

DRAFT Grassland/Prairie/Savanna in the East and West Gulf Coastal Plain (EWGCP)

This Assessment has not yet been peer reviewed.



**From the Executive Summary
of the 2016 State of the GCPO**



PHOTOS, CITATION, ACKNOWLEDGEMENTS

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Map Credit on Cover:

Harrell Prairie Hill, Bienville National Forest, Scott County, Mississippi - Toby Gray, GCPO LCC

Map Credits in Text

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The term “prairie,” from the Latin *pratium* means “meadow-land.” Through most of the twentieth century, many natural historians doubted whether such landscapes occurred naturally in the southeastern United States, based on the widely-held assumption that, in the absence of humans, fire would be infrequent on the land, and most areas would transition naturally into a climax condition of various forest types. In the last forty years or so, more scientists have come to view southeastern prairies and savannas as a natural component of the landscape that, while never dominant, existed as an ecologically cohesive and important “archipelago” or “shifting mosaic” of patches.



Blackland Prairie forbs (wildflowers), MS - Toby Gray, GCPO LCC

In a climate with enough rainfall for forests, southeastern grasslands exist due to historical interactions between soil, grazers (e.g. bison), browsers (e.g. elk), and both human-set and lightning-ignited fire. The size and number of such patches has declined dramatically since European settlement due to conversion to agriculture and other land uses, as well as the removal of free-roaming fire from the landscape. As a consequence, animals that evolved to use these open landscapes have much less habitat. Today, southeastern grasslands, prairies, and savannas are thought to occupy less than one percent of their historical range. An urgent need exists to conserve these remaining spaces before they, and the species that require the habitat they provide, are lost forever.

The GCPO LCC describes the broadly defined habitat as “relatively large patches of dense, tall, and diverse native warm season grasses and forbs,” and establishes a set of measurable desired condition endpoints to be used to assess habitat conditions, which when combined, create a region-wide condition index for grasslands. “Grassland” refers to any area dominated by grass, including pasture/hay, but excluding marshes, dunes, and developed areas (glades were also excluded, as they will likely be addressed as a separate priority habitat by the LCC). For the purpose of this study, the term “grassland” allows for the presence of exotic species, whereas “prairie” refers to a subset of grasslands that are dominated by native grasses and forbs, with few or no exotic species present.

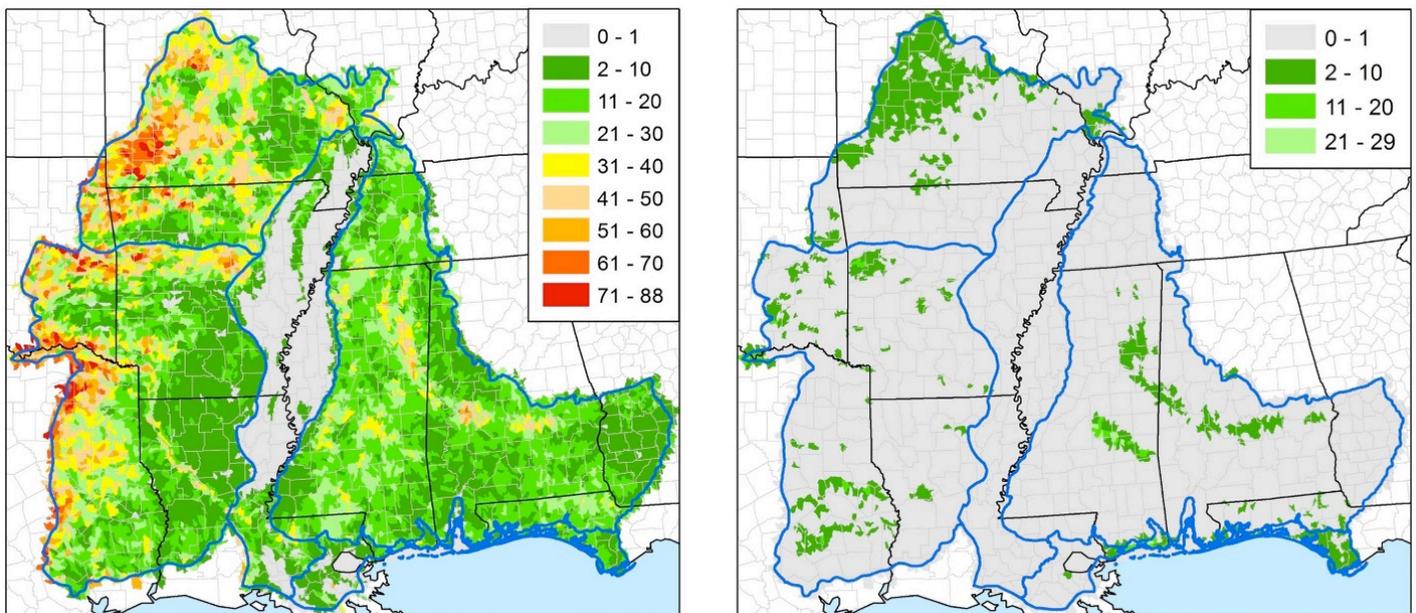


Figure 1: Grassland (left) and prairie (right) summarized as percent of total cover within HUC12 watersheds in the GCPO.

Summary of Findings for Landscape Endpoints

AMOUNT

100,000 acres

The Assessment team assessed landscapes within the broad vegetative class of grasslands at a spatial resolution of 30 meters using a national database of existing vegetation type (LANDFIRE) combined with various high resolution data layers obtained from the states of Oklahoma, Texas, and Florida, and from researchers, non-governmental agencies, and state agencies for Alabama, Arkansas, Mississippi, and Missouri. This process identified over 32 million acres of the grassland vegetative type (broadly defined) and just over 1 million acres meeting the more restrictive definition of prairie (Figure 1). However, none of those areas identified as prairie were shown to meet all four of the condition endpoints assessed, and only 98 acres show the presence of three endpoints.

CONFIGURATION

5 patches >10,000 ac
500 patches >100 ac

A general axiom in conservation biology is that bigger patches are better, but how big is “big enough”? The ISA calls for five patches greater than 10,000 acres and 500 patches greater than 100 acres. The Assessment team identified about 4.5 million acres of grassland in 125 patches greater than 10,000 acres and 23.5 million acres in 52,630 patches greater than 100 acres. These numbers describe the general grassland vegetative type in a variety of conditions.



Baker Prairie - [Arkansas Natural Heritage Commission Galleries](#)

CONDITION

Vegetation height (grass) 4-6'

Because tall grasses and forbs provide concealment and cover from predators and wind, vegetation height is a consistent predictor of habitat use by grassland birds. The team assessed this endpoint by applying a data layer that represents the average height weighted by species cover, based on the existing vegetation type defined as “herbaceous height > 1 meter.” The team identified where grasslands also met this condition, finding an estimated 2.4 million acres of grassland described as meeting this endpoint (Figure 2).

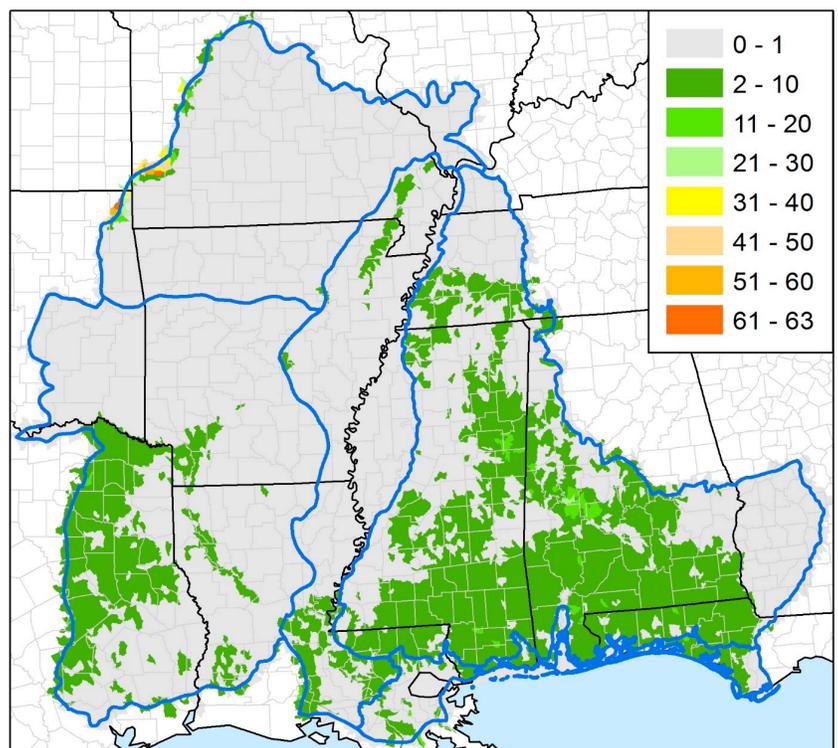


Figure 2: Percent coverage of HUC12 watershed by land that is both classified as grassland and as herbaceous > 1 meter height.

Bare ground > 5% but < 20% and shrub cover < 20%

Interspersion of bare ground among bunch grasses is important for mobility and foraging of grassland birds and the presence of available woody cover improves characteristically low winter survival rates for northern bobwhites. The team used existing vegetative cover classes “herbaceous cover ≤ 80 and $< 90\%$ ” and “herbaceous cover > 90 and $\leq 100\%$ ” as substitutes for the bare ground endpoint, and “shrub cover ≥ 10 and $< 20\%$ ” to assess these endpoints. The data sources for this analysis are characterized by seams at state boundaries, representing different data collection methods within states (Figure 3). Of the 35.4 million acres of grassland, about 7 million are described as belonging to these three cover classes.

Tree density < 10/acre

The presence of trees is directly related to the amount of solar radiation available on the ground for photosynthesis, with lower values of both overstory canopy cover and tree density favoring the mixture of sun-loving grasses and forbs common to prairies. The Assessment team identified areas where tree density is less than 10/acre using U.S. Forest Service data and satellite imagery inputs. About 4.7 million acres of the mapped grasslands meet this condition (Figure 4).

Composition

Although the ISA calls for grasslands “Dominated by native warm season grasses and forbs,” this can only be accurately assessed at the site level.

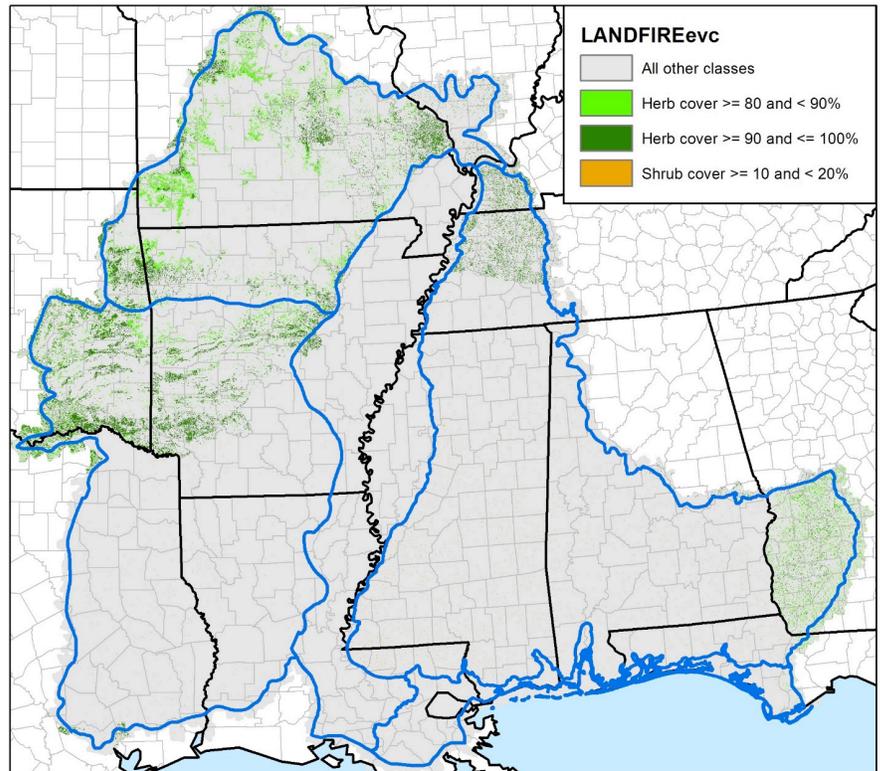


Figure 3. Selected existing vegetation coverage classes in the GCPO that show partial herbaceous coverage (allowing for some bare ground). Shrub cover, confined for the most part to the East Gulf Coastal Plain, is widely scattered and not visible at this scale.

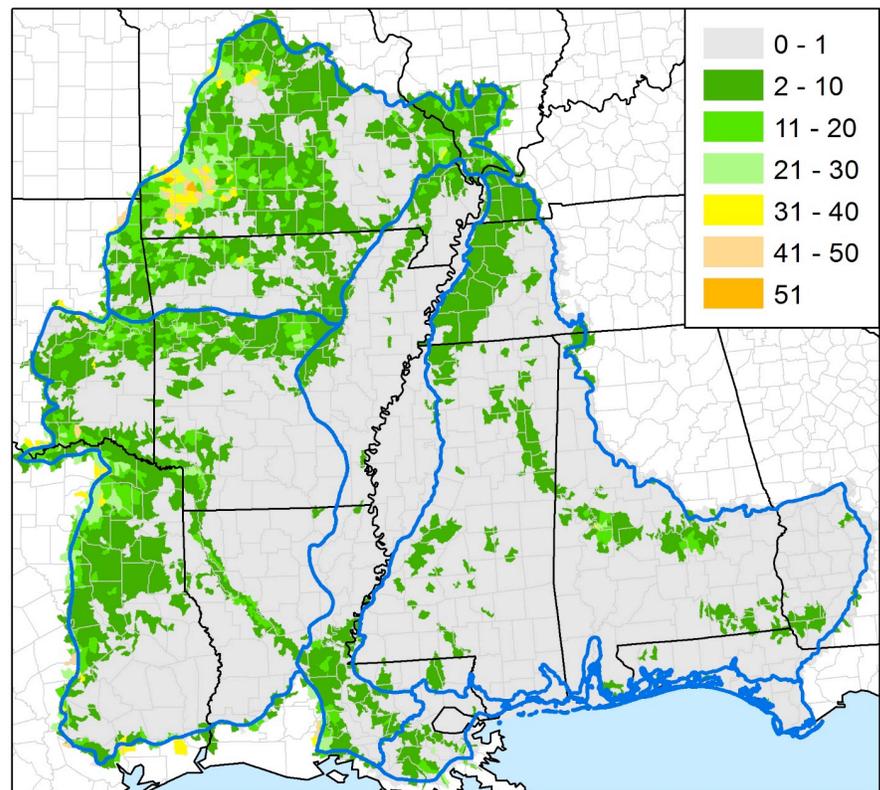


Figure 4: Land that is indicated as having tree density < 10/acre according to USFS and is also described as a selected grassland type, summarized as percentage of total coverage in HUC12 watersheds.

TEMPORAL CONSIDERATIONS

5-year return interval on disturbance
20% of all grasslands disturbed annually

Frequent disturbance of grasslands, principally by fire, is necessary to prevent natural succession into woody vegetation classes, especially in productive soils and climates with adequate rainfall for forests. Historical patterns in the frequency of burning, called fire regimes, have been estimated at many localities by examining and dating burn scars in the rings of felled trees. Regional scale fire regimes are speculative in nature and very coarse in spatial scale. The team used information from LANDFIRE, which collected national data on various kinds of disturbance for the period 1999-2012. They estimated that disturbance from wind, mowing, fire, and chemical application occurred on about 3 million acres over this period.

Potential Grasslands

Areas not described as grasslands by either the national LANDFIRE dataset or state-level inputs were assessed regarding their potential for restoration. A selected set of grassland types from a LANDFIRE data layer that represents vegetation that may have been dominant on the landscape at the time of European settlement was used as a base map (Figure 6). We excluded developed classes of land and open water. About 11.3 million acres meet this description.

Figure 6: (at right) Selected classes from the LANDFIRE Biophysical Settings (BpS) data layer representing the likely configuration of grassland vegetation classes at the time of European settlement.

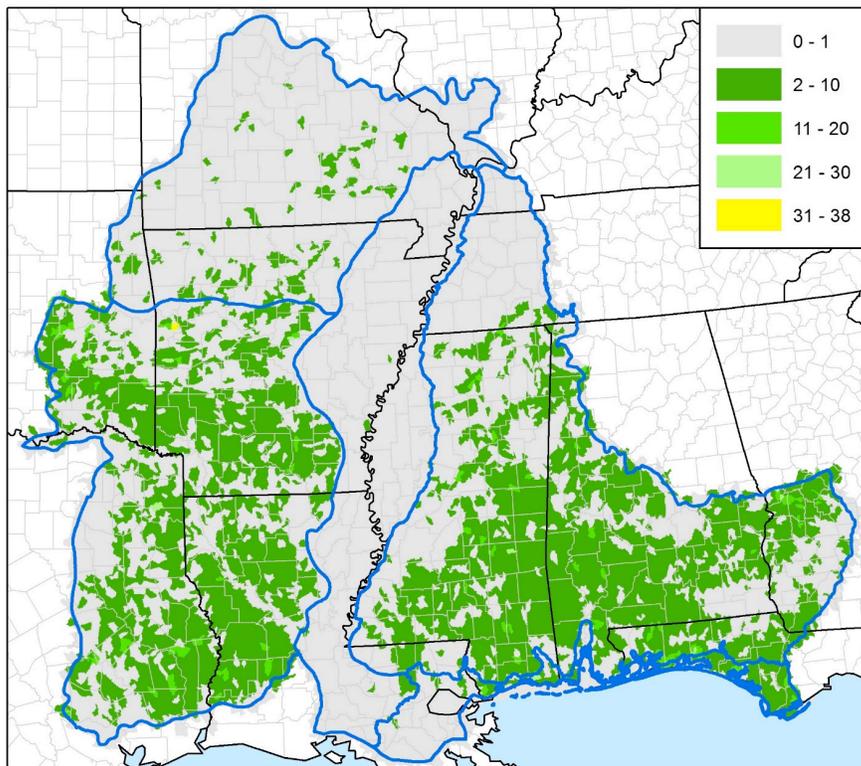
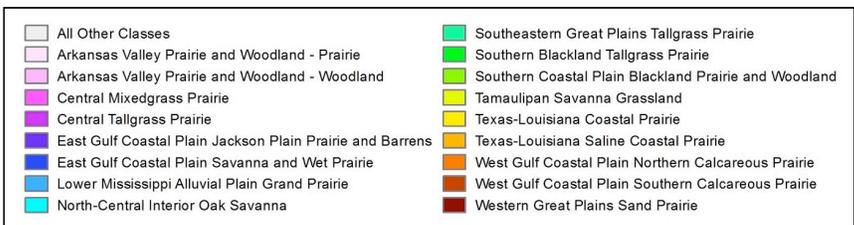
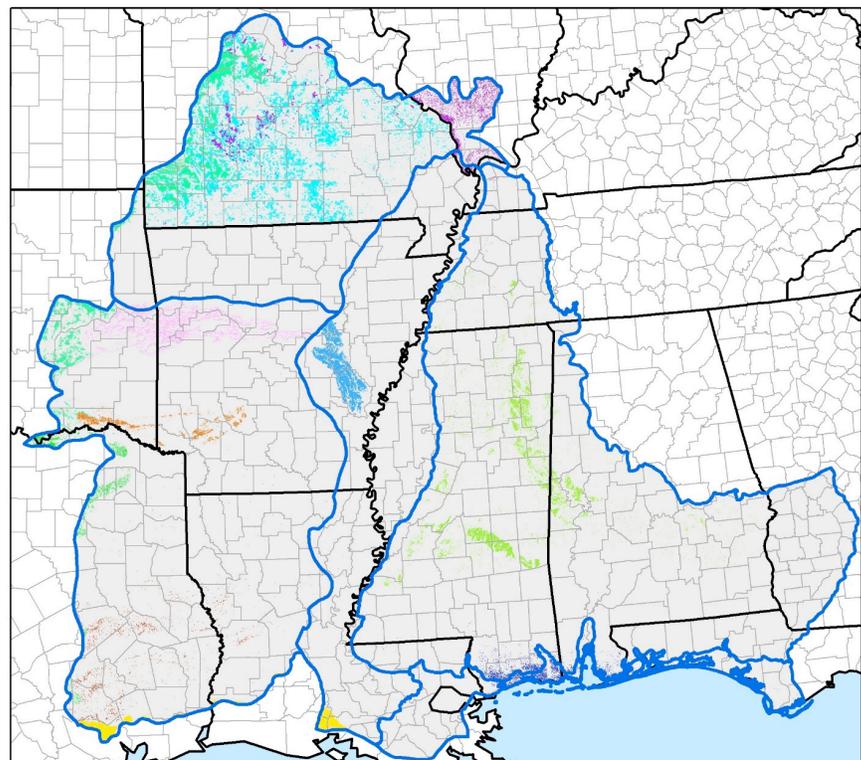


Figure 5: Grassland areas that indicate relevant disturbance types during the period 1999-2012, summarized by HUC12 watershed.



Conclusion: Assessing the Desired Ecological State for Grassland/Prairie/Savanna

The smallest unit of analysis (1 pixel) in this Assessment is approximately 1/4 acre. The team assessed each unit in the GCPO region by assigning a score derived from a dichotomous decision-based approach (Figure 7) that determines first whether the unit is a grassland, then whether it is a prairie, then whether it is in a large patch, and finally the number of condition endpoints met. To score patch size, since the analysis is done at the ~1/4-acre level, the team used the smaller of the two patch size thresholds (100 acres) presented in the ISA.

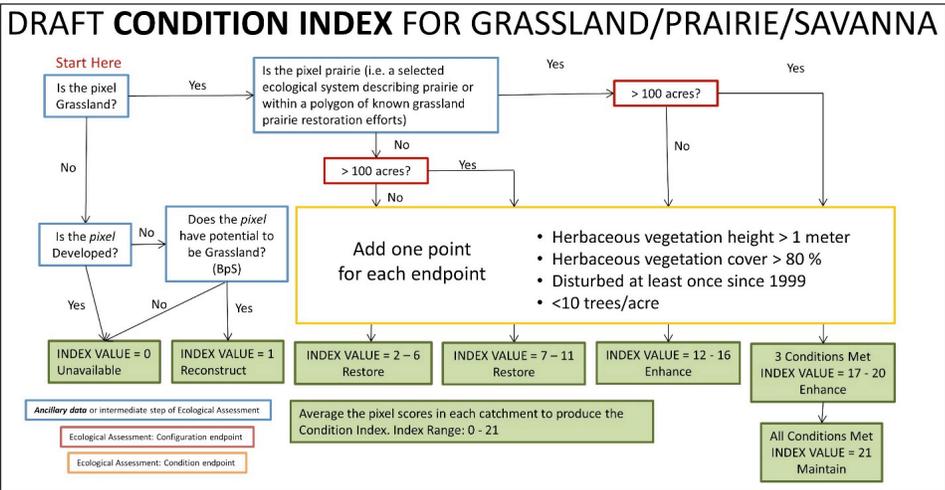


Figure 7: Unit (pixel)-based Dichotomous decision tree for generating the condition index for grasslands in the GCPO region.

Table 1: Condition endpoints met (rows) by grassland/prairie distinction and patch size (columns) measured in acres.

Number of endpoints met	Grassland < 100 acres	Grassland > 100 acres	Prairie < 100 acres	Prairie > 100 acres	TOTAL
0	8,152,217	11,343,755	523,738	268,872	20,288,583
1	4,203,072	8,089,943	120,858	115,863	12,529,736
2	679,074	1,916,798	4,570	12,090	2,612,531
3	2,284	11,510	18	77	13,889
4	0	0	0	0	0
TOTAL	13,036,648	21,362,006	649,184	396,901	35,444,740

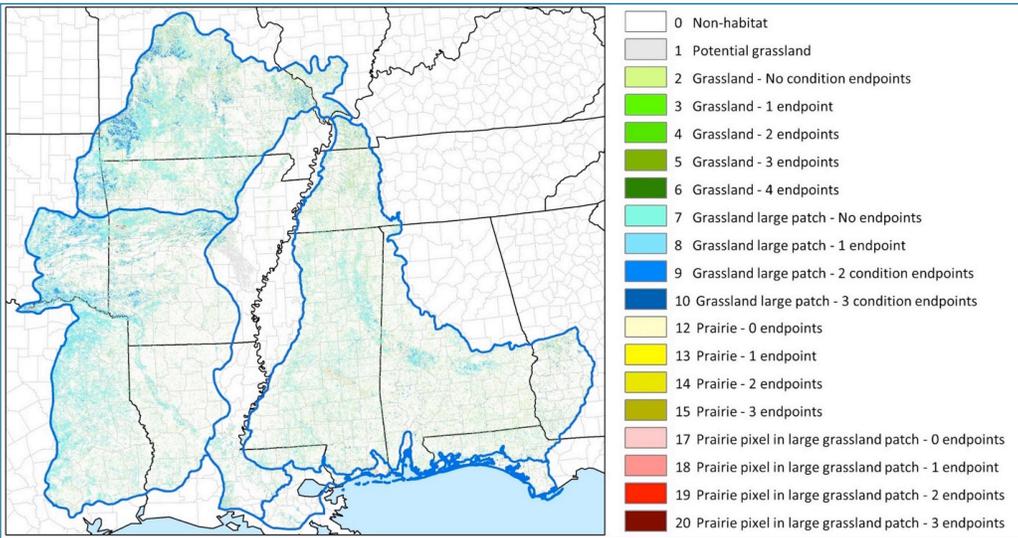


Figure 8: Grassland Condition Index resampled to 250 meters. Prairie patches not to scale. Darker colors within each landscape category indicate the presence of more condition endpoints.

The results did not indicate the presence of all four condition endpoints combined with both prairie status and large patch size anywhere in the GCPO. Of the 35.4 million acres of grassland, the presence of three of the four condition endpoints is indicated on only 13,889 acres (Table 1). Most concentrated areas of grassland in the GCPO are on the western boundary where the coastal plain transitions to interior plains, in the Black Belt of Mississippi and Alabama, and in the floodplain of the Red River in Louisiana (Figure 8). Elsewhere grassland patches are small and widely scattered across the East and West Gulf Coastal Plains.

Discussion & Needs

Grasslands were historically an extensive, somewhat patchy, disturbance-dependent, and ecologically important feature of the GCPO. Today much of our landscape is still dominated by grasses, but most of these lands are intensively managed and the amount available as habitat for wildlife is very small. National-level ecological mapping systems reliably distinguish forest from herbaceous vegetation, but generally lack the ability to identify important differences within herbaceous classes. Anticipated improvements in this area will provide better inputs to regional assessments of grassland conditions. Currently, assessments on this scale require cooperative efforts across multiple state and local agencies, organizations, universities, and individuals. Conservation and restoration of native grasslands is supported by active and dedicated individuals at local scales all across the GCPO. Obstacles to “scaling up” conservation efforts to the regional level (as exemplified by the achievements of America’s Longleaf, or the Shortleaf Pine Initiative, in other broadly-defined habitats) include the fact that grasslands are not associated with a merchantable product in the way that forests are, and therefore lack not only the financial incentives for private landowner participation but also the legacy of more than a century of academic research. However, new grassland conservation efforts, such as the East Gulf Coastal Plain Joint Venture’s Black Belt Prairie initiative, have already begun. The Gulf Coastal Plains and Ozarks LCC - along with our neighbor LCC’s, Joint Ventures, and others - is well-suited to provide a forum in which the coalescing of the many local initiatives can be encouraged.



Four prairies: Roth Prairie, AR (top left) and Kingsland Prairie, AR (bottom right) - [Arkansas Natural Heritage Commission Galleries](#); Blackland Prairie, MS (top right) and Saline prairie, TX - [Toby Gray on Flickr](#). GCPO LCC