Ecological site PX135B01Y015
Well Drained Flood Plain

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): 135B–Cretaceous Western Coastal Plain

Major Land Resource Area 135B, Cretaceous Western Coastal Plain, is in Arkansas and Oklahoma. This MLRA is about 3,970 square miles (10,290 square kilometers). This area is mostly in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain. It consists of nearly level to moderately sloping uplands, terraces, and flood plains. Valley floors, side slopes, and ridgetops are underlain by clay, marl, and chalk. These parent materials are highly erodible, causing gullies to form. Elevations generally range from 260 to 570 feet (80 to 170 meters), with lower and higher elevations found on valley floors and ridgetops. Cretaceous marine sediments underlie most of this MLRA. Geologic members of the Lower Cretaceous include a basal member of gravel and conglomerate rocks. Members of the Upper Cretaceous consist of clay marls, thin limestones, sandy marls, and fine grained sands. Other formations consist of crystalline limestone, chalk, and marly chalk, some of which contain fossils. The dominant soil orders in this MLRA are Inceptisols and Alfisols, with Entisols and Vertisols present to a lesser extent. The soils in the area have a thermic soil temperature regime, an ustic soil moisture regime, and smectitic or mixed mineralogy.

Ecological site concept

The Well Drained Flood Plain Ecological Site is on coastal plains along flood plains. This site has slopes between 0 and 3 percent and elevations ranging from 90 to 830 feet (27 to 250 meters). Soils are formed in alluvium, are deep to very deep, well drained, and have a moderately rapid permeability class. This site is characterized by a clay content of 18 to 35 percent in the particle size control section, evidence of redox reactions below 24 inches (60 cm). Flooding during the winter and spring seasons occur on an occasional to frequent basis (5 to 50 times in 100 years to more than 50 times in 100 years) with durations of very brief to brief (4 to 48 hours or 2 to 7 days).

Associated sites

PX135B01Y012	**Terrace** Found on coastal plains along terraces. This ecological site is differentiated from the Well Drained Floodplain Ecological Site by landscape position and no flooding events.

Similar sites

PX135B01Y014	**Poorly Drained Flood Plain** Found on coastal plains along flood plains. This ecological site is differentiated from the Well Drained Floodplain Ecological Site by a higher percentage of clay soil throughout the particle size control section and increased flooding duration.

Table 1. Dominant plant species

Tree	(1) *Quercus* (2) *Liquidambar*

Shrub	(1) *Rhus* (2) *Cornus*
Herbaceous	(1) *Panicum virgatum* (2) *Tripsacum dactyloides*

Legacy ID

F135BY015AR

Physiographic features

This ecological site is found on coastal plains and occurs along flood plains. This site has slopes between 0 and 3 percent. Elevations range from 90 to 830 feet (27 to 250 meters). Runoff class varies from low to high, with no ponding.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Flood plain
Runoff class	Low to high
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	30 – 250 m
Slope	0 %
Water table depth	50 – 150 cm
Aspect	Aspect is not a significant factor

Climatic features

This ecological site is characterized by hot summers, cool winters, and mild spring and fall temperatures. Mean annual precipitation is 51 inches. The average frost-free period is 193 days, and the average freeze-free period is 217 days. The highest precipitation occurs in May (6.2 inches), and the lowest occurs in August (2.8 inches). Precipitation varies across the MLRA, with decreasing precipitation from east to west. The warmest month of the year is August (94°F average high), and the coolest is January (29°F average low).

Thunderstorms and heat waves are common and occur frequently during summer months. Catastrophic storm events such as tornados, ice-storms, floods, and hail-storms are also known to occasionally occur within this ecological site. According to the Oklahoma Water Resource Board, drought occurs on 5 to 10 year cycles. The EPA predicts that droughts will become more severe throughout Arkansas due to longer periods without rain and an increase in very hot days (EPA, 2016).

Data was provided by the Antlers, Hugo, Idabel, DeQueen, Nashville, and Arkadelphia climate stations. Site specific data should be

obtained by accessing the database provided by the National Centers for Environmental Information (https://www.ncdc.noaa.gov/cdo-web/search).

Table 3 Representative climatic features

Frost-free period (characteristic range)	190-200 days
Freeze-free period (characteristic range)	210-220 days
Precipitation total (characteristic range)	1,220-1,370 mm
Frost-free period (actual range)	180-200 days
Freeze-free period (actual range)	200-230 days
Precipitation total (actual range)	1,190-1,400 mm
Frost-free period (average)	190 days
Freeze-free period (average)	220 days
Precipitation total (average)	1,300 mm

- (1) ANTLERS [USC00340256], Antlers, OK
- (2) HUGO [USC00344384], Hugo, OK
- (3) IDABEL [USC00344451], Broken Bow, OK
- (4) DEQUEEN [USC00031948], De Queen, AR
- (5) NASHVILLE [USC00035112], Nashville, AR
- (6) ARKADELPHIA 2 N [USC00030220], Arkadelphia, AR

Influencing water features

This ecological site is influenced by occasional to frequent flooding (more than 5 to 50 times in 100 years to more than 50 times in 100 years) of various durations.

Wetland description

This ecological site is not significantly influenced by wetlands.

Soil features

The soils associated with this ecological site are formed in alluvium derived from loamy material. These soils are deep to very deep, somewhat poorly to well drained, and have a very slow to moderately rapid permeability class. A fine sandy loam surface texture is common. Important abiotic characteristics associated with this site are a clay content of 18 to 35 percent in the particle size control section and evidence of redox reactions below 24 inches (60 cm).

The soil series associated with this site are Ouachita and Rexor.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Fine sandy loam (2) Gravelly silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow to moderately rapid
Soil depth	150 – 200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	9.65 – 19.56 cm
Soil reaction (1:1 water) (Depth not specified)	4.5 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The Well Drained Flood Plain reference state consists of a bottomland hardwood forest that is periodically flooded throughout the year. The common trees species for this state are hickory, oak, hackberry, elm, and loblolly pine (Eldredge, 1937).

Flooding is a major ecosystem disturbance on this ecological site. Ecosystems are affected differently by flooding depending on the duration, time of year, and water stagnation. Species diversity has been shown to decrease with increased flooding duration. Nutrients and seeds are transported and distributed throughout the landscape during flooding events (Smith and Callahan, 1983). Flooding during the dormant season does not have negative effects on species diversity and growth (Bedinger, 1979).

Fire has some influence on this ecological site during dry years. High precipitation throughout the year will decrease fire behavior due to proximity with riparian areas. The historical average fire return interval was likely between 3 and 25 years (Guyette and Spetich, 2003; Hallgren, DeSantic, and Burton, 2012). These wildfires would occur naturally through lightning strikes, but the majority were probably

ignited by anthropogenic sources (DeSantis, Hallgren, and Stahle, 2010).

Climate related events, such as hail-storms, tornados, thunderstorms, and extreme precipitation, occur on these sites. Hail-storms can reduce canopy size, increase litter deposition, and increase tree bark removal. When paired with other disturbances, such as fire, the effects on tree species were much greater than in areas not affected by hail-storms (Gower et al., 2015). Tornados have been shown to change plant community compositions in savanna ecosystems, favoring hardwoods and eliminating softwoods (Liu et al., 1997). Thunderstorms greatly effect ecosystem dynamics. Thunderstorms generally occur during summer months but can occur during every season. If a fire is started by a lightning strike, there will be different effects in the ecosystem depending on the season (Hiers, Wyatt, and Mitchell, 2000).

Grazing and farming can occur on this ecological site. Changes to the ecological dynamics are proportional to the intensity of livestock grazing and can be accelerated by overgrazing (Angerer, Fox, and Wolfe, 2013; Kohl, 2016). For example, desirable grasses and forbs are repeatedly grazed by livestock, weakening, and potentially killing or replacing these species with less desirable species (Smith, 1940).

A state and transition model has been created to explain this Ecological Site. However, sparse data availability only allowed basic principles to be explored and a small number of species to be recorded. More data will be collected to provide a greater understanding of the ecological dynamics, as well as the resources consumption and distribution.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Animal community

Major wildlife species include whitetail deer, coyote, armadillo, bobcat, beaver, raccoon, skunk, mink, cottontail rabbit, turkey, and mourning dove. Fish species include channel catfish, flathead catfish, white bass, largemouth bass, black bass, and bluegill.

Hydrological functions

The following are the estimated withdrawals of freshwater by use in this MLRA: Public supply—surface-water, 11.6%; ground-water, 6.6% Livestock—surface-water, 1.9%; ground-water, 2.4% Irrigation—surface-water, 0.0%; ground-water, 1.2% Other—surface-water, 70.3%; ground-water, 6.1% Total withdrawals average 82 million gallons per day (310 million liters per day). About 16 percent is from ground-water sources with the remaining 84 percent from surface-water sources. Precipitation and perennial streams are important sources of water in this area. Ponds provide water for livestock and are used locally for recreation. A few large reservoirs are available for recreational uses. Surface-water is used for industrial production and for cooling thermoelectric power plants, as well as by some communities for their public water supply. The principal sources of ground-water in this area are bedrock aquifers, including the Antlers aquifer in Oklahoma and the Nacatoch aquifer in Arkansas. The ground-water in this area is used primarily for public supply. Most rural landowners also rely on the bedrock aquifers for domestic water. The ground-water is soft to hard in Arkansas and very hard in Oklahoma.

Recreational uses

Mountain biking, camping, fishing, hiking, horseback riding, hunting, mineral prospecting, nature viewing, off-highway vehicle riding, and water activities can all be enjoyed throughout this MLRA on public land where permitted and on private land where allowed.

Wood products

Public and private timberland comprise large areas throughout this MLRA. Loblolly pine is the most popular species to harvest and produces products such as lumber, pulpwood, posts, and poles. Hardwood species are also harvested and used to produce lumber, flooring, and pulpwood.

Other products

Poultry production is a major industry throughout the MLRA. Small grains, soybeans, and hay are major crops. Sand, gravel, clay, bauxite, gypsum, and petroleum are found in industrially significant quantities.

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NatureServe

Oklahoma Water Resource Board
National Centers For Environmental Information
University of Arkansas
Oklahoma State University
Arkansas Department of Forestry
Oklahoma Department of Forestry

Contributors

Trevor Crandall, Ecological Site Specialist

Approval

Bryan Christensen, 9/22/2023

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Larry Gray Elizabeth Gray Erin Hourihan

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	09/25/2026
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):**

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

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

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

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

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

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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:**
