Ecological site R135AY110MS
Shallow to Moderately Deep Well Drained Silty Clay to Clay Alkaline Broad Flats

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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): 135A–Alabama and Mississippi Blackland Prairie

This MLRA has two narrow (less than 40 miles wide), long, arching bands known as the Blackland Prairie and the Jackson Prairie, which are characterized by clayey soils with a high shrink-swell potential. Several major drainageways bisect this region on their way to larger tributaries. Very little native prairie vegetation remains due to agriculture and forestry activities. This area is in eastern Mississippi (57 percent) and central and western Alabama (43 percent). It makes up about 10,165 square miles (26,328 square kilometers). Most of this region is surrounded by the distinctly different MLRA 133C, which has sandy soils and stratified, coastal sediment mineralogy. A very small section of MLRA 135A has a diffuse boundary with MLRA 134 that occurs as a loess cap that gradually thins from west to east. (USDA, NRCS, 2022)

LRU notes

This ecological site can be seen in the Blackland Prairie, Jackson Prairie, and the Interior Flatwoods of MLRA 135A. Blackland Prairie: This physiographic region is a long crescent shaped land use area that starts in northeastern Mississippi and ends in central Alabama. The Blackland Prairie soils are formed from mostly calcareous coastal plains. These soils occur on low lying, flat, broad landscapes; they are mostly alkaline, heavy clays, with some weathered acid areas. The Blackland Prairie is interspersed native prairie and hardwood forests; this area is 90% cultivated. The Jackson Prairie: This physiographic region consists of a narrow band of soils that occurs in central Mississippi. These soils are gently sloping and formed from a heavy clay parent material. The Jackson Prairie is mostly acidic and weathered. This region is mostly a mixed conifer forest but does have some local pasture and cultivation. The Interior Flatwoods: This physiographic region consists of a narrow band, of soils which were formed out of an acid gray clay. This band of similar soils is situated directly west of the Blackland Prairie. These acid and clayey soils are flat, low lying, mostly saturated, hardwood forests with some areas in heavy cultivation.

Classification relationships

This area is in the East Gulf Coastal Plain section of the Coastal Plain province of the Atlantic Plain. The northern part of the area is a slightly elevated, hilly plain. The separate southwestern part is locally known as the Jackson Prairie portion of the East Gulf Coastal Plain section in Mississippi. (USDA, NRCS, 2022) National Vegetation Classification System Vegetation Association (NatureServe, 2010): The reference state for this system is comparable to Schizachyrium scoparium - Sorghastrum nutans - Dalea candida - Liatris squarrosa - (Silphium terebinthinaceum) Black Belt Grassland (CEGL004664). Additionally, the Juniperus virginiana - (Celtis laevigata, Prunus angustifolia, Sideroxylon lycioides) Ruderal Woodland community (CEGL007747) is also represented heavily in this ecological site.

Ecological site concept

These sites are found on the upland slopes of broad and relatively flat landscapes with shallow clay soil over chalk. These sites were historically native grasslands. Today, due to fire suppression and changes in land management, these sites are more frequently redcedar forests or pasture land.

Associated sites

R135AY130MS	**Deep Moderately Well to Well Drained Clay Alkaline Broad Flats** These sites are found in similar geomorphic positions with gentler slopes and deeper soils than R135AY110MS
R135AY140MS	**Deep Somewhat Poorly Drained Clay Alkaline Broad Flats** These sites are found in similar geomorphic positions with gentler slopes and deeper soils than R135AY110MS
F135AY150AL	**Deep Well to Moderately Well Drained Clay Acid Broad Flats** These sites are on more common on slopes than R135AY110MS
F135AY160MS	**Deep Somewhat Poorly Drained Clay Acid Broad Flats** These sites are on higher and flatter areas than R135AY110MS
F135AY230MS	**Deep Somewhat Poorly Drained To Moderately Well Drained Clay Alkaline Floodplains** These sites are found in the floodplains below R135AY110MS

Similar sites

F135AY120AL	**Shallow Well Drained Clay Acid Broad Flats** The primary difference is the pH. F135AY120AL consist of acid soils whereas R135AY110MS consist of alkaline soils.
R135AY130MS	**Deep Moderately Well to Well Drained Clay Alkaline Broad Flats** The primary difference is soil depth. R135AY130MS has deep soils and R135AY110MS has shallow to moderately deep soils.
R135AY140MS	**Deep Somewhat Poorly Drained Clay Alkaline Broad Flats** The primary differences are soil depth and drainage class. R135AY140MS has deep soils and is somewhat poorly drained, and site R135AY110MS has shallow to moderately deep soils and are well drained.

Table 1. Dominant plant species

Tree	(1) *Prunus angustifolia* (2) *Maclura pomifera*
Shrub	(1) *Juniperus virginiana* (2) *Cercis canadensis*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Sorghastrum nutans*

Physiographic features

Most of this area is underlain by Cretaceous-age clay, marl, soft limestone, or chalk of the Selma Group. The Jackson Prairie part, in southern Mississippi, and parts of the MLRA in southwest Alabama are underlain by Tertiary-age clay, marl, soft limestone, or chalk of the Vicksburg and Jackson Groups. (USDA, NRCS, 2022)

Table 2. Representative physiographic features

Landforms	(1) Upland > Flat (2) Upland > Hillslope (3) Upland > Hill (4) Upland > Ridge (5) Upland > Knoll
Runoff class	Medium
Flooding frequency	None
Ponding frequency	None
Elevation	50 – 120 m
Slope	0 – 10 %
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Medium
Flooding frequency	None
Ponding frequency	None
Elevation	40 – 140 m
Slope	0 – 30 %
Ponding depth	0 cm

Climatic features

This ecological site occurs in the thermic temperature regime for MLRA 135A. The thermic soil temperature regime has mean annual soil temperatures of 15 ?C or more, but less than 22 ?C; and a difference between mean summer and mean winter soil temperatures of greater than 6 ?C at 50 cm below the surface.

The average annual precipitation is sampled from areas running the length of MLRA 135A. Rainfall is common throughout the year; with the maximum precipitation occurring in early winter, spring, and midsummer. The lowest rainfall occurs in autumn. The rainfall typically occurs during high intensity, convective thunderstorms in summer, but some heavy rains occur during tropical storms in winter.

Table 4 Representative climatic features

Frost-free period (characteristic range)	180-200 days
Freeze-free period (characteristic range)	220-240 days
Precipitation total (characteristic range)	1,370-1,470 mm
Frost-free period (actual range)	170-210 days
Freeze-free period (actual range)	200-240 days
Precipitation total (actual range)	1,350-1,500 mm
Frost-free period (average)	190 days
Freeze-free period (average)	230 days
Precipitation total (average)	1,420 mm

- (1) CORINTH 7 SW [USC00221962], Corinth, MS
- (2) FOREST [USC00223107], Forest, MS
- (3) ABERDEEN [USC00220021], Amory, MS
- (4) STATE UNIV [USC00228374], Starkville, MS
- (5) BROOKSVILLE EXP STN [USC00221111], Brooksville, MS
- (6) MACON 3N [USC00225361], Macon, MS
- (7) LIVINGSTON [USC00014798], Livingston, AL
- (8) MARION JUNCTION 2 NE [USC00015121], Marion Junction, AL
- (9) MONTGOMERY AP [USW00013895], Hope Hull, AL
- (10) MONTGOMERY 6SW [USC00015553], Montgomery, AL
- (11) RIPLEY [USC00227467], Ripley, MS
- (12) BOONEVILLE [USC00220955], Booneville, MS
- (13) TUPELO RGNL AP [USW00093862], Tupelo, MS
- (14) VERONA EXP STN [USC00229173], Tupelo, MS
- (15) FULTON 3 W [USC00223208], Fulton, MS
- (16) HOUSTON [USC00224265], Houston, MS
- (17) COLUMBUS [USC00221880], Columbus, MS
- (18) PELAHATCHIE [USC00226811], Pelahatchie, MS

Influencing water features

Due to the topographic position, this site does not have water features or wetlands.

Soil features

Soils associated with this site fall within the thermic temperature regime of MLRA 135A. The thermic soil temperature regime is defined as having a difference in soil temperature of 6 degrees C or more between mean summer (June, July, and August) and mean winter (December, January, and February) and a mean annual soil temperature of: 15 degrees C (59 degrees F) to 22 degrees C (72 degrees F). Soils in this ecological site are well drained and relatively shallow over a chalk parent material. Soils included in this ecological site concept are Demopolis, Binnsville, and Sumpter with the Demopolis series being the modal concept for this site.

Please note that the soils listed in this section of the description may not be all inclusive. There may be additional soils that fit the site's concepts. Additionally, the soils that provisionally form the concepts of this site may occur elsewhere, either within or outside of the MLRA and may or may not have the same geomorphic characteristics or support similar vegetation. Some soil map units and soil series included in this "provisional" ecological site were used as a "best fit" for a particular soil – landform catena during a specific era of soil mapping, regardless of the origin of parent material or the location of MLRA boundaries. Therefore, the listed soils may not be typical for MLRA 135A or a specific location, and the associated soil map units may warrant further investigation in a joint ecological site inventory – soil survey project. When utilizing this provisional description, the user is encouraged to verify that the area of interest meets the appropriate ecological site concepts by reviewing the soils, landform, vegetation, and physical location. If the site concepts do not match the attributes of the area of interest, please review the Similar or Associated Sites listed in the General Information section of this description to determine if another site may be a better fit for your area of interest.

Table 5. Representative soil features

Parent material	(1) Residuum – chalk (2) Marine deposits – chalk
Surface texture	(1) Silty clay (2) Clay (3) Clay loam (4) Loam (5) Silt loam (6) Silty clay loam
Drainage class	Well drained
Permeability class	Very slow to moderately rapid
Depth to restrictive layer	40 – 100 cm
Soil depth	40 – 100 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified

Available water capacity (0-101.6cm)	4.32 – 11.94 cm
Soil reaction (1:1 water) (0-25.4cm)	6.6 – 8.4
Subsurface fragment volume <=3" (0-7.6cm)	0 – 10 %
Subsurface fragment volume >3" (7.6-101.6cm)	Not specified

Table 6. Representative soil features (actual values)

Drainage class	Well drained
Permeability class	Very slow to moderately rapid
Depth to restrictive layer	10 – 100 cm
Soil depth	10 – 100 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	0 %
Available water capacity (0-101.6cm)	2.03 – 16.76 cm
Soil reaction (1:1 water) (0-25.4cm)	6.6 – 8.4
Subsurface fragment volume <=3" (0-7.6cm)	0 – 30 %

Subsurface fragment volume >3" (7.6-101.6cm)	0 %

Ecological dynamics

This Ecological site has six states: Native Grassland, Wooded Thicket, Pasture, Cropland, Conservation area, and Gullied Land.

Native Grassland is the reference state for this ecological site. Grasslands depend on regular disturbance (fire, mowing, etc.) intervals to stay as grasslands. Today, Native Grasslands are highly encroached upon by non-native species that tend to thrive off of the same disturbances and often outcompete native species.

Wooded thicket, the second ecological state, occurs when there is not enough disturbance to maintain a Native Grassland. Trees (especially redcedar) and shrubs are allowed to grow and will eventually outcompete native grass species.

Pasture and Cropland (the third and fourth ecological states) occur as a result of heavy land management changes (clearcutting, herbicide, tilling, grazing, etc.) in order to produce livestock and crops. These changes not only alter the represented species but can also lead to changes in the landscape.

Conservation areas are sites set aside to try and recapture the historical plant and animal communities of the reference state. These states will never be a perfect replication because of anthropogenic and natural changes to the ecological system.

Gullied Land, the sixth ecological state, occurs on steeper portions of this ecological site in areas where soils are especially shallow. Different farming and grazing practices allow the soils to compact creating an impermeability of the soil. This impermeability combined with the steepness of the slopes allows for an excess of rain water runoff that erode the soils down to the chalk parent material. If this process continues the landscape will turn into steep chalk gullies that do not support plant life.

State and transition model

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 11. Community 2.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 12. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 13. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 14. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 15. Community 6.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Inventory data references

Data collection and analysis of field data will be performed during the Verification Stage of ESD development.

Other references

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Contributors

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Approval

Charles Stemmans, 5/29/2025

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	Peyton Fralick Peyton.Fralick@usda.gov 662-205-3404
Date	09/04/2026
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):**

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

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

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

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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:**
