Ecological site F134XY105MS
Southern Rolling Plains Loess Fragipan Upland - PROVISIONAL

Accessed: 05/11/2025

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 74c, Southern rolling Plains. 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. Although less dissected than the Bluff Hills (74a), the region has more irregular and dissected topography than adjacent 74b to the north in Mississippi. The historic forests contained shortleaf pine, loblolly pine, and upland oaks and hickories. Pine is naturally more prevalent here than in 74a and 74b. Land cover now is mostly mixed pine-hardwood forest, pine plantations, pasture, and cropland. The eastern boundary of this region is broad, with a gradual transition to the southern Coastal Plains.

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

Moderately well to Well drained soils with a fragipan or other root restricting layer, which is the major factor that drives this site concept. These are upland sites that are productive and have a slope range from 0 to 20 percent but generally below 6 percent. These sites are found in level IV EPA Ecoregions, 74a, Bluff Hills & 74c, Southern Rolling Plains of the Southern Mississippi Valley Loess Plains, within the Southern Mississippi Valley Loess Major Land Resource Area.

Associated sites

F134XY106MS	**Southern Rolling Plains Thin Loess Upland - PROVISIONAL** 134XY106 Southern Rolling Plains Thin Loess Upland will be in a similar site position, however the root restriction will be due to a change in parent material in the soil profile.
F134XY107MS	**Southern Deep Loess Summit - PROVISIONAL** 134XY107 Southern Deep Loess Summit will be in a similar site position, however it will not have the root restriction due to fragic properties in the soil profile.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The Bluff Hills and the Southern Rolling Plains (EPA Level IV Ecoregions 74A and 74C, respectively) of the Southern Mississippi Valley Loess (MLRA 134) are located in southwest Mississippi and southeast Louisiana. The areas lie within the Coastal Plain Province of the Atlantic Plain. The underlying geology consists of marine deposits of sand, silt, clay, and lignite of the Pascagoula, Hattiesburg, Catahoula and Citronelle formations. The Bluff Hills, which bound the Mississippi River floodplain, are capped by loess deposits often greater than 50 feet thick (Chapman et al., 2004). The adjacent terraces of the Southern Rolling Plain are loess mantled as well.

“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). The Bluff Hills and Southern Rolling Plains are covered mainly with 2 separate layers (and ages) of loess deposits, the older and lower Sicily Island loess and the younger Peoria loess at the soil surface.

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. The loess mantle on the Southern Rolling Plains begins to thin and become more acid in the east as it transitions to the Southeastern Plains. Stream gradients in the Bluff Hills are high with narrow drainageways and floodplains, while the stream gradients become lower with broader floodplains in the Southern Rolling Plains.

This Site occurs mainly on narrow to broad ridges and side slopes in the uplands of the Southern Rolling Plains in Mississippi and Louisiana. This site also occurs on a smaller extent in the Loess Bluff Hills in Mississippi. This site also occurs on high broad stream terraces in the uplands and on other erosional surfaces in both Louisiana and Mississippi. Slopes can range from nearly level to steeply sloping (0 to 20 percent), but mainly range below 8 percent. Many of these sites are in eroded to severely eroded areas with rills and shallow gullies forming, with a surface layer composed of a mixture of topsoil and subsoil.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	120–510 ft
Slope	0–20%
Water table depth	18–36 in
Aspect	Aspect is not a significant factor

Climatic features

The Southern Rolling Plains portions of MLRA 134 in Mississippi and 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. As you move northward in this region temperature trends lower and Precipitation is not as well distributed. This change in distribution does not imply that there is a rainy season and dry season, however there is a change in distribution. Water is a definitive part of this landscape, largely due to the combination of low elevation and fairly abundant rainfall in most years. Mean annual precipitation ranges from 50 to 70 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, however chances increase as you move Northward through the region. Growing seasons are long, typically from late February to late November. Hurricanes and tropical storms impact the climate of this region predominately in the southern areas, with some impact occurring nearly every year in some areas. However, devastating storms do not occur too often, and heavy rain is usually the biggest concern compared to wind damage. The following climatic data are averages from the ten 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)	227 days
Freeze-free period (average)	268 days
Precipitation total (average)	62 in

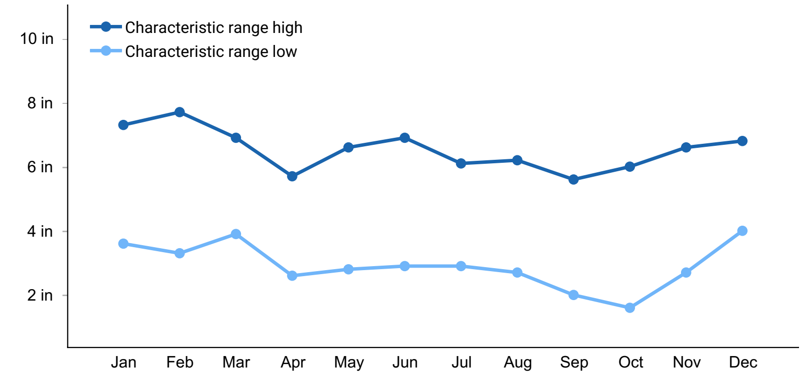

Figure 1. Monthly precipitation range

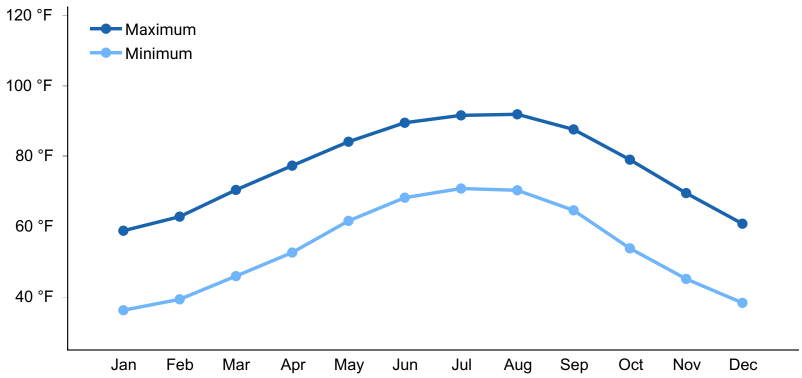

Figure 2. Monthly average minimum and maximum temperature

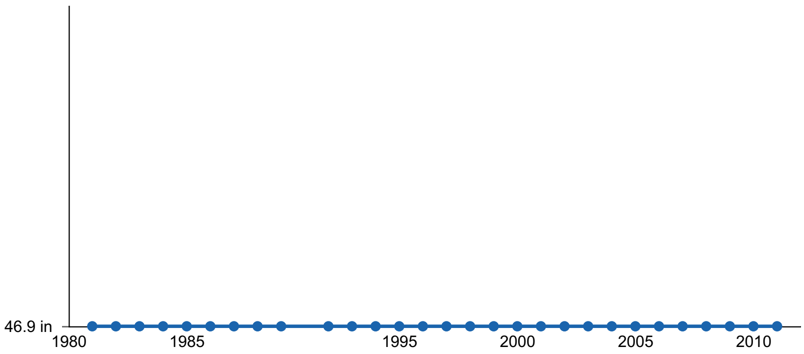

Figure 3. Annual precipitation pattern

Climate stations used

- (1) CLINTON 5 SE [USC00161899], Clinton, LA
- (2) HAZLEHURST 5 SW [USC00223920], Hazlehurst, MS
- (3) OAKLEY EXP STN [USC00226476], Raymond, MS
- (4) WOODVILLE 4 ESE [USC00229793], Centreville, MS
- (5) MCCOMB/PIKE CO/JOHN E LEWIS AP [USW00093919], McComb, MS
- (6) BROOKHAVEN CITY [USC00221094], Brookhaven, MS
- (7) CRYSTAL SPGS EXP STN [USC00222094], Crystal Springs, MS
- (8) NATCHEZ [USC00226177], Natchez, MS
- (9) MEADVILLE [USC00225704], Bude, MS
- (10) PORT GIBSON 1 NE [USC00227132], Port Gibson, MS

Influencing water features

This site is influenced by mostly surface water however sub-surface hydrology can impact the site especially with a Fragipan to hold water closer to the soil surface.

Soil features

Soils are moderately well drained Oxyaquic Fragiudalfs (Loring, Providence), Oxyaquic Fraglossudalfs (Grenada), and Typic Fragiudults (Tangi). These nearly level to steeply sloping soils formed in thick loess deposits and thin loess deposits over loamy coastal plain sediments mainly in the Southern Rolling Plains in the Southern Mississippi Valley Loess (MLRA 134). A few areas are found in the Loess Bluff Hills in the Southern Mississippi Valley Loess (MLRA 134). Slopes range from 0 to 20 percent, but are mainly below 8 percent. These deep soils are found on mainly on narrow to broad ridgetops, side slopes, high stream terraces, and other erosional surfaces in the uplands. These soils have fragipans which act as root restricting layers that also perch water. These soils are moderately permeable above the fragipan and slowly permeable within the fragipan. All these soil have a seasonal high water table within 1.5 to 3 feet of the surface during winter and spring months in normal years. Many of these soils are in eroded to severely eroded areas with rills and shallow gullies forming, with a surface layer composed of a mixture of topsoil and subsoil.

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.

Table 4. Representative soil features

Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained
Permeability class	Slow to moderate
Soil depth	60–80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0.05–0.25 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–6
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 mixed hardwood and pine species. Within this site there will be a gradient of wetness due to the permeability of the soils which holds soil moisture within the profile. The wetness variations will dictate the species that are present and the composition of them within an area.

Due to Fragic soil properties or root restricting layers, rooting depths of some species will be limited and due to this and there is a potential for some trees to be uprooted by climatic events, such as strong winds. 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 mixed hardwoods and pines.

Another historical ecological process that drove the system was fire, on this site due to wetness the vegetative production would have provided fuel, the lessening of flooding potential would have allowed fire to burn across this site or may have created a mosaic pattern of unburned portions that had wetness at a given time. Adjacent drier sites would have carried a fire and if conditions where adequate the fire would have burned through this site setting back succession of the herbaceous layer. Fire intensity could have been variable depending on conditions at the time on the site and would have impacted the species composition and stature of the site. Historically the region experienced a fire return interval of 2 to 4 years. Prior to European settlement naturally occurring and Native American set fires would have been a driving process in the system. Without the manmade interruptions of roads and altered land uses fires could have begun many mile from this site and carried across hundreds if not thousands of acres at a given time as well as leaving islands of unburned areas throughout the landscape.

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 the Fragic soil layers and wetness are limitations 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

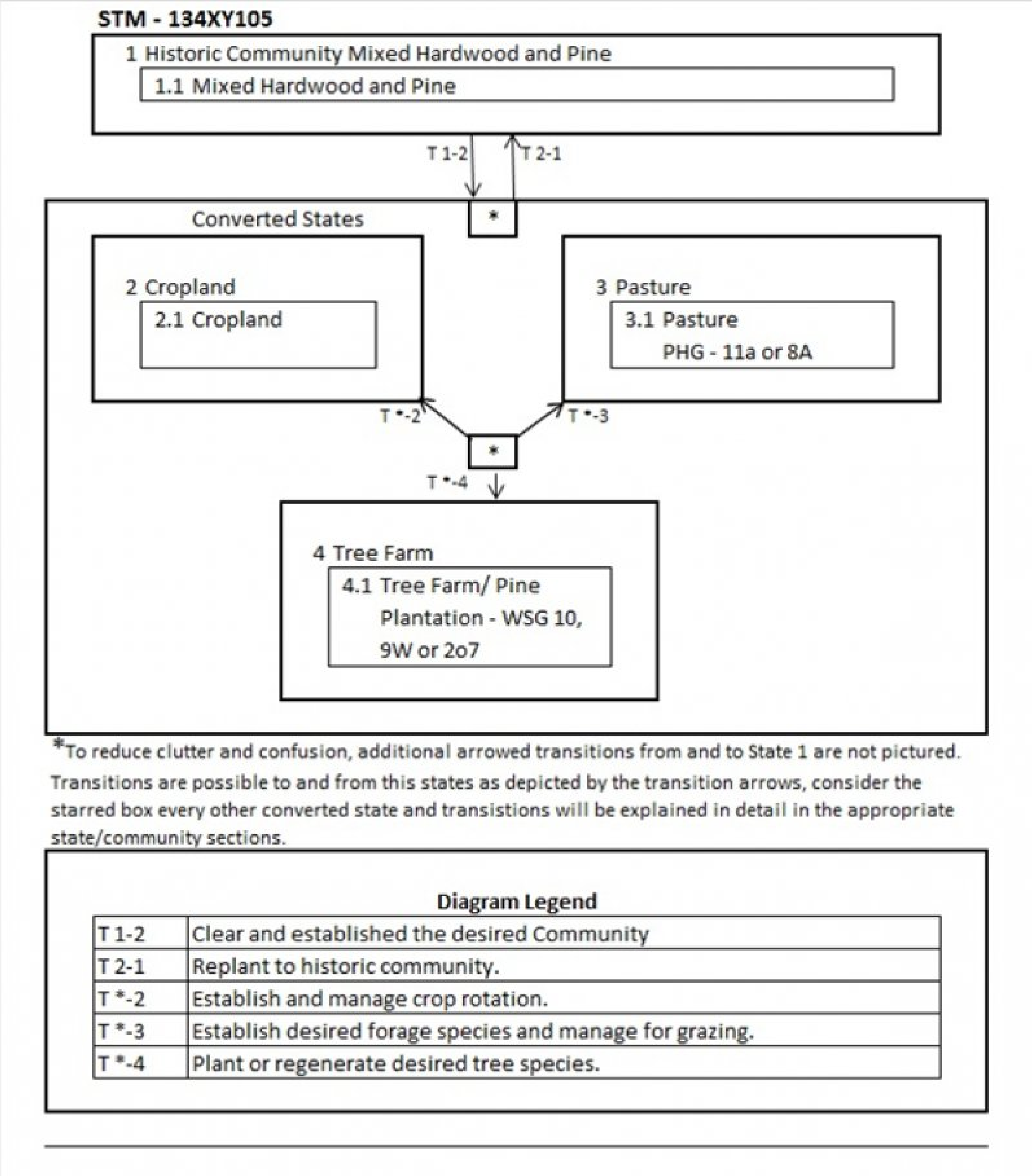

Figure 5. 134XY105 Southern Loess Fragipan Upland - PES STM

State 1
Historic Community - Mixed Hardwoods and Pine

Historically hardwoods and pines, Cherrybark oak, Eastern Cottonwood, Loblolly Pine, Nuttall oak, Water oak, Sweetgum and Yellow-Poplar

Community 1.1

Mixed Hardwoods and Pine

Pinus taeda (loblolly pine), *Liquidambar styraciflua* (sweetgum), *Fagus grandifolia* (American beech), *Quercus nigra* (water oak), *Q. pagoda* (cherrybark oak), *Q. michauxii* (cow oak), *Q. alba* (white oak), *Liriodendron tulipifera* (yellow poplar), *Ulmus americana* (American elm), *Magnolia grandiflora* (Southern magnolia), *Acer rubrum* (red maple), *Carya glabra* (pignut hickory)

State 2
Cropland

Cropland

Community 2.1
Cropland

Row Crop Production

State 3
Pastureland

Managed Pasture - PHG 11a or 8A.

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 Suitability Groups: 11a in MS or 8A in LA. • 11a - Upland, moderately deep, medium textured soils, Moderately well and somewhat poorly drained • 8 - Upland, deep, medium-textured soil • A – soils having few limitations for the growth of the commonly grown plants except for slope. From these bullet descriptions of the Groups this site would generally be described as a Moderately Deep to Deep, Moderately Well to somewhat poorly drained, Medium textured soils on Uplands. It has limiting factors including a possibility of a root limiting layer. 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. 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.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1900	3600	5200
Total	**1900**	**3600**	**5200**

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 Management and Productivity Groups 10 or 9W in MS. The first element in ordination is a number that denotes potential productivity in terms of cubic meters of wood per hectare per year for an indicator tree species. The larger the number, the greater the potential productivity. (1 means 1 cubic meter per hectare per year (14.3 cu.ft./ac) 10 means 10 cubic meters per hectare per year (143 cu.ft./ac)) The second element or subclass is indicated by a capital letter, which indicates certain soil or physiographic characteristics that contribute to important hazards or limitations in management. Subclass W (excessive wetness). Soils in which excessive water, either seasonally or year round, causes significant limitations for forest land use and management. These soils may have restricted drainage, a high water table, or flooding hazard that adversely affects either stand development or management. OR this Site fits into Woodland Suitability Group 2o7 in LA, depending on the soil Mapunit. The first part of the symbol indicates potential productivity of the soils for important trees, high (2). The second part, a letter, indicates the major kind of soil limitation, no serious management problems (o). 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 7 indicate slight limitations and suitability for both needle leaf and broadleaf trees. 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. These groups would generally describe this site as moderately to highly productive with moderate to slight limitations for wetness for the production of broadleaf and some needle leaf species.

Additional community tables

Table 6. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm Season Grasses**			1900–5200	
	Bermudagrass	CYDA	*Cynodon dactylon*	1900–5200	–

Animal community

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Hydrological functions

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Recreational uses

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Wood products

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Other products

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Other information

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Other references

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Contributors

D Charles Stemmans II
Rachel Stout Evans

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:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
