Ecological site F134XY005AL
Northern Wet Loess Interfluve

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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): 134X–Southern Mississippi Valley Loess

The Southern Mississippi Valley Loess (MLRA 134) extends some 500 miles from the southern tip of Illinois to southern Louisiana. This MLRA occurs 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. Landscapes consist of highly dissected uplands, level to undulating plains, and broad terraces that are covered with a mantle of loess. The soils, mainly Alfisols, formed in the loess mantle. Stream systems of the MLRA typically originate as low-gradient drainageways in the upper reaches that broaden rapidly downstream to wide, level floodplains with highly meandering channels. Alluvial soils are predominantly silty where loess thickness of the uplands are deepest but grade to loamy textures in watersheds covered by thin loess. Underlying the loess mantle are Tertiary deposits of unconsolidated sand, silt, clay, gravel, and lignite. Crowley's Ridge, Macon Ridge, and Lafayette Loess Plains are discontinuous, erosional remnants that run north to south in southeastern Missouri - eastern Arkansas, northeastern Louisiana, and south-central Louisiana, respectively. Elevations range from around 100 feet on terraces in southern Louisiana to over 600 feet on uplands in western Kentucky. The steep, dissected uplands are mainly in hardwood forests while less sloping areas are used for crop, pasture, and forage production (USDA, 2006). This site occurs throughout the Loess Plains (EPA Level IV Ecoregion: 74b) from western Kentucky south to the Southern Rolling Plains (EPA Level IV Ecoregion: 74c) in southwestern Mississippi.

Classification relationships

All or portions of the geographic range of this site falls within a number of ecological/land classifications including: -NRCS Major Land Resource Area (MLRA) 134 – Southern Mississippi Valley Loess -Environmental Protection Agency's Level IV Ecoregion: Loess Plains, 74b (Griffith et al., 1998; Woods et al., 2002; Chapman et al., 2004) -231H - Coastal Plains-Loess section of the USDA Forest Service Ecological Subregion (McNab et al., 2005) -LANDFIRE Biophysical Setting 4713260 and NatureServe Ecological System CES203.479 South – Central Interior / Upper Coastal Plain Flatwoods (LANDFIRE, 2009; NatureServe, 2009) -LANDFIRE Biophysical Setting 4713270 and NatureServe Ecological System CES203.479 South – Central Interior / Upper Coastal Plain Wet Flatwoods (LANDFIRE, 2009; NatureServe, 2009) -Xerohydric Flatwoods – Kentucky State Nature Preserves Commission (Evans et al., 2009) -Western Mesophytic Forest Region - Mississippi Embayment Section (Braun, 1950)

Ecological site concept

The Northern Wet Loess Interfluve is characterized by very deep, poorly drained soils that formed in thick loess or silty materials. This site occurs on broad, nearly level upland interfluves and divides of the Loess Plains and includes such widely varying physiographic features and landforms as upland depressions, headslopes (or drainheads), and flats on broad divides. Slope gradients range from 0 to 3 percent but are more often 0 to 2 percent. A seasonally high or perched water table at or near the surface generally occurs from winter to mid-spring, which can become very dry to xeric during drier times of the year. Natural vegetation of the site varies by geomorphic feature. Ponding of upland depressions is generally short-lived, which contributes to the presence of species frequently found in both lowland and upland environments. Representative species may include overcup, white, cherrybark, pin, willow, and water oaks in addition to other hardwoods such as red maple, elm, hickory, and sweetgum. Vegetation of both headslopes and flats are somewhat similar in that upland oaks and hickory dominate. The broad, upland flats often resemble or possess characteristics that are suggestive of flatwoods; they have a relatively open understory and support droughty woodland species such as post, southern red, cherrybark, black, and white oaks. Shortleaf pine may become an additional community component farther south.

Associated sites

F134XY004AL	**Northern Moderately Wet Loess Interfluve**

Similar sites

F134XY010AL	**Northern Wet Loess Terrace**
F134XY202AL	**Western Wet Loess Terrace**

Table 1. Dominant plant species

Tree	(1) *Quercus stellata* (2) *Quercus pagoda*
Shrub	(1) *Ilex decidua*
Herbaceous	Not specified

Physiographic features

The Northern Wet Loess Interfluve is broadly distributed across the largest physiographic subsection or ecoregion of the MLRA, the Loess Plains. West to east, this ecological site extends from the heart of the plains into portions of the Southeastern Plains (EPA Level III Ecoregion: 65). North to south, the site extends from the plains in western Kentucky to the border of the Southern Rolling Plains in southwestern Mississippi. The latter forms the southern-most boundary of the site due to warmer average annual air temperatures, greater annual rainfall, and a transition to slightly warmer soils (Chapman et al., 2004).

Characteristics of this region generally include undulating uplands, gently rolling hills, and irregular plains. Topographic relief of the Loess Plains is generally low, averaging about 30 to 70 feet. Upland slopes typically range from 0 to 20 percent with 1 to 8 percent being dominant. Elevations in the range of 300 to 400 feet are commonplace to the south but increase to nearly 600 feet in the north. In portions of western Kentucky and Tennessee, the undulating pattern of the plains is interrupted by dissected landscapes. Such areas tend to be hillier with steeper slopes and greater relief and appear to be concentrated along the borders of broader valleys and floodplains. As the plains continue eastward, starkness of the terrain becomes even more pronounced, which signals the transition of the Loess Plains to the thin loess-capped ridges, hills, and plateaus along the western edge of the Southeastern Plains. To the south, through much of Mississippi, the Loess Plains consists of a very thin east – west belt, compressed between the dissected Loess Hills and Mississippi Alluvial Plain to the west and the Coastal Plain to the east. The convergence of such contrasting ecoregions contribute to a very complex pattern of soils, landforms, and vegetation communities.

This ecological site primarily occurs on broad, level interfluves or divides and the heads of drains. Several local examples in western Kentucky and Tennessee occur in areas that are, physiographically, plateau-like. The site includes shallow upland depressions, headslopes (nearly level drainheads), and flats on broad divides.

All aspects are well represented and included in this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Interfluve (2) Depression (3) Flat

Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	70 – 180 m
Slope	0 %
Ponding depth	0 – 80 cm
Water table depth	0 – 40 cm
Aspect	Aspect is not a significant factor

Climatic features

This site falls under the Humid Subtropical Climate Classification (Koppen System). The average annual precipitation for this site from 1980 through 2010 is 56 inches and ranges from 53 in the north to 58 inches in the south. Maximum precipitation occurs in winter and spring and precipitation decreases gradually throughout the summer, except for a moderate increase in midsummer. Rainfall often occurs as high-intensity, convective thunderstorms during warmer periods but moderate-intensity frontal systems can produce large amounts of rainfall during winter, especially in the southern part of the area. Snowfall generally occurs in the north during most years. However, accumulations are generally less than 12 inches and typically melt within 3 to 5 days. South of Memphis, winter precipitation sometimes occurs as freezing rain and sleet. The average annual temperature is 60 degrees F and ranges from 58 in the north to 64 degrees F in the south. The freeze-free period averages 222 days and ranges from 206 days in the north to 252 days in the south. The frost free period averages 197 days and ranges from 191 in the north to 224 days in the south.

The broad geographic distribution of this site north to south naturally includes much climatic variability with areas farther south having a longer growing season and increased precipitation. These climatic factors likely lead to important differences in overall plant productivity and key vegetation components between the southern and northern portions of this site. As future work proceeds, the current distribution of this site will likely be revised with a “central” site interjected between the northern and southern extremes of this MLRA.

Table 3 Representative climatic features

Frost-free period (average)	200 days
Freeze-free period (average)	220 days
Precipitation total (average)	1,420 mm

- (1) BROOKPORT DAM 52 [USC00110993], Paducah, IL
- (2) COVINGTON 3 SW [USC00402108], Covington, TN

- (3) GILBERTSVILLE KY DAM [USC00153223], Gilbertsville, KY
- (4) BARDWELL 2 E [USC00150402], Bardwell, KY
- (5) LOVELACEVILLE [USC00154967], Paducah, KY
- (6) MURRAY [USC00155694], Murray, KY
- (7) CANTON 4N [USC00221389], Canton, MS
- (8) OAKLEY EXP STN [USC00226476], Raymond, MS
- (9) BOLIVAR WTR WKS [USC00400876], Bolivar, TN
- (10) LEXINGTON [USC00225062], Lexington, MS
- (11) BATESVILLE 2 SW [USC00220488], Batesville, MS
- (12) GRENADA [USC00223645], Grenada, MS
- (13) HOLLY SPRINGS 4 N [USC00224173], Holly Springs, MS
- (14) MILAN EXP STN [USC00406012], Milan, TN
- (15) PADUCAH [USW00003816], West Paducah, KY
- (16) JACKSON INTL AP [USW00003940], Pearl, MS
- (17) SENATOBIA [USC00227921], Coldwater, MS
- (18) COLLIERVILLE [USC00401950], Collierville, TN
- (19) NEWBERN [USC00406471], Newbern, TN
- (20) DRESDEN [USC00402600], Dresden, TN
- (21) VICKSBURG MILITARY PK [USC00229216], Vicksburg, MS
- (22) UNION CITY [USC00409219], Union City, TN
- (23) YAZOO CITY 5 NNE [USC00229860], Yazoo City, MS

Influencing water features

The poorly drained soils of this site are noted for supporting a high water table (perched) during periods of high rainfall and low evapotranspiration, typically from winter to spring. With the exception of some headslopes and upland drains, wetness of this site is primarily influenced by precipitation. Highly localized surfacing of groundwater may influence the site along a very narrow corridor of some drainheads, but such occurrences generally do not have a demonstrable influence on the overall vegetation of this site. Instances where water has the greatest influence are closed and open (or flow-through) depressions that seasonally pond and in areas where the site is positioned adjacent to small, upland drainageways. Wetland or hydrophytic vegetation may occur in closed and some flow-through depressions. Vegetation of the upland flats consists predominantly of upland species, although some facultative wetland species may occur.

Soil features

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 134 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 Supporting Information section of this description to determine if another site may be a better fit for your area of interest.

The soils of this site are very deep, poorly drained, and have a perched water table at or near the surface during wet periods of the year, generally winter into spring. They formed in a mantle of loess, or "water reworked" loess, on broad, nearly level upland interfluves where they occur as depressions, headslopes, and flats. Dominant slope gradient is between 0 and 2 percent but may range to a high of 3 percent. Permeability is slow and runoff is negligible to slow with some areas receiving overland flow from adjacent sites.

Principal soils of this site include Routon (Fine-silty, mixed, active, thermic Typic Epiaqualfs), Adaton (Fine-silty, mixed, active, thermic Typic Endoaqualfs), and Henry (Coarse-silty, mixed, active, thermic Typic Fragiaqualfs) soil series. Routon soils are characteristically episaturated; saturation occurs in the layers above 54 inches. Adaton soils are recognized as being endosaturated, but a seasonally high water table may also be influenced by an argillic horizon consisting of 20 to 35 percent clay in the upper 20 inches. Henry soils have a slowly permeable fragipan in the subsoil. Depth to the fragipan ranges from 20 to 36 inches (USDA, 2016).

Table 4. Representative soil features

Surface texture	(1) Silt loam
Family particle size	(1) Loamy

Drainage class	Poorly drained
Permeability class	Slow to moderate
Soil depth	20 – 70 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	17.78 – 21.59 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	10 – 5.6
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This ecological site is essentially the upland counterpart to the Northern Wet Loess Terrace and its embedded associate, Northern Ponded Loess Terrace. The major difference is that there are less species having wetland affinities in the upland site. The upland systems tend to be drier and plant productivity is probably lower, overall. Still, there are similarities between the terrace and upland sites, which include poorly drained soils, the presence of local depressions, and co-occurrence of species found on both terraces and uplands.

A key characteristic of this site is the propensity of these poorly drained soils to perch water during wetter times of the year. Poor surface runoff and slow permeability contributes to saturated conditions from winter through spring in most years. Ironically, this extreme wet

condition through the first part of the year is reversed by mid- to late summer when evapotranspiration essentially removes moisture above the soils' perching layer, which leads to very droughty conditions during summer and fall. The alternating wet – dry pattern of this site characteristically occurs in other "flatwoods" communities in the eastern United States (see Taft et al., 1995; Fralish et al., 1999). This moisture regime is often referred to as "hydroxeric" (or xero-hydric, depending on preference).

The soils that define this site have been mapped on three important upland landforms or positions: headslopes (or drainheads), upland depressions, and broad, level to nearly level flats. There are a number of instances in the MLRA where the poorly drained soils of this site support the origins of first order streams (both intermittent and perennial). Many of these areas have been cleared and the originating streams channelized. However, those areas where vegetation is somewhat intact (often heavily cutover) have been found to support interesting conditions from a structural and compositional perspective.

Upland depressions of this site have also undergone many transformations that range from obliterated (erased from the landscape) to channelized and drained to well-defined, seasonally ponded concavities. Some existing sites exhibit flow-through hydrodynamics, and some are actually the heads of intermittent or perennial streams. Most depressions of this site are nearly circular and are positioned on broad flats within like soils, usually Routon soils in the north and Adaton and Henry soils to the south. There are a few conjectures over the origins of these "vernal pools" and some "old timers" refer to them as "buffalo wallows" insinuating that they were favored bison watering and wallowing holes. Most of these isolated depressions today exist as a perfect circle of trees within vast agriculture fields.

The third and equally significant landform associated with this site is the broad, "tableland-like" flats or flatwoods. So significant and recognizable were these plateau-like flats that Loughridge (1886) illustrated their occurrence and discussed them in a later volume (Loughridge, 1888). He mapped and addressed their distribution as a legitimate region, "Flatwoods" and gave them a species descriptor of "post oak Flatwoods." Loughridge described them as "crawfishy" and listed "…red and post oaks…" as the chief vegetation type. Similar to the preceding two landforms of this site, these flatwoods are reduced to a few small blocks or patches of woods. Most of their former distribution is in cropland.

As alluded to above, the predominant land use activity on this site today is agriculture production with principal crops being soybean, cotton, corn, and milo (USDA-NRCS, 2016). Depending on crop type, manipulation and management of surface water and drainage capabilities of a given site is generally implemented. A minor use on this site is reportedly pastureland or hayland with principal forage of bermudagrass, bahiagrass, and tall fescue. This site has some limitations for forest production, mainly due to seasonal wetness but also dryness during summer and fall. (Forest production is a very minor use on this site as the vast majority of the site's distribution is cropland. Therefore, forest or timber management as a state is "provisionally" represented in the accompanied State and Transition Model.) All uses on this site have limitations due to seasonal wetness, but forest productivity may have some limitations due to seasonal dryness, particularly on planted seedlings.

To date, no reference sites have been identified or located for any of the landforms that this site comprises. However, several locations that included all three landforms of this site have been examined, and reference conditions are projected based on those observations. In every situation, various impacts were noted, however a suite of species thought to have been representative of the historic community were observed. Based on location of this site near other fire-influenced systems (e.g., the Jackson Purchase prairies or "barrens"), the flatwoods of these "tablelands" were most certainly fire-influenced. The woodland character and dry association that still exists in small pockets lends to that hypothesis.

Following this narrative, a "provisional" state and transition model is provided that includes the "perceived" reference state and several alternative (or altered) vegetation states that have been observed and/or projected for the Northern Wet Loess Interfluves ecological site. This model is based on limited reconnaissance, literature, expert knowledge, and interpretations. Plant communities will differ across MLRA 134 due to natural variability in climate, soils, and physiography. Some of the presented alternate states may warrant removal as additional information is learned and/or becomes available. Depending on objectives, the reference plant community may not necessarily be the management goal.

The environmental and biological characteristics of this site are complex and dynamic. As such, the following diagram suggests pathways that the vegetation on this site might take, given that the modal concepts of climate and soils are met within an area of interest. Specific locations with unique soils and disturbance histories may have alternate pathways that are not represented in the model. This information is intended to show the possibilities within a given set of circumstances and represents the initial steps toward developing a defensible description and model. The model and associated information are subject to change as knowledge increases and new information is garnered. This is an iterative process. Most importantly, local and/or state professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

Figure 5. STM - Northern Wet Loess Interfluve

Figure 6. Legend - Northern Wet Loess Interfluve

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 2.1 plant community composition

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

Table 7. Community 3.1 plant community composition

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

Table 8. Community 4.1 plant community composition

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

Table 9. Community 5.1 plant community composition

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

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Contributors

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Approval

Matthew Duvall, 3/20/2025

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	
Date	08/21/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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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:**
