USDA Natural Resources Conservation Service

Ecological site F134XY302LA
West Central Swales/Depressions Wet Flats - PROVISIONAL

Accessed: 05/19/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 134X–Southern Mississippi Valley Loess

MLRA 134, Southern Mississippi Valley Loess, is in Mississippi (39 percent), Tennessee (23 percent), Louisiana (15 percent), Arkansas (11 percent), Kentucky (9 percent), Missouri (2 percent), and Illinois (1 percent). It makes up about 26,520 square miles (68,715 square kilometers). The northern part of the area includes Paducah and Murray, Kentucky; Paragould, Jonesboro, and Forrest City, Arkansas; and Memphis, Dyersburg, Bartlett, and Germantown, Tennessee. The southern part includes Yazoo City, Clinton, and Jackson, Mississippi, and Baton Rouge, Opelousas, Lafayette, and New Iberia, Louisiana. This portion is the central western part of the MLRA in Louisiana and Arkansas. It is in the Macon Ridge Section of the EPA Ecoregions in sub-section 73j. The dissected plains in this MLRA have a loess mantle that is thick at the valley wall and thins rapidly as distance from the valley wall increases. This portion of the MLRA is distinct from other portions of the MLRA because of the influences of the Mississippi River and it series of entrenchments and adjacent old channels of the Arkansas River, such channels as Bayou Bartholomew, Bayou Bonnne Idee, Boeuf River, and segments of the Ouachita River. The Macon Ridge has been inhabited prior to European Settlement, Poverty Point is located on the east central portion of the Macon Ridge and has earthworks dating back to 1700-1100 BC.

Classification relationships

Major Land Resource Area (MLRA) and Land Resource Unit (LRU) (USDA-Natural Resources Conservation Service, 2006)
EPA Level IV Ecoregion
The Natural Communities of Louisiana - (Louisiana Natural Heritage Program - Louisiana Department of Wildlife and Fisheries)

Ecological site concept

The site is nearly level thin loess, less than 4ft thick, potentially reworked loess by water. The site is poorly drained, rarely to occasionally flooded. Found on broad flats, drainage ways and depressional areas on terraces of the Macon Ridge likely overlaying clayey braided stream materials. Chemical properties of the soil are potentially acid while the subsoil is potentially high in Na (Sodium). Community species would have a range of wetness tolerance from Willow oak which is commonly found up to less abundant Water oak in the driest areas of the site.

Associated sites

F134XY301LA	**West Central Flooded Swales And Depressions And Flood Plains - PROVISIONAL** The "West Central Flooded Swales And Depressions And Flood Plains - PROVISIONAL" site is similar but will be found at lower local elevations.
F134XY303LA	**West Central Natric Loess Terrace - PROVISIONAL** The "West Central Natric Loess Terrace - PROVISIONAL" site is in a similar landscape position however the sodium in the soil differentiates the sites.

Similar sites

F134XY301LA	**West Central Flooded Swales And Depressions And Flood Plains - PROVISIONAL** The "West Central Flooded Swales And Depressions And Flood Plains - PROVISIONAL" site is similar but will be found at lower local elevations.
F134XY303LA	**West Central Natric Loess Terrace - PROVISIONAL** The "West Central Natric Loess Terrace - PROVISIONAL" site is in a similar landscape position however the sodium in the soil differentiates the sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

Macon Ridge in extreme northeastern Louisiana and southeastern Arkansas is a 135-mile long prominent ridge that lies between the Boeuf and Tensas Basins (Saucier, 1994). Macon Ridge is a terrace that features level to gently undulating topography with steep scarps of uplands, floodplains, depressions, and drainageways. The entire area is located within the Mississippi Alluvial Valley section of the Coastal Plain Province of the Atlantic Plain. It reaches a maximum width of about 25 miles in northeastern Louisiana about 30 miles north of Sicily Island (Saucier, 1994). Elevation ranges from 50 to 150 feet (15 to 46 m). The ridge is consistently higher on its eastern side where elevations are 20 to 30 feet higher than in the adjacent Tensas Basin (floodplain). It is bounded on the eastern edge by Bayou Macon. On the western side, bounded by the Boeuf River, elevations of the ridge are approximately the same as those in the Boeuf Basin, and it is sometimes difficult to distinguish the two at the surface (Saucier, 1994). Both Bayou Macon and Boeuf River are underfit streams occupying ancient Arkansas River meanders. The entire Macon Ridge is underlain by Pleistocene-aged loamy and clayey braided stream alluvium from the “old” Arkansas River. Macon Ridge consists almost entirely of Early Wisconsin age glacial outwash and is a continuation of the valley train in the Western Lowlands (Saucier, 1994). The area mantled by loess on the eastern edge of the terrace rises 10 to 30 feet above the floodplains. The loess thins toward the west, and elevation decreases. The loess in the western part of Macon Ridge contains small mixtures of the older underlying braided-stream terrace alluvium, and in even lower elevations, the loess contains mixtures of recent clayey alluvium or is buried completely beneath recent alluvium (T. E. Allen, USDA-NRCS Richland Parish Soil Survey Report, 1993).

This PES occurs on clayey and silty broad flats and depressional areas adjacent to drainageways on the Macon Ridge in Arkansas and Louisiana. Slopes are level (0 to 1%). The site occurs on terraces, floodplains, depressions and swales of the loess-mantled Macon Ridge braided-stream terrace. These soils are coarse-silty, fine-silty and fine to a depth of 80 inches or more.

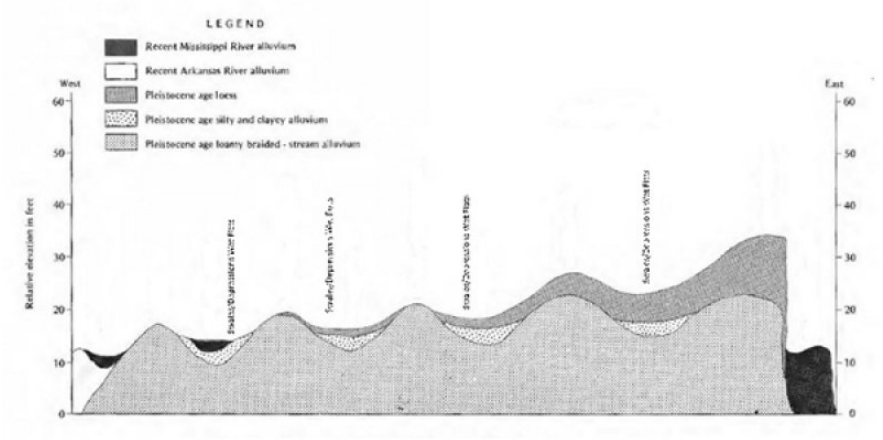


Figure 1. 134XY302 PES Landscape Diagram

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Flood plain (3) Depression
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	17–40 m
Slope	0–1%
Ponding depth	0 cm
Water table depth	0–76 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of North East Louisiana and South East Arkansas is warm and humid with a monthly precipitation that is well distributed throughout the year. The monthly precipitation mean is between 2.9 and 5.3 inches, with the lowest rainfall occurring from June through November. The following climatic data are averages from the three weather stations listed below. Temperature and precipitation may vary considerably from that listed for each month. Site specific weather data should be used for land management decisions. For site specific weather conditions, obtain data from a weather station close to the site.

Table 3. Representative climatic features

Frost-free period (average)	227 days
Freeze-free period (average)	263 days
Precipitation total (average)	1,499 mm

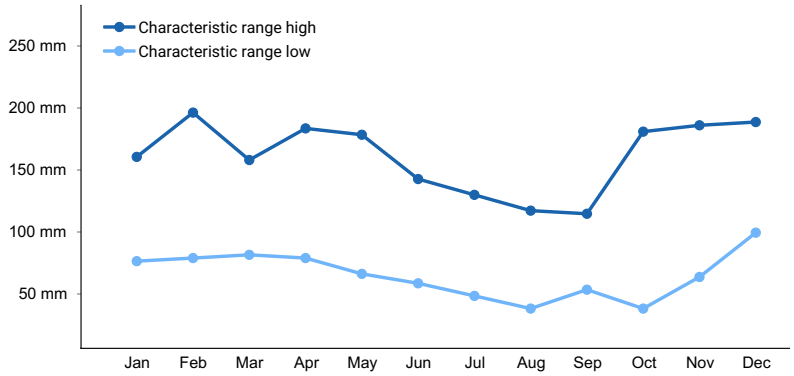


Figure 2. Monthly precipitation range

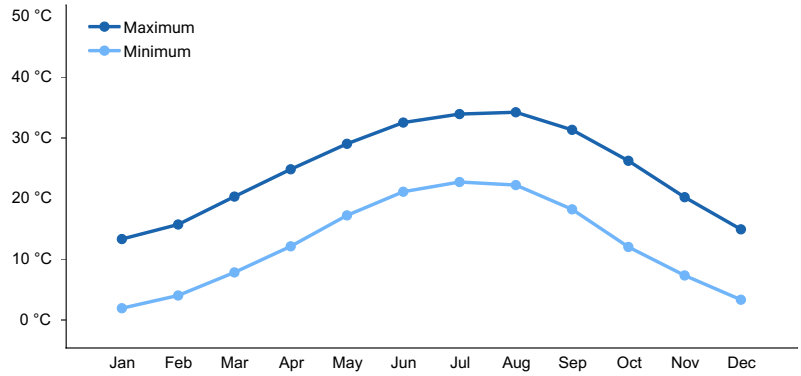


Figure 3. Monthly average minimum and maximum temperature

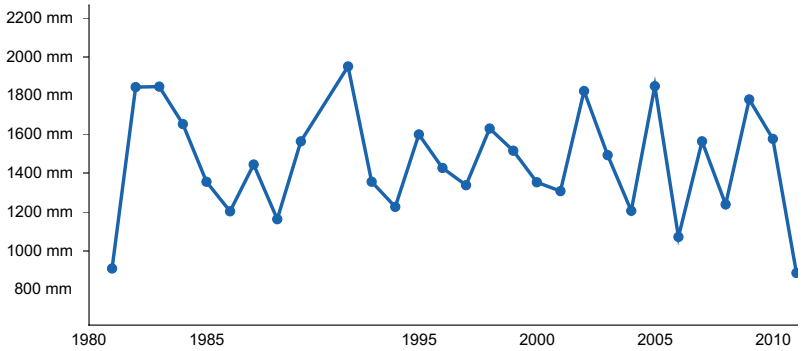


Figure 4. Annual precipitation pattern

Climate stations used

- (1) RAYVILLE [USC00167691], Rayville, LA
- (2) WINNSBORO 5 SSE [USC00169806], Winnsboro, LA
- (3) EUDORA [USC00032355], Eudora, AR

Influencing water features

This site is influenced by both surface and sub-surface hydrology. Standing water can be found in the winter months and soils may be saturated into early spring. Wetness is a dominate driver of this system and in Alternative States it will be a limiting factor. Flooding and ponding are not generally noted in the soils of this site, however the site is generally found in the lower portions of the landscape so it will receive surface flows from adjacent areas which will influence soil saturation.

Soil features

Forestdale, silty clay loam, Calhoun, Gilbert, Henry

Soils are poorly drained, Typic Endoaqualfs (Forestdale), Typic Glossaqualfs (Calhoun and Gilbert), and Typic Fragiaqualfs (Henry). These soils formed from mixed clayey, and loamy alluvium, and loess sediments of late Pleistocene Age. Slopes range from 0 to 1 percent. These very deep, slowly and very slowly permeable soils are found in broad flats and narrow depressional areas adjacent to drainageways in the terrace uplands. These soils are considered hydric and the water table is at or within 1.5 feet of the surface during winter and spring months in normal years. These soils are subject to rare flooding for brief duration.

Table 4. Representative soil features

Surface texture	(1) Silty clay loam (2) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained

Permeability class	Very slow to slow
Soil depth	152–203 cm
Available water capacity (0-101.6cm)	0.28–0.61 cm
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	3.6–9

Ecological dynamics

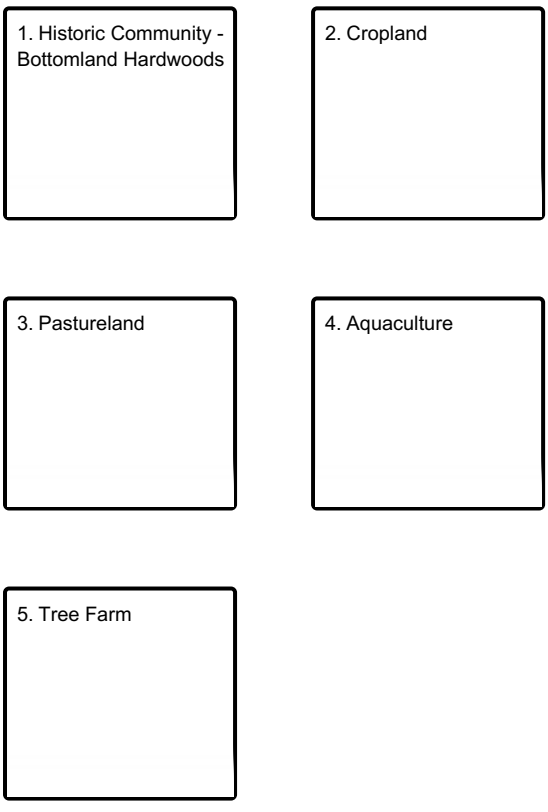
The pre settlement plant community of this site would have been dominated by bottomland hardwood species. Within this site there will be a gradient of wetness from Rare to No flooding and brief duration. The wetness variations will dictate the species that are present and the composition of them within an area.

Due to wetness, rooting depths of some species will be limited and due to this there is a potential for some trees to be uprooted by climatic events, such as strong winds or floods. With these events, openings in the canopy can occur which will set back succession and allow herbaceous and woody shrub species to colonize, these low stature communities are generally short lived and the upper canopy will close as tall growing trees mature. There is generally an age gradient within a forest stand from the herbaceous openings to mature bottomland hardwoods.

This site has been altered by human activity and is utilized for multiple production systems such as Aquaculture, Cropland, Pasture and Tree Farms, for all of these alternative states wetness is a limitation for this site for productivity and management activities. Within the alternative uses of the site the transitions will be very similar and require the input of resources such as installation of infrastructure needs and establishment of the desired species.

State and transition model

Ecosystem states



State 1 submodel, plant communities

1.1. Bottomland Hardwood

State 2 submodel, plant communities

2.1. Cropland

State 3 submodel, plant communities

3.1. Pasture

State 4 submodel, plant communities

4.1. Aquaculture

State 5 submodel, plant communities

5.1. Tree Farm

State 1
Historic Community - Bottomland Hardwoods

Historically bottomland hardwoods, Nuttall oak, Willow oak, Green ash, Overcup oak, Bitter pecan and Bald cypress, Drummond red maple, Swamp privet, Persimmon, Tupelo gum. Community species would have a range of wetness tolerance from Willow oak which is commonly found up to less abundant Water oak in the driest areas of the site.

Community 1.1
Bottomland Hardwood

Nuttall oak, Willow oak, Green ash, Overcup oak, Bitter pecan and Bald cypress, Drummond red maple, Swamp privet, Persimmon, Tupelo gum. Community species would have a range of wetness tolerance from Willow oak which is commonly found up to less abundant Water oak in the driest areas of the site.

State 2

Cropland

Cropland

Community 2.1
Cropland

Row Crop Production

State 3
Pastureland

Managed Pasture - PHG 2D, 8A, 8F, 8G or 8I

Community 3.1
Pasture

Pasture or Grassland This phase is characterized by a monoculture of or mixture of Forage species planted or allowed to establish from naturalized species managed for forage production or as herbaceous ground cover. This Site fits into multiple Pasture & Hayland Groups: 1A, 2D, 8A, 8F, 8G or 8I • 1-Bottomland, deep, fine-textured soil • 2-Bottomland, deep, medium-textured soil • 8-Upland, deep, medium-textured soil • A – soils having few limitations for the growth of the commonly grown plants except for slope • D – organic soils – restrictions due to wetness and traffic ability • F – soils with restricted rooting depth because of fragipans, claypans and other slowly permeable layers which restrict growth and adaptation • G – unfavorable chemical properties such as excessive salts, high exchangeable sodium, unfavorable soil reaction or toxic materials From these bullet descriptions of the Groups this site would generally be described as a Deep, fine to Medium textured soil on Uplands and alluvial bottoms. It has a range of few to wetness limitations, root restricting layers and soil chemistry. Soils descriptions of some of the soils note a presence of Aluminum (Al) in the soil profile and others a potential for a Fragipan or fragic layer. 1A - Mainly poorly drained and somewhat poorly drained, clayey bottom land soils. Most soils have a clayey surface layer. Some soils have a thin loamy overwash on the surface. Natural fertility is mostly medium to high. The soils are nonflooded or rarely flooded. 0-8% slopes. Most slopes are 0-3%. Only a few soils occur on 3-8% slopes. 2D - Bottom land soils that mainly have loamy surface layers and loamy subsoils. Mainly well or moderately well drained, acid, bottom land soils of low or medium natural fertility. Includes some somewhat poorly drained soils and some soils that are subject to rare or occasional overflow for brief periods. 0-5% slopes. Only a few soils occur on 3 to 5% slopes. 8A - Silty upland soils that formed in loess or loess-like materials. Well drained and moderately well drained, acid soils that are silty in the upper 20 inches. The subsoil is silty or clayey. Fertility is low or medium. 0-12% slopes. There are only a few soils in the 8-12% range. 8F - Silty upland and stream terrace soils that formed in loss or silty alluvium. The soils have a silty surface layer and a silty or clayey subsoil. Somewhat poorly drained, acid soils of low or medium natural fertility. 0-5% slopes. 8G - Upland and stream terrace soils mostly with silty surface layers and silty or clayey subsoils. Mainly poorly drained, acid soils of low natural fertility. 0-3% slopes. Most slopes are 0-1%. 8H - Upland and terrace soils with mainly silty surface layers and silty subsoils. Poorly drained to moderately well drained soils of low or medium natural fertility. The soils are alkaline within 20 inches of the surface. 0-1% slopes. 8I - Upland and terrace soils with silty surface layers and subsoils. Poorly drained and somewhat poorly drained, droughty, alkaline soils that have a concentration of sodium in the subsoil. Natural fertility is low or medium. 0-3% slopes. Most slopes are 0-1%. All soils need nitrogen fertilization for production when grasses are grown alone. It is not practical to apply high rates of fertilizer due to the wetness limitation potential of the site which normally occurs from December through June. To prevent extreme acidity in the subsoil when high rates of acidifying nitrogen is used, the surface soil should not be allowed to become more acid than 5.0 pH and lime should be applied at more frequent intervals. Adapted Grasses and Legumes Bahia and common bermuda are adapted. The adapted cool season legumes are white clover, winter peas, and vetch. White clover requires a higher level of calcium and phosphorus than peas or vetch. Tall fescue does well on these soils if good management is applied. Without fertilization, these soils will normally support a cover of little bluestem, slender bluestem, threeawns, broomsedge and carpetgrass.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	7846	10088	12329
Total	**7846**	**10088**	**12329**

State 4
Aquaculture

Aquaculture

Community 4.1
Aquaculture

Aquaculture Production

State 5
Tree Farm

Tree Farm

Community 5.1
Tree Farm

Hardwood or Pine Plantation: This phase is characterized by few or a monoculture of Hardwood or Pine species planted or allowed to regenerate from seed trees managed for wood production. This Site fits into multiple Woodland Suitability Groups (2o6, 2o7, 2w5, 2w7, 2w8, 2w9 & 3w9) depending on the soil Mapunit. The first part of the symbol indicates potential productivity of the soils for important trees, high (2) to moderately high (3). The second part, a letter, indicates the major kind of soil limitation, no serious management problems (o), limitation of excessive water in or on the soil (w). The third part of the symbol, a numeral, indicates the kind of trees for which the soils are best suited and the severity of the hazard or limitation. The numerals 5 and 6 indicate moderate, and severe limitations, respectively, and suitability for broadleaf trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needle leaf and broadleaf trees. These groups would generally describe this site as highly to moderately highly productive with few or Slight to severe limitations for wetness for the production of broadleaf and some pine species. WS 2 o 7 Well drained, loamy soils with high potential productivity; no serious management problems; well suited for either pine or southern hardwoods. Site index for loblolly and slash pine 90, oaks and sweetgum 90. Potential is high for management of quail and turkey, and moderately high for squirrels and deer. WS 2 w 5 Moderately wet, loamy and clayey soils with high potential productivity; moderate equipment limitations and slight to moderate seedling mortality due primarily to excess water; best suited for southern hardwoods. Site index for green ash 80, cottonwood 110, oaks and sweetgum 90. Potential is high for management of deer, turkey, squirrels and ducks. WS 2 w 8 Slightly to moderately wet, acid, loamy and clayey soils with high potential productivity; moderate equipment limitations due primarily to excess water; well suited for either pines or southern hardwoods. Site index for loblolly and slash pine 90, oaks and sweetgum 90. Potential is high for management of turkey and moderately high for deer, ducks, quail and squirrels. WS 2 w 9 Wet, occasionally to frequently flooded loamy soils with high potential productivity; severe equipment limitations and moderate to severe seedling mortality due primarily to excess water; well suited for either pines or southern hardwoods. Site index for loblolly and slash pine 90, cottonwood 90-100, green ash, water oaks, and sweetgum 90. Potential is high for management of deer, squirrels and turkey, moderately high for ducks, and moderate for quail. WS 3 w 9 Wet, clayey soils with moderately high potential productivity; severe equipment limitations and moderate seedling mortality due primarily to excess water; suited for pine and southern hardwood. Site index for loblolly and slash pine 80, oaks and sweetgum 80. Potential is high for management of deer, squirrels and turkey, and moderately high for ducks.

Additional community tables

Table 6. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm Season Grasses**			7846–12329	
	Bermudagrass	CYDA	*Cynodon dactylon*	7846–12329	–

Animal community

.

Hydrological functions

.

Recreational uses

.

Wood products

.

Other products

.

Other information

.

Other references

Allen, T. E., USDA-NRCS Richland Parish Soil Survey Report, 1993

Autin, W. J., Burns, S. F., Miller, B. J., Saucier, R. T., & Snead, J. I. (1991). Quaternary geology of the lower Mississippi Valley. The Geology of North America, 2, 547-582.

Cowardin, L. M., Carter, V., Golet, F. C., & LaRoe, E. T. (1979). Classification of wetlands and deepwater habitats of the United States. US Fish and Wildlife Service FWS/OBS, 79(31), 131.

Daigle, J.J., Griffith, G.E., Omernik, J.M., Faulkner, P.L., McCulloh, R.P., Handley, L.R., Smith, L.M., and Chapman, S.S., 2006, Ecoregions of Louisiana (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,000).

Ezell, A. W., & Hodges, J. D. (1995). Bottomland hardwood management: Species Site Relationships. MSU Extension Service Publication 2004.

Saucier, R. T. (1994). Geomorphology and Quarternary Geologic History of the Lower Mississippi Valley. Volumes 1 and 2. ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MS GEOTECHNICAL LAB.

Schumacher, B. A., B. J. Miller, and W. J. Day. "A chronotoposequence of soils developed in loess in central Louisiana." Soil Science Society of America Journal 51.4 (1987): 1005-1010.

McCraw, David J., and Whitney J. Autin. Lower Mississippi Valley, Loess: A Field Guide. Inqua Commission on Loess, 1989. Emerson, F. V. (1918). Loess-depositing winds in Louisiana. The Journal of Geology, 26(6), 532-541.

Frost, C. C. Presettlement Fire frequency regimes of the United States: A First approximation. Fire in ecosystem

management: Shifting the paradigm from suppression to prescription, ed. TL Pruden and LA Brennan, 70-81.

Guyette, R. P., Stambaugh, M. C., Dey, D. C., & Muzika, R. M. (2012). Predicting fire frequency with chemistry and climate. Ecosystems, 15(2), 322-335. Heinrich, P. V., (2008), Loess Map of LA, Louisiana Geological Survey

Kochian, L. V., Pineros, M. A., & Hoekenga, O. A. (2005). The physiology, genetics and molecular biology of plant aluminum resistance and toxicity. In Root Physiology: From Gene to Function (pp. 175-195). Springer Netherlands.

Latimore S. (1996). THE RARE AND SENSITIVE NATURAL WETLAND PLANT COMMUNITIES OF INTERIOR LOUISIANA. Louisiana Natural Heritage
Program, Louisiana Department of Wildlife & Fisheries, Baton Rouge, Louisiana.

Louisiana Natural Heritage Program, Louisiana Department of Wildlife & Fisheries, (2009) The Natural Communities of Louisiana

Miller, B. J., Day, W. J., & Schumacher, B. A. (1986). Loesses and loess-derived soils in the Lower Mississippi Valley. Guidebook for soils-geomorphology tour.

Miller, B. J., Lewis, G. C., Alford, J. J. & Day, W. J. (1984) Loesses in Louisiana and at Vicksburg, Mississippi. Guidebook for Friends of the Pleistocene Field Trip.

Muery, E. (1998), ANALYSIS OF PRESETTLEMENT NATURAL PLANT COMMUNITY TYPES OF THE MACON RIDGE OF LOUISIANA.

Pettry, D. E., & Switzer, R. E. (1998). Sodium soils in Mississippi.

United States Salinity Laboratory Staff, USA, USDA (1954), Diagnosis and improvement of saline and alkali soils, USDA Agriculture Handbook 60, 1954, 160 pp.

USDA Agriculture Handbook 296. (2006). http://soils.usda.gov/MLRAExplorer. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin

USDA Natural Resources Conservation Service. Published Soil Surveys from Catahoula, Franklin, Richland and West Carroll Parishes. Various publication dates.

USDA Natural Resources Conservation Service. Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app. USDA NRCS Soil Survey Division. Washington, DC. 2008.

Contributors

D. Charles Stemmans II
Dwayne Rice
Wayne Roberts
Rachel Stout Evans

Acknowledgments

The Macon Ridge Technical Team did an outstanding job of utilizing existing data and knowledge to develop site concepts. They also provided the needed sections of the descriptions, review and comments of them.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**