

State of the Gulf Coastal Plains and Ozarks

Phase I: An Ecological Assessment of Priority
Landscape Endpoints of the Integrated Science
Agenda

Gulf Coastal Plains and Ozarks Landscape Conservation
Cooperative

Draft Version 1.0

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Introduction and Objectives

Secure, healthy landscapes are necessary to stem species declines, keep common species common, provide clean water and other ecological services to society, and preserve our cultural heritage. The Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative (GCPO LCC) is working identify, build, and sustain healthy landscapes through the development of Desired Ecological States for major habitat systems across our region. However, a lack of readily-available, detailed information on how habitat condition varies spatially across the GCPO LCC geography limits our ability to achieve this vision. We therefore undertook a rapid assessment of the current condition of priority habitat systems in the GCPO LCC as outlined in the draft Integrated Science Agenda. This “Ecological Assessment” focused on using existing LCC-wide digital geospatial data sets to quantify expert-defined metrics of habitat quality, with particular emphasis on assessing three basic themes as they relate to Desired Ecological States of each habitat system: **How much** habitat is in the desired ecological state? **How much more** is needed? **Where** is the habitat already in the desired ecological state and where are opportunities to manage for these conditions? Based from these overarching themes, this assessment was intended address five primary objectives for the GCPO LCC partnership:

1. Provide a foundation for assessing current population status for representative species in each system through the application of species distribution models,
2. Identify areas where habitat systems are largely in the Desired Ecological States outlined in the GCPO LCC Integrated Science Agenda (i.e. existing healthy landscapes),
3. Provide a foundation for developing strategies & tools for moving habitat systems towards Desired Ecological States (i.e., improving landscape health),
4. Provide a baseline for assessing change over time (i.e., status & trends) in the condition of habitat systems and the species they support, and
5. Provide a baseline measure of the current state of our scientific information about habitat condition (i.e., data needs assessment).

The abbreviated report that follows details the progress to date on the GCPO LCC ecological assessment, including full assessments for two of the nine habitat systems (Medium-Low Gradient Streams and Rivers in the East and West Gulf Coastal Plains, and Forested Wetlands in the Mississippi Alluvial Valley) identified in the GCPO LCC’s draft Integrated Science Agenda.

An overview of the Gulf Coastal Plains and Ozarks LCC

[Landscape Conservation Cooperatives](#) (or, LCCs) are a network of public-private partnerships comprised of resource managers and scientists from various federal, state, tribal, and local agencies, non-governmental organizations, universities and other interested groups who share mutual landscape-level conservation objectives. The 22 LCCs that constitute the North American LCC network are intended to improve functional connectivity among groups to

integrate science and management at the landscape-level to better address the changing environment we live in.

The [Gulf Coastal Plains and Ozarks \(GCPO\) LCC](#) was founded in 2009 with the mission of defining a shared vision for sustainable natural and cultural resources in the face of a changing climate and other threats; designing strategies to achieve that vision; and delivering results on the ground through leadership, partnerships, contributed resources, evaluation and refinement over time. The GCPO LCC geography encompasses 180 million acres in the western portion of the Southeastern United States, and intersects 12 state jurisdictions (Figure 1). Long-range goals for the GCPO LCC include working collaboratively with the LCC partnership to identify healthy ecosystems to prioritize for conservation, identify opportunities to restore degraded ecosystems, and develop measures to adapt to the changing landscape. The GCPO LCC brings a landscape perspective and opportunity for partnership, efficiency, and effectiveness among local conservation communities. The GCPO LCC is tasked with understanding and incorporating potential future landscape changes into strategic designs for sustainable landscapes. The LCC is also tasked with evaluating impacts of conservation actions toward achieving those goals.

Implementing comprehensive conservation across a 180 million acre landscape is admittedly no easy task. Some important conservation problems are ubiquitous across the entire GCPO geography. However, the GCPO landscape is not uniform in land form, land use, and threats posed to natural resources, and even seemingly ubiquitous issues will affect different parts of the GCPO LCC geography differently. The GCPO LCC has therefore been further divided into 5 functional “subgeographies” or regions sharing similar landscape features and environmental stressors to facilitate meeting the GCPO LCC mission in the most effective way possible (Figure 1). These subgeographies are intended to help LCC staff and partners improve effectiveness through focusing conservation work to address the varying science needs within each area. The GCPO LCC subgeographies were also intentionally crafted primarily along Bird Conservation Region boundaries to align with existing Joint Venture efforts that have been established in the landscape for quite some time to maximize potential effectiveness through functional conservation partnerships.

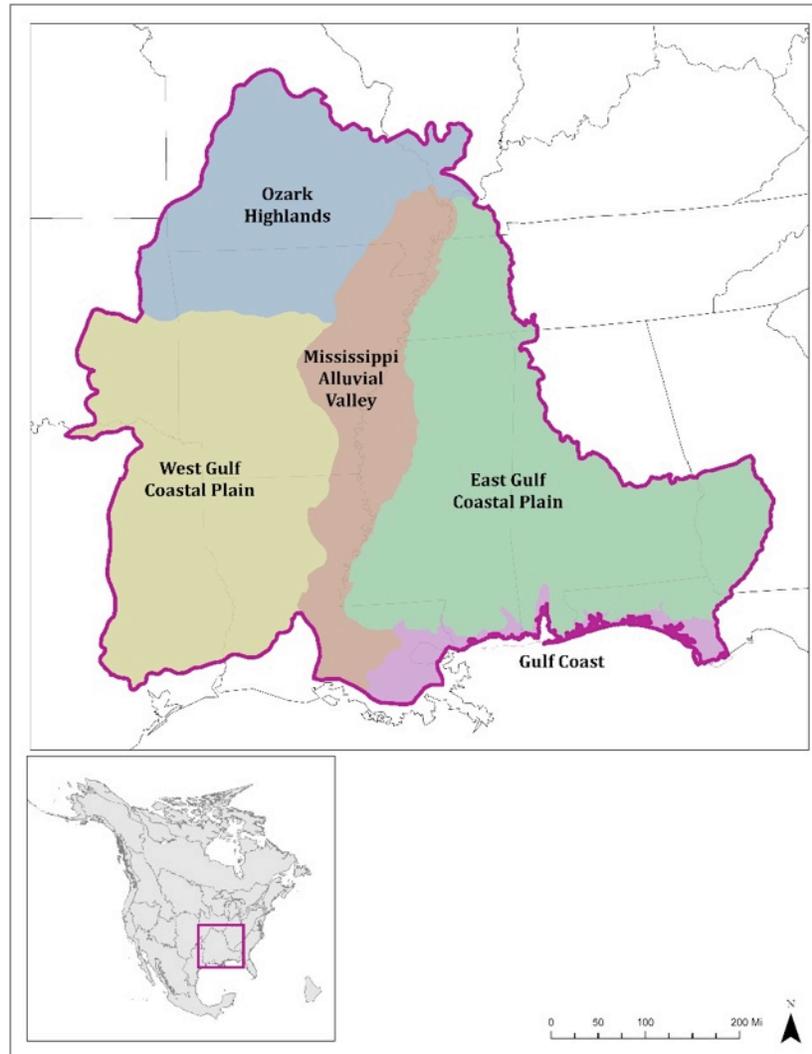


Figure 1. The Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative physiographic extent and associated subgeographies.

Strategic approach to habitat conservation

Conservation of our nation's natural resources is a dynamic process. Resources change in their availability, species change in distribution and abundance, land use often rapidly changes, the climate is changing, environmental threats change quickly, scientific knowledge is changing rapidly and fiscal opportunities for conservation work are changing. In a field that is constantly responding to change, it is critical that the conservation community strategically link management decisions to the best available scientific information at the time and have the collective capacity to anticipate and adapt to future change through scientific forecasting. The network of North American LCC's have adopted the [Strategic Habitat Conservation](#) (SHC) framework as an approach to defining and integrating priorities for conservation design and planning work undertaken by LCC's. This "strategic pursuit of sustainable landscapes" is a cyclical process by which biological planning, conservation design, conservation delivery, and

evaluation are looped to provide the most effective resource conservation toward the goal of sustainable landscapes (National Ecological Assessment Team 2006). Under SHC the U.S. Fish and Wildlife Service (FWS) established six guiding principles for SHC implementation. These included maintaining an ultimate objective of sustaining ecological function with habitat conservation as a means to achieving that objective; defining measurable population objectives; using the best available scientific information while acknowledging and managing for uncertainty; implementing SHC in a systematic and well-documented manner such that actions and recommendations are defensible and transparent; providing dynamic objectives and approaches that adapt to changing information; and fostering effective conservation partnerships. The GCPO LCC partnership is closely following these guiding principles and currently working through early biological planning elements of the SHC cycle and moving rapidly toward the second and third elements of the SHC cycle with emphasis on strategic conservation design to facilitate effective conservation delivery.

A national LCC priority

Under the FY2014 FWS [Science Investment and Accountability Schedule](#) (SIAS) the FWS formally adopted the SHC framework as the standard approach to LCC operations with collaborative conservation activities aimed at sustaining fish and wildlife populations and ecosystem and landscape integrity (USFWS 2013). Objectives of the SIAS include development of science-driven strategic goals and conservation targets linking species to landscape and habitat conditions at the landscape scale while remaining transparent and accountable to stakeholders and acknowledging uncertainty of future conditions. The SIAS describes several key activity areas important to this report including Landscape Conservation Planning Foundation, which provides the baseline from which conservation design and delivery are built, Landscape Conservation Design, which integrates elements of the conservation planning foundation along with resource goals and objectives to define priority resource targets on the landscape, Decision-based Monitoring, which tracks the status and trend of priority LCC natural and cultural resources, and Science and Conservation Community Integration, which requires engagement with technical experts and conservation partnerships within the LCC. Each of the elements described below directly addresses one or more components of the SIAS activity areas.

Defining LCC science priorities

With SHC selected as an overarching framework and SIAS elements as a guiding doctrine, it was clear that the broad multi-disciplinary GCPO LCC needed to prioritize and focus science priorities to be effective in designing and delivering strategic conservation. To address this need the GCPO LCC Steering Committee established a group of partners from multiple scientific disciplines and resource interests to serve as representatives on the GCPO LCC Adaptation Science Management Team (ASMT) with the goal of defining and focusing LCC science priorities to activities that best met the LCC's mission. Science priorities developed by the ASMT integrated multi-disciplinary, multi-scale, and multi-resource science needs and were intended to address several facets of conservation including planning, delivery, and monitoring/research.

The ASMT piloted their efforts with development of the draft GCPO LCC [Integrated Science Agenda](#), which defines an initial group of LCC science priorities that best meet the GCPO LCC mission. The initial group of LCC science priorities are defined according to nine broadly defined habitat types developed by [NatureServe](#) and the U.S. Fish and Wildlife Service that fall within one or more of the 5 LCC subgeographies (Table 1). Other priority systems will be added

as the LCC progresses from the initial set of science priorities toward a suite of priority systems within each subgeography.

Table 1. Initial priority terrestrial and aquatic ecological systems within each GCPO LCC subgeography as defined in the GCPO LCC [Integrated Science Agenda](#).

LCC Subgeographies	Priority Terrestrial System(s)	Priority Aquatic System
East and West Gulf Coastal Plains	Grasslands	Freshwater aquatic: medium-low gradient streams and rivers
	Open pine woodlands and savannas	
Gulf Coast	Beaches and dunes	Estuarine tidal marsh
Mississippi Alluvial Valley	Forested wetlands	Freshwater aquatic: mainstem big rivers
Ozark Highlands	Upland hardwoods and montane conifers	Freshwater aquatic: high-gradient streams and rivers

Once priority systems were defined the GCPO LCC ASMT worked to define an initial set of specific and measurable outcomes, or desired ecological states, that would reflect the ecological integrity of each system. Desired ecological states were often characterized by the limits they impose with regards to ecosystem and community character, particularly related to interrelationships of individual species with the system. These desired ecological states (i.e., endpoints) were grouped as priority habitat or landscape characteristics and target species representative of priority habitat systems. Landscape endpoints were defined specific to each priority system in terms of four broad categories (amount, configuration, condition, and temporal consideration). Endpoints addressing the “amount” category were typically defined in terms of area (e.g., acres of habitat) for terrestrial systems, and length (e.g., river miles) or area for aquatic systems. Endpoints addressing the “configuration” category were defined by features such as patch size/connectivity and landscape composition for terrestrial systems, and lateral and linear connectivity and channel/corridor features for aquatic systems. Endpoints addressing the “condition” category were typically local characteristics, defined often by a subcategories of structure, composition, quantity and quality. Examples of these metrics include canopy cover, basal area, tree/vegetation density, vegetation height, species composition, etc. for terrestrial systems and dissolved oxygen, temperature, flow, woody debris/litter, sinuosity, etc. for aquatic systems. Endpoints addressing temporal aspects of each system were typically related to succession and disturbance interval.

As the second Science Agenda component, the GCPO LCC and ASMT pooled their collective knowledge to list a suite of species that would characterize one or more landscape/habitat features of the priority ecological system. The suite of representative species were defined by first listing all Species of Greatest Conservation Need (SGCN) identified in each respective State Wildlife Action Plan. SGCN species were then selected based on species-habitat limitations with regards to the landscape endpoints defined in the Integrated Science Agenda.

This resulted in a suite of species endpoints thought to be representative of habitat needs and limitations of most of the desired species in those ecological systems.

Basis for an ecological assessment

For managers to make informed decisions about where and how much conservation action must be taken to meet landscape and species endpoint criteria outlined in the GCPO LCC Science Agenda, the conservation community must first have a baseline estimate of what currently exists on the landscape relative to those endpoints. As a necessary mid-step between defining LCC science priorities and designing conservation on the landscape, it is critical that we first assess where on the landscape priority systems are already meeting the desired ecological states outlined in the Science Agenda and where they fall far short. The vision for a GCPO LCC ecological assessment is then to establish predicted capacity of landscapes within the GCPO LCC geography to support science priorities outlined in the Science Agenda. The need for baseline information specific to the landscape endpoints outlined in the Science Agenda is paramount to a data-driven conservation design approach, where the data provide support to facilitate stakeholder conservation design decisions.

The majority of data used to conduct the initial ecological assessment of landscape endpoints are derived from a combination of remotely-sensed land cover data, data products derived from remote-sensing applications, and summarized or interpolated plot-level data. Objectives for data acquisition/use for the project include assessing the most comprehensive and current data available at the most appropriate spatial resolution across the GCPO geography. The goal is to use the best available data to rapidly assess all possible landscape endpoints within each priority system, and identify major data gaps and conservation needs that the LCC partnership could dedicate time and resources toward development.

Once the assessment of landscape endpoints is completed, the necessary next step is to evaluate habitat relationships among species and landscape endpoints to ensure species are truly responding to the desired ecological states outlined in the Science Agenda. A thorough assessment of each priority system and the landscape endpoints defining the ecological integrity of the system in combination with an understanding of the species-habitat relationships of priority species within those systems provides the decision context to implement a robust conservation design within the GCPO LCC geography.

The assessment of landscape and species endpoints will also provide critical information relative to refinement of the GCPO LCC Science Agenda. These endpoints are hypotheses meant to be tested. Species-habitat models compiled during the ecological assessment will indicate if the proper landscape endpoints, or range of endpoint values, were selected, and provide opportunity for refinement of landscape endpoints over time. An assessment of species endpoints will also indicate whether the species selected as representative of each priority system serve as proper indicators for the system, and if not provide opportunity for refinement of priority species as well.

Roadmap to a conservation blueprint

Data products and species habitat models derived or compiled as part of the GCPO ecological assessment provide critical information toward development of a comprehensive conservation design in the GCPO LCC. These products, combined with data and models from other conservation partners will be brought to stakeholders through a series of hands-on workshops to facilitate an informed, data-driven, and widely accepted conservation design process for

defined priority systems in GCPO LCC subgeographies based on known species-habitat interrelationships. The ultimate objective is a comprehensive conservation blueprint targeting specific areas of conservation opportunity for priority systems across the GCPO LCC landscape. This rigorous scientifically-informed conservation blueprint will then become the basis for strategic targeting of conservation delivery within the GCPO.

Report structure and intended audience

The assessment of landscape and species endpoints defined in the GCPO LCC Science Agenda will be compiled into a comprehensive “State of the GCPO” report which will summarize the character of priority ecological systems within each LCC subgeography. The “State of the GCPO” report will be delivered in two phases, with the first assessing landscape endpoints defined within Integrated Science Agenda priority ecological systems, followed by a second phase examining interrelationships with priority species endpoints and habitats within each system. This two-phased approach was adopted to allow for efficiency and timeliness in data assessment. Each phase of the report will be available in a three-tiered structure intended for a variety of audiences (i.e., full comprehensive report, abbreviated report highlighting important findings, and an executive summary). Target audiences for comprehensive reports include science and technical experts, LCC staff and close cooperators desiring to understand the processes for each ecological assessment in depth. Target audiences for the abbreviated report include the National LCC Network staff and collaborators, GCPO LCC steering committee, other LCC staff, other state and federal agency science and administration partners and other interested parties. Target audiences for the executive summary will include the regional and national directorate, general LCC community, and general public and representatives needing to communicate a brief snapshot of the assessment highlights.

The phase I assessment of landscape endpoints is structured hierarchically in chapters following the Integrated Science Agenda and arranged by GCPO LCC subgeography, priority systems within each subgeography, and landscape endpoints grouped by general categories of amount, configuration, condition, and temporal considerations. Typically each landscape endpoint is assessed independently and collectively where appropriate within a priority system. Within each landscape endpoint we structured the data as follows:

- 1) Brief description of the data sources and processing steps used in the assessment if available;
- 2) Highlights of important results written briefly in the text and displayed in tables and figures where appropriate;
- 3) Description of limitations/assumptions associated with data sets and processing steps applied, and future directions if data could be developed or is being developed to help address a particular endpoint;
- 4) Technical references used in each endpoint assessment if applicable; and
- 5) Linkages to data products on the GCPO LCC [Conservation Planning Atlas](#).

Technical references

Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative [GCPO LCC]. 2013. Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative [Strategic Plan, 2013-2018](#).

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National Ecological Assessment Team. 2006. [Strategic Habitat Conservation: final report of the National Ecological Assessment Team](#). U.S. Department of Interior, U.S. Geological Survey and U.S. Fish and Wildlife Service.

U.S. Fish and Wildlife Service [USFWS]. 2013. U.S. Fish and Wildlife Service [Science Investment and Accountability Schedule \(SIAS 2.0\)](#) Commitment in Support of a National Landscape Conservation Cooperative Network FY2014.

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