

# Ecological site NX118B01Y006

## Wet Flood Plain

Last updated: 9/22/2023

Accessed: 10/10/2026

### 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): 118B—Arkansas Valley and Ridges, Western Part

118B—Arkansas Valley and Ridges, Western Part Major Land Resource Area (MLRA) is entirely in Oklahoma and encompasses approximately 3,070 square miles (7,960 square kilometers). It contains the towns of Henryetta and McAlester, and the McAlester Army Ammunition Plant. Interstate 40 passes through the northern part of the area from east to west (USDA 2006). Most of this MLRA is in the Osage Plains Section of the Central Lowland Province of the Interior Plains with parts of the east side in the Arkansas Valley and Ouachita Mountains Sections of the Ouachita Province of the Interior Highlands. The topography is characterized by long, narrow sandstone-capped ridges that trend northeastward. The ridges are dissected by valleys incised by streams at right angles to the ridges. The valleys and scarp areas are cut into less resistant shale units. Elevation ranges from 550 feet (170 meters) to 1,500 feet (455 meters). The North and South Canadian Rivers flow from the western part of the MLRA and merge at Eufaula Lake on the east side. A narrow extension catches part of the Arkansas and Verdigris Rivers southeast of Tulsa. The Arkansas River is heavily regulated by locks, dams, and reservoirs. It allows Mississippi River barge traffic to reach land-locked Tulsa, to the northwest. MLRA 118B principally consists of hard and soft sandstone, shale, siltstone, limestone, and some conglomerates of the Cabaniss, Krebs, and Marmaton geologic groups. These are of Pennsylvanian age (formed approximately 300 million years ago) and may include economically viable coal deposits. The bedrock geology of the area is tilted 2 to 15 degrees from the horizontal and is gently folded in some places. Unconsolidated clay, silt, sand, and gravel are deposited in the river valleys.

### Classification relationships

This ecological site is found in Major Land Resource Area 118B - the Arkansas Valley and Ridges, Western Part. MLRA 118B is located within Land Resource Region N - the East and Central Farming and Forest Region (USDA 2006). In addition, MLRA118B falls within area #29 – Cross Timbers (USEPA 2013). The Poorly Drained Terrace ecological site occurs in United States Forest Service Ecoregions - 255A - Prairie Parkland (Subtropical) Province (Bailey 1995) and 29a – the Northern Cross Timbers section of EPA Ecoregion IV (Woods et. al. 1996). Crosstimbers Oak Forest and Woodland - CES202.608 (NatureServe 2017).

### Ecological site concept

The Wet Flood Plain ecological site is found on broad floodplains along rivers and streams. These sites have slopes between 0 and 1 percent. Elevations range from 500 to 1,000 feet. Runoff class varies from high to very high. Flooding occurs occasionally to frequently, with a very brief to brief duration. The soils associated with this ecological site are formed in alluvium from sedimentary rock. These soils are very deep, very poorly drained to poorly drained, and have a moderately slow to moderate permeability class. A fine silt loam surface texture is common. This site receives additional moisture from the surrounding landscape, occurs on flood plains, soils are characterized by seasonal water tables, and has greater than 18 percent clay by weight in the particle size control section.

### Associated sites

|              |                                                |
|--------------|------------------------------------------------|
| NX118B01Y007 | <b>Sandy Hillslope</b><br><br>Adjacent uplands |
|--------------|------------------------------------------------|

### Similar sites

|                    |                                                                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>R084AY095OK</b> | <b>Subirrigated Bottomland</b><br><br>Occurs in an adjacent major land resource area, but is very similar to the Poorly Drained Terrace. |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------|

**Table 1. Dominant plant species**

|            |                                                               |
|------------|---------------------------------------------------------------|
| Tree       | (1) <i>Ulmus</i><br>(2) <i>Salix</i>                          |
| Shrub      | Not specified                                                 |
| Herbaceous | (1) <i>Andropogon gerardii</i><br>(2) <i>Panicum virgatum</i> |

## Legacy ID

R118BY006OK

## Physiographic features

This ecological site is found on broad, nearly level to slightly concave, floodplains along rivers and streams.. These sites have slopes between 0 and 1 percent. Elevations range from 500 to 1,000 feet. Runoff class varies from high to very high. Flooding occurs occasionally to frequently, with a very brief to brief duration.

**Table 2. Representative physiographic features**

|                    |                                                   |
|--------------------|---------------------------------------------------|
| Landforms          | (1) Plains > Flood plain                          |
| Runoff class       | High to very high                                 |
| Flooding duration  | Very brief (4 to 48 hours) to brief (2 to 7 days) |
| Flooding frequency | Occasional to frequent                            |
| Elevation          | 150 – 310 m                                       |
| Slope              | 0 %                                               |
| Water table depth  | 20 – 90 cm                                        |
| Aspect             | Aspect is not a significant factor                |

## Climatic features

This ecological site is characterized by hot summers, cool winters, and mild spring/fall temperatures. Mean annual precipitation is 45 inches with an average frost free period of 194 days and an average freeze free period of 212 days. The highest precipitation occurs in May (6.3 inches), while the lowest occurs in January (2.2 inches). The warmest month of the year is August (94°F average high), while

the coolest is January (27°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 hailstorms are also known to occasionally occur within this ecological site. According to the Oklahoma Water Resource Board, drought occurs on 5 to 10 year intervals.

Data was provided by the McAlester, Centrahoma, Okmulgee, Lake Eufaula, Eufaula, Atoka, and Hanna 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)   | 180-200 days   |
| Freeze-free period (characteristic range)  | 200-230 days   |
| Precipitation total (characteristic range) | 1,120-1,190 mm |
| Frost-free period (actual range)           | 180-210 days   |
| Freeze-free period (actual range)          | 190-230 days   |
| Precipitation total (actual range)         | 1,070-1,190 mm |
| Frost-free period (average)                | 190 days       |
| Freeze-free period (average)               | 210 days       |
| Precipitation total (average)              | 1,140 mm       |

- (1) OKMULGEE WTR WKS [USC00346670], Okmulgee, OK
- (2) LAKE EUFAULA [USC00344975], Checotah, OK
- (3) EUFAULA 6 SSW [USC00342993], Canadian, OK
- (4) ATOKA [USC00340391], Atoka, OK
- (5) HANNA [USC00343884], Hanna, OK
- (6) MCALESTER RGNL AP [USW00093950], McAlester, OK
- (7) CENTRAHOMA 2 ESE [USC00341648], Centrahoma, OK

### Influencing water features

This site is subject to occasional or frequent flooding from adjacent streams or rivers during the winter and spring.

### Wetland description

This ecological site includes wetlands. Wetlands are areas that support plants which can grow in water saturated conditions (called hydrophytes), have a predominance of undrained (hydric) soils, and are periodically saturated or covered by shallow water at some time during the growing season (Cowardin 1979). These wetlands fall within the Palustrine system, which includes all nontidal wetlands dominated by trees, shrubs, and persistent emergent plants in freshwater environments. This ecological site is classified as a Palustrine broad-leaved deciduous seasonally saturated forested wetland (Cowardin 1979). An onsite investigation is recommended to determine the wetland conditions of a specific location.

## Soil features

The soils associated with this ecological site are formed in alluvium from sedimentary rock. These soils are very deep, very poorly drained to poorly drained, and have a moderately slow to moderate permeability class. A fine silt loam surface texture is common. A clay content between 22 and 28 percent is representative. The surface and subsurface fragment volume rarely has any large material present. Soil depth is generally 80 inches or deeper. A seasonal high watertable is present during winter and spring in normal years. Redox features are present throughout the soil profile.

The soil series associated with this site are the Boley, Convent, Cupco, Tallahassee, and Wynona.

Table 4. Representative soil features

|                                                          |                                       |
|----------------------------------------------------------|---------------------------------------|
| Parent material                                          | (1) Alluvium – sedimentary rock       |
| Surface texture                                          | (1) Silt loam                         |
| Drainage class                                           | Very poorly drained to poorly drained |
| Permeability class                                       | Moderately slow to moderate           |
| Soil depth                                               | 200 cm                                |
| Surface fragment cover <=3"                              | Not specified                         |
| Surface fragment cover >3"                               | Not specified                         |
| Available water capacity<br>(Depth not specified)        | 15.75 – 23.62 cm                      |
| Soil reaction (1:1 water)<br>(Depth not specified)       | 4.5 – 6.5                             |
| Subsurface fragment volume <=3"<br>(Depth not specified) | Not specified                         |
| Subsurface fragment volume >3"<br>(Depth not specified)  | Not specified                         |

## Ecological dynamics

The Wet Flood Plain ecological site consists of four identified states: Reference, Encroached, Pasture, and Eroded.

The reference state consists of a wet savanna, characterized by grasslands with trees and shrubs that floods during portions of the year. The common trees species for this state are cottonwood, soap berry, willow, American elm, sugar berry, hickory, and oak species. Dominate grasses consist of little bluestem, switchgrass, indiangrass, and big bluestem. More water tolerant grass, rush, sedge, forb,

shrub, and tree species may also be present depending on the duration of flooding events. (Landfire 2010; NatureServe 2009).

The encroached state consists of a many tree species, especially eastern redcedar, where there is significant canopy closure. Depending on how long this state has been present on the ecological site, the plant community will vary from oak, to hickory, to eastern redcedar. As the woody canopy increases and an encroached state occurs, the hydrology of the site is altered. The increased canopy intercepts most of the precipitation and changes hydrological patterns. Understory species will generally have less available water for growth and will have to compete with an extensive redcedar root system (Zou, 2018).

The pasture state will comprise species that are planted and grown for specific management goals, mainly livestock grazing. Common pasture species include buffalograss, western wheatgrass, little bluestem, sideoats grama, composite dropseed, silver beardgrass, winter bentgrass, purple lovegrass, kentucky bluegrass, tumblegrass, fall panicgrass, little barley, white sagebrush, slimflower scurfpea, and missouri goldenrod. Quality and quantity of forb, grass and legume species within this state will depend on the level of management inputs including seeding, weed management, and land uses. Species of both warm-season and cool-season grasses are feasible for these sites.

The eroded state consists of an area where the soil and plant communities are not stable due to wind and water erosion. In addition to destroying the original plant community, over plowing (degrading soil through cultivation) has resulted in major soil condition changes. Reductions in organic matter, mineral levels, soil structure, oxygen levels, water holding capacity, and populations of soil dwelling organisms are common on these sites. The extent of these changes depend upon duration of over plowing, as well as the species of crops grown and other management practices. Where vegetation is able to grow, this states plant community is predominately prairie threeawn interspersed in remnants of perennial grasses such as alkali sacaton, blue grama, sideoats grama and buffalograss. Numerous annuals are usually found on this state.

Fire has some influence on this ecological site. Depending on how much precipitation occurred during the year, fire would have minimal affects on this site due to their proximity with riparian areas (NatureServe). The historical average fire return interval was likely between 1 to 10 years (Halgren, 2011). These wildfires would occur naturally through lightning strikes, but the majority were probably ignited by anthropogenic sources (DeSantis, 2010). Native grass species evolved with and responded well to fires, gaining an advantage compared with other plant species (Engle, 2001).

Grazing was also important to these ecological sites. As the practices of fencing and livestock husbandry replaced herds of bison, elk, and deer, the ecological dynamics of this site were altered (Kohl, 2013). Changes were usually proportional to the season and intensity of livestock grazing behavior and were accelerated by a combination of drought and overgrazing (when the consumption of vegetation biomass by livestock and other grazers exceeds the vegetations ability to recover in a timely fashion, thus exposing the soil and reducing the vegetations productive capacity (Angerer, 2013)). For example, palatable grasses and forbs are repeatedly grazed by livestock, weakening and potentially killing or replacing these species with less desirable species (Smith, 1940).

A variety of climate related events can occur that affect these ecological states such as hail storms, tornados, thunder storms, and extreme precipitation. 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 the hail storm (Gower, 2015). Tornados have been shown to change plant community compositions in savanna ecosystems, favoring hardwoods and eliminating softwoods (Liu, 1997). Lightning storms greatly effect ecosystems and while they generally occur during summer months, they can occur during every season. If a fire is started by a lightning strike and allowed to burn there will be different effects in the ecosystem depending on the season (Hiers, 2000).

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 should be collected from this ecological site to provide a greater understanding of the ecological form and function, 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 (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 8. Community 2.1 plant community composition

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

Table 9. Community 2.2 plant community composition

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

Table 10. Community 3.1 plant community composition

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

Table 11. Community 3.2 plant community composition

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

Table 12. Community 3.3 plant community composition

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

Table 13. Community 4.1 plant community composition

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

Animal community

Common wildlife species include whitetail deer, black bear, turkey, quail, racoons, opossums, groundhogs, chipmunks, armadillos, roadrunners, and coyotes. Eagles, vultures, red-tailed hawks and a variety of songbirds are viewed periodically during seasonal migrations. Uncommon and threatened/endangered species include the rich mountain salamander, mountain redback salamander, red-cockaded woodpecker, and a variety of bat species. Feral hogs are present and can disrupt plant communities. Cattle are grazed throughout this ecological site. Cattle grazing can alter vegetative communities and disrupt nutrient distribution.

Hydrological functions

Hydrological function will be altered depending on the state of this ecological site. When trees are present, rain will make contact with trees before hitting the ground, slowing the momentum of raindrops. Evapotranspiration changes depending on the type of vegetation present. Overland and ground water flow patterns will also be altered depending on the ecological state.

Recreational uses

Hunting, hiking, camping, and wildlife viewing are the primary recreational uses of these sites.

Wood products

There are no significant wood products produced on this site.

Inventory data references

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

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## Approval

Bryan Christensen, 9/22/2023

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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                                        | 10/10/2026        |
| Approved by                                 |                   |
| Approval date                               |                   |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

### 1. Number and extent of rills:

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2. Presence of water flow patterns:

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3. Number and height of erosional pedestals or terracettes:

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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:

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