

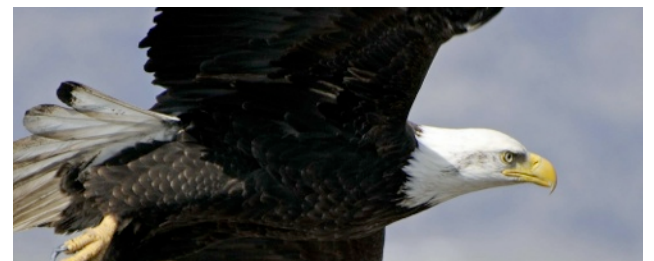


GCPO

Gulf Coastal Plains & Ozarks
Landscape Conservation Cooperative



LANDSCAPE CONSERVATION
COOPERATIVES



2012 Annual Report

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Table of Contents

Mission & Vision of the GCPO LCC	Page 4
From our Steering Committee Co-Chairs	Page 5
The roles of the GCPO LCC and our 2012 major accomplishments	Page 7
Providing a landscape perspective: using conservation frameworks and ecosystem conceptual modeling to develop a science agenda for the LCC	Page 8
Linkages across partnerships: Climate Science Center coordination	Page 9
Incorporating future change into conservation planning: The Gulf Coast Vulnerability Assessment	Page 9
Define and design sustainable landscapes: Collaborative assessment of Lower Mississippi River floodplain habitats to create an alligator gar/aquatic species habitat model	Page 10
Monitoring effectiveness of conservation: Surveying winter waterfowl distribution and evaluating forecasts of vulnerability	Page 11
Overview of GCPO LCC Operations and Progress	Page 12
Steering Committee Meetings	Page 12
Partnership Advisory Council Meeting	Page 14
The Growing Capacity of the GCPO LCC	Page 15
Additional Priority Projects in 2012	Page 16
Beyond LCC Borders	Page 25

Mission

The Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative articulates a shared vision for sustainable natural and cultural resources in the face of a changing climate and other threats; fosters a cooperative capacity within the conservation community to meet the challenges of achieving that vision; and facilitates the refinement of that vision through targeted evaluation over time.

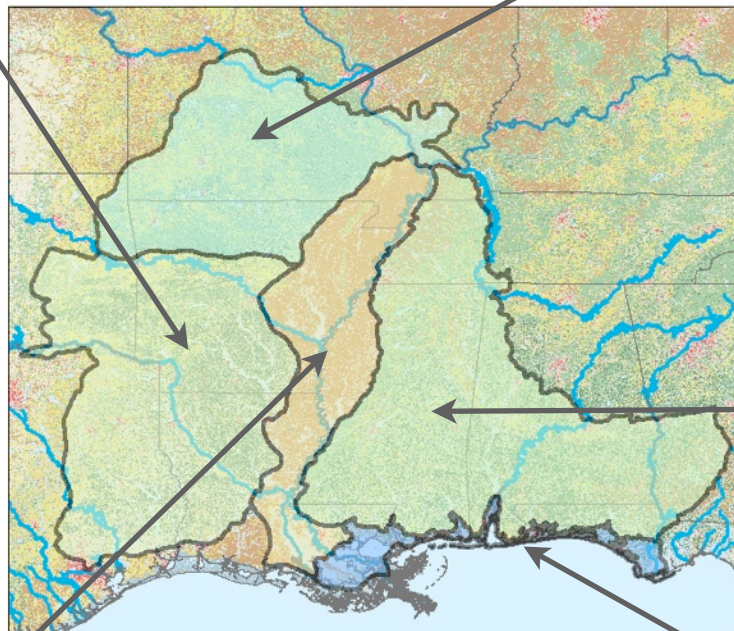
The National Vision for Landscape Conservation Cooperatives

Landscapes capable of sustaining natural and cultural resources for current and future generations.

West Gulf Coastal Plain: 39 million acres spanning Arkansas, Louisiana, Oklahoma, and Texas. Ecologically similar to the EGCP, the region is ~71% forested, with nearly ~30% in evergreen forest, and a more western-influenced flora and fauna. The WGCP is the LCC sub-unit with the lowest proportion of land in row crops or pasture, but greatest fraction of developed land. The region has 11,000 miles of rivers.

Interior Highlands: Includes the Ozark Highlands, Boston Mountains, Arkansas Valley, and Ouachita Mountains - the only notable topographic relief between the Appalachian and Rocky Mountains. Altitudes to 2,700 feet. ~60% is forest; more than ~25% is grasslands. Highly erodible carbonates and sandstones combine with abundant water to produce a karst topography dotted with cliffs, caves, seeps, and springs.

Mississippi Alluvial Valley: 28 million acres, extends 600 miles from southern Missouri to coastal Louisiana, 100 miles at its widest. An ecosystem created by the river and its flood pulses. Pre-settlement, the valley contained a 22-million acre expanse of sub-tropical/temperate zone forested wetlands. Agricultural development has resulted in a land base that is 50% row crops; forested wetlands remain on only ~22% of the area, making habitat restoration and connection a priority.



East Gulf Coastal Plain: 65.5 million acres, the largest sub-unit of the GCPO LCC. Touches 7 states: Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, and Tennessee. ~68% forested with ~15% of this in shrub-scrub (i.e., clearcuts); ~6% developed. More than 14,500 miles of river course across this region, accounting for more than a third of all river miles within the entire GCPO LCC.

Gulf Coast region: Includes marshlands in Louisiana and the entire coastline of Mississippi, Alabama and the panhandle of Florida. This region includes a significant proportion of the northeast Gulf Coast's marshes, which make up 60% of the total in the continental US. This region also extends out 200 miles offshore into Gulf of Mexico waters.

From our Steering Committee Co-chairs



Kenny Ribbeck, GCPO LCC
Steering Committee Chair



Steve Patrick, GCPO LCC
Steering Committee Vice Chair

2012: The GCPO LCC's year of consolidation, focus and expanding our capacity

In 2012, the Gulf Coastal Plains & Ozarks Landscape Conservation Cooperative (GCPO LCC) embarked upon the development of a science agenda that will support the research and applications we need to make enhanced conservation measures across a 180-million-acre landscape a reality. We added seven new positions to our staff roster, added representatives from the National Park Service and the US Army Corps of Engineers to our Steering Committee, and welcomed representatives from the Gulf of Mexico Alliance, the Southeast Bat Diversity Network and Southeast Partners in Amphibian & Reptile Conservation to our Partnership Advisory Council. Most of our new staff are shared positions, representing embedded linkages within LCC partner organizations and connections between disciplines and programs.

It is a testament to the holistic and inter-disciplinary approach of the GCPO LCC that many of the projects listed in this annual report represent interconnected efforts resulting from the leveraged resources of many organizations, including some of our neighboring LCCs. For example, the Conservation Planning Atlas, under development throughout 2012, is scheduled to come online in spring 2013 and will be providing many types of information to a wide audience in the GCPO and South Atlantic regions, including a seamless set of land cover data, which is being developed as part of our Land Cover Database project. The GCPO LCC now has a high capacity to develop sophisticated tools and applications that will give field biologists and planners the ability to place their activities within a larger landscape context.

The recruitment, establishment and first workshop of our Adaptation Science Management Team (ASMT) in 2012 were key milestones. We believe that the research and tools the LCC develops must translate into solutions that work on the ground, where conservation happens. The ASMT is an essential step toward this goal, as they will develop

a science agenda for the LCC that focuses our Cooperative not only on landscape level science, but the highest priority landscape science needs and questions. Likewise, our Gulf Coast Landscape Conservation liaison brought together the Gulf Coast Vulnerability Assessment team in 2012 to focus on adaptation approaches to deal with future development, sea level rise, and other climate-induced changes across the entire Gulf coast.

The GCPO LCC also played a key role in facilitating progress toward an overarching conservation vision for the entire Southeast, known as the Southeast Conservation Adaptation Strategy (SECAS). This initiative includes all of the state and federal natural resource agencies in 15 southeastern states, Puerto Rico and the US Virgin Islands. We anticipate that the groundwork laid in 2012 will pave the way toward significant achievements in 2013.

As the GCPO's newly elected Steering Committee Chair and Vice-chair, we are honored to be in the company of our distinguished predecessors, Mark Musaus, who retired from the US Fish & Wildlife Service at the end of 2012 and Ron Seiss, previously of the Mississippi Department of Wildlife, Fisheries & Parks, now working for The Nature Conservancy. Their early direction and coordination were essential in standing up this LCC and providing guidance to the development of the staffing we now experience. As our Cooperative moves forward, we will be looking outward to you, our conservation community, for more guidance on your vision of our role in landscape conservation.

We believe that one of the most important aspects of Landscape Conservation Cooperatives is that we are self-directed partnerships. As such, we have the ability to be flexible in our focus on the issues and approaches that will work for our region. As such, it is incumbent upon each of us to participate in the collaborative approach of the Cooperative and to provide the input and perspectives that will ensure the highest quality decision-making as we confront the accelerating pace of change in our environment and society. We thank our community of partners for their ongoing dedication to this effort, while encouraging each to tap into the science teams that have been developed throughout the LCC network. Your engagement and utilization of this amassed resource will determine the benefit that our Cooperative and others can provide toward conserving our natural resources.

Till we meet in Memphis this spring, or connect via airwaves, we encourage you to [share](#) your outdoors experiences.

Kenny Ribbeck,

Wildlife Division Administrator, Louisiana Department of Wildlife and Fisheries

Steve Patrick,

Assistant Executive Director for Field Operations, Tennessee Wildlife Resources Agency

[join the gcpolcc.org](http://join.thegcpolcc.org)

THE ROLES OF THE GCPO LCC AND OUR 2012 MAJOR ACCOMPLISHMENTS

Functional Roles of the GCPO LCC in Fostering Progress toward Landscape Scale Conservation

The Gulf Coastal Plains & Ozarks LCC has adopted Strategic Habitat Conservation (SHC) as a fundamental business model for its conservation activities, integrating the fundamental adaptive management

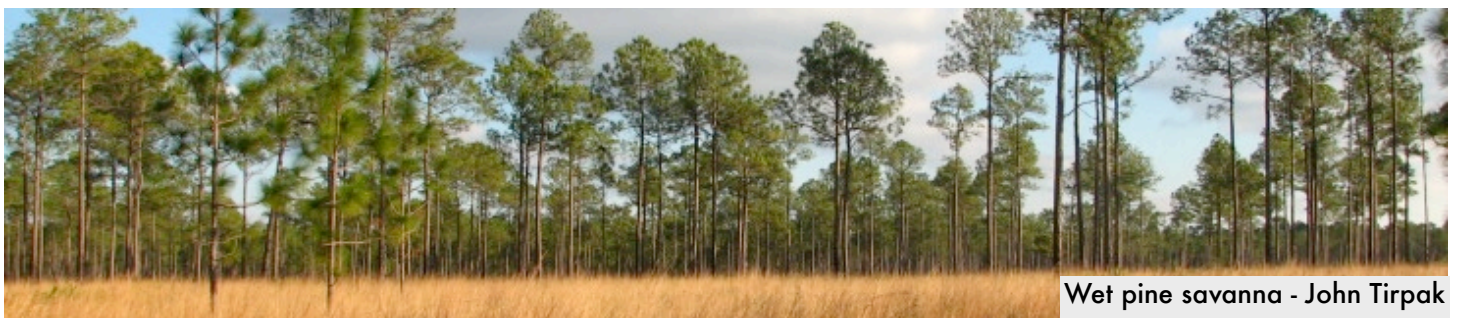
components of biological planning, conservation design, conservation delivery, assumption-based research, and monitoring, evaluation and refinement. Within the context of SHC, LCC staff and partners may provide leadership or expertise, coordinate activities, collaborate in projects, help leverage funding and even provide funding support. All of these activities generally fit into five broad categories defined by the role that the Cooperative plays in advancing landscape scale conservation and science. These five “functional roles” are:

1. Offer partners a landscape perspective for their conservation activities
2. Develop explicit linkages across existing conservation partnerships that span multiple taxa and habitats
3. Help incorporate future change into conservation planning (such as urbanization, sea-level rise)
4. Pull these pieces together to help conservation partners define and design sustainable landscapes
5. Monitor the effectiveness of conservation programs towards achieving sustainable landscapes

Each major accomplishment highlights one project that embodies one of the five functional roles played by the GCPO LCC.



A shared vision is prerequisite to action - Greg Wathen

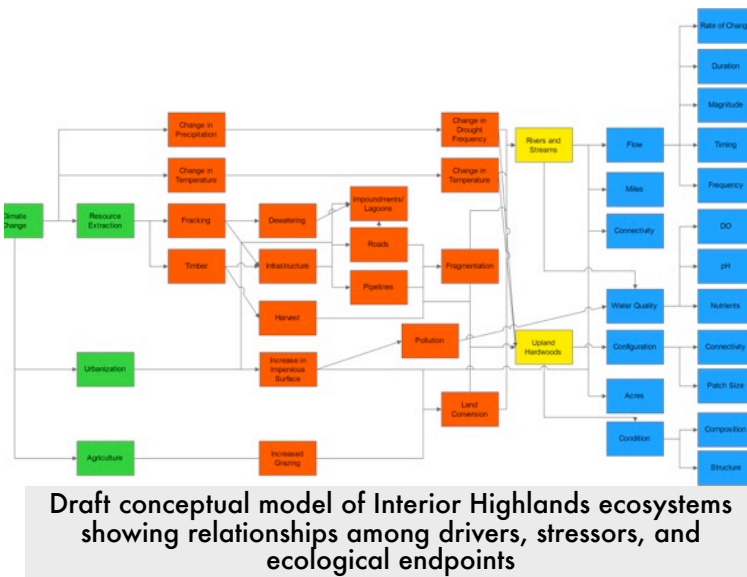


Wet pine savanna - John Tirpak

Major Accomplishments in 2012

1. Providing a landscape perspective: using conservation frameworks and ecosystem conceptual modeling to develop a science agenda for the LCC

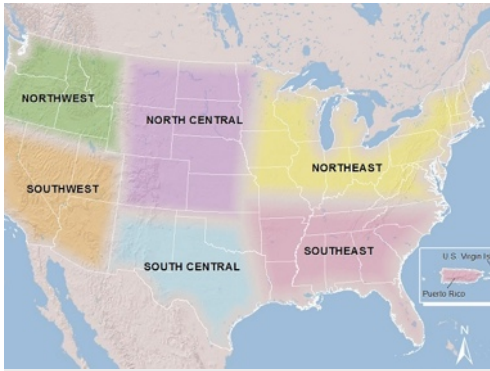
The Cooperative's [Adaptation Science Management Team](#) (ASMT) formed and held its first workshop in 2012. The highest priority of the ASMT is to develop a Science Agenda for the GCPO LCC to identify not only the best landscape science projects, but also the most important ones. In 2012, the ASMT initiated this process during a September workshop of 52 individuals, including 34 of the 38 [ASMT members](#). During the workshop, participants met as a group and also split into teams focusing on five subgeographies within the GCPO region: the West and East Gulf Coastal Plains, the Gulf Coast, the Mississippi Alluvial Valley, and the Interior Highlands.



[Findings and decisions from the first ASMT Workshop](#)

- ◆ The GCPO LCC needs an overarching modeling approach that could serve as a framework for identifying and applying critical science that will better inform conservation decisions.
- ◆ Incorporate scenario planning; however, first identify clear decision contexts tied to explicit conservation objectives.
- ◆ Use a conceptual modeling approach to simplify the complexity at a system-level scale and home in on the important drivers and stressors within each subgeography. Conceptual modeling is useful for identifying important knowledge gaps and building an LCC Science Agenda, but drivers and stressors are only part of the science portfolio needed to better inform conservation. Conceptual models communicate a common vision of system dynamics and focus LCC efforts on the science and strategies needed to respond to stressors and other key components of each system.
- ◆ Fragmentation of terrestrial habitats and altered hydrology within aquatic habitats are nearly universal stressors of importance (though the mechanisms for these differed among subgeographies).
- ◆ By workshop's end, a large majority of attendees identified themselves as vested members of the GCPO LCC and found the workshop to be a valuable use of their time.

2. Linkages across partnerships: Climate Science Center coordination



USGS Climate Science Center regions

The GCPO LCC region overlaps with the focal areas of three Climate Science Centers (CSC): The [Southeast CSC](#), the [South Central CSC](#), and the [Northeast CSC](#). USGS Climate Science Centers are an integral part of our national response to climate change. Broadly, their missions focus on providing natural resource managers the scientific tools and information they need to address the impacts of climate and other global changes on fish and wildlife and their habitats, and they work closely with the LCCs to ensure that they are addressing critical science needs identified by the Cooperatives.

The GCPO LCC Coordinator and Science Coordinator worked hard throughout 2012 to establish good working relationships with each Climate Science Center. They participated in formulating the CSCs' research priorities by ensuring they would support the needs and focus of the LCC.

3. Incorporating future change into conservation planning: The Gulf Coast Vulnerability Assessment



Hurricane Katrina - Nasa Goddard

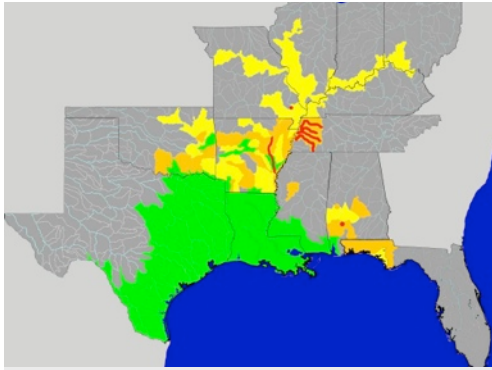
The goal of the Gulf Coast Vulnerability Assessment (GCVA) is to enhance conservation and restoration planning and implementation by providing a better understanding of the effects of climate change, sea level rise, and land use change on Gulf of Mexico coastal ecosystems and their species. The GCVA represents a collaborative effort shared by the 4 LCCs with Gulf Coast responsibilities, as well as significant support from NOAA.

GCVA accomplishments in 2012:

- ◆ Formed a set of multidisciplinary teams that will assist with implementation. A Project Consultation Team provides a broad range of expertise, provides representation of regional organizations, and ensures that final products are tailored to meet partners' needs. There are two experts teams: the Climate and Sea Level Rise Experts Team and the Ecosystems and Species Experts Team.
- ◆ Stakeholders across the Gulf Coast, as well the LCCs, were identified and receive information about the GCVA to ensure they have an opportunity to provide input.
- ◆ Stakeholders developed and reviewed a detailed work plan; identified products to be developed by the GCVA; and defined and mapped the GCVA project area.

4. Define and design sustainable landscapes: Collaborative assessment of Lower Mississippi River floodplain habitats to create an alligator gar/aquatic species habitat model

The GCPO LCC identifies the Lower Mississippi River Valley as an important geographic component of the GCPO geography and lists aquatic habitat characterization as a priority. This project is centered on St. Catherine's Creek National Wildlife Refuge (SCC NWR), but will eventually result in decision support tools that can characterize the availability, suitability, and spatial distribution of aquatic habitat throughout the Lower Mississippi River floodplain. This pilot initiative brings together multiple state and federal LCC partners, SCC NWR, Private John Allen National Fish Hatchery (NFH), and is supported by the [National Fish Habitat Partnership](#) through the [Southeast Aquatic Resources Partnership](#) (SARP) and the [USFWS Inventory & Monitoring Program](#). The interrelated components of the project are described below:



Historic and current alligator gar range

- ◆ Develop a spatial habitat model with biological forecast capabilities. The model will have the capacity to evaluate current aquatic habitat availability and assess the influence of different environmental stressors on habitat availability and suitability. In 2012, researchers completed a first iteration of the model for assessing the focal species alligator gar. Workshop demonstrations of the model have illustrated the potential for implementing the Fish & Wildlife Service surrogate species concept.
- ◆ Use a network of 15 – 20 telemetry receivers to collect behavioral data and habitat use on 40 alligator garfish at St. Catherine's Creek NWR and in the Mississippi River. The data feeds the model and decision support tools, but it has also provided important information on alligator gar behavior and floodplain habitat use to managers.
- ◆ Maintain a network of 10 continuous water quality monitors on SCC NWR to monitor water quality. These data are also integral to model development and for characterizing aquatic habitat on the refuge to help interpret behavioral data collected from telemetry.
- ◆ Develop and apply new technology for collecting and analyzing aquatic habitat data. Because there is little available aquatic habitat information in river floodplain ecosystems, this project incorporates a variety of remote sensing techniques as a cost effective means of data collection over 3 million acres of historic and current floodplain habitat, including:



Alligator Gar - yaybiotic on Tumblr

- land/water classification- delineates the spatial distribution of water and land on the floodplain for each satellite image
- turbidity water classification – quantifies the spatial distribution of turbid water as a measure of water quality and a relative signature of the river’s influence on the floodplain
- thermal gradient – evaluation of the thermal infrared band in the satellite image indicates relative thermal gradients on the landscape
- floodplain inundation model – uses land/water classification and elevation data to predict the relative frequency, depth, and duration of flooding to which floodplain habitat may be subjected.

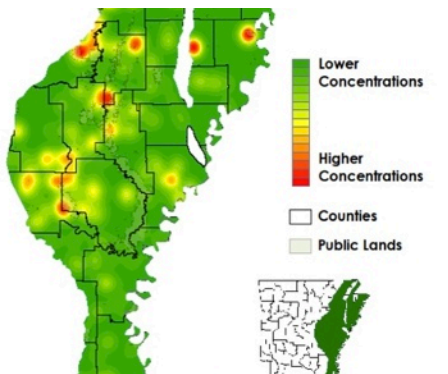


Mississippi River satellite image - wireddivision.jp - tumblr

◆SARP prioritized funds from the National Fish Habitat Action Plan to characterize subsurface physical habitats in permanently flooded areas using side scan sonar technology. Biologists were trained and sonar equipment was tested during 2012.

5. Monitoring effectiveness of conservation: Surveying winter waterfowl distribution and evaluating forecasts of vulnerability

This project was completed in 2012. In collaboration with the US Fish & Wildlife Service Inventory & Monitoring Program and the Lower Mississippi Valley Joint Venture, the GCPO



Mallard density map for the Delta - Arkansas Game & Fish Commission

LCC worked with agency partners to develop technology to improve the accuracy and efficiency of waterfowl surveys in the lower Mississippi Alluvial Valley. It has been adopted by agencies in Arkansas, Mississippi, Missouri and Louisiana. Arkansas Game and Fish Commission conducted their [first stratified, transect-based aerial survey in the Arkansas River valley](#) during winter of 2012-2013.

This improved survey method has the advantages of more extensive coverage and increased accuracy compared to older methods. In addition, a data analysis task that used to take days now can be completed in about half an hour. More accurate waterfowl data allow tracking of changes in abundance in response to changes in land use, flooding patterns or weather conditions. More accurate data also will allow evaluation of the predicted effects of climate change on migration patterns in mallards, since this species’ movements typically respond to weather patterns each winter.

OVERVIEW OF GCPO LCC OPERATIONS AND PROGRESS

Steering Committee Meetings

In 2012, the GCPO LCC Steering Committee formally met twice and the Partnership Advisory Council formally met once. In addition, flexible use of web meeting technology allowed regular communication, coordination and decision-making without travel costs.

[Spring 2012 Steering Committee \(SC\) meeting](#)

Spanish Fort, Alabama

Theme: Towards a Future Conservation Landscape in the GCPO LCC: Connecting to the Gulf

- ◆ Approved the creation of an Adaptation Science Management Team ([ASMT](#)) and agreed to assist in recruiting appropriate members. The ASMT is the primary technical science body guiding decision-making and research of the LCC. The SC also stressed the need for greater coordination among partners already working on Vulnerability Assessments.
- ◆ The SC approved formation of an [Ecosystem Services team](#) with Mike Osland as lead. Three SC members volunteered to guide development of this team.
- ◆ Approved the [GCPO LCC Communications Strategy](#); requested further guidance on use of the Communications Network and website functions.
- ◆ Selected and approved the GCPO LCC logo.
- ◆ Recognized that a strength of the LCC in addressing the Gulf issue of hypoxia is its landscape-scale reach into the upper watershed of the Mississippi River, where many Gulf organizations do not work. Asked the ASMT to consider nutrient management, water quality, wetland restoration, and ecosystem services within the GCPO landscape as part of a larger set of issues that the LCC should address in answering the question, "What kinds of landscape planning tools would be appropriate for tackling these issues across the entire LCC?"

Steering Committee Members

Alabama Department of Conservation and Natural Resources

American Bird Conservancy

Arkansas Game and Fish Commission

Auburn University

Ducks Unlimited

Florida Fish and Wildlife Conservation Commission

Kentucky Department of Fish and Wildlife Resources

Louisiana Department of Wildlife and Fisheries

Mississippi Department of Wildlife, Fisheries, and Parks

Mississippi State University

Missouri Department of Conservation

National Bobwhite Conservation Initiative

National Oceanic and Atmospheric Administration

National Park Service

Oklahoma Department of Wildlife Conservation

Texas Parks and Wildlife Department

The Conservation Fund

The Nature Conservancy

Tennessee Wildlife Resources Agency

U.S. Fish and Wildlife Service

US Forest Service

US Geological Survey

US Army Corps of Engineers

- ◆ Supported development of a Southeast Conservation Adaptation Strategy and commitment of LCC staff capacity to help lead it.
- ◆ Requested coordination from Janet Ertel, National Wildlife Refuge System Inventory & Monitoring Coordinator, to reach out to states and other agency representatives to coordinate with the Fish & Wildlife Service Inventory & Monitoring program.

[Fall 2012 Steering Committee \(SC\) meeting](#)

Hot Springs, Arkansas

Theme: SECAS, Surrogate Species, and Strategic Habitat Conservation (SHC) - Connecting the Dots in the GCPO LCC

- ◆ The SC approved the following preliminary recommendations from the Adaptation Science Management Team:
 - ◆ Recommendation 1: Pursue an ecosystem modeling approach that incorporates scenario planning and explicitly ties projections to specific conservation decisions.
 - ◆ Recommendation 2: Invest LCC science capacity and funding on characterizing the response of hydrology and fragmentation to key drivers across the GCPO landscape.
 - ◆ Recommendation 3: Steering Committee endorses the ASMT's desire to use species endpoints to guide conservation design.
- ◆ Heard a [recommended process](#) for coordinating planning on the shared boundary of the Apalachicola-Chattahoochee-Flint River (ACF) Basin, and decided to await feedback from the South Atlantic LCC Steering Committee and ACF Basin team before approving.
- ◆ Considered a request from the Central Hardwoods Joint Venture (CHJV) to incorporate the Central Hardwoods Bird Conservation Region (BCR) entirely within one LCC, as it was split between the GCPO and Appalachian LCCs by the national LCC framework. The SC recognized the need to understand what compelling information is required to make an LCC boundary change, and requested a timely resolution with the Appalachian LCC on the issue. Given the integrated planning frameworks being developed, the GCPO LCC also recognized that splitting responsibility for terrestrial vs. aquatic planning is not a viable option.
- ◆ SC approved the US Army Corps of Engineers' (USACE) request to join the GCPO LCC Steering Committee.
- ◆ Kenny Ribbeck was elected Chair of the GCPO LCC Steering Committee upon Mark Musaus's retirement at the end of December. Steve Patrick elected Vice-Chair.



The NPS and USAC, newest additions to the GCPO LCC Steering Committee



Several new organizations joined the LCC's Partnership Advisory Council

Partnership Advisory Council Meeting

March 7, 2012 in Vicksburg, MS

Summary of Agreements & Decisions from the meeting:

- ◆ Partnership representatives agreed that integration of private landowner needs and perspectives is important to consider in ongoing LCC initiatives, and there are various ways of doing this - both by the LCC and through existing partners who already work with private landowners.
- ◆ The science needs assessment to be developed by the GCPO Adaptation Science Management Team (ASMT) will also inform the development of the Southeast Conservation Adaptation Strategy.
- ◆ Partnerships encourage the FWS Inventory & Monitoring Program within the GCPO LCC to consider expanding its work outside refuges. The impact on or off refuges will be more tied to coordination and the ability to develop protocols that improve everyone's capacity and comparability of data.
- ◆ Partnerships agreed that the GCPO LCC should move forward with developing Vulnerability Assessments to assist in prioritizing conservation action along the Gulf and throughout the GCPO LCC region while recognizing the need to be clear about how they can and should be used.
- ◆ Discussion of the Ecosystem Services work group recognized that there appears to be no science program focused on ecological and biodiversity connections to nutrient reduction practices in the Mississippi River Basin, and this is a potential role for the LCCs to play in contributing to the response to hypoxia.
- ◆ Partnerships shared their priorities with the LCC staff.

Partnership Advisory Council Members

Black Bear Conservation Coalition
Central Hardwoods Joint Venture
East Gulf Coastal Plain Joint Venture
Gulf Coast Joint Venture
Gulf of Mexico Alliance
Lower Mississippi Valley Joint Venture
Lower Mississippi River Conservation Committee
Southeast Aquatic Resources Partnership
Southeast Bat Diversity Network
Southeast Partners in Amphibian & Reptile Conservation

The GCPO LCC Partnership Advisory Council, established in June 2011, serves as a forum to engage the various conservation partnerships with planning responsibilities within the GCPO geography (joint ventures, fish habitat partnerships, etc.), and to facilitate sharing of information, specifically;

- 1) formal collaboration on projects of mutual interest;
- 2) sharing resources and assets to meet mutual goals and objectives; and
- 3) making recommendations on priority projects, strategies, and initiatives for the collective GCPO LCC conservation community.

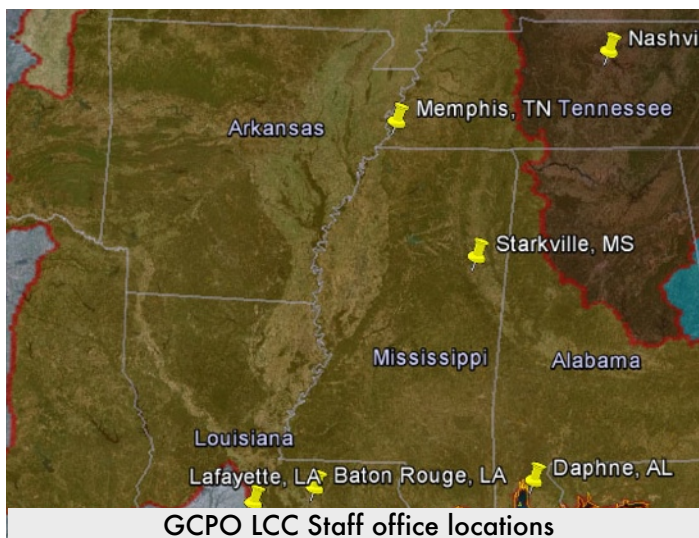
The Growing Capacity of the GCPO LCC

The year 2012 saw a significant increase in the LCC's Conservation Science Team, achieved through partners willing to put plenty of "skin in the game." The trend is for creatively defining new positions to cross-over between organizations in responsibilities, office placement and supervision.

Currently the GCPO LCC has a total of [12 dedicated or affiliated staff](#), reflecting the broad diversity of skill sets and expertise needed to help the LCC achieve its mission. These positions are supported by five organizations: the Tennessee Wildlife Resources Agency (TWRA), the US Fish & Wildlife Service (USFWS), Mississippi State University (MSU), the National Oceanic and Atmospheric Administration (NOAA) and the US Geological Survey (USGS).

Reflecting the scope of the LCC's geography, these staff are co-located with a variety of organizations throughout the region:

- ◆ Nashville, TN - TWRA and NOAA offices
- ◆ Memphis, TN - contractor office
- ◆ Starkville, MS - Mississippi State University
- ◆ Lafayette, LA - USGS National Wetland Research Center
- ◆ Baton Rouge, LA - USFWS Fish & Wildlife Conservation Office
- ◆ Daphne, AL - USFWS Alabama Ecological Services Field Office



Dedicated and Affiliated Staff:

Greg Wathen, Coordinator – Tennessee Wildlife Resources Agency

Dr. John Tirpak, Science Coordinator – US Fish & Wildlife Service

Dr. Mike Osland, Research Ecologist – US Geological Survey

Karen Gregg Elliott, Communications & Outreach Specialist - K Gregg Consulting

Laurie Rounds, Gulf Coast Landscape Conservation Liaison – National Oceanic and Atmospheric Administration

Janet Ertel, NWRS Inventory & Monitoring Coordinator for the GCPO geography and Region-wide Deputy Branch Chief - US Fish & Wildlife Service

Taylor Hannah, SCEP Student and graduate student - Mississippi State University

Glenn Constant, Aquatic Resource Specialist for the GCPO geography and Baton Rouge Fish & Wildlife Conservation Office Project Leader - US Fish & Wildlife Service

Dr. H. Alexis Londo, Geomatics Coordinator - Geosystems Research Institute, Mississippi State University

Chad Fanguy, Research Associate - University of Louisiana at Lafayette, National Wetlands Research Center

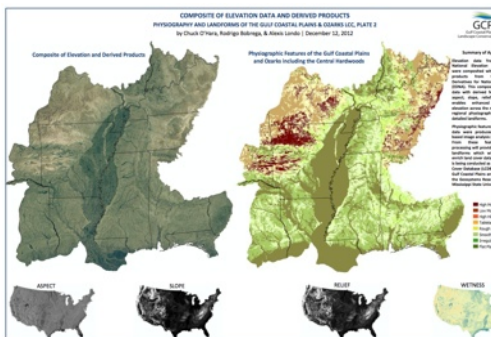
Dr. Jeffrey S. Gleason, Science Liaison - US Fish & Wildlife Service, Alabama Ecological Services Field Office

Yvonne Allen, Aquatic Habitat Analyst - US Fish & Wildlife Service

ADDITIONAL PRIORITY PROJECTS IN 2012

Providing a landscape perspective for conservation activities

Assembling a dynamic land cover database to foster consistent and comparable analyses across the Southeast



The LCDB synthesizes many existing geospatial data layers

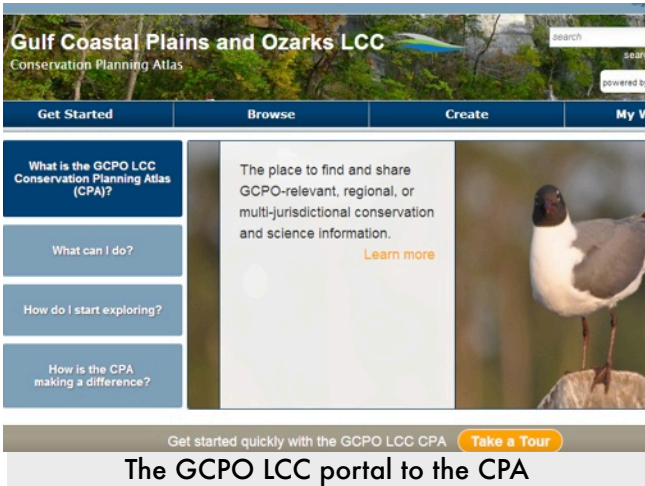
The GCPO LCC is working with the [Geosystems Research Institute](#) (GRI) and the [High Performance Computing Collaboratory](#) (HPC2) at Mississippi State University, Starkville to develop a consistent, updated land cover data layer that monitors land cover change. The objective of this GCPO Land Cover Database (LCDB) is to provide science-based insight for conservation decision making. The LCDB will address land cover change, dynamics, and change monitoring capabilities, will involve a phased approach to

collecting existing and historical land cover data, and will harmonize efforts with national teams. It will deliver capabilities to identify land cover changes, conduct updates to land cover databases, and include these changes into a land cover, habitat, and conservation monitoring framework that delivers insight to land managers and planners. During the past year, the LCDB project has accomplished the following tasks:

- ◆ Coordinated with the USGS and Multi-Resolution Land Characteristics (MRLC) Land Cover Teams regarding standard data sets for land cover classification, change detection, and other derived products to harmonize data sources and efforts with national activities.
- ◆ Developed GCPO-wide data holdings for historical land cover and comprehensive satellite source data for historical land cover products.
- ◆ Developed GCPO-wide (and in some cases nationwide) coverage for vital remote sensing as well as derived products and ancillary data.
- ◆ Developed approaches to cross-walk classification categories between the National Land Cover Database and Gap Analysis Program (GAP) as well as other land cover data sets.
- ◆ Developed and refined methods to extract physiographic features and landforms relevant to land cover context.
- ◆ Created a [national elevation dataset \(NED\)-derived data layer](#) for physiography and landform analysis, which is important to provide landscape context beyond simple vegetation cover. This dataset has also been applied specifically to the [GCPO region](#).

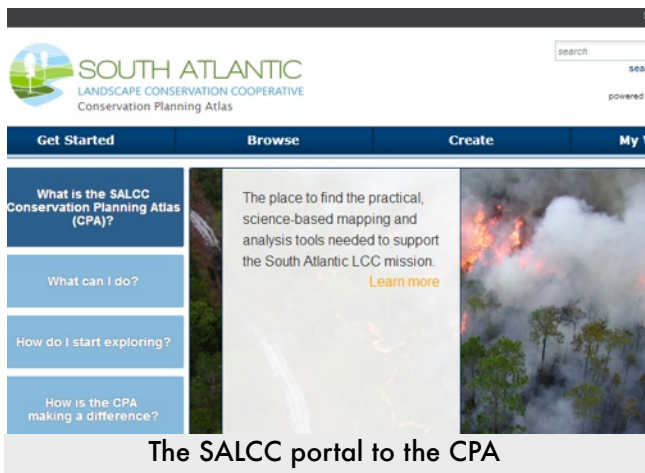
Projected date of completion for this project is July 2013.

Developing a Southeast Conservation Planning Atlas to improve resource professionals' access to spatially referenced data and tools



The GCPO LCC and South Atlantic LCC (SALCC) are jointly developing the [Southeast Conservation Planning Atlas](#) (CPA) to address a problem: inconsistent and incompatible geospatial data that hampers the development of adaptation strategies. The volume of new datasets is overwhelming; they can be hard to find; they often have technical difficulties; and many require desktop GIS software.

The goal of the Southeast Conservation Planning Atlas is to develop an online platform to serve data and provide a tool for partners to work together using spatial data in a framework that is easy to use, discover, access, and integrate. The end result should be intuitive for the non-GIS savvy natural resource manager. The CPA is being constructed using existing platforms with a focus on data content and user experience. The design team decided to

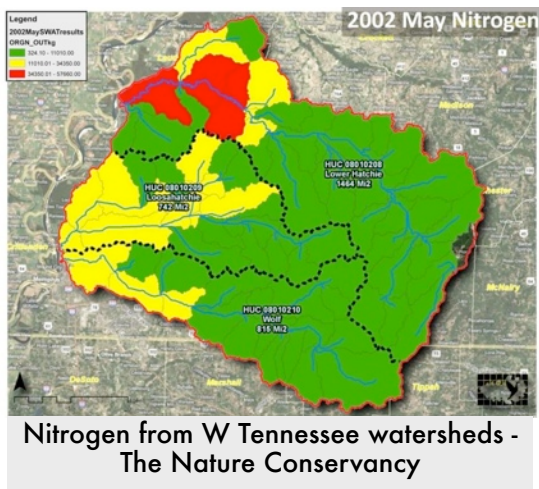


merge Data Basin from Conservation Biology Institute (CBI) with LCMAP MapServer. Data Basin provides a good data viewer with some ready-made tools, while LCMAP provides a data management platform for the CPA. Mississippi State University has agreed to build and host a tile cache server to aid in the viewing of large datasets. By the close of 2012, the project had progressed to the development of user guides, background content page creation, and data organization.

The CPA will be accessible online via two portals, one developed for the GCPO LCC and one for the South Atlantic LCC, each of which will allow end-users to easily discover, access, and integrate land use and other data and tools across the entire Southeast. The audience for this project consists of land managers, field biologists, and administrators.

The CPA is scheduled to be completed and available to the public in spring 2013.

Using USGS SPARROW models to characterize and quantify the value of habitat restoration for reducing nutrient water pollution



US Geological Survey (USGS) [SPARROW](#) ("SPAtially Referenced Regressions On Watershed attributes") models predict that some of the highest contributors to Mississippi River nutrient pollution -- and by extension Gulf hypoxia -- are its tributaries located within the GCPO LCC.

Most work done to date on nutrient reduction has focused on agricultural BMPs. The GCPO LCC and partners -- the Southeast Aquatic Resources Partnership, the Southeast Climate Science Center, the Lower Mississippi Valley Joint Venture, and Mississippi State University -- all want to determine if there is a relationship between forest wetland restoration and nutrient reduction, using SPARROW and other models to help answer this question. This project has the potential to quantify a number of ecosystem services supplied by reforested zones along the lower Mississippi, including nutrient reduction, carbon sequestration and habitat suitability for species of concern.

Developing linkages across existing partnerships and initiatives

Coordinating the work of four Landscape Conservation Cooperatives along the Gulf Coast



Gulf Coast Toad - Charles&Clint on Flickr
Creative Commons

The partnership with the National Oceanic and Atmospheric Administration ([NOAA](#)) that established the Gulf Coast Landscape Conservation Liaison position was extended through fiscal year 2013. This position facilitates cross-LCC coordination on Gulf Coast priorities, leads the Gulf Coast Vulnerability Assessment, and supports LCC engagement with NOAA as well as other partnerships and stakeholders within the Gulf Coast region. Examples of increased awareness of the LCC mission and participation in the Gulf LCCs by Gulf Coast regional stakeholders include:

- ◆ Gulf of Mexico Alliance, a key regional partnership, joined the Gulf Coastal Plains and Ozarks LCC Advisory Council in March 2012
- ◆ Addition of representatives to science teams for both the Gulf Coast Prairie and Gulf

Coastal Plains and Ozarks LCCs from NOAA, and the Grand Bay, Weeks Bay, and Mission-Aransas National Estuarine Research Reserves

- ◆ The Gulf LCCs, NOAA, and USGS hosted the Gulf of Mexico Climate Data and Scenarios Workshop in May 2012, with the goal of identifying regional climate and sea level rise resources. This marked an important step towards implementing a Memorandum of Understanding between the Department of Interior and the Department of Commerce (NOAA) to coordinate climate related activities.
- ◆ LCC staff and partners participated in a stakeholders' meeting in September 2012 to help shape the goals and objectives for NOAA's new [Sentinel Site Cooperative](#).

Assembling a database of State Wildlife Action Plans (SWAPs) to facilitate cross-walking of needs, goals, and sensitive species

The GCPO LCC is developing a database of SWAP species for each state within the GCPO



LCC. The SWAP database will facilitate the work of the Adaptation Science Management Team (ASMT) in developing conceptual models for priority habitat systems within the GCPO, identifying priority species that inhabit those systems, and identifying species-based ecological endpoints for the conceptual models. Assembling a database of the sensitive species, habitats and threats designated in each plan will facilitate coordination among the states and cross-walking of goals for a more integrated

landscape scale approach in future SWAP updates, many of which are scheduled to occur in 2015.

Taking the lead to implement Strategic Habitat Conservation (SHC) and define functional landscapes using conceptual modeling for the GCPO region



Black bear - Charlie Choc, America's Great outdoors, Tumblr

The US Fish & Wildlife Service (USFWS) has proposed to enhance its SHC business model by moving toward a model of setting measurable population objectives for selected species of fish, wildlife, or plants to help conserve functional landscapes that support sustainable populations. In the summer of 2012, USFWS released [draft technical guidance on selecting surrogate species](#) for the purposes of sustaining functional landscapes. As a part of the review process of the technical guidance, 2 FWS-sponsored

workshops were held in the GCPO, including participants from FWS field offices, and other partners.

There is much overlap in this approach and that of defining “species endpoints” for ecosystem conceptual models for the purposes of conservation planning, which has been adopted by the GCPO's Adaptation Science Management Team (ASMT). A key question for the GCPO LCC and its ASMT has been to what extent are LCC partners willing to adopt the surrogate species approach and lead the effort within the GCPO region?

At its fall 2012 workshop, the ASMT strongly supported the use of surrogate species to guide refinement of landscape-level endpoints (amount, configuration, and condition of habitats) that had been the focus of conceptual modeling discussions. The ASMT also indicated endpoints at multiple organizational levels (ecosystem, landscape, community, and species) were useful and offered cautionary tales about the potential misuse of a hyperfocus on surrogate species in monitoring and management. The ASMT offered to assist the USFWS in leading the effort to identify appropriate surrogate species. This matter is still under review by the GCPO LCC Steering Committee, with a final decision expected in 2013.

Growing and engaging our GCPO community



The groups page on gcpolcc.org



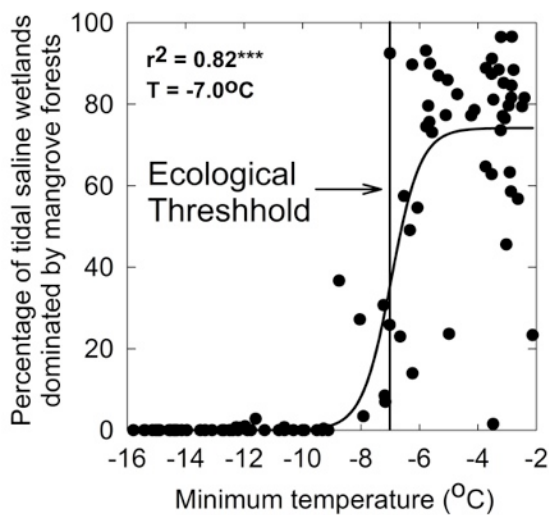
The GCPO newsletter, The Monitor

Membership on the gcpolcc.org website doubled in 2012 from ~420 to ~820 members, and the Steering Committee approved an official logo. The GCPO LCC staff keep the membership informed on LCC projects, landscape scale initiatives, and events through a [bi-monthly newsletter](#), the *Monitor*. Web-based [work groups](#) focusing on everything from freshwater mussels to geomatics to ecosystem services within the GCPO geography currently total 24.

Implementation of the [GCPO LCC Communication Strategy](#) has increasingly focused on mining the expertise of our membership, to augment the work of the Steering Committee, Partnership Advisory Council and Adaptation Science Management Team. A number of [webinars](#) and [meetings](#) of the LCC leadership have been recorded and made available to our membership and stakeholders. Targeted engagement of our web and stakeholder communities for specific purposes will increase in 2013.

Incorporating Future Change into Conservation Planning

Modeling mangrove migration along the Gulf of Mexico coast



Temperature threshold for salt marsh-mangrove conversion - Osland et al.

The GCPO LCC's Research Ecologist led and completed research in 2012 showing that relatively small changes in winter weather could cause relatively dramatic ecosystem changes in wetlands along the Gulf of Mexico and southeastern Atlantic coasts. Global Change Biology accepted the [research paper](#) for publication in 2012, and it was published in January 2013.

Researchers affiliated with the GCPO LCC, the [U.S. Geological Survey's National Wetlands Research Center](#) and Five Rivers Services, LLC partnered with the [Southeast Climate Science Center](#) to use climate and

coastal wetland habitat data to assess the sensitivity, exposure, and adaptive capacity of coastal ecosystems to winter climate change. The study identified winter temperature thresholds for salt marsh-mangrove forest interactions and determined that salt marsh vulnerability to winter climate change-induced forest mangrove expansion is high. The next step will be to investigate the ecological implications of such changes, with a focus on coastal protection and wildlife habitat.

Tennessee Vulnerability Assessment of priority SWAP species



Brook trout, *Salvelinus fontinalis*, USFWS

A [2009 study](#) on the potential effects of climate change in Tennessee concludes that Tennessee's forests are expected to undergo changes, with some tree types expanding at the expense of others. Some high elevation forest types will be dramatically impacted or lost entirely, brook trout populations are expected to decline as surface water temperatures increase, and migratory songbirds may alter their ranges, with some species disappearing from Tennessee altogether.

To better understand the potential impacts of climate change on Tennessee's fish and wildlife, the Tennessee Wildlife Resources Agency is undertaking a vulnerability assessment

of State Wildlife Action Plan (SWAP) species in western Tennessee. Utilizing [NatureServe's Climate Change Vulnerability Index](#), TWRA will assess the estimated vulnerability of over 100 species of greatest conservation need.

This information will be used to help the Agency incorporate climate related adaptation strategies into its revised SWAP, and to adopt adaptation strategies that will promote the resilience of the habitat systems that these species rely on.

Urban growth models will provide urbanization scenarios through the year 2100

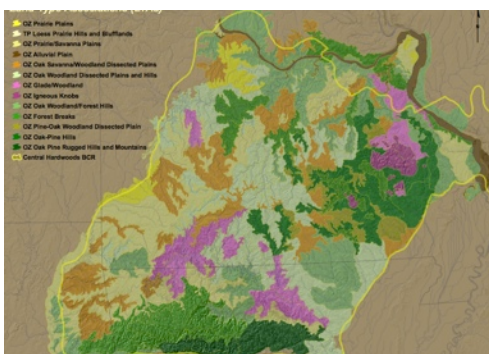


Anticipated urban expansion (red) along the Gulf Coast - SLEUTH

The GCPO LCC and the Appalachian LCC identified the need for long term urbanization scenarios to foster proactive planning for future growth. They have partnered with the SE Climate Science Center to expand existing SLEUTH (Slope, Land cover, Exclusion, Urbanization, Transportation and Hill shade) [urban growth models](#) developed for the South Atlantic LCC region to cover the entirety of the Southeast.

Originally developed as part of the Southeast Regional Assessment Project, or [SERAP](#), this project will provide a heretofore unavailable level of detail to conservation planners, urban planners and land managers. By understanding where urban growth is likely to occur under existing conditions, conservation and urban planners can develop better, more targeted strategies for land conservation. They can use the information to make adjustments that can avoid future conflicts between development and high priority conservation and watershed lands as much as possible. By the end of 2012, datasets for the states of Arkansas and Mississippi were done, with two-thirds of central and southern Missouri and southern Illinois completed.

Central Hardwoods vulnerability assessment analyzes impacts of climate change and the adaptive capacity of nine community types



Land type associations for central hardwoods within the GCPO - CHJV

Understanding the vulnerabilities of forests to climate change can help land managers make important decisions about forest management into the future. As part of a larger [Climate Change Response Framework](#), a panel of 20 experts from across the Central Hardwoods (which includes parts of the GCPO and Appalachian LCCs) evaluated evidence on the potential impacts and adaptive capacity of nine community types. Natural communities that lack the ability to withstand disturbances or are constrained by fragmentation or topographic barriers may be particularly vulnerable.

Results from the assessment indicate that mesic hardwood forests may be among the most vulnerable because they are not adapted to frequent disturbance and may not be able to withstand a late-season reduction in precipitation. On the other hand, conditions for wildfire may be more favorable by the end of the century. Fire-adapted and drought-tolerant systems, such as savannas, open woodlands and prairies, may be more resilient to climate change. A number of the species that dominate these systems, such as shortleaf pine and some oak and hickory species, will also likely do well under future climate projections.

Linking ecosystem, wildlife and climate models to predict changes to Central Hardwood landscapes and wildlife



Henslow's Sparrow, *Ammodramus henslowii* - CHJV

The goal of this project is to facilitate [“climate smart” conservation and management](#) throughout the region by linking the results of three models that simulate climate change, ecosystem processes and wildlife response to habitat. Multiple partners, including several national forests, are working with the [Northern Institute of Applied Climate Science](#) to predict future landscape composition and structure for the Central Hardwood Bird

Region under three climate scenarios, from the most conservative to extreme climate change predictions. The results will demonstrate the potential range of change that can be expected in the region's forests and the potential effect of these changes on wildlife species.

Helping conservation planners define and design sustainable landscapes

The Ozark Planning Initiative: achieving a common conservation vision across three states



Winter waterfalls in the Ozarks - Larry Chapman Kelly, USGS

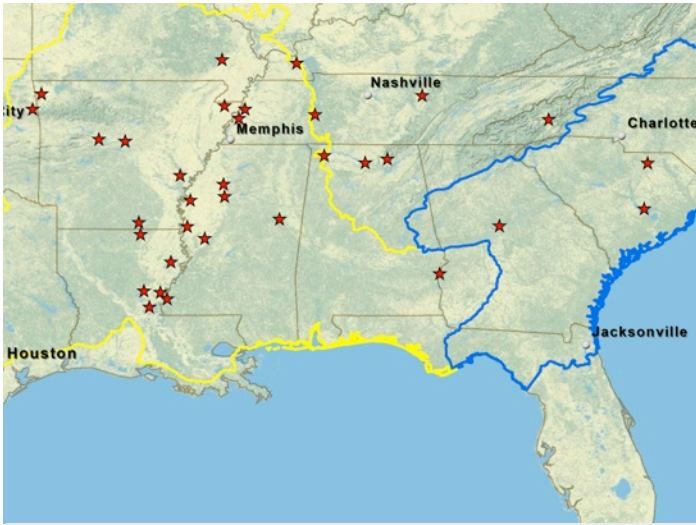
The states of Arkansas, Oklahoma and Missouri are collaborating to bring the priorities and goals reflected in their individual State Wildlife Action Plans (SWAP) into a common framework. Each state currently uses a different habitat classification and indicators for the health of each system. Initially, the three states will focus on identifying priority Conservation Opportunity Areas driven by both regional habitats and the needs of species of conservation concern.

The GCPO LCC's Geomatics Coordinator and Aquatic Habitat Analyst are providing geospatial support and coordinating this effort with the broader ASMT approach to conservation design. The Central Hardwoods Joint Venture is an integral part of this project.

Monitoring the effectiveness of conservation programs in achieving sustainable landscapes

Inventory and monitoring using acoustical bat surveys

The US Fish & Wildlife Service (USFWS) Region 4 National Wildlife Refuge System Inventory & Monitoring Network coordinated acoustical bat monitoring at 30 national wildlife refuges and ecological services stations within the GCPO and South Atlantic LCC regions in 2012.



Acoustic bat monitoring locations across the Southeast

This project has been the product of excellent partnership and teamwork: the National Wildlife Refuge System I&M Network provided funding for equipment, technical support, coordination, training, and data management; the GCPO LCC provided prioritization and logistical support; and not least, USFWS station field biologists committed time to collect data on 39 separate sample routes.

Over time, annual surveys will establish baseline inventories of bats at each station and contribute to a landscape-level understanding of bat population trends and habitat associations. Classification of calls to species has been delayed to allow assessment and validation of call classification software. Data will be classified to species when robust classification methods are available.



Cross Bayou in Bayou Cocodrie NWR, LA - Taylor Hannah



Indiana bats - USFWS via Flickr Creative Commons

BEYOND LCC BORDERS

The Southeastern Conservation Adaptation Strategy (SECAS)



15 Southeast states overlap 8 LCCs - Blair Tirpak

The [SECAS](#) initiative aims to develop a collaborative approach among federal, state and nongovernmental entities to ensure a future for fish and wildlife through expanded science capacity and more robust planning for land managers. The goal is to define the future conservation landscape of the southeastern United States.

SECAS was initiated in 2011 at the request of [SEAFWA](#), the Southeast Association of Fish and Wildlife Agencies, and subsequently [SENRLG](#), the Southeast Natural Resource Leadership Group, which includes corresponding federal resource and research agencies. Conservation science and technological planning capacity for SECAS efforts will be delivered through the multi-agency LCCs who coordinate with existing and future partnerships and therefore will not create another layer of bureaucracy.

SECAS goals:

- ◆ Coordinate in-reach within agencies and outreach between conservation adaptation efforts to remove duplication of effort and ensure greater consistency, coordination and communication of ongoing partnership efforts and time investments.
- ◆ Minimize partnership staffing “strains” being felt by the agencies asked to represent their organizations’ interests in numerous partnership efforts.
- ◆ Establish a common habitat framework, for use by all Partners in the SEAFWA Region.
- ◆ Coordinate the work of adjoining LCCs.
- ◆ Develop a common SEAFWA/SENRLG regional understanding of ecological vulnerabilities and potential threats.
- ◆ Focus current conservation priorities regionally and refine them with additional data including projected changes in urban growth, down-scaled climate data, and sea-level rise. Projections will be used to identify priority species and ecosystems in need of conservation action, as well as those most vulnerable to systemic changes.

Cultural Conservation in the Southeast



Shiloh Cemetery, TN - tjjohn12 Flickr Creative Commons

In 2012, the GCPO LCC Coordinator initiated outreach concerning cultural resources in the region by attending a meeting of the Southeastern State Historic Preservation Officers (SHPO). Science products being developed by LCCs will be useful to cultural resources conservation. For example, [SLEUTH urban growth modeling](#) and projected climate change impacts can be important resources for those interested in the protection of historic sites, such as Civil War battlefields, which are increasingly

surrounded by development. In the GCPO geography, there are at least 6 National Heritage Areas that may provide a landscape scale cultural resource context to overlay with fish and wildlife priority areas, creating a synergy for conservation.