

Ecological site F133BY005TX

Loamy Upland

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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): 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

NatureServe, 2002. - CEGLO07499 – West Gulf Coastal Plain Shortleaf Pine – Post Oak Forest USDA-Natural Resources Conservation Service, 2006. -Major Land Resource Area (MLRA) 133B Soil Survey Staff, 2011. - Woodland Suitability Group 2o7 and 2w8 Van Kley et. Al., 2007. - 231.Ea.8.1.30 Shortleaf-southern red oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands - 231.Ea.9.1.30 Shortleaf-southern red oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands - 231.Ea.10.1.30 Shortleaf-post oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands - 231.Ea.11.1.30 Shortleaf-post oak/Callicarpa-Chasmanthium Loamy Dry-Mesic Uplands

Ecological site concept

The Loamy Uplands have very deep loamy soils greater than 80 inches. The ecological sites produce high amounts of plant biomass because of the loamy growing medium with nonrestrictive soil textures through the soil profiles with adequate water-holding capacity. The sites generally have the most robust plant communities of any adjacent sites.

Associated sites

F133BY001TX	Depression Sites are lower in the landscape, have poor drainage patterns, and wetter associated plant species.
F133BY002TX	Seasonally Wet Upland Sites have poor drainage patterns and wetter associated plant species.
F133BY003TX	Loamy Over Clayey Upland Sites have clay textured soils instead of loamy textures.
F133BY004TX	Loamy Claypan Upland Sites have an abrupt textural change from loam to clay and are sometimes shallow to bedrock.

F133BY006TX	Northern Sandy Loam Upland Sites have deeper soil horizons of sandy and loamy textures. These sites are not as dense in biomass and have lessened accumulations of nutrients due to their sandier nature.
F133BY007TX	Southern Sandy Loam Upland Sites have deeper soil horizons of sandy and loamy textures. These sites are not as dense in biomass and have lessened accumulations of nutrients due to their sandier nature.
F133BY012TX	Wet Terrace Sites are located on terraces and are overall wetter with poor drainage and associated plant species.
F133BY013TX	Terrace Sites are located on the terrace landform.

Similar sites

F133BY006TX	Northern Sandy Loam Upland Sites have deeper soil horizons of sandy and loamy textures. These sites are not as dense in biomass and have lessened accumulations of nutrients due to their sandier nature.
F133BY004TX	Loamy Claypan Upland Soils have an abrupt textural change from loamy to clayey and are sometimes shallow to bedrock.
F133BY007TX	Southern Sandy Loam Upland Sites have deeper soil horizons of sandy and loamy textures. These sites are not as dense in biomass and have lessened accumulations of nutrients due to their sandier nature.
F133BY003TX	Loamy Over Clayey Upland Soils have clayey textures throughout their profiles.

Table 1. Dominant plant species

Tree	(1) <i>Pinus echinata</i> (2) <i>Quercus falcata</i>
Shrub	(1) <i>Callicarpa americana</i>
Herbaceous	(1) <i>Dichanthelium acuminatum</i>

Physiographic features

The ecological site is on broad flats to moderately sloping uplands. Slopes are predominantly 0 to 8 percent, but can range to 25 percent. Elevations range from 150 to 650 feet. The topography of the area includes summits and side slopes.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Interfluve
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	50 – 200 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	0 – 30 %

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

Influencing water features

Due to the well-drained nature of the soils, water is typically not a factor to the sites.

Wetland description

Wetlands are not generally associated with the sites.

Soil features

The soils of this site are deep and characterized by loams throughout the soil profile, measured to 80 inches. The soils belong to the alfisol and ultisol orders and have well developed horizons. The Bowie series is a representative soil and consists of very deep, well drained, moderately slowly permeable soils that formed in loamy residuum from Southern Coastal Plain marine deposits. The series is classified as a fine-loamy, siliceous, semiactive, thermic Plinthic Paleudult. Not all soils within the ecological site will have the same taxonomic classification, but produce similar vegetative communities. Other soils are included within the ecological site and all are defined by deep fine-loamy and fine-silty control sections. The soils included are well drained or moderately well drained. Soils that are moderately well drained have a general increase in clay in the lower horizons. Besides the Bowie series, the Alto, Beauregard, Blevins, Diboll, Elrose, Eylau, Fuller, Gunter, Keatchie, Keithville, Kullit, Latex, Oakwood, Olla, Penning, Rigolette, Rogan, Ruston, Saffell, Sailes, Sawlit, Sawtown, Sawyer, Scottsville, Smithdale, Ultio, and Warnock are correlated to the Loamy Uplands.

Table 5. Representative soil features

Parent material	(1) Marine deposits – sandstone and shale
Surface texture	(1) Fine sandy loam (2) Loam
Family particle size	(1) Loamy

Drainage class	Well drained to moderately well drained
Permeability class	Moderate 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)	13.46 – 18.03 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)	4.5 – 6.5
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
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

pinus 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 reference state for the Loamy Uplands was a Shortleaf Pine/Red Oak (*Pinus echinata*/*Quercus falcata*) Woodland. 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. 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. As more people colonized they began suppressing fire, which allowed dense thickets of shrubs to replace the herbaceous understory.

Current Management and State – Today much of the remnant forest is gone, replaced by pine plantations, crops, and pastures. The areas that were not converted have been fire-suppressed so long that loblolly pine and fire intolerant hardwoods populate the overstory structure. Currently, U.S. Forest Service properties are the best place to view the remnant sites. Some private individuals have begun restoring communities through selective tree planting and retention of communities that remain. Other restoration efforts include mimicking natural-disturbance regimes through gap-phase regeneration on plantation sites.

Fire Regimes – Fire was a natural and important disturbance throughout the Western Gulf Plain. Fire occurred naturally from lightning strikes and by Native Americans for game movement. The reference community developed with a frequency of fire every 3 to 5 years. Fires usually occurred in early spring, removing senescent vegetation, recycling nutrients and minerals, and spurring new plant growth. Late summer fires occurred as well, but with a different community effect. Summer fires burned hotter and with more intensity, greatly suppressing the shrub canopy layer. The summer fires also shifted the ecological site transitional state by decreasing grass densities and increasing forb densities. The topography, fuel loads, and other conditions caused patchy burns throughout the region resulting in mosaic patterns of plant communities and a heterogeneous landscape.

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. Another cause of large canopy openings is the effects of the southern pine beetle (*Dendroctonus frontalis*). Starting in the late 1950's, beetle outbreaks have occurred every 6 to 9 years (although a major attack has not occurred in some time), usually when the trees are stressed due to multiple environmental factors.

Plant Community Interactions – The deep loamy soils provide an excellent growing medium with very little restrictions. No special plant adaptations are necessary to persist in these soils, as compared to plants adapted to overly saturated (wetlands) or overly droughty (deep sands) conditions. Because of the high desirability for plants to grow on the ecological site, great competition exists between plants as they try and occupy space, rapidly taking advantage of sunlight. High amounts of biomass are produced and, left unchecked through management or natural frequencies of fire, the understory is quickly occupied by shrubs and understory saplings. Little bare ground exists in natural conditions and high amounts of litter accumulate. The sites typically support a basal area of trees from 80 to 120 square feet result in 65 to 85 percent canopy cover. Mature stands of pines will attain heights over 100 feet. The sites are characterized by high productivity of all plant types.

State and transition model

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height M	Canopy Cover (%)	Diameter Cm	Basal Area (square M/hectare)
Tree							
shortleaf pine	PIEC2	<i>Pinus echinata</i>	Native	–	60-100	–	–
southern red oak	QUFA	<i>Quercus falcata</i>	Native	–	0-30	–	–
blackjack oak	QUMA3	<i>Quercus marilandica</i>	Native	–	0-20	–	–
post oak	QUST	<i>Quercus stellata</i>	Native	–	0-10	–	–
black hickory	CATE9	<i>Carya texana</i>	Native	–	0-5	–	–

Table 8. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (m)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
needleleaf rosette grass	DIAC	<i>Dichanthelium aciculare</i>	Native	–	10-50
variable panicgrass	DICO2	<i>Dichanthelium commutatum</i>	Native	–	5-25
little bluestem	SCSC	<i>Schizachyrium scoparium</i>	Native	–	0-20
longleaf woodoats	CHSE2	<i>Chasmanthium sessiliflorum</i>	Native	–	5-20
Forb/Herb					
eastern poison ivy	TORA2	<i>Toxicodendron radicans</i>	Native	–	5-15
dogfennel	EUCA5	<i>Eupatorium capillifolium</i>	Native	–	0-7
flowering spurge	EUCO10	<i>Euphorbia corollata</i>	Native	–	1-5
Nuttall's wild indigo	BANU2	<i>Baptisia nuttalliana</i>	Native	–	0-5
St. Andrew's cross	HYHY	<i>Hypericum hypericoides</i>	Native	–	0-5
hairy small-leaf ticktrefoil	DECI	<i>Desmodium ciliare</i>	Native	–	1-5
slender yellow woodsorrel	OXDI2	<i>Oxalis dillenii</i>	Native	–	0-3
whitemouth dayflower	COER	<i>Commelina erecta</i>	Native	–	0-3
downy milkpea	GAVO	<i>Galactia volubilis</i>	Native	–	0-3
nettleleaf noseburn	TRUR2	<i>Tragia urticifolia</i>	Native	–	0-1
Fern/fern ally					
western brackenfern	PTAQ	<i>Pteridium aquilinum</i>	Native	–	0-5
Shrub/Subshrub					
American beautyberry	CAAM2	<i>Callicarpa americana</i>	Native	–	20-65
yaupon	ILVO	<i>Ilex vomitoria</i>	Native	–	10-50
sawtooth blackberry	RUAR2	<i>Rubus argutus</i>	Native	–	3-15
parsley hawthorn	CRMA5	<i>Crataegus marshallii</i>	Native	–	0-10
farkleberry	VAAR	<i>Vaccinium arboreum</i>	Native	–	0-5
rusty blackhaw	VIRU	<i>Viburnum rufidulum</i>	Native	–	0-5
Vine/Liana					
summer grape	VIAE	<i>Vitis aestivalis</i>	Native	–	5-15
Virginia creeper	PAQU2	<i>Parthenocissus quinquefolia</i>	Native	–	5-15
saw greenbrier	SMBO2	<i>Smilax bona-nox</i>	Native	–	1-5
cat greenbrier	SMGL	<i>Smilax glauca</i>	Native	–	1-5
laurel greenbrier	SMLA	<i>Smilax laurifolia</i>	Native	–	1-5

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 13. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 14. Community 5.1 plant community composition

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

Turkey and quail will utilize the site to some degree, but in combination with other sites. The grass layer is well-suited to provide nesting habitat, and the presence of mature oaks will provide roosting areas. As long as the canopy is open, such as those found in the reference conditions, a diverse forb layer will create an abundance of insects. The insects provide high-quality protein in their diet, especially for newly hatched chicks. Deer will utilize the site as the community matures and browse the saplings and desired shrubs. As with most deer habitat, deer utilize a large array of ecological sites throughout their life. Well-managed browse, cover, and natural food sources provide the best habitat. Migratory song birds and woodpeckers use the site as well. Locations with fire and snags will typically have a higher diversity of birds. Fruits from the shrub species (American beautyberry and yaupon) are readily consumed by birds as well. Grazing animals primarily use grasses as their food source. While grasses can be in abundance on the Loamy Uplands, the sites will have to be specifically managed for grazing to produce enough biomass. Reduction of basal area, below 60 square feet per acre, will create more openings for light to penetrate to the ground layer, therefore allowing more biomass to be produced.

Hydrological functions

Due to the texture of the soils, the Loamy Uplands are typically well drained and have little runoff, therefore absorbing most of the rainfall. Hydrology is basically absent from these upland soils unless excessive amounts of precipitation occur.

Recreational uses

Much of this land is leased for deer hunting purposes.

Wood products

These deep soils are on uplands and have a high potential for woodland management, both pine and hardwood. The 50-year site index for loblolly pine averages 90 feet (60 feet on a 25-year curve), but ranges from 85 to 100 feet. The yield from an unmanaged, natural stand of loblolly pine, over a 50-year period, is approximately 330 board feet (Doyle Rule), 2.64 tons, or 129 cubic feet per acre per year. Management can substantially increase this yield. The only problem associated with these soils is the somewhat limited access and equipment operability during wet periods when rutting can be a moderate concern. Short-term restrictions may be necessary at these times and harvesting and other operations may need to be suspended during such periods when rutting can be severe. Site preparation operations should be limited to the dry months and planting should be planned for the drier part of the planting season. The use of herbicides for site preparation should take into consideration the slow drainage and high water table on these soils. Applications should not be made during wet periods.

Other products

Fruits, nuts, acorns, and seeds of the trees, shrubs, vines, and herbaceous plants are used for food, jellies, and jam.

Table 15. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
shortleaf pine	PIEC2	75	95	119	139	50	—	—	
loblolly pine	PITA	85	100	119	139	50	—	—	

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.

Type locality

Location 1: Shelby County, TX

Latitude	31° 45′13″
Longitude	-93° 58′24″
General legal description	Sabine National Forest

Other references

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Contributors

Tyson Hart

Approval

Bryan Christensen, 12/13/2023

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	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:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

14. Average percent litter cover (%) and depth (in):

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

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:

17. Perennial plant reproductive capability:
