Ecological site F134XY107MS
Southern Deep Loess Summit - PROVISIONAL

Accessed: 04/26/2024

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 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

Deep Loess Upland site having 0 to 12 percent Slopes and few restrictions for productivity in the soil. This site is found on the summits and interfluves in the dissected uplands found in level IV EPA Ecoregion 74a, Bluff Hills of the Mississippi Valley Loess Plains, within the Southern Mississippi Valley Loess Major Land Resource Area, south of the Big Black River in Mississippi and extending to LA. This site is also found in the Sicily Island area of the MLRA.

Associated sites

F134XY108MS	**Southern Deep Loess Backslope - PROVISIONAL** Southern Deep Loess Backslope is differentiated from this site by slopes greater than 12%.

Similar sites

F134XY105MS	**Southern Rolling Plains Loess Fragipan Upland - PROVISIONAL** Southern Rolling Plains Loess Fragipan Upland will be in a similar site position, however the root restriction will be due to Fragic properties in the soil.
F134XY106MS	**Southern Rolling Plains Thin Loess Upland - PROVISIONAL** Southern Rolling Plains Thin Loess Upland will be in a similar site position, however it will have a thinner loess surface of the soil.

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 mainly occurs on narrow to broad, flat to convex ridges and side slopes in the Bluff Hills and the very western portion of uplands of the Southern Rolling Plains in Mississippi and Louisiana. In extreme southwest Mississippi and adjacent area in Louisiana, the site is in an area locally known as the Tunica Hills. Smaller areas are also on broad convex high stream terraces. Slopes can range from nearly level to strongly sloping (0 to 12 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
Flooding frequency	None
Ponding frequency	None
Elevation	100–420 ft

Slope	0–12%
Water table depth	72–96 in
Aspect	Aspect is not a significant factor

Climatic features

The Southern Bluff Hills 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 four 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)	233 days
Freeze-free period (average)	271 days
Precipitation total (average)	63 in

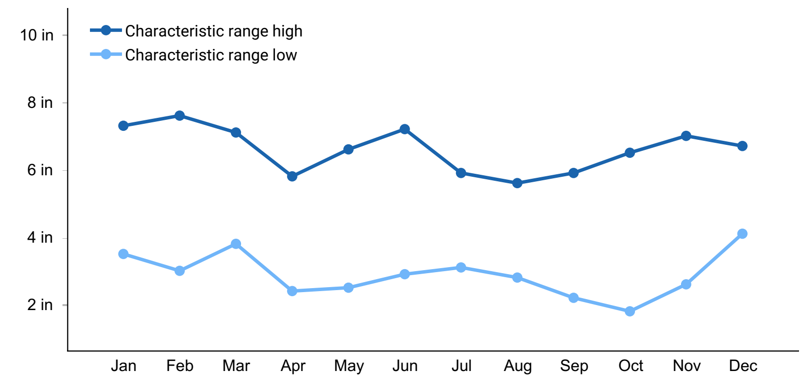

Figure 1. Monthly precipitation range

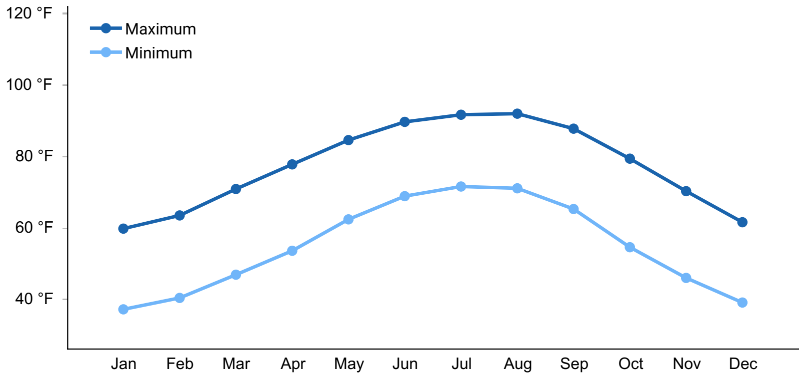

Figure 2. Monthly average minimum and maximum temperature

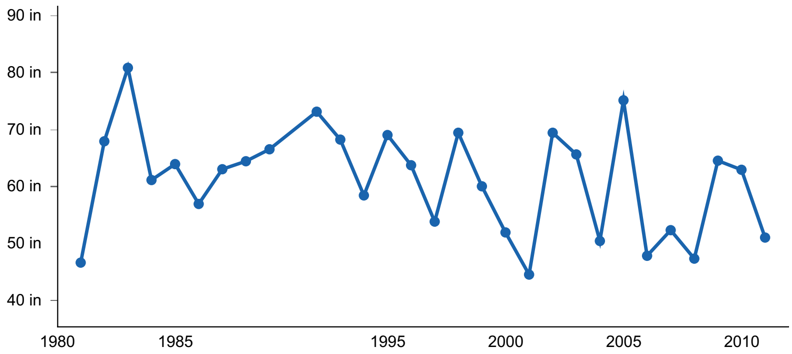

Figure 3. Annual precipitation pattern

Climate stations used

- (1) WOODVILLE 4 ESE [USC00229793], Centreville, MS
- (2) BATON ROUGE RYAN AP [USW00013970], Baton Rouge, LA
- (3) NATCHEZ [USC00226177], Natchez, MS
- (4) PORT GIBSON 1 NE [USC00227132], Port Gibson, MS

Influencing water features

This site is mostly influenced by surface hydrology.

Soil features

Soils are well drained Typic Hapludalfs (Memphis) and Ultic Hapludalfs (Feliciana). These nearly level to strongly sloping soils formed in thick loess deposits mainly in the Bluff Hills and the western portion of the Southern Rolling Plains in the Southern Mississippi Valley Loess (MLRA 134). Slopes range from 0 to 12 percent, but are mainly below 8 percent. These deep, moderately permeable soils are found on mainly on narrow to broad, flat to convex ridgetops and side slopes in the uplands. A few small areas are on broad, convex high stream terraces. These soils have relatively few restrictions for plant growth. These soils have medium fertility, but could possibly have moderately high to high levels of exchangeable aluminum that are potentially toxic to plants. The seasonal high water table is at a depth of more than 6 feet below the surface. 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 (2) Silt
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	60–80 in
Surface fragment cover <=3"	0%

Surface fragment cover >3"	0%
Available water capacity (0-40in)	0.2–0.23 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	3.6–6.5
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 Upland hardwood species, the deep loess would have made the site very productive. The gentle to fairly sloping area of the sites would have provided adequate drainage as well as the well distributed rainfall of the region would have provided adequate moisture for production. Within this site there will be a gradient of moisture due to the topography of the site, providing wetness variations dictating the species that are present and the composition of them within an area.

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 vegetative production would have provided fuel to carry a fire, the productivity would have allowed for intense fires on this site. A mosaic pattern of burned and unburned portions at a given time would have been normal for this site. The intensity of the fire would have burned through this site setting back succession of the herbaceous layer and at times potential into the upper stories of the plant community. 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 these alternative states the site productivity is generally high especially with management activities that enhance the productivity. The slope potential of the site can allow the site to become eroded if not protected on the steeper slopes as well as on the lesser slopes. 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

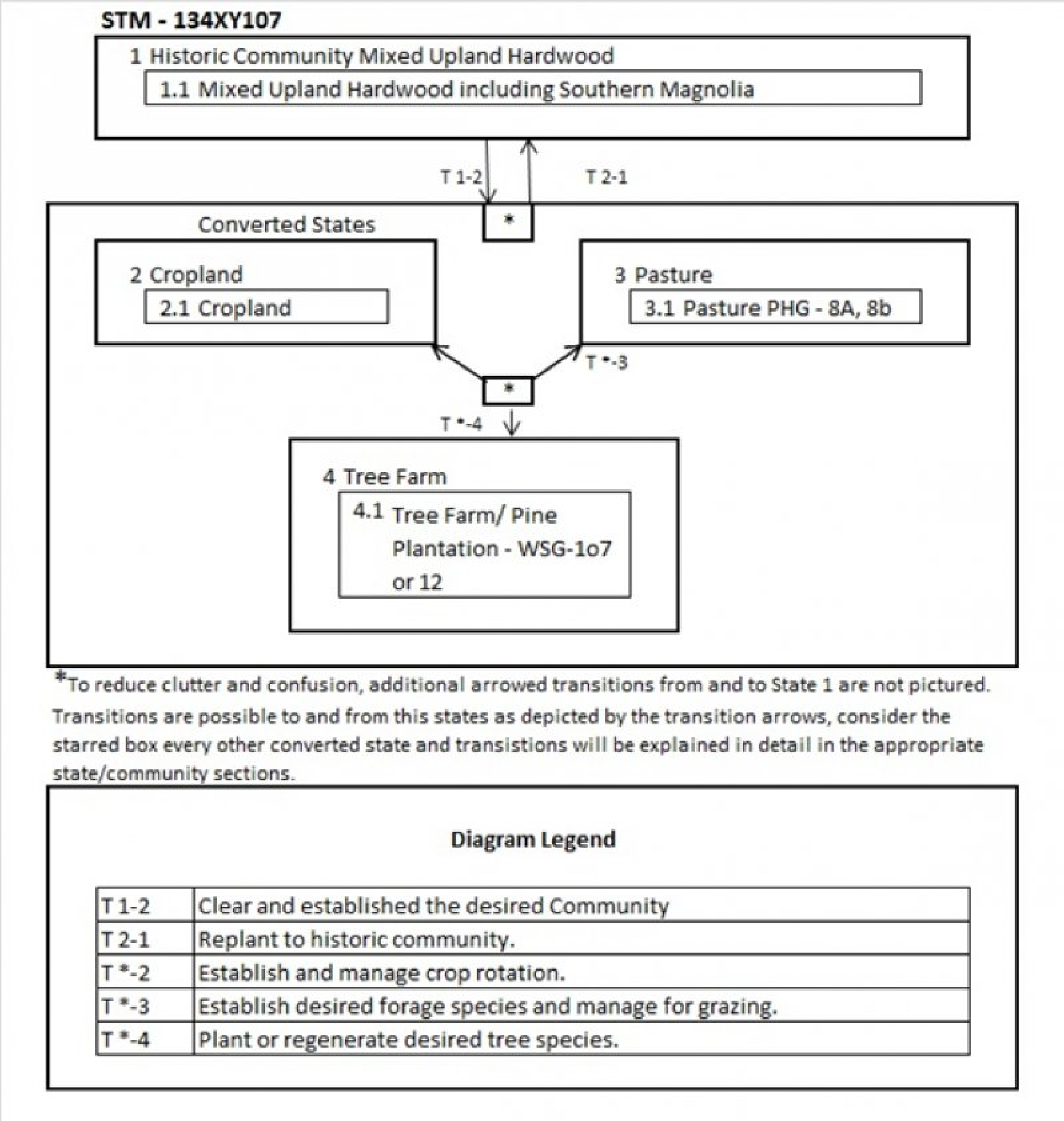

Figure 5. 134XY107 Southern Deep Loess Summit PES STM

State 1
Historic Community - Mixed Upland Hardwoods

Historically hardwoods and pines: *Fagus grandifolia* (beech), Q. shumardi (Shumard oak), Q. alba (white oak), Q. muhlenbergii (chinkapin oak), Q. michauxii (cow oak), Q. nigra (water oak), *Liriodendron tulipifera* (yellow poplar), *Magnolia grandiflora* (southern magnolia), *M. acuminata* (cucumber magnolia), *M. pyramidata* (pyramid magnolia), *Ulmus americana* (American elm), *U. rubra* (slippery elm), Tillia caroliniana (Carolina basswood), *Morus rubra* (red mulberry), Acer barbatum (Florida sugar maple), *Carya glabra* (pignut hickory), *C. cordiformis* (bitternut hickory), *Fraxinus americana* (white ash), *Celtis laevigata* (hackberry), *Platanus occidentalis* (sycamore)

Community 1.1
Mixed upland Hardwoods

Fagus grandifolia (beech), Q. shumardi (Shumard oak), Q. alba (white oak), Q. muhlenbergii (chinkapin oak), Q. michauxii (cow oak), Q. nigra (water oak), *Liriodendron tulipifera* (yellow poplar), *Magnolia grandiflora* (southern magnolia), *M. acuminata* (cucumber magnolia), *M. pyramidata* (pyramid magnolia), *Ulmus americana* (American elm), *U. rubra* (slippery elm), Tillia caroliniana (Carolina basswood), *Morus rubra* (red mulberry), Acer barbatum (Florida sugar maple), *Carya glabra* (pignut hickory), *C. cordiformis* (bitternut hickory), *Fraxinus americana* (white ash), *Celtis laevigata* (hackberry), *Platanus occidentalis* (sycamore)

State 2
Cropland

Cropland

Community 2.1
Cropland

Row Crop Production

State 3
Pastureland

Managed Pasture - PHG 8b 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: 8b in MS or 8A in LA. • 8b - Upland, deep, medium textured soils, well 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 Deep, Well 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 12 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. OR this Site fits into Woodland Suitability Group 1o7 in LA, depending on the soil Mapunit. The first part of the symbol indicates potential productivity of the soils for important trees, very high (1). 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. WSG 1o7 Well drained loam soils suitable for either pines or southern hardwoods with very high potential productivity; no serious management problems. Potential is high for management of turkey and quail, and moderately high for squirrels and deer. These groups would generally describe this site as highly productive with moderate to slight limitations 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

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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:**