Ecological site F134XY205AL
Western Moderately Wet Alluvial Flat

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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. Underlying the loess are Tertiary deposits of unconsolidated sand, silt, clay, gravel, and lignite. 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, mostly Entisols and Inceptisols, are predominantly silty where loess thickness of the uplands are deepest but grade to loamy textures in watersheds covered by thin loess. 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-NRCS, 2006). This site primarily occurs on floodplains of larger stream systems that drain upland areas of Crowley's Ridge from about Helena, Arkansas northward through Stoddard County and into Scott County, Missouri.

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 (USDA-NRCS, 2006) -Environmental Protection Agency's Level IV Ecoregion: Bluff Hills, 74a (Chapman et al., 2002; Woods et al., 2004) -231H - Coastal Plains-Loess section of the USDA Forest Service Ecological Subregion (McNab et al., 2005) -LANDFIRE Biophysical Setting 4514730, Gulf and Atlantic Coastal Plain Floodplain Systems (LANDFIRE, 2008) - East Gulf Coastal Plain Small Stream and River Floodplain Forest CES203.559 (NatureServe, 2012) -Wet-Mesic Bottomland Forest (Nelson, 2005) -Western Mesophytic Forest Region - Mississippi Embayment Section - Loess Hills (Braun, 1950)

Ecological site concept

The Western Moderately Wet Alluvial Flat is characterized by very deep, somewhat poorly drained soils that formed in silty or loamy alluvium. Soil reactions range from very strongly acid to moderately acid. This site occurs on level to nearly level alluvial flats and within localized, shallow depressions that are often pocked throughout the better drained areas of narrow to broad floodplains. The site is also a transitional zone between landforms and positions with better drainage, such as natural levees, and the wet, low-lying flats and backswamps. On narrower floodplains, this site is positioned at slightly lower elevations landward of the stream bank. Slopes are commonly less than 1 percent but range from 0 to 3 percent. Flooding ranges from rare to frequent during winter and spring, and duration is brief to very long depending on stream and drainage basin size and flood magnitude. Outside of overbank flooding, a seasonal high water table generally occurs within 1 to 2 feet of the soil surface. Vegetation associated with the site exhibit signs of increasing soil wetness compared to better drained areas. Species requiring drier conditions begin dropping out and are replaced by plants more tolerant of anaerobic conditions. Overstory components generally include swamp chestnut oak, water oak, willow oak, overcup oak, Nuttall oak, pin oak, American sycamore, sweetgum, red maple, hickory, green ash, American elm, and ironwood. Understory density is typically lower than better drained sites and ground cover is often a mixture of facultative wetland and wetland obligate species.

Associated sites

F134XY204AL	**Western Alluvial Flat** This site occurs in close association with the Western Moderately Wet Alluvial Flat where it occupies drier positions (e.g., natural levees, rises, etc.) within the floodplain environment.

Similar sites

F134XY019AL	**Northern Moderately Wet Alluvial Flat** This site is the eastern counterpart to the Western Moderately Wet Alluvial Flat.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The distribution of the Western Moderately Wet Alluvial Flat is primarily associated with streams that drain upland areas of a distinct physiographic subsection of the Southern Mississippi Valley Loess (MLRA 134): Crowley's Ridge. However, there are a few instances where the soils of this site have been mapped on the adjoining Western Lowlands (EPA Level IV Ecoregion: 73g; Woods et al., 2004) and along the eastern edge of Crowley's Ridge and the Southern Mississippi River Alluvium (MLRA 131A).

Physiographic features of the site include alluvial flats along narrow stream drainageways and moderately broad to broad floodplain flats of larger stream systems. This ecological site generally borders the better drained natural levees and alluvial flats and is often transitional to the wettest position(s) of the floodplain environment: the wet alluvial flat and/or backswamps. Interestingly, this site often occurs as inclusions within the better drained alluvial flats in the form of shallow depressions and linear, relict scour and overwash channels and sloughs. These lower, subtle surface irregularities often hold water for slightly longer periods than the surrounding, better drained flats.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Alluvial flat (3) Depression
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Elevation	50 – 120 m
Slope	0 %

Ponding depth	0 cm
Water table depth	30 – 50 cm
Aspect	Aspect is not a significant factor

Climatic features

This site falls under the Humid Subtropical Climate Classification (Koppen System). The mean annual precipitation for this site from 1980 through 2010 was approximately 51 inches with a range from 37 to roughly 65 inches. Maximum precipitation occurs in spring (April and May) and late fall (November and December) and typically decreases throughout the summer. Rainfall often occurs as high-intensity, convective thunderstorms during warmer periods but moderate-intensity frontal systems can produce large amounts of rainfall during winter. Snowfall generally occurs in most years, and the average annual snowfall in the northern portions of this site in Stoddard County, Missouri is 11 inches (USDA-NRCS, 2006). The average annual maximum and minimum air temperature is 71 (range 46 to 91) and 49 (range 28 to 70) degrees F, respectively. The average frost free and freeze free periods are 200 and 226 days, respectively.

Table 3 Representative climatic features

Frost-free period (average)	200 days
Freeze-free period (average)	230 days
Precipitation total (average)	1,300 mm

- (1) CLARENDON [USC00031442], Clarendon, AR
- (2) HELENA [USC00033242], Helena, AR
- (3) JONESBORO 2 NE [USC00033734], Jonesboro, AR
- (4) SAINT CHARLES [USC00036376], Clarendon, AR
- (5) MADISON 1 NW [USC00034528], Forrest City, AR
- (6) WYNNE [USC00038052], Wynne, AR
- (7) MALDEN MUNI AP [USC00235207], Malden, MO
- (8) MARIANNA 2 S [USC00034638], Marianna, AR
- (9) CAPE GIRARDEAU MUNI AP [USW00003935], Chaffee, MO
- (10) PARAGOULD 1S [USC00035563], Paragould, AR
- (11) ADVANCE 1 S [USW00093825], Advance, MO

Influencing water features

This site occurs within floodplains of small to large stream systems. Overland flooding occurs over a large percentage of the site's distribution. Flood duration is highly variable and directly dependent upon stream size and watershed position. Narrow floodplains of small streams are typically "flashy" and may flood occasionally to frequently but flood duration is generally brief. Sites associated with larger streams and large drainage basins may flood frequently with much longer flood duration. Soils of this site are somewhat poorly drained and the wettest soil associated with this site, Arkabutla, often supports hydrophytic vegetation (both obligate wetland and facultative wetland species). However, not every soil correlated with this site classifies as hydric. Particularly problematic situations pertain to channelized and leveed stream systems, which deleteriously affects connectivity with associated soils and vegetation.

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.

This site is characterized by very deep, somewhat poorly drained soils that formed in silty and/or loamy alluvium. These level to nearly level soils are generally associated with wide floodplains but also occur on wetter and lower positions of narrow, stream floodplains. The site is subject to flooding during winter to early spring. Flood duration ranges from brief to very long depending on stream and drainage basin size and flood magnitude. The seasonal high water table ranges from 1 to 2 feet of the surface during periods of high rainfall. Soil reactions generally range from strongly acid to very strongly acid.

Principal soils associated with this site include Falaya (Coarse-silty, mixed, active, acid, thermic Aeric Fluvaquents) and Arkabutla (Fine-silty, mixed, active, acid, thermic Fluventic Endoaquepts). Secondary soils of this site consist of Mantachie (Fine-loamy, siliceous, active, acid, thermic Fluventic Endoaquepts) and Waverly (Coarse-silty, mixed, active, acid, thermic Fluvaquentic Endoaquepts). The latter two soil series are represented by a single map unit, each. Waverly is the only poorly drained soil of this site.

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Silty clay loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained
Permeability class	Moderate
Soil depth	140 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	17.27 – 21.59 cm
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified

Soil reaction (1:1 water) (0-101.6cm)	4.8 – 6.3
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This site occurs on level to nearly level alluvial flats and within localized, shallow depressions that are often pocked throughout the better drained areas of narrow to broad floodplains. The site may also be viewed as a transitional zone between landforms and positions with better drainage (e.g., natural levees) and the hydric, low-lying flats and backswamps. Within narrower floodplains, this site is positioned at slightly lower elevations landward of the stream bank.

A key characteristic of this site pertains to a distinct gradation of soil wetness. When viewed from the perspective of a soil catena, this site lies in the middle of the classic floodplain moisture gradient. This gradient is also reflected in the plant community. Species requiring drier conditions begin dropping out and are replaced by plants more tolerant of anaerobic conditions. Overstory components generally include swamp chestnut oak, water oak, willow oak, overcup oak, pin oak, American sycamore, sweetgum, red maple, hickory, green ash, American elm, and ironwood. Understory density is typically lower than the adjoining better drained sites and ground cover may consist of a mixture of facultative wetland and wetland obligate species, depending on local conditions.

The dominant ecological processes associated with this site include periodic flooding, stand disturbances at varying scales, and natural, stream migration. Given the site's landform position, periodic flooding is a common and important process of the system. Flooding can enhance fertility of the soil environment via deposition of new alluvium but can also impact the site by scouring and/or depositing excessive materials. Flood duration is highly variable and directly dependent upon stream size and magnitude of the flood event. Flood durations of small streams are typically brief and "flashy", while those of larger systems may range from brief to very long depending on drainage basin size and flood magnitude. The collective effects of the hydrodynamics within this system naturally lead to migration or movement of the stream across its connected landscape, the floodplain. Low-gradient streams generally meander and frequently change course leading to the erosion of a portion of the floodplain with the concomitant deposition and creation of new point bars, levees, and alluvial flats (LANDFIRE, 2008).

Forest stand disturbances vary in both size and type. Disturbances range from gap-scale (single tree to small group) to stand-initiating events that are greater than one acre (per Johnson et al., 2009). Smaller gaps or forest openings may result in the release of suppressed understory components, but the greatest response is often ingrowth or expansion of the surrounding canopy (Oliver and Larson, 1990). Understories of long-term, non-disturbed portions of the stand (i.e., complete canopy closure) are typically comprised of shade-tolerant woody and herbaceous species. Larger gaps often consist of heavy, downed woody debris and a dense concentration of shrubs, forbs, vines, and released saplings and young trees. Types of disturbances may include wind, severe ice storms, and beaver. The influence of the latter is perhaps the most dynamic as local hydrologic regimes are dramatically altered leading to wetter soils, different vegetation communities, and a different suite of ecological processes.

An additional disturbance factor that rarely occurs on this site today but is thought to have been an important historical influence is fire. This supposition is drawn from the presence of a single species: cane. Cane grows readily on this site and historically, extended across many floodplains of the Southeast (Gagnon, 2009). The sheer presence of this species in the historic community suggests disturbance beyond flooding alone. Fire may have been an important disturbance factor in the pre-settlement bottomland community (see Gagnon and Platt, 2008; Gagnon, 2009), which suggests that the structure of this site may have been more open where dense canebrakes existed. However, any vestige of that system is long past. Those areas that have been allowed to revert naturally are now best characterized as closed-canopied, bottomland hardwoods.

The principal land use, today, is agriculture production with some areas in pasture and/or forage production. The fertile soils of the broader floodplains are almost exclusively cropland. Timber production is mostly restricted to the narrower drainageways. Perhaps the largest and most significant alteration to this site has been channelization and levee (or spoil bank) construction. Such hydrologic alterations are probably more commonplace on streams that extend onto the Western Lowlands than those occurring within Crowley's Ridge physiographic area. Still, this action results in a disconnection between the stream - floodplain environment, which interrupts and alters the ecological processes and functions of the system as a whole.

There are a few areas that have been set aside in the public and/or private interest (e.g., parks, refuges, natural areas, and forest preserves), and those areas are now heavily forested. With no example of the pre-settlement plant community remaining intact, reference conditions of this site have been arbitrarily chosen to reflect the native plant species that most frequently occur and that influence the overall structure and characteristics of maturing stands. Locations that offer an opportunity to examine these “surrogate” reference conditions are relegated to those public and private land holdings.

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 this ecological site. This model is based on limited inventories, literature, expert knowledge, and interpretations. Plant communities will differ across MLRA 134 due to natural variability in climate, soils, and physiography. 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 - Western Moderately Wet Alluvial Flat

Figure 6. Legend - Western Moderately Wet Alluvial Flat

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 (%)

Other references

Braun, E.L. 1950. Deciduous Forests of Eastern North America. Hafner Press, New York. 596 p.

Chapman, S.S., J.M. Omernik, G.E. Griffith, W.A. Schroeder, T.A. Nigh, and T.F. Wilton. 2002. Ecoregions of Iowa and Missouri (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,800,000).

Gagnon, P.R. 2009. Fire in floodplain forests in the southeastern USA: insights from disturbance ecology of native bamboo. Wetlands 29(2): 520-526.

Gagnon, P.R. and W.J. Platt. 2008. Multiple disturbances accelerate clonal growth in a potentially monodominant bamboo. Ecology 89(3): 612-618.

Green, Jonathan D., W.W. Witt, and J.R. Martin. 2006. Weed management in grass pastures, hayfields, and other farmstead sites. University of Kentucky Cooperative Extension Service, Publication AGR-172.

Hodges, J.D. 1998. Minor alluvial floodplains. In: Messina, M.G. and W.H. Conner (eds.). Southern forested wetlands: ecology and

management. Boca Raton, FL: Lewis
Publishers/CRC Press. 616 p.

Johnson, P.S., S.R. Shifley, and R. Rogers. 2009. The Ecology and Silviculture of Oaks. 2nd Edition. CABI, Cambridge, MA. 580 p.

LANDFIRE. 2008. Gulf and Atlantic Coastal Plain Floodplain Systems, 4514730. LANDFIRE Biophysical Setting Models. Biophysical Setting 45. (2008, February - last update). Homepage of the LANDFIRE Project, U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, [Online]. Available:
http://www.landfire.gov/index.php (Accessed: 1 July 2014).

McNab, W.H.; Cleland, D.T.; Freeouf, J.A.; Keys, Jr., J.E.; Nowacki, G.J.; Carpenter, C.A., comps. 2005. Description of ecological subregions: sections of the conterminous United States [CD-ROM]. Washington, DC: U.S. Department of Agriculture, Forest Service. 80 p.

NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available: http://www.natureserve.org/explorer. (Accessed: February 9, 2011).

Nelson, P. 2005. The Terrestrial Natural Communities of Missouri. Third edition. Missouri Natural Areas Committee, Department of Natural Resources and the Department of Conservation, Jefferson City, MO. 550 p.

Oliver, C.D. and B.C. Larson. 1990. Forest Stand Dynamics. McGraw Hill, Inc., New York, NY. 476 p.

Rhodes, G.N., Jr., G.K. Breeden, G. Bates, and S. McElroy. 2005. Hay crop and pasture weed management. University of Tennessee, UT Extension, Publication PB 1521-10M-6/05 (Rev). Available: https://extension.tennessee.edu/washington/Documents/hay_crop.pdf.

[USDA-NRCS] United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

[USDA-NRCS] United States Department of Agriculture, Natural Resources Conservation Service. 2010. Conservation Practice Standard: Prescribed Grazing. Practice Code 528. Updated: September 2010. Field Office Technical Guide, Notice 619, Section IV. [Online] Available: efotg.sc.egov.usda.gov/references/public/ne/ne528.pdf.

[USDA-NRCS] United States Department of Agriculture, Natural Resources Conservation Service. 2016. Official Soil Series Descriptions. Available online: https://soilseries.sc.egov.usda.gov/osdname.asp. (Accessed: 17 May 2016).

[USDA-SCS] United States Department of Agriculture, Soil Conservation Service. 1992. Hardwood forest grazing. Woodland Fact Sheet No. 7. Columbia, Missouri. 2 p. [Online] Available: www.forestandwoodland.org/uploads/1/2/8/8/12885556/hardwood_forest_grazing1.pdf.

Woods, A.J., T.L. Foti, S.S. Chapman, J.M. Omernik, J.A. Wise, E.O. Murray, W.L. Prior, J.B. Pagan, Jr., J.A. Comstock, and M. Radford. 2004. Ecoregions of Arkansas (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,000).

Contributors

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Approval

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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	09/02/2026
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):**

   _____

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:**

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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:**
