USDA Natural Resources Conservation Service

Ecological site F134XY123LA
Baton Rouge Terrace Southern Loess Low Terrace - PROVISIONAL

Accessed: 05/07/2024

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 farthest southeast part of the MLRA in Louisiana. It is in the Mississippi Valley Loess Plains Section of the EPA Ecoregions in sub-section 74d, Baton Rouge Terrace. 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. The Baton Rouge Terrace ecoregion occurs on the Pleistocene Prairie Terraces and is lower in elevation and has flatter topography than Ecoregion 74c to the north.

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

Nearly Level to depresional terrace uplands above the stream terraces and higher elevations on the Stream Terrace. Hydrology is a driver in this site with Flooding Frequency of None to Frequent however the modal concept is occasionally flooded. Ponding frequency is None with a range to include some frequently flooded areas, the site is overall Poorly Drained. This site would be in thinner loess deposits of the MLRA.

Associated sites

F134XY122LA	**Baton Rouge Terrace Southern Loess Stream Terrace - PROVISIONAL** Baton Rouge Terrace Southern Loess Stream Terrace is found at lower elevation from this site in the Baton Rouge Terrace and may be better drained.
F134XY124LA	**Baton Rouge Terrace Southern Loess Terrace - PROVISIONAL** Baton Rouge Terrace Southern Loess Terrace is found at the next higher elevation from this site in the Baton Rouge Terrace.

Similar sites

F134XY103MS	**Southern Rolling Plains Loess Wet Terrace - PROVISIONAL** Southern Rolling Plains Loess Wet Terrace fits a similar site position on the landscape, however is found in the Rolling Plains and Bluff Hills Portion of the MLRA to the north.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The Baton Rouge Terrace (EPA Level IV Ecoregions 74D) of the Southern Mississippi Valley Loess (MLRA 134) are located in southeast Louisiana, occurs on the Pleistocene Prairie Terraces and is lower in elevation and has flatter topography than Ecoregion 74c to the north. Similar to other parts of Ecoregion 74, loess is thicker to the west.

“Loess” is the geologic term of German origin that refers to widespread deposits of homogeneous layers of friable, porous silt mixed with minor amounts of clay or fine sand (Heinrich, 2008). The loess mantle, created by well-sorted windblown silt, was deposited during the Pleistocene age. Its source was glacial sediment from glacial meltwater that was flowing down an extensive braided stream system depositing large volumes of silt over the floodplain of the Mississippi River (Heinrich, 2008). Glacial meltwater ceased flowing when southern edges of ice sheets stopped melting in fall and winter, thereby creating dry conditions on the previously flooded Mississippi River Valley. Strong seasonal winds blew across dry floodplains and eroded large quantities of silt-sized sediment, and transported it out of the Mississippi alluvial valley and deposited it on adjacent uplands and terraces (Heinrich, 2008). Over thousands of years, the silt accumulations created loess deposits that are many feet thick (Heinrich, 2008).

Where blankets of loess are thicker than 6 feet, the soils formed entirely in loess. Where loess deposits are less than 6 feet thick, soils reflect the nature of the underlying parent material (McDaniel, 2001). Thick loess areas produce intensely dissected terrain with excessively steep slopes and ridge and ravine topography (McDaniel, 2001). The Bluff Hills tend to have deeper, calcareous loess and steeper, much more dissected topography than the Southern Rolling Plains to the east and Baton Rouge Terrace to the Southeast.

This Site occurs mainly on nearly level to depressional terrace uplands above the stream terraces and higher elevations on the Stream Terrace in the Southern Rolling Plains in Louisiana. Smaller areas of this site occur on similar landscape positions within the Bluff Hills of Louisiana. Slopes are level to nearly level to depressional (0 to 3 percent).

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Depression (3) Flood plain
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	3–49 m
Slope	0–2%
Ponding depth	0–13 cm
Water table depth	15–203 cm
Aspect	Aspect is not a significant factor

Climatic features

South Louisiana has a warm, humid climate, with fairly long summers and relatively short winters. The result is a long growing season and abundant plant growth. Water is a definitive part of the southern Louisiana landscape, largely due to the combination of low elevation and fairly abundant rainfall in most years. Mean annual precipitation ranges from 51 to 67 inches over this region, and is fairly well distributed throughout the year. There have been very few years when less than 50 inches of precipitation has fallen. Snow is a rarity, and little more than 1 inch typically falls every few years. Growing seasons are long, typically from late February to late November. Along the Gulf Coast, it is not unusual for the lowest winter temperature to be above 30 degrees. Inland, there have been occasional blasts of cold air that have dropped temperatures into the teens and 20s, but these are rare. Hurricanes and tropical storms are an important part of the climate of southern Louisiana, with some impact occurring nearly every year in some part of the region. However, devastating storms do not occur too often, and heavy rain and storm surge are usually the biggest concerns, compared to wind damage. The following climatic data are averages from the five 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. Information can be accessed from specific weather stations at http://www.wrcc.dri.edu/coopmap/ or http://www.wrcc.dri.edu/summary/climsmla.html.

Table 3. Representative climatic features

Frost-free period (average)	245 days
Freeze-free period (average)	292 days
Precipitation total (average)	1,575 mm

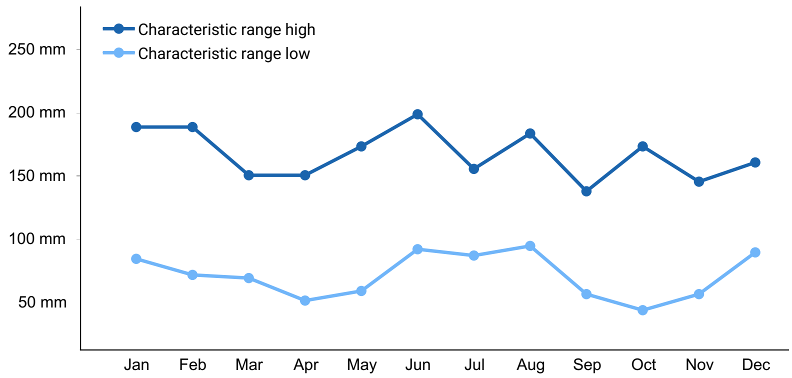

Figure 1. Monthly precipitation range

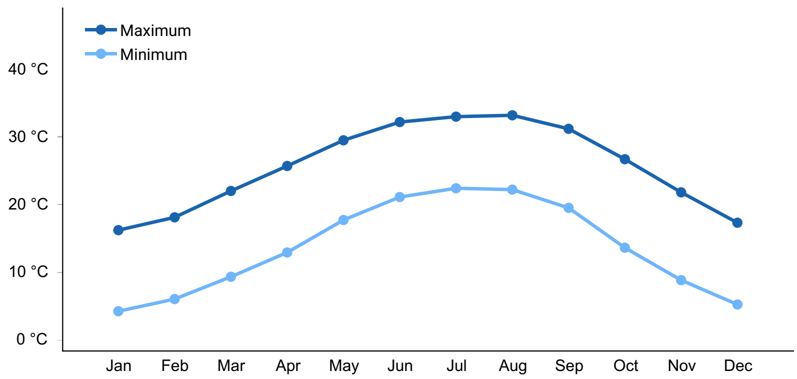

Figure 2. Monthly average minimum and maximum temperature

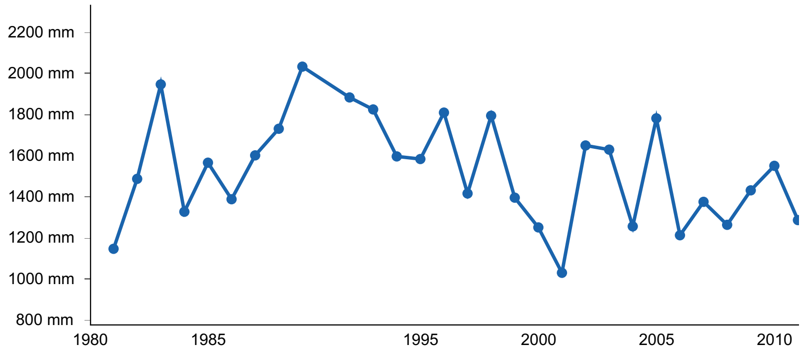

Figure 3. Annual precipitation pattern

Climate stations used

- (1) CLINTON 5 SE [USC00161899], Clinton, LA
- (2) BATON ROUGE RYAN AP [USW00013970], Baton Rouge, LA
- (3) LSU BEN-HUR FARM [USC00165620], Baton Rouge, LA

Influencing water features

This site is influenced by both surface and sub-surface hydrology. It is subject to surface run in and sub surface flow from adjacent parts of the landscape. 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.

Soil features

The soils listed in this section of the description may not be all inclusive. There may be other soils that fit this site concept, as well as in some areas where the listed soils are mapped they may not fit the site concept. Some soil map units and soil series included in this Provisional Ecological Site grouping were used as “best fit” for a particular soil-landscape catena during a specific era of soil mapping, regardless of origin of parent material or Major Land Resource Area. Therefore, these soil series may not be typical for MLRA 134, and those soil map units deserve further investigation in a joint ecological-soil survey project. When utilizing this description verify it is the correct site utilizing multiple parameters, the soils, the physiography and the location. If the site does not fit the particular location well utilize the Similar or Associated Sites listed in the Supporting Information section of this description to determine if another site may be a better fit to your location.

Soils are Poorly Drained, Frequently to Not Flooded, Aeric Albaqualfs (Springfield), Typic Glossaqualfs (Calhoun, Encrow, Frost and Gilbert) and Glossic Natraqualfs (Bonn). These soils formed in the loess uplands of the Southern Mississippi Valley Loess (MLRA 134) with flat slopes to depressions. These deep and very deep, moderately to slowly permeable soils are found on the lowers landscape and first terrace at elevations above the floodplains.

The water table is at or within 1 to 2 feet of the surface during winter and spring months in normal years. These soils are subject to frequent to no flooding of up to long duration, and can be subject none to frequent ponding of long duration.

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Silt
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Very slow to slow
Soil depth	152–203 cm
Surface fragment cover <=3"	0%

Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	25.4–38.1 cm
Sodium adsorption ratio (0-101.6cm)	0–30
Soil reaction (1:1 water) (0-101.6cm)	3.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

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 frequent to no flooding. 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 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

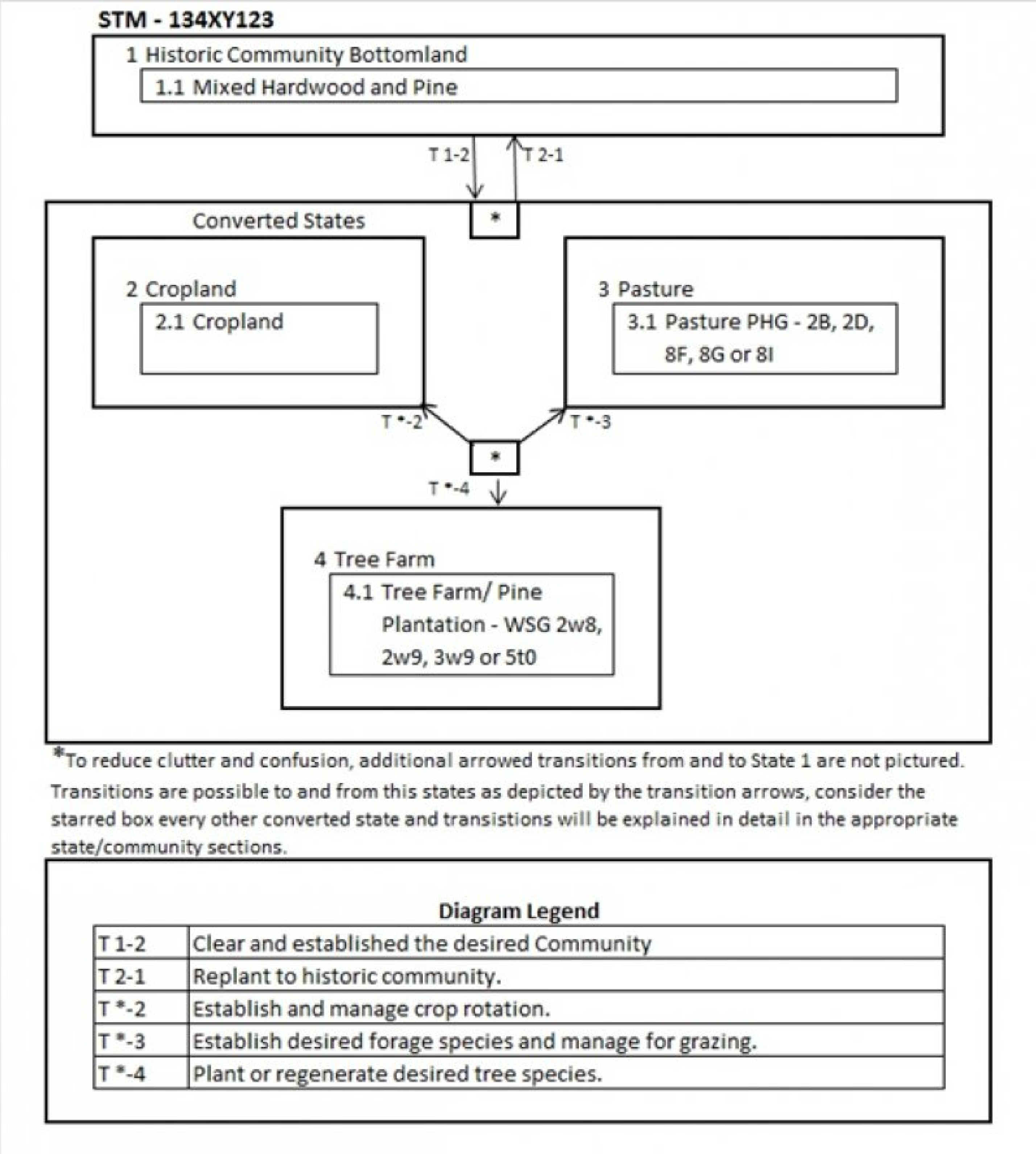

Figure 5. 134XY123LA Southern Loess Low Terrace PES STM

State 1
Historic Community - Bottomland Hardwoods

Historically Bottomland Hardwoods

Community 1.1
Bottomland Hardwood

The overstory is typically dominated by *Quercus pagoda* (cherrybark oak), *Liquidambar styraciflua* (sweetgum), and *Q. nigra* (water oak), with primary associates including *Platanus occidentalis* (American sycamore), *Magnolia* *grandiflora* (Southern magnolia), *Fagus grandifolia* (American beech), Ulmus Americana (American elm), and *Q. michauxii* (swamp chestnut oak). Other canopy species include *Liriodendron tulipifera* (yellow poplar), *Q. shumardii* (Shumard oak), *Tilia americana* var. caroliniana (basswood), *Morus rubra* (red mulberry), *Acer rubrum* (red maple), *Carya glabra* (pignut hickory), and *Celtis laevigata* (hackberry).

State 2
Cropland

Cropland

Community 2.1
Cropland

Row Crop Production

State 3
Pastureland

Managed Pasture - PHG 2B, 2D, 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: 2B, 2D, 8F, 8G or 8I • 2-Bottomland, deep, medium-textured soil • 8-Upland, deep, medium-textured soil • B – low available water capacity, usually sandy and have deep rooting depths • D – organic soils – restrictions due to wetness and trafficability • 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, Medium textured soil on bottomlands and uplands. It has a range of limiting factors from root restricting layers to soil chemistry. Soils descriptions of some of the soils note a presence or a potential for a Fragipan or fragic layer, exchangeable Sodium (Na. 2B - Bottom land soils with mostly loamy surface layers. Mainly small stream bottom land soils that have low or medium natural fertility and are subject to frequent overflow. The duration of flooding generally is very brief or brief, but it ranges to very long. 0-5% slopes. Most soils have slopes of 0-1%. A few are gently undulating or undulating. 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. 8F - Silty upland and stream terrace soils that formed in loess 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%. 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. 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. 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	2130	3811	6837
Total	**2130**	**3811**	**6837**

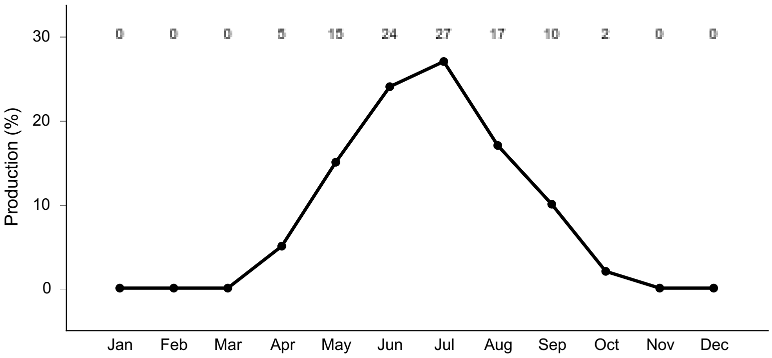

Figure 7. Plant community growth curve (percent production by month). LA0012, Bahia. Bahiagrass.

State 4
Tree Farm

Tree Farm

Community 4.1
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 (2w8, 2w9, 3w9, 5t0) depending on the soil Mapunit. The first part of the symbol indicates potential productivity of the soils for important trees, high (2), moderately high (3), low (5). The second part, a letter, indicates the major kind of soil limitation, 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 numeral 8 and 9 indicate moderate and severe limitations, respectively, and suitability for both needle leaf and broadleaf trees. These groups would generally describe this site as high to moderately high productivity with moderate to severe limitations for wetness for the production of broadleaf and needle leaf species. 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				2130–6837	
	bahiagrass	PANO2	*Paspalum notatum*	2690–6837	–
	Bermudagrass	CYDA	*Cynodon dactylon*	2130–5380	–

Animal community

.

Hydrological functions

.

Recreational uses

.

Wood products

.

Other products

.

Other information

.

Other references

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.

Chapman, S.S, Griffith, G.E., Omernik, J.M., Comstock, J.A., Beiser, M.C., and Johnson, D., 2004, Ecoregions of Mississippi, (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,000).

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).

Emerson, F. V. (1918). Loess-depositing winds in Louisiana. The Journal of Geology, 26(6), 532-541.

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

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.

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.

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.

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

Rutledge, E.M., M.J. Guccione, H.W. Markewich, D.A. Wysocki, and L.B. Ward. 1996. Loess stratigraphy of the Lower Mississippi Valley. Engineering Geology 45: 167-183.

Saucier, Roger T. 1994. Geomorphology and Quaternary Geologic History of the Lower Mississippi Valley, Volume I & II. U.S. Army Corps of Engineers, Vicksburg, MS.

Schumacher, B. A., Miller, B. J., & Day, W. J. (1987). A chronotoposequence of soils developed in loess in central Louisiana. Soil Science Society of America Journal, 51(4), 1005-1010.

Theriot, R. F. (1992). Flood tolerance of plant species in bottomland forests of the southeastern United States.

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

Contributors

D Charles Stemmans II

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:**