (I & M) Program to implement coordinated surveys of bat communities on refuges, as well as working with I&M staff and partners within the Southeastern Bat Diversity Network to ensure standard protocols are adopted. Through the partnership efforts of the GCPO LCC the scope of coordinated bat monitoring has expanded to include 53 additional refuges in 3 USFWS Regions as well as 3 Ecological Services (ES) offices. Training scheduled for FY 2012 will include other federal agencies and state partners to further increase standardization and coordination of approaches. The goal of these surveys is to track the bats we lose and to more efficiently target our limited resources on key areas to conserve and avoid future bat losses. The GCPO LCC is currently assembling an Adaptation Management Science Team consisting of partners from other Service programs (Refuges, ES, Fisheries, and Migratory Birds) to ensure the science emanating out of the LCC is being translated on-the-ground and informing existing conservation delivery.



Adaptive Science – Combined Performance Change and Overview Table

Performance Goal	2010 Actual	2011 Plan	2011 Actual	2012 Target	2013 President's Budget	Change from 2012 to 2013 PB
Number of risk and vulnerability assessments developed or refined for priority species or areas. (Cumulative) INITIATED	20	20	32	62	91	29
Number of risk and vulnerability assessments developed or refined for priority species or areas. (Cumulative) COMPLETED	1	1	5	16	29	13
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) INITIATED	28	32	46	56	65	9
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) COMPLETED	2	12	12	18	23	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) INITIATED	33	35	58	79	97	18
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) COMPLETED	1	9	14	29	42	13
Number of biological planning and conservation design projects developed in response to climate change (Cumulative) INITIATED	27	22	39	49	58	9
Number of biological planning and conservation design projects developed in response to climate change (Cumulative) COMPLETED	1	8	9	15	20	5
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) INITIATED	13	14	37	45	52	7

Adaptive Science – Combined Performance Change and Overview Table

Performance Goal	2010 Actual	2011 Plan	2011 Actual	2012 Target	2013 President's Budget	Change from 2012 to 2013 PB
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) COMPLETED	1	6	6	9	18	9
Number of conservation genetics projects to improve and enhance conservation design and delivery for fish and wildlife populations in response to climate change (Cumulative) INITIATED	3	5	7	9	11	2
Number of conservation genetics projects to improve and enhance conservation design and delivery for fish and wildlife populations in response to climate change (Cumulative) COMPLETED	1	2	2	2	5	3

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