Ecological site F133BY016TX
Sandy Bottomland

Last updated: 9/21/2023
Accessed: 09/08/2026

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): 133B–Western Coastal Plain

Major Land Resource Area (MLRA) 133B, Western Coastal Plain is in eastern Texas, western Louisiana, and the southwest corner of Arkansas. Locally termed the Pineywoods, the area is dominated by coniferous forest covering 45,450 square miles (117,770 square kilometers or 29,088,000 acres). The region is a hugely diverse transition zone between the eastern deciduous forests and the central grasslands to the west.

Classification relationships

USDA-Natural Resources Conservation Service, 2006. -Major Land Resource Area (MLRA) 133B

Ecological site concept

The ecological site has very deep, somewhat poorly drained soils that are occasionally flooded. The sites will typically stay flooded longest during the periods of November to May. Due to their coarse textured soils, the sites drain quicker and do not stay flooded as long as the loamy and clayey bottomlands sites. The drainage patterns and sandy soils create their unique plant community.

Associated sites

F133BY011TX	**Deep Sandy Terrace** Sites are located on a higher terrace position.
F133BY012TX	**Wet Terrace** Sites are located on a higher terrace position and do not have sandy soils.
F133BY013TX	**Terrace** Sites are located on a higher terrace position and do not have sandy soils.

Similar sites

F133BY018TX	**Clayey Bottomland** Sites have clayey soils and flood for longer periods.

F133BY014TX	**Creek Bottomland** Sites do not flood as often or as long. Sites are typically more narrow and not as wide.
F133BY017TX	**Loamy Bottomland** Sites have loamy soils and flood for longer periods.

Table 1. Dominant plant species

Tree	(1) *Quercus phellos* (2) *Quercus nigra*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The ecological sites are rarely to occasionally flooded. The site typically floods for brief to long periods during normal rainfall years. Flooding will last longer from November through May. When not flooded, the soils will have a water table from 0 to 30 inches. The water table will deepen during the warmer months. Slopes are from 0 to 5 percent, but are most often 0 to 1 percent.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Flood plain
Runoff class	Negligible to low
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Elevation	30 – 200 m
Slope	0 %
Water table depth	0 – 80 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified

Flooding duration	Not specified
Flooding frequency	Not specified
Elevation	Not specified
Slope	0 – 10 %
Water table depth	Not specified

Climatic features

The climate of the Western Coastal Plain (MLRA 133B) is humid subtropical with hot summers and mild winters. Canadian air masses that move southward across Texas and Louisiana over the Gulf of Mexico in winter produce cool, cloudy, rainy weather with only rare cold waves that moderate in one or two days. Precipitation is distributed fairly even throughout the year and is most often in the form of slow and gentle rains.

Spring weather can be variable. March is relatively dry while thunderstorm activities increase in April and May. Occasional slow-moving thunderstorms or other weather disturbances may dump excessive amounts of precipitation on the area. Fall has moderate temperatures. Fall experiences an increase of precipitation and frequently has periods of mild, dry, sunny weather. Heavy rain may occur early in the fall because of tropical disturbances, which move westward from the gulf. Tropical storms are a threat to the area in the summer and fall but severe storms are rare. Prolonged droughts and snowfall are rare.

The total annual precipitation ranges from 39 inches in the western part of the region to 60 inches in the eastern part of the region. Approximately 50 percent of the rainfall occurs between April and September, which includes the growing season for most crops. Thunderstorms occur on about 50 days each year and most occur during the summer.

The average relative humidity in mid-afternoon is about 60 percent. Humidity is higher at night and the average at dawn is about 90 percent. The sun shines 70 percent of the time in summer and 50 percent in winter. The prevailing wind is from the south-southeast. Average wind-speed is highest at 11 miles per hour in spring.

Table 4 Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	250 days
Precipitation total (average)	1,400 mm

- (1) CALHOUN RSCH STN [USC00161411], Calhoun, LA
- (2) CARTHAGE [USC00411500], Carthage, TX
- (3) HUNTSVILLE [USC00414382], Huntsville, TX
- (4) RUSK [USC00417841], Rusk, TX
- (5) TOLEDO BEND DAM [USC00419068], Anacoco, TX
- (6) CALION L&D [USC00031140], El Dorado, AR
- (7) JENA 4 WSW [USC00164696], Trout, LA
- (8) DEKALB [USC00412352], Simms, TX
- (9) GILMER 4 WNW [USC00413546], Gilmer, TX
- (10) MAGNOLIA [USC00034548], Magnolia, AR
- (11) SHERIDAN [USC00036562], Sheridan, AR
- (12) MINDEN [USC00166244], Minden, LA

Influencing water features

The sites are within floodplains and are influenced by floodwaters. The sites will flood for longer durations between November and May.

Wetland description

The soils are considered hydric, but onsite delineations using the United States Army Corps of Engineers (USACOE) manual should be used to clearly define the wetland status.

Soil features

The ecological site formed from alluvium and is associated with very deep, somewhat poorly drained, entisols and inceptisols on bottomlands. These sites differ from the loamy and clayey bottomlands by having coarse textured, sandy soils. Their drainage is comparatively better and the soils do not stay as saturated as their other bottomland coutnerparts. Soils correlated to this site include: Henco, Kawah, Keechi, Lotus, Melhomes, Naconiche, Nugent, and Osier.

Table 5. Representative soil features

Parent material	(1) Alluvium – sandstone
Surface texture	(1) Sand (2) Loamy sand (3) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to poorly drained
Permeability class	Rapid to moderately slow
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	5.08 – 12.7 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)	3.6 – 6.5
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

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 – Southern Arkansas, western Louisiana, and eastern Texas have been deemed the Pineywoods because of the vast expanse of pine trees. The region represents the western edge of the southern coniferous belt. Historically, the area was covered by pines with mixed hardwoods, sparse shrubs, and a diverse understory of grasses and forbs. Fire played a significant role in reducing the woody competition that generally out-competes the herbaceous understory layer. Fire suppression and land conversion have reduced the amount of historical communities in existence today.

Background – Prior to settlement by the Europeans, the ecological site on the Sandy Bottomland was a Willow Oak/Water Oak (Quercus phellos/Quercus nigra) Forest. Remnants of this presumed historic plant community still exist where natural conditions are replicated through conservation management techniques. Evidence of the reference state is found in accounts of early historic explorers to the area, historic forest and biological survey teams, as well as recent ecological studies in the last 30 years. The age of this woodland community varies, and has a diverse understory of grasses and forbs.

Settlement Management – As human settlement increased throughout the area, so did the increase in logging and grazing by domestic livestock. Oftentimes, an early settler would make camp by logging pines in the area for lodging. The accompanying livestock would graze the upland woodlands filled with warm-season forage during the summer. As the summer grazing season would end, the livestock would naturally begin grazing in the bottoms to forage on large cane breaks and other cool-season plants found in the area. The bottomlands also provided plentiful hunting opportunities for deer, turkey, and squirrel that utilize the acorn crop.

Eventually, the logging became so extensive that by the 1930's most of the region had been cut-over. Replanting trees to historic communities was not common and early foresters began planting loblolly pine (Pinus taeda) for its quick growth. The loblolly pines were commonly grown plantation style (site preparation, planting, long-term weed control, etc). This, coupled with the advent of heavy site preparation machinery made the conversion from low-grade hardwood possible.

Current Management and State – Today much of the remnant forest is gone, replaced by tree plantations, crops, and pastures. The largest bottomlands of disappearance are areas converted to reservoirs, including Sam Rayburn and Toledo Bend. The areas that have not been converted retain resemblance to pre-settlement conditions. Fire is not a large driver in the bottomlands, hence fire suppression does not play a large role in shaping the forested communities.

Fire Regimes – Fire was a natural and important disturbance throughout the Western Gulf Plain. Fire occurred naturally and was started by Native Americans for game movement, insect control, travel, and many other reasons. Contrary to most of the region, the bottomland communities developed with a very infrequent fire regime. The bottomlands are estimated to have burned one in every 50 years. Bottomlands naturally retard fire in a number of ways. Frequent flooding inundates the sites for sometimes months, and fire cannot travel. Another reason for reduced fire intervals is the understory vegetation is somewhat sparse of fine-fuel materials compared to those in the uplands. Coupled with the thicker, fire-resistant leaves adorning much of the vegetation, the bottomlands do not burn very often.

Disturbance Regimes – Extreme weather events occur occasionally throughout the region. Tornados uproot trees and open canopies in the spring months. In the late summer and early fall, hurricanes or tropical depressions often make landfall, dumping excessive amounts of rain and toppling trees with high winds. Flooding events occur most years in which rainfall is normal or higher. Prolonged flooding due to excessive precipitation can cause mortality in vegetative species that are unable to handle the continuous water, especially during the growing season (March through September). Reservoirs affect the natural flooding regimes. Upstream areas remain flooded longer and the frequency and duration of flooding on downstream areas are also impacted.

Plant Community Interactions – The dominant force in shaping the bottomlands is the close-proximity to a water source that floods the site throughout the year. Flooding for one to three months during the dormant season gives rise to plants that tolerate a wetter environment. Micro-relief within the broadly delineated bottomlands also affects the plant dispersion. Plants more adapted to water grow in the lower micro-elevations, and those that are more facultative (less water tolerant) occupy the higher micro-elevations. The difference between the upper and lower elevations could be as little as inches. The loamy surface of the ecological site has gleyed subsoils resulting from lack of oxygen during flooding. The communities are dominated by hardwood trees and an understory that can tolerate the varying conditions accompanying the floods.

State and transition model

Figure 5. STM

Additional community tables

Table 6. Community 1.1 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 3.1 plant community composition

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

Table 9. Community 4.1 plant community composition

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

Inventory data references

These site descriptions were developed as part a Provisional Ecological Site project using historic soil survey manuscripts, available site descriptions, and low intensity field traverse sampling. Future work to validate the information is needed. This will include field activities to collect low, medium, and high-intensity sampling, soil correlations, and analysis of that data. A final field review, peer review, quality control, and quality assurance review of the will be needed to produce the final document.

Other references

Ajilvsgi, G. 2003. Wildflowers of Texas. Revised edition. Shearer Publishing, Fredericksburg, TX.

Ajilvsgi, G. 1979. Wildflowers of the Big Thicket. Texas A&M University Press, College Station, TX.

Allen, J. A., B. D. Keeland, J. A. Stanturf, and A. F. Kennedy Jr. 2001. A guide to bottomland hardwood restoration. Technical report, USGS/BRD/ITR-2000-0011.

Bray, W. L. 1904. Forest resources of Texas. Bureau of Forestry Bulletin 47, Government Printing Office, Washington D.C.

Diggs, G. M., B. L. Lipscomb, M. D. Reed, and R. J. O'Kennon. 2006. Illustrated flora of East Texas. Second edition. Botanical Research Institute of Texas & Austin College, Fort Worth, TX.

Jones, S. D., J. K. Wipff, and P. M. Montgomery. 1997. Vascular plants of Texas: a comprehensive checklist including synonymy, bibliography, and index. University of Texas Press, Austin.

NatureServe. 2002. International classification of ecological communities: Terrestrial vegetation of the United States. National forests in Texas final report. NatureServe, Arlington, VA.

Nixon, E. S. 2000. Trees, shrubs & woody vines of East Texas. Second edition. Bruce Lyndon Cunningham Productions, Nacogdoches, TX.

Picket, S. T. and P. S. White. 1985. The ecology of natural disturbance and patch dynamics. Academic Press, Orlando, FL.

Randall, J. M., and J. Marinelli. 1996. Invasive plants: weeds of the global garden. Volume 149. Brooklyn Botanic Garden, Brooklyn, NY.

Roberts, O. M. 1881. A description of Texas, its advantages and resources with some account of their development past, present and future. Gilbert Book Company, Saint Louis, MO.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database.

Stanturf, J. A., S. H. Schoenholtz, C. J. Schweitzer, and J. P. Shepard. 2001. Achieving restoration success: Myths in bottomland hardwood forests. Restoration Ecology, 9:189-200.

Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2003. State and transition modeling: An ecological process approach. Journal of Range Management 56:106-113.

Truett, J. C. 1984. Land of bears and honey: A natural history of East Texas. The University of Texas Press, Austin, TX.

U.S. Army Corps of Engineers. 2010. Regional supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-20.

USDA-NRCS Ag Handbook 296 (2006).

Van Kley, J. E., R. L. Turner, L. S. Smith, and R. E. Evans. 2007. Ecological classification system for the national forests and adjacent areas of the West Gulf Coastal Plain. Second approximation. Stephen F. Austin University and The Nature Conservancy, Nacogdoches, TX.

Vines, R. A. 1960. Trees, shrubs, and woody vines of the Southwest. University of Texas Press, Austin, TX.

Watson, G. E. 2006. Big Thicket Plant Ecology. Third Edition. University of North Texas Press, Denton, TX.

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	09/03/2021
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:**

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:**
