USDA Natural Resources Conservation Service

Ecological site F131DY003AR
Sodic Terrace

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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.

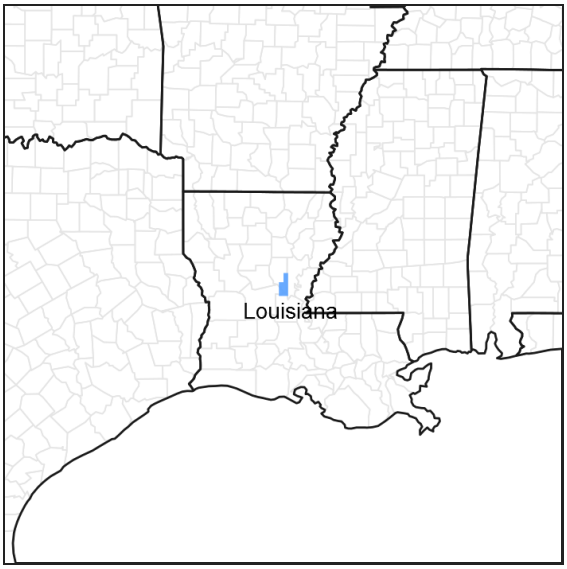


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

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 Sodic Terrace ecological site is unique because of a salty subsurface horizon. The high concentrations of sodium, coupled with a high seasonal water table, allow growth of plants adapted to both conditions.

Associated sites

F131DY004AR	**Loess Terrace** Sites are on the same landform, but have a fragipan in the subsurface.
F131DY005AR	**Loamy Prairie Terrace** Sites are on the same landform, but do not have a sodic horizon.
F131DY006AR	**Clayey Terrace** Sites are on a similar landform, but have clayey textures throughout the profile.

Table 1. Dominant plant species

Tree	(1) *Quercus stellata*
Shrub	(1) *Baccharis halimifolia*
Herbaceous	(1) *Distichlis spicata*

Physiographic features

These sites are on level to nearly level terraces throughout the Lower Mississippi Valley. They are saturated in winter and early spring. Water runs off the surface slowly. Slope ranges from 0 to 1 percent.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Terrace
Runoff class	Negligible to low
Flooding frequency	None
Ponding frequency	None
Elevation	50–76 m
Slope	0–1%
Water table depth	15–30 cm
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)	1,346 mm

Climate stations used

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

Influencing water features

The sites have a high water table in the winter and early spring, as high as six inches below the surface.

Wetland description

The sites are classified as hydric, but onsite delineations are required to determine if they are wetlands as defined by the United States Army Corps of Engineers.

Soil features

The ecological site consists of deep to very deep, poorly drained, slowly permeable to impermeable soils that formed in loamy and silty material high in sodium. The high sodium layer affects plant growth and this restrictive layer begins at 8 to 18 inches below the surface. The taxonomic name differs slightly between each soil, but all are listed as Glossic Natraqualfs. Soils correlated to this site include: Bonn, Foley, and McCrory.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous and sedimentary rock
Surface texture	(1) Silt loam (2) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Slow
Soil depth	165–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.54–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	3–5 mmhos/cm
Sodium adsorption ratio (Depth not specified)	26–34
Soil reaction (1:1 water) (0-101.6cm)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–3%
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.

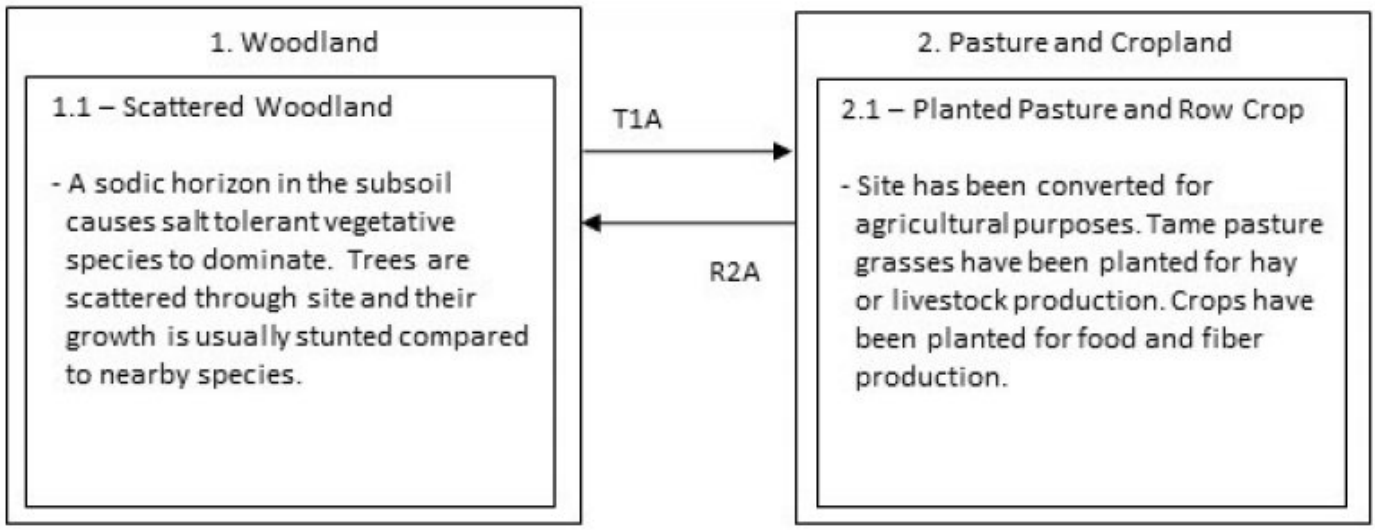
Geology - Bedrock in this area consists of Tertiary and Cretaceous sands formed as beach deposits during the retreat of the Cretaceous ocean from the midsection of the United States. Alluvial deposits from flooding and lateral migration of the rivers crossing this area typically lie above the bedrock. 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	Site is prepared and planted to grass or crops
R2A	Restoration efforts require preparing site and replanting native species.

Figure 6. STM

State 1
Woodland

The saltiness of the site and seasonally perched water table greatly affect the available nutrients, especially magnesium. This stunts the growth of overstory trees and creates a diverse understory of halophytic vegetation. The site will have stunted trees scattered throughout varying amounts of shrubs and herbaceous vegetation. Some areas may have "slicks", or areas denude of vegetation due to very high salt concentrations. Lichens and small-flowering plants may be the only inhabitants in these areas.

Community 1.1
Scattered Woodland

Scattered and stunted tree species inhabiting the site include: post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), bottomland post oak (quercus similis), and loblolly pine (*Pinus taeda*). Shrub species found onsite include: eastern baccharis (*Baccharis halimifolia*), wax myrtle (*Morella cerifera*), and narrowleaf marsh elder (*Iva angustifolia*). Herbaceous species include: threeawns (Aristida sp.), saltgrass (*Distichlis spicata*), spikerush (Eleocharis sp.), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), inland sea oats (*Chasmanthium latifolium*), Nuttall's rayless goldenrod (*Bigelowia nuttallii*), and saltmarsh aster (Aster subulatus).

State 2
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 2.1
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 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 by reseeding native seeds. After a successful stand of grass has returned, further management practices may be need to keep the native plant community intact.

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:

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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:**
