Ecological site F131DY004AR
Loess Terrace

Last updated: 9/22/2023
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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): 131D–Southern Mississippi River Terraces

Major Land Resource Area (MLRA) 131D, Southern Mississippi River Terraces, is located in Arkansas (88 percent) and Louisiana (12 percent). It is in two separate areas that together make up about 2,945 square miles. The towns of Lonoke and Stuttgart, Arkansas, are in the northeastern part of the MLRA, which is called the Grand Prairie. Bastrop, Louisiana, is in the southwestern part of the MLRA.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 131D

Ecological site concept

The Loess Terrace is a diverse grassland prairie. A fragipan layer exists two to three feet below that surface that restricts root growth and perches water. Vegetative species are adapted to the restrictive layer.

Associated sites

F131DY003AR	**Sodic Terrace** Sites are on the same landform, but have a sodic horizon.
F131DY005AR	**Loamy Prairie Terrace** Sites are on the same landform, but do not have a fragipan in the subsurface.
F131DY006AR	**Clayey Terrace** Sites are on a similar landform, but have clayey textures throughout the profile.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium* (2) *Sorghastrum nutans*

Physiographic features

These nearly level to strongly sloping sites are located on terraces. Sites have a perched water table 6 to 18 inches below the surface during winter and early spring. Slopes range from 0 to 12 percent.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Terrace
Runoff class	Negligible to high
Flooding frequency	None
Ponding frequency	None
Elevation	50–250 ft
Slope	0–12%
Water table depth	6–18 in
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation is 53 inches, which increases from north to south. Most of the rainfall occurs as frontal storms in spring and early summer. Some high-intensity, convective thunderstorms occur in summer. The average seasonal snowfall is five inches. Temperatures range from highs in the low 90's during the summer to lows in the low 30's during the winter. The frost-free period averages 221 days, while the freeze-free period averages 246 days.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	246 days
Precipitation total (average)	53 in

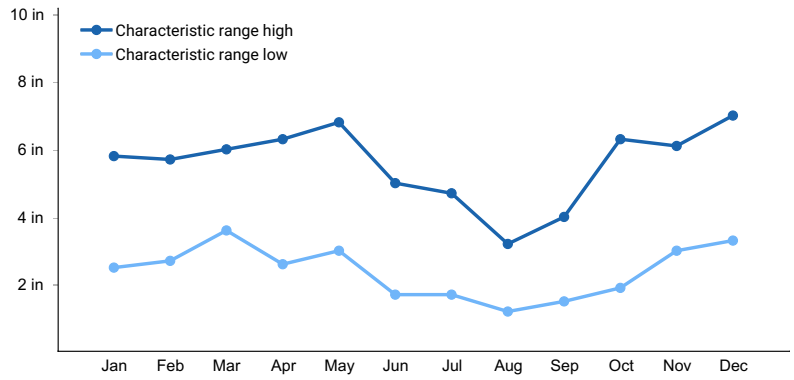


Figure 1. Monthly precipitation range

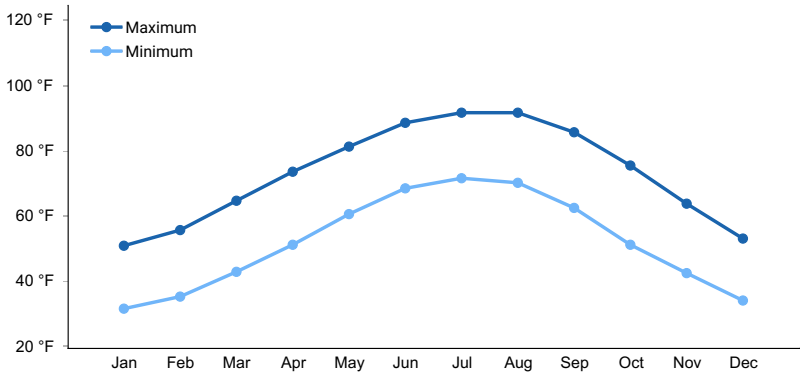


Figure 2. Monthly average minimum and maximum temperature

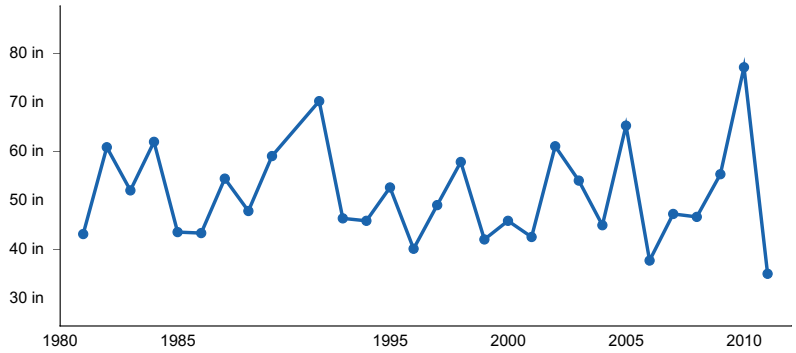


Figure 3. Annual precipitation pattern

Climate stations used

- (1) ARKANSAS POST [USC00030240], Gillett, AR
- (2) DES ARC [USC00031968], Des Arc, AR
- (3) STUTTGART 9 ESE [USC00036920], Stuttgart, AR
- (4) CROSSETT 2 SSE [USC00031730], Crossett, AR
- (5) SAINT CHARLES [USC00036376], Clarendon, AR

Influencing water features

The restrictive fragic layer causes a perched water table, especially during winter and early spring.

Wetland description

Some of the soils correlated are classified as hydric, but onsite delineations are required to determine if the site is a wetland as defined by the United States Army Corps of Engineers.

Soil features

The ecological site consists of very deep, somewhat poorly to moderately well drained, very slowly permeable soils that formed in thick loess. These soils have a fragipan between 28 and 37 inches deep that restrict root growth and perch water during winter and early in spring. Soils correlated to this site include: Calloway, Grenada, and Henry.

Table 4. Representative soil features

Parent material	(1) Loess–igneous and sedimentary rock
Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Very slow
Depth to restrictive layer	18–38 in
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	6 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm

Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The information in this ecological site description (ESD), including the state-and-transition model (STM), was developed using archeological and historical data, professional experience, and scientific studies. The information is representative of a complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals, and ecological processes are described to inform land management decisions.

Introduction - The Southern Mississippi River Terrace (MLRA 131D) region is on smooth terraces and floodplains along the Mississippi River and its major tributaries south of its confluence with the Ohio River. The geologic material in the region consists of very thick deposits of sandy to clayey alluvium of Pleistocene to Holocene age. This material was deposited by the rivers with local relief is typically less than 15 feet and elevation ranging from 50 to 250 feet.

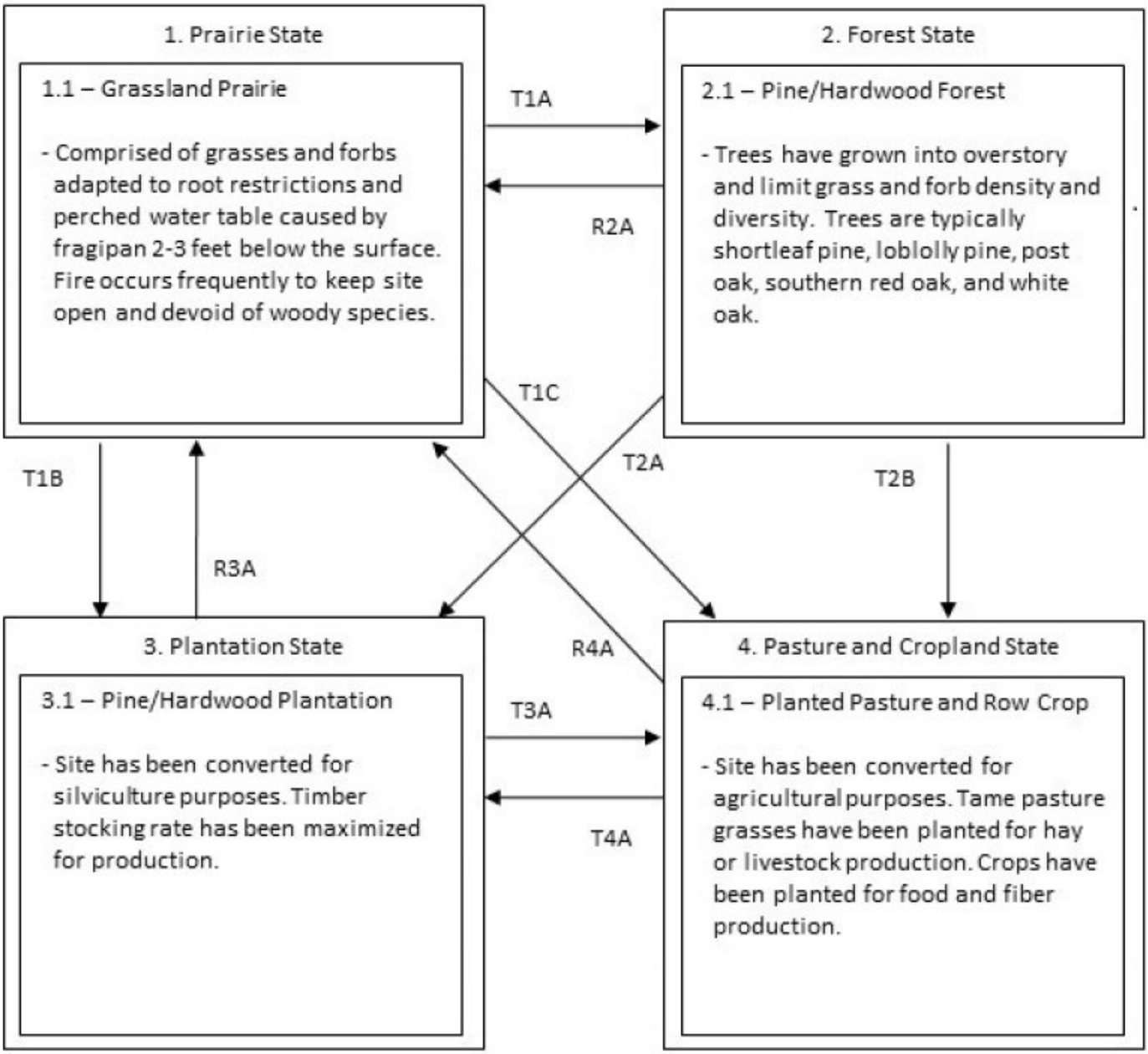
Geology - Bedrock in this area consists of Tertiary and Cretaceous sands formed as beach deposits during the retreat of the Cretaceous ocean from the midsection of the United States. Alluvial deposits from flooding and lateral migration of the rivers crossing this area typically lie above the bedrock. These sediments form Pleistocene-age alluvial terraces. Silty alluvium underlies most of the area. Clayey sediments are in old channel scars. The Pleistocene terraces are part of the Prairie Terrace complex. A minor portion of the area is in the Deweyville and Montgomery terrace formation. These terraces have a base of red alluvium capped by one to several feet of brownish alluvium.

Biological Resources - This area as a whole, supports hardwoods and pines. The Grand Prairie originally supported tall prairie grasses interlaced with hardwood timber. Cherrybark oak (*Quercus pagoda*) and Shumard oak (*Quercus shumardii*) are widely distributed. Tuliptree (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), eastern cottonwood (*Populus deltoides*), and black walnut (*Juglans nigra*) are important species on the flood plains. Loblolly pine (*Pinus taeda*) and shortleaf pine (*Pinus echinata*) are on a wide variety of sites, mainly the eroded soils on uplands and ridges. Other hardwood species that commonly grow in this area are white oak (*Quercus alba*), basswood (Tillia sp.), sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), American elm (*Ulmus americana*), blackgum (*Nyssa sylvatica*), sycamore (Plantanus occidentalis), sassafras (*Sassafras albidum*), southern red oak (*Quercus falcata*), chinkapin oak (*Quercus muehlenbergii*), American beech (*Fagus grandifolia*), and hickory (Carya sp.).

Land Use - Land use varies throughout the MLRA consisting of 42 percent cropland, 4 percent grassland, 47 percent forest, 3 percent urban development, 3 percent water, and 1 percent other. Scattered tracts of forests and farms make up nearly all of this area. Rice, soybeans, and wheat are the main crops. In most areas furrow or flood irrigation is used throughout the growing season. Hardwood timber is harvested on some forested wetlands, and most forested areas are managed for wildlife. Bait fish are produced commercially in ponds that are contained by levees. The area is in a major migratory flight path and hunting waterfowl is a popular recreation activity.

Conservation - The major soil resource concerns are management of soil moisture, erosion control, and maintenance of the content of organic matter and productivity of the soils. Depletion of ground water through excessive pumping is a major concern in the Grand Prairie area. Conservation practices on cropland generally include nutrient management, crop residue management, and alternative tillage systems, especially no-till systems that reduce the need for tillage. In many areas land leveling or shaping optimizes the control of surface water. Other major cropland management practices are control of competing vegetation and insects through aerial or ground spraying of herbicides and insecticides and fertility management programs that make use of chemical fertilizers.

State and transition model



Code	Practice
T1A	Fire suppression and no management. Woody species escape the height at which fire can be effective.
T1B, T2A, T4A	Site is prepared and planted to a monoculture of trees.
T1C, T2B, T3A	Site is prepared and planted to grass or crops.
R2A, R3A	Clearcut, possible reseeding, and return of natural fire intervals.
R4A	Native species reseeded and return of natural fire intervals.

Figure 5. STM

State 1
Prarie

This ecological site was a grassland prairie. The fragipan layer located two to three feet below the surface restricts root growth and perches water. Herbaceous vegetation found throughout the site are adapted to these conditions. Frequent fire is necessary to keep the sites open and free of woody species.

Community 1.1
Grassland Prairie

The vegetation adapted to the Loess Prairie is a diverse grassland. Grasses occupying the area include: little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), muhly (Muhlenbergia sp.) dropseeds (Sporobolus sp.), and sedges (Carex sp.). Forbs include: blackeyed Susan (*Rudbeckia hirta*), prairie tea (*Croton monanthogynus*), blazing star (Liatris sp.), and golden tickseed (*Coreopsis tinctoria*).

State 2
Forest

Prolonged absence of fire in the Prairie State will transition into the Forest State. Without natural frequent fire intervals, woody species become established. Within a few years they can grow to a height where fire is ineffective at controlling their growth. They eventually grow to densities where light is restricted to the grasses and forbs, and only shade tolerant species can thrive.

Community 2.1
Pine/Hardwood Forest

Shortleaf pine and loblolly pine are the dominant pines. Hardwood species are mixed and include: post oak (*Quercus stellata*), southern red oak, and white oak. Other species associated with the site include: flowering dogwood (*Cornus florida*), hawthorns (Crategus sp.), hophornbeam (*Ostrya virginiana*), greenbriers (Smilax sp.), and grapes (Vitis sp.)

State 3
Plantation

The Plantation State is a result of conversion activities. The landowner has maximized silviculture production by planting a monoculture of tree species.

Community 3.1
Pine/Hardwood Plantation

In the immediate years following the initial plantation tree planting, the understory community will resemble State 1. During this early growth period, the landowner will typically remove unwanted tree species and herbaceous plants to reduce competition with the planted trees. As the overstory canopy closes, less understory management is required due to sunlight restrictions to the ground layer.

State 4
Pasture and Cropland

The Pasture and Cropland State is a result of conversion activities. The landowner has maximized agriculture production by planting a monoculture of introduced grass species or agricultural row crops.

Community 4.1
Planted Pasture and Row Crop

Typical perennial warm-season grasses include Bermudagrass, bahiagrass, dallisgrass, and Johnsongrass. Spring and fall forages may include legumes such as clover. The grasses are grown for livestock production through direct grazing or baling hay for later use. Agricultural row crops are grown for food and fiber production. Typical crops include cotton, soybeans, milo, corn, rice, and sugarcane. Many farmers use herbicides to reduce unwanted plant competition which yields a plant community unrepresentative of State 1 or subsequent vegetative states.

Transition T1A
State 1 to 2

The transition from State 1 to State 2 is a result of time and long periods of no fire. Without fire to suppress

seedlings, biomass and diversity is lost from the grass and forb layers.

Transition T1B
State 1 to 3

The transition is due to the land manager maximizing silviculture potential. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to a monoculture of trees.

Transition T1C
State 1 to 4

The transition is due to the land manager maximizing agricultural production. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to either a tame grass or row crop.

Restoration pathway R2A
State 2 to 1

Restoration of this community to the reference state begins with a timber harvest. Removing trees opens up the canopy, allowing sunlight penetration to the ground. If the land has been forested for many decades, native seeds may be required if a seedbank does not exist. After a successful stand of grass has returned, natural burn intervals are required to keep woody species controlled.

Transition T2A
State 2 to 3

The transition is due to the land manager maximizing silviculture potential. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to a monoculture of trees.

Transition T2B
State 2 to 4

The transition is due to the land manager maximizing agricultural production. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to either a tame grass or row crop.

Restoration pathway R3A
State 3 to 1

Restoration of this community to the reference state begins with a timber harvest. Removing trees opens up the canopy, allowing sunlight penetration to the ground. If the land has been forested for many decades, native seeds may be required if a seedbank does not exist. After a successful stand of grass has returned, natural burn intervals are required to keep woody species controlled.

Transition T3A
State 3 to 4

The transition is due to the land manager maximizing agricultural production. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to either a tame grass or row crop.

Restoration pathway R4A
State 4 to 1

Restoration of this community to the reference state begins by reseeding native seeds. After a successful stand of grass has returned, natural burn intervals are required to keep woody species controlled.

Transition T4A
State 4 to 3

The transition is due to the land manager maximizing silviculture potential. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to a monoculture of trees.

Additional community tables

Inventory data references

This site description was developed as part of the provisional ecological site initiative using historic soil survey manuscripts, available range site descriptions, and low intensity field sampling.

Other references

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Contributors

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Approval

Bryan Christensen, 9/22/2023

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	11/23/2021
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

7. **Amount of litter movement (describe size and distance expected to travel):**

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

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

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

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

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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:**
