USDA Natural Resources Conservation Service

# Ecological site F134XY305LA
# West Central Somewhat Poorly Drained Loess Terrace - PROVISIONAL

Accessed: 05/15/2024

## 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)
The Natural Communities of Louisiana - (Louisiana Natural Heritage Program - Louisiana Department of Wildlife and Fisheries)
EPA Level IV Ecoregion

## Ecological site concept

Somewhat poorly drained soils that formed in thin loess or water reworked loess deposits on broad nearly level to gently sloping uplands and stream terraces. Potential soil limitations that could drive the ecological site processes could include a fragipan or restrictive layer, acidity, high water table or high exchangeable Al (Aluminum). This soil chemistry limitation is significant because, Aluminum (Al) toxicity limits production on strongly acidic soils, pH values at or below 5, toxic forms of Al solubilized into the soil solution, inhibiting root growth and function (Kochian, 2005). The site includes multiple historic communities, Prairie and Woodland (If fire is excluded it will maintain a Forest community, if burned Prairie community or open woodland with a herbaceous understory). Cherrybark oak, Delta Post oak, Loblolly pine and Black gum are species that would historically colonize the site.

## Associated sites

| | |
|---|---|
| F134XY302LA | **West Central Swales/Depressions Wet Flats - PROVISIONAL**<br>The Swales Depression and Wet Flats sites will be at a lower level on the landscape. |

| | |
|---|---|
| F134XY306LA | **West Central Well Drained Loamy Ridge - PROVISIONAL**<br>The Well Drained loamy Ridge site will be found at a higher landscape position. |

## Similar sites

| | |
|---|---|
| F134XY304LA | **West Central Somewhat Poorly Drained Flats - PROVISIONAL**<br>SWPD Flats is similar to this site with little or no Loess influence. |

**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, 1993).

This PES occurs on silty and loamy low ridges and knolls of broad, nearly level to gently sloping stream terraces on the loess-mantled Macon Ridge in Arkansas and Louisiana. Slopes are nearly level to gently undulating (0 to 3 percent). These sites include low ridges and knolls of stream terraces of the Boeuf River and other former channels and distributaries of the Arkansas River such as: Indian Bayou, Big Colewa Creek, Big Creek, Cypress Creek, Hurricane Bayou, Bee Bayou, Deer Creek, Turkey Creek, and Grayson Bayou.

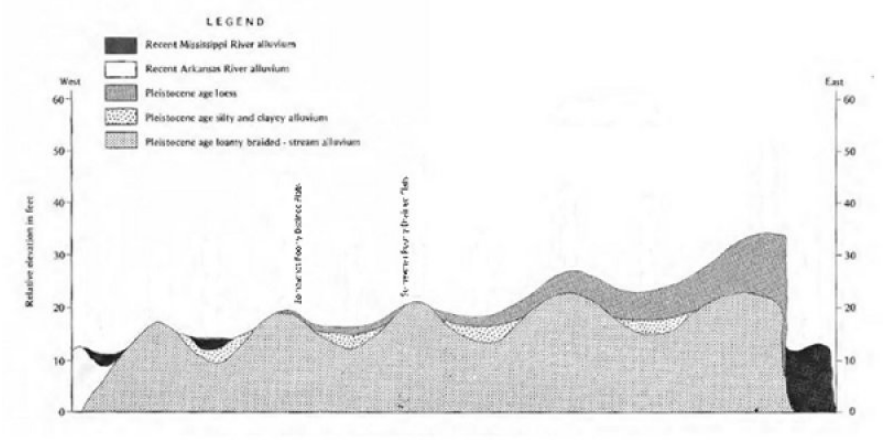


**Figure 1. 134XY305 Block Diagram**

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Ridge<br>(2) Knoll<br>(3) Terrace |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 20–37 m |
| Slope | 0–3% |
| Ponding depth | 0 cm |
| Water table depth | 15–61 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 |

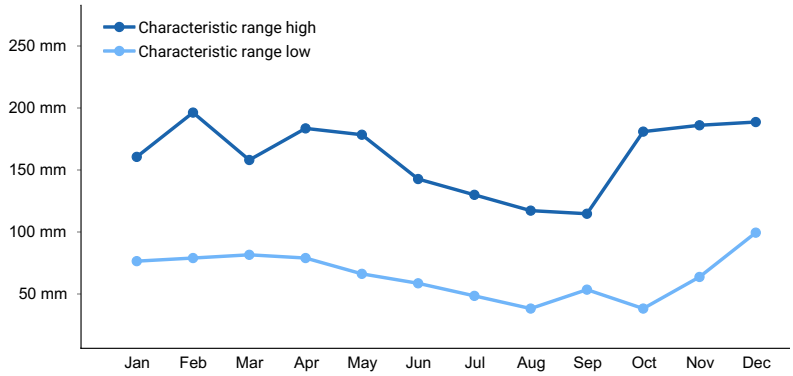


**Figure 2. Monthly precipitation range**

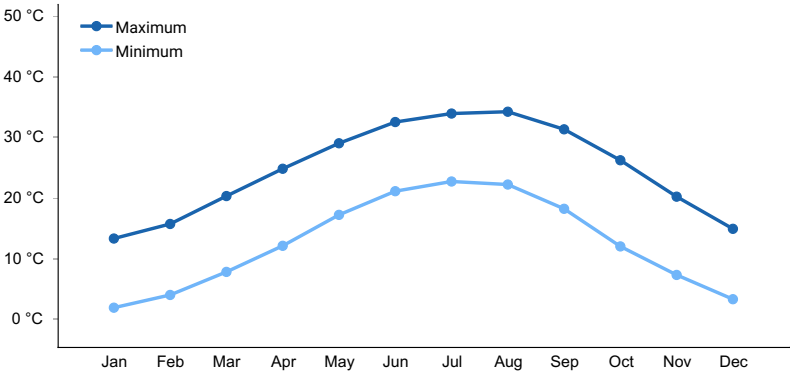


**Figure 3. Monthly average minimum and maximum temperature**

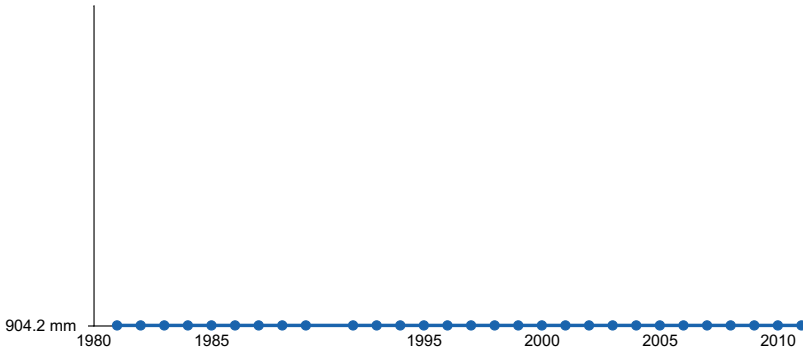


**Figure 4. Annual precipitation pattern**

## Climate stations used

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

## Influencing water features

Hydrology on this site is very important and when water is limited by drought or removal by other means vegetative composition will be affected by soil chemistry. The potential for Aluminum (Al) to be present in the soils of this site could affect growth, production and species composition in a more drastic manner when moisture is limited.

This site is generally found on ridges and knolls so it will shed water. However they are slowly permeable soils, which will hold available water in the soil profile. They can have a perched water table at or within 0.5 to 2.0 feet of the surface during winter and spring months in normal years.

## Soil features

Soils are somewhat poorly drained, Aquic Fraglossudalfs (Calloway) and Aquic Glossudalfs (Egypt). These soils formed from mixed loess and loamy sediments or water reworked loess deposits of late Pleistocene Age. Slopes range from 0 to 3 percent. These very deep, slowly permeable soils are found on low ridges and knolls of broad, nearly level to gently sloping uplands and stream terraces. These soils are not considered hydric and the perched water table is at or within 0.5 to 2.0 feet of the surface during winter and spring months in normal years. These soils are not subject to flooding.

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Silt loam |
| Family particle size | (1) Loamy |
| Drainage class | Somewhat poorly drained |
| Permeability class | Slow |
| Soil depth | 152–203 cm |
| Surface fragment cover <=3" | 0% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 0.23–0.58 cm |
| Electrical conductivity (0-101.6cm) | 0 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–30 |

| | |
|---|---|
| Soil reaction (1:1 water) (0-101.6cm) | 4.5–9 |
| 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 phase there will be a gradient of wetness, the wetness variations will dictate the species that are present and the composition of them within an area. With increasing fire frequency and intensity, to manipulate specie succession, the community would shift to more savanna or Prairie species composition. These community phases would have existed along a continuum.

Some trees can 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. When these herbaceous openings have the re-occurring addition of fire they could maintain as Prairie phases or if fire tolerant hardwoods are present it would maintain as a savanna type community. These regular fire intervals may be from natural ignition sources, lightning, or set intentionally by man.

This site has been altered by human activity and is utilized for multiple production systems such Cropland, Pasture and Tree Farms, for all of these alternative states drainage 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.

This PES occurs on Somewhat poorly drained nearly level areas and on low ridges and knolls in braided stream terraces of the Loess Plain. Located on the Macon Ridge in Louisiana and Arkansas.

## State and transition model

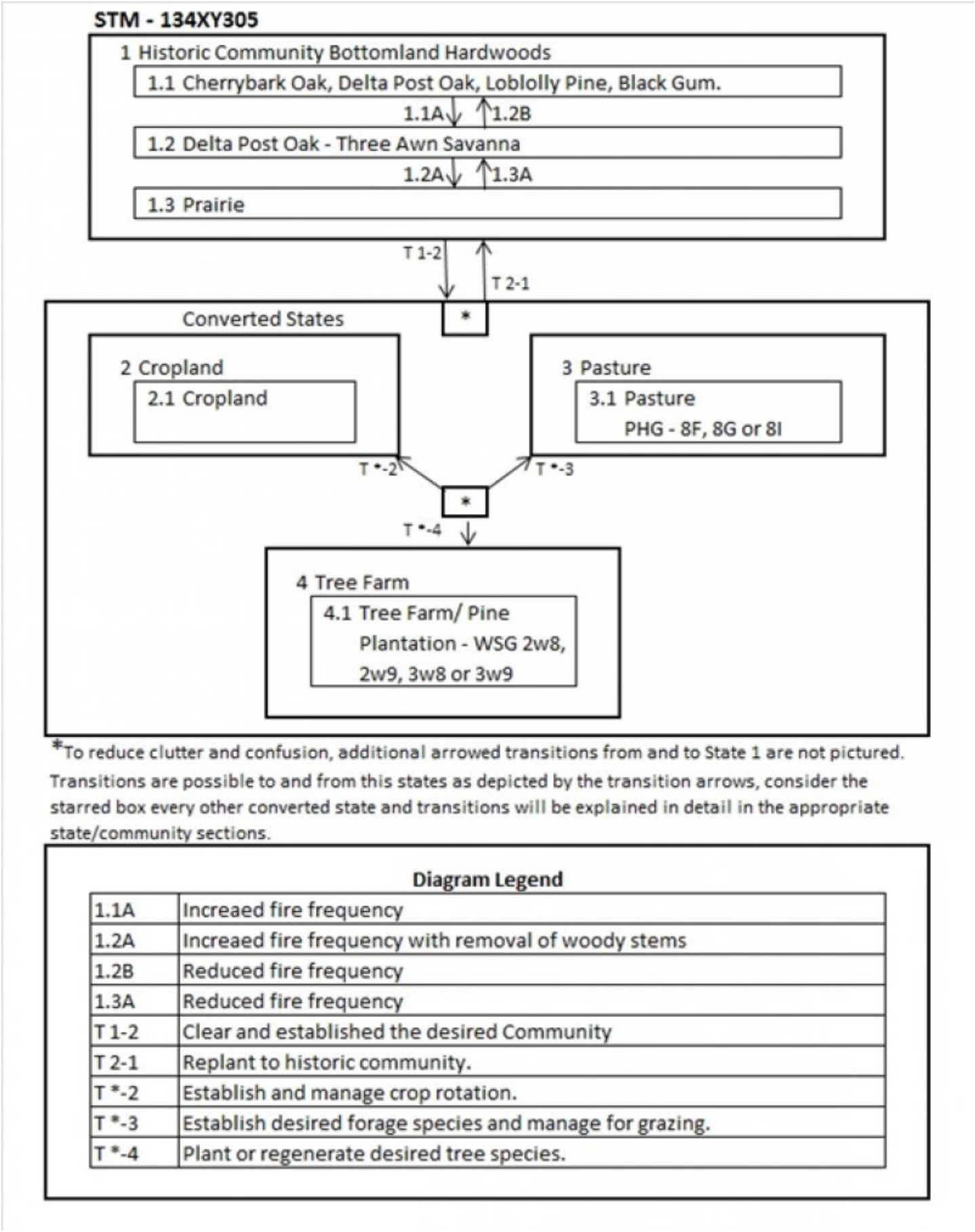


**Figure 6. 134XY305 West Central Somewhat Poorly Drained Loes**

## State 1
## Historic Community - Bottomland Hardwoods

Historically bottomland hardwoods; Cherrybark Oak, Delta Post Oak, Loblolly Pine & Black Gum. Community

species would have a range of wetness tolerance from wettest to the driest areas of the site.

### Community 1.1
### Bottomland Hardwood

Cherrybark Oak, Delta Post Oak, Loblolly Pine, Black Gum. Community species would have a range of wetness tolerance from Black Gum up to Cherrybark oak and Loblolly pine in the driest areas of the site.

### Community 1.2
### Savanana

Delta Post Oak, three awn Savanna.

### Community 1.3
### Prairie

Mixed Grass and Forb Prairie.

## State 2
## Cropland

Cropland

### Community 2.1
### Cropland

Row Crop Production

## State 3
## Pastureland

Managed Pasture - PHG 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: 8F, 8G or 8I • 8-Upland, deep, medium-textured soil • 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 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), or saturated with exchangeable Aluminum (Al). 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. Tall fescue does well on these soils if good management is applied. Fescue should not be grazed in the summer. 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 | 2018 | 3811 | 5044 |
| **Total** | **2018** | **3811** | **5044** |

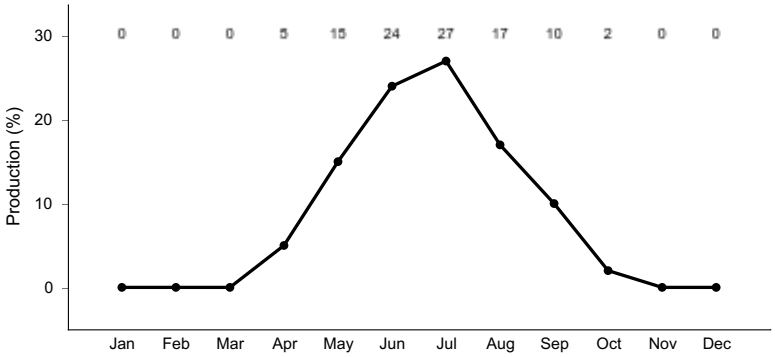


**Figure 8. Plant community growth curve (percent production by month). LA0012, Bahia. Bahiagrass.**

## 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, 3w8, 3w9) 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). 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 8 Slightly wet, loamy soils with high potential productivity; moderate equipment limitations due primarily to excess water; suited for either pines or southern hardwoods. Site index for loblolly and slash pine 80, oaks and sweetgum 80. Potential is high for management of turkey; moderate high for deer, ducks and squirrels, 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 | | | | 2018–5044 | |
| | bahiagrass | PANO2 | *Paspalum notatum* | 3363–5044 | – |
| | Bermudagrass | CYDA | *Cynodon dactylon* | 2018–4371 | – |

## 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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## 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):**

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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:**

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