Ecological site NX118B01Y006
Wet Flood Plain

Last updated: 9/22/2023
Accessed: 05/14/2024

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	**Sandy Hillslope** Adjacent uplands

Similar sites

R084AY095OK	**Subirrigated Bottomland** Occurs in an adjacent major land resource area, but is very similar to the Poorly Drained Terrace.

Table 1. Dominant plant species

Tree	(1) *Ulmus* (2) *Salix*
Shrub	Not specified
Herbaceous	(1) *Andropogon gerardii* (2) *Panicum virgatum*

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	152–305 m
Slope	0–1%
Water table depth	15–89 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)	184-204 days
Freeze-free period (characteristic range)	202-227 days
Precipitation total (characteristic range)	1,118-1,194 mm
Frost-free period (actual range)	180-207 days
Freeze-free period (actual range)	194-228 days
Precipitation total (actual range)	1,067-1,194 mm
Frost-free period (average)	194 days
Freeze-free period (average)	212 days
Precipitation total (average)	1,143 mm

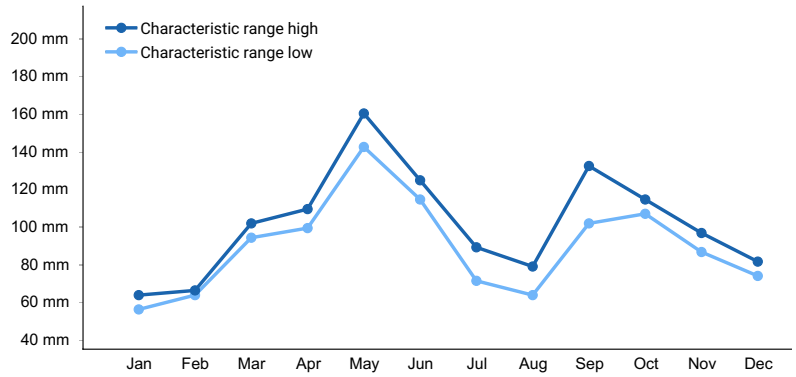


Figure 1. Monthly precipitation range

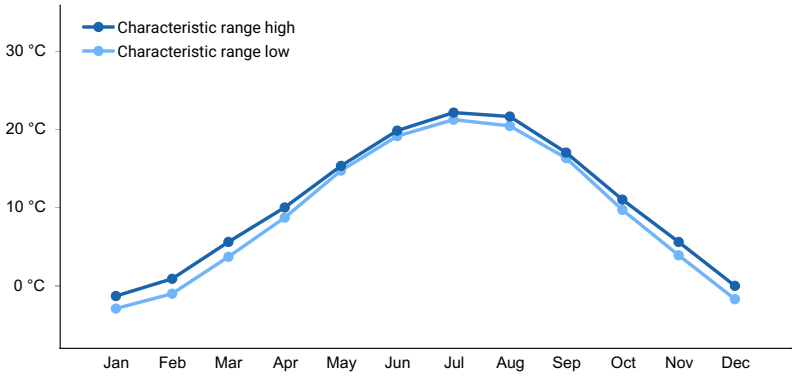


Figure 2. Monthly minimum temperature range

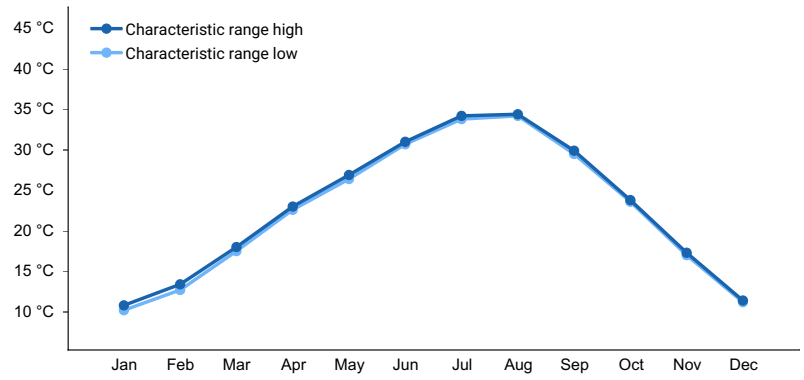


Figure 3. Monthly maximum temperature range

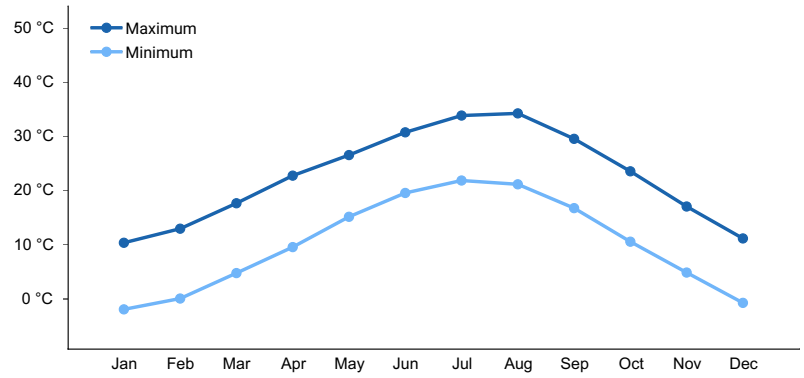


Figure 4. Monthly average minimum and maximum temperature

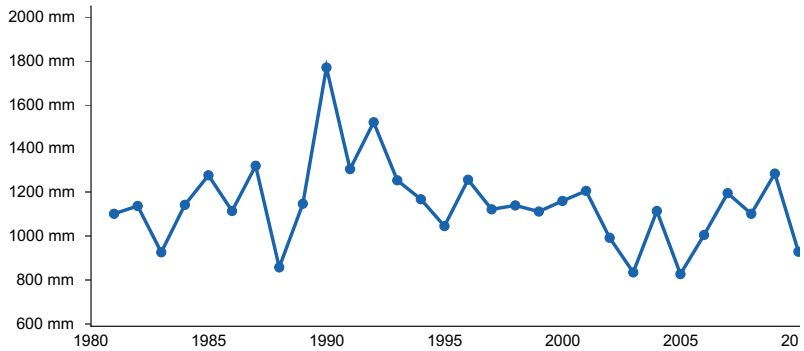


Figure 5. Annual precipitation pattern

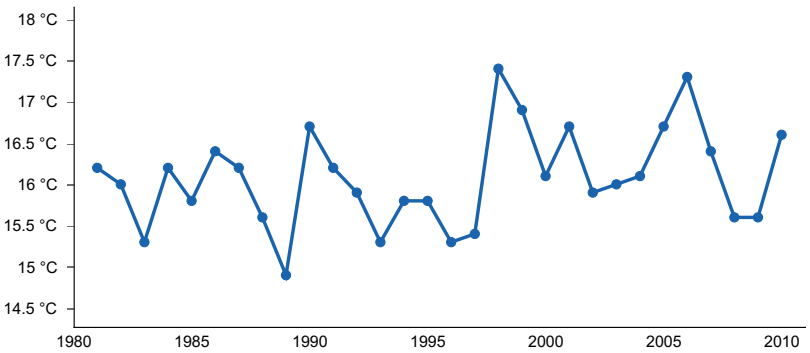


Figure 6. Annual average temperature pattern

Climate stations used

- (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, Tullahassee, 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	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	15.75–23.62 cm
Soil reaction (1:1 water) (Depth not specified)	4.5–6.5
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

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).

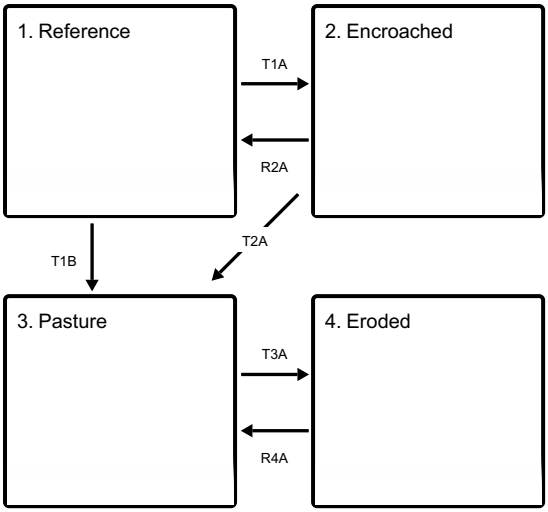
Grazing was also important to these ecological sites. As the practices of fencing and livestock husbandry replaced herds of bison, elk, and deer, the ecological dynamics of this site were altered (Kohl, 2013). Changes were usually proportional to the season and intensity of livestock grazing behavior 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

Ecosystem states



T1A - Fire suppression, overgrazing, increased precipitation, and shading.

T1B - Tree removal, brush management, forage seed establishment and management.

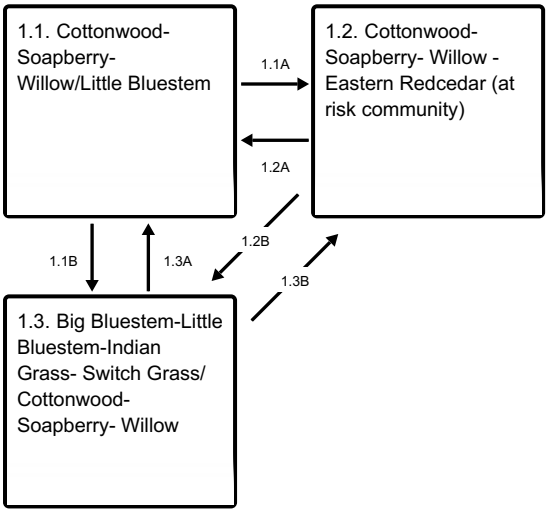
R2A - Tree thinning, brush management, prescribed fire, and grazing.

T2A - Woody species removal, prescribed fire, and grazing.

T3A - Abusive agricultural practices, drought

R4A - Establish ground cover

State 1 submodel, plant communities



1.1A - Fire suppression, overgrazing, drought.

1.1B - Excessive fire behavior, tree removal, drought.

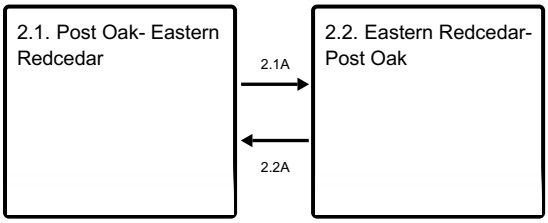
1.2A - Excessive fire behavior, tree removal, flooding.

1.2B - Excessive fire behavior, tree removal, drought.

1.3A - Fire suppression, flooding.

1.3B - Fire suppression, flooding.

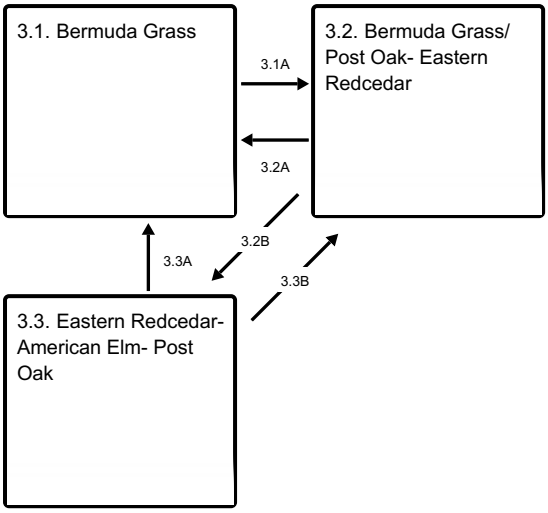
State 2 submodel, plant communities



2.1A - Fire suppression.

2.2A - Excessive fire, mechanical tree removal.

State 3 submodel, plant communities



3.1A - Fire Suppression

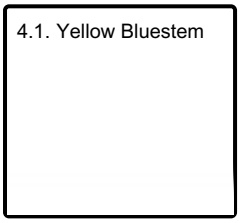
3.2A - Tree Removal, Brush Management

3.2B - Fire Suppression

3.3A - Tree Removal, Brush Management

3.3B - Tree Removal, Brush Management

State 4 submodel, plant communities



State 1
Reference

The reference state (wet savanna) consists of trees with minimal canopy cover, allowing sunlight to reach the ground vegetation. Wet savanna canopy cover ranges from 10-25%. Drivers- Fire intensity and frequency between 1 to 10 years (Hallgren et al.), climate (decadal scale), insect and disease presence or establishment (oak wilt, beetles), flooding events, and wildlife/livestock grazing or browsing. Feedbacks- Fire tolerant grasses dominate the ecological site, fire intervals suppress woody vegetation growth. Wildlife and livestock grazing/browsing decrease the amount of grass available, decreasing fire intensity and increasing woody vegetation growth. Disease and insect loads decrease the amount of tree species on the ecological site.

Characteristics and indicators. 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).

Dominant plant species

- elm (*Ulmus*), tree
- willow (*Salix*), tree
- cottonwood (*Populus*), tree
- soapberry (*Sapindus*), tree
- post oak (*Quercus stellata*), tree

- blackjack oak (*Quercus marilandica*), tree
- big bluestem (*Andropogon gerardii*), grass
- little bluestem (*Schizachyrium*), grass
- Indiangrass (*Sorghastrum*), grass
- switchgrass (*Panicum virgatum*), grass

Community 1.1
Cottonwood- Soapberry- Willow/Little Bluestem

This community phase is dominated by water tolerant tree species. Other common species included grasses such as little bluestem, hairy grama, dropseed, and purpletop. Forbs and legumes include sunflower, lespedezas, prairie clovers, Cuman or western ragweed, and sageworts.

Community 1.2
Cottonwood- Soapberry- Willow -Eastern Redcedar (at risk community)

This community phase has a moderately closed canopy with an understory of tallgrasses and midgrasses. The absence of fire has allowed water tolerant tree species and eastern redcedar densities to increase. The overstory tree canopy is around 25%. The competition from the increased canopy has led to a decrease in herbaceous understory plants.

Community 1.3
Big Bluestem-Little Bluestem-Indian Grass- Switch Grass/ Cottonwood- Soapberry- Willow

This community phase is dominated by grass and forb species, with the occasional tree.

Pathway 1.1A
Community 1.1 to 1.2

Canopy cover increases, decreasing the amount of sunlight available for ground cover vegetation. Decreasing amounts of ground cover vegetation can eventually lead to fires that are not intense enough to control woody vegetation. This community will generally occur when canopy cover is around 25%. A possible reasons for increased canopy cover is fire suppression (less fire=more woody vegetation growth).

Pathway 1.1B
Community 1.1 to 1.3

Canopy cover decreases, increasing the amount of sunlight that reaches the ground cover vegetation. Water and nutrient availability to ground cover vegetation will also increase when there is less competition from woody species. This community will generally occur when canopy cover is less than 10%. Possible reasons for decreased canopy cover are excessive fire behavior (higher intensity fire=more woody vegetation consumption), climatic shifts, and insect/disease outbreaks.

Pathway 1.2A
Community 1.2 to 1.1

Canopy cover decreases, increasing the amount of sunlight that reaches the ground cover vegetation. Water and nutrient availability to ground cover vegetation will also increase when there is less competition from woody species. This community will generally occur when canopy cover is between 10-25%. Possible reasons for decreased canopy cover are excessive fire behavior (higher intensity fire=more woody vegetation consumption), climatic shifts, and insect/disease outbreaks.

Conservation practices

Prescribed Burning
Prescribed Grazing

Pathway 1.2B
Community 1.2 to 1.3

Canopy cover decreases, increasing the amount of sunlight that reaches the ground cover vegetation. Water and nutrient availability to ground cover vegetation will also increase when there is less competition from woody species. This community will generally occur when canopy cover is less than 10%. Possible reasons for decreased canopy cover are excessive fire behavior (higher intensity fire=more woody vegetation consumption), climatic shifts, and insect/disease outbreaks.

Pathway 1.3A
Community 1.3 to 1.1

Canopy cover increases, decreasing the amount of sunlight that reaches the ground cover vegetation. A decrease in the ground cover vegetation can lead to fires that are not intense enough to control woody vegetation. This community will generally occur when canopy cover is between 10-25%. A possible reasons for increased canopy cover is fire suppression (less fire=more woody vegetation growth).

Pathway 1.3B
Community 1.3 to 1.2

Canopy cover increases, decreasing the amount of sunlight that reaches the ground cover vegetation. A decrease in the ground cover vegetation can lead to fires that are not intense enough to control woody vegetation. This community will generally occur when canopy cover is around 25%. A possible reasons for increased canopy cover is fire suppression (less fire=more woody vegetation growth).

State 2
Encroached

The encroached state is dominated by tree species. Canopy cover is greater than 25%. Driver- Absence of wildfire, seed dispersal by wildlife, climate (decadal scale), and canopy density. Feedbacks- Tree species dominate the ecological site, causing shading of grass species and shorter woody species. Less ground cover will decrease fire risk. Nutrient and water cycling will be controlled by tree species.

Characteristics and indicators. The encroached state consists of 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 to favor tree species over grass species. Understory species will generally have less available water for growth and will have to compete with an extensive redcedar root system (Zou, 2018).

Dominant plant species

- oak (*Quercus*), tree
- eastern redcedar (*Juniperus virginiana*), tree

Community 2.1
Post Oak- Eastern Redcedar

This plant community consists mainly of oak species with hickory and eastern red cedar present.

Community 2.2
Eastern Redcedar- Post Oak

This plant community consists mainly of eastern redcedar. Oak trees and hickory trees can be found in this plant community, however, ecosystem dynamics are dominated by eastern redcedar.

Pathway 2.1A
Community 2.1 to 2.2

Canopy cover increases, decreasing the amount of sunlight that reaches the ground and understory vegetation. A decrease in the ground vegetation can lead to fires that are not intense enough to control woody vegetation. This community will generally occur when canopy cover is greater than 75%. Possible reasons for increased canopy cover are fire suppressions (less fire=more woody vegetation growth).

Pathway 2.2A
Community 2.2 to 2.1

Canopy cover decreases, increasing the amount of sunlight that reaches the ground and understory vegetation. An increase in the ground vegetation can lead to fires that are able to control woody vegetation. This community will generally occur when canopy cover is greater between 25-50%. Possible reasons for decreased canopy cover are excessive fire (more fire= less woody vegetation) and mechanical tree removal.

State 3
Pasture

The pasture state consists of introduced grass species that are planted to maximize livestock forage production. Drivers- Mechanical soil disturbance and seed planting, climate (decadal scale), seed dispersal, and wildlife/livestock grazing or browsing. Feedbacks- Land managers use mechanical or chemical equipment to manipulate the ecological site. Wildlife and livestock grazing/browsing decrease the amount of available forage. Inputs of fertilizer and brush management are required to maintain high productivity across this ecological state.

Characteristics and indicators. 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.

Dominant plant species

- Bermudagrass (*Cynodon*), grass
- sideoats grama (*Bouteloua curtipendula*), grass

Community 3.1
Bermuda Grass

Grass and forb species have been planted to maximize production for grazing livestock.

Community 3.2
Bermuda Grass/ Post Oak- Eastern Redcedar

Grass and forb species have been planted to maximize production for grazing livestock. Tree species are encroaching.

Community 3.3
Eastern Redcedar- American Elm- Post Oak

Grass and forb species have been planted to maximize production for grazing livestock. Tree species have encroached this site and cover significant amounts of grazing land.

Pathway 3.1A
Community 3.1 to 3.2

Fire Suppression

Pathway 3.2A
Community 3.2 to 3.1

Tree Removal, Brush Management

Pathway 3.2B
Community 3.2 to 3.3

Fire Suppression

Pathway 3.3A
Community 3.3 to 3.1

Tree Removal, Brush Management

Pathway 3.3B
Community 3.3 to 3.2

Tree Removal, Brush Management

State 4
Eroded

The eroded state consists of an area where the soil and plant communities are not stable due to wind and water erosion. Drivers- Loss of soil and site stability, active soil erosion, climate (decadal scale), and wildlife/livestock grazing or browsing. Feedbacks- Reduced basal cover and increased bare ground resulting in increased overland flow leading to rills and gullies.

Characteristics and indicators. 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 in this state. 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.

Dominant plant species

- prairie threeawn (*Aristida oligantha*), grass
- fall panicgrass (*Panicum dichotomiflorum*), grass

Community 4.1
Yellow Bluestem

Significant amounts of bare ground are present with grasses and forbs that establish quickly in poor soil conditions.

Transition T1A
State 1 to 2

Trigger- Fire suppression, 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)), shading, and increased woody species seedling success. Slow Variables: Increasing amounts of shade (reducing ground cover species), decreasing amounts of native grass species (both annual and perennial) changing nutrient cycles from grass dominated to leaf dominated, and increased woody vegetation changes hydrology and precipitation through percolation and transpiration. Thresholds: Canopy cover

becoming greater than 25%.

Transition T1B
State 1 to 3

Trigger- Mechanical tree removal, mechanical and chemical woody vegetation suppression (removing brush by use of mechanical cutter, chopper, or other equipment followed by an application of chemicals in order to reduce fuel loading and improve ecological site condition, (NRCS 314)), introducing annual/ perennial grass and forb species, prescribed fire (applying controlled fire to a predetermined area of land, (NRCS 338)), and prescribed grazing (managing the harvest of vegetation with grazing and-or browsing animals, (NRCS 528)). Slow Variables: Increased production and management of introduced species. Thresholds: Native seed sources are removed and suppressed from the ecological site.

Conservation practices

Brush Management
Prescribed Burning
Land Clearing
Prescribed Grazing

Restoration pathway R2A
State 2 to 1

Trigger- Mechanical tree removal, mechanical and chemical woody vegetation suppression (removing brush by use of mechanical cutter, chopper, or other equipment followed by an application of chemicals to reduce fuel loading and improve ecological site condition, (NRCS 314)), and prescribed fire that will kill trees and suppress woody vegetative growth (applying controlled fire to a predetermined area of land, (NRCS 338)). Slow Variables: Removal of tree species decreases the amount of shade, allowing grass species to receive nutrients. Nutrient and water cycles shift from complete tree domination to a combination of tree and grass dominated. Thresholds: Canopy cover becomes less than 25%.

Conservation practices

Brush Management
Prescribed Burning

Transition T2A
State 2 to 3

Trigger- Mechanical tree removal, mechanical and chemical woody vegetation suppression (removing brush by use of mechanical cutter, chopper, or other equipment followed by an application of chemicals to reduce fuel loading and improve ecological site condition, (NRCS 314)), prescribed fire that will suppress woody vegetative growth (applying controlled fire to a predetermined area of land, (NRCS 338)), prescribed grazing (managing the harvest of vegetation with grazing and-or browsing animals, (NRCS 528)), and introduced species planting/establishment. Slow Variables: Removal of tree species decreases the amount of shade, allowing grass species to receive nutrients. Nutrient and water cycles shift from complete tree domination to a combination of tree and grass dominated. Introduced species are established. Thresholds: Introduced species become a significant environmental factor at the ecological site.

Conservation practices

Brush Management
Prescribed Burning
Land Clearing
Prescribed Grazing

Transition T3A
State 3 to 4

Trigger- Drought, over-plowing (degrading soil through cultivation), 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)). Slow Variables: Vegetation quantity and quality will decrease over time. Ground cover will decrease, increasing water and wind erosion. New vegetation will quickly be consumed by livestock/wildlife when it becomes available. Thresholds: Significantly reduced ground cover, increasing water and wind erosion. Feedbacks- Any vegetation that is grown will quickly be consumed by livestock, destabilizing the soil and continuing erosion.

Restoration pathway R4A
State 4 to 3

Stop practices that are causing harm such as 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)), over-plowing (degrading soil through cultivation), and other unsustainable agricultural practices. Establish ground cover, preferably using non-invasive species. Following ground cover establishment, plant species that will increase site stabilization. Manage for desirable site conditions.

Additional community tables

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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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	05/14/2024
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:**

_____

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:**

    ___