Ecological site NX118B01Y002
Clayey Upland

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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

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 #37 of EPA Ecoregion Level III - the Arkansas Valley, and area #29 – Northern Cross Timbers (USEPA 2013). The Clayey Upland ecological site occurs mostly in United States Forest Service Ecoregion -255A - Prairie Parkland (Subtropical) Province (Bailey 1995). This ecological site is found within 37e – the Lower Canadian Hills section of EPA Ecoregion IV (Woods et. al. 1996).

Southeastern Great Plains Tallgrass Prairie - CES205.685 (NatureServe 2017)

Ecological site concept

The Clayey Upland ecological site is found on hills and occurs along hill slopes. These sites have slopes between 3 and 14 percent. Elevations range from 500 to 1,200 feet. Soils associated with this site formed in residuum and colluvium derived from sandstone and shale. These soils are somewhat poorly drained to well drained, and have a slow to moderate permeability class. A silt loam surface texture is common, with modifiers such as gravelly, cobbly, or stony. Clay content ranging from 45 to 48 percent is representative. This site is characterized by not receiving additional moisture from surrounding landscapes, moderate to deep soils (greater than 20 inches to root restrictive layer), and a greater than 35 percent clay by weight in the particle size control section.

Associated sites

NX118B01Y004	**Rarely Flooded Terrace**

Similar sites

R112XY007KS	**Clay Upland (PE 35-42)**

Table 1. Dominant plant species

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

Legacy ID

R118BY002OK

Physiographic features

This ecological site is found on hills and occurs along hill slopes. These sites have slopes between 3 and 14 percent. Elevations range from 500 to 1,200 feet. Runoff class varies from high to very high, with no ponding or flooding. A perched water table may occur between 12 and 36 inches for short periods in the dormant season, between November and April.

Table 2. Representative physiographic features

Landforms	(1) Hills > Hillslope
Runoff class	High to very high
Elevation	500–1,200 ft

Slope	3–14%
Water table depth	12–36 in
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)	44-47 in
Frost-free period (actual range)	180-207 days
Freeze-free period (actual range)	194-228 days
Precipitation total (actual range)	42-47 in
Frost-free period (average)	194 days
Freeze-free period (average)	212 days
Precipitation total (average)	45 in

Climate stations used

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

Influencing water features

This ecological site is not significantly influenced by water features.

Wetland description

This ecological site is not significantly influenced by wetlands.

Soil features

The soils associated with this ecological site formed in residuum and colluvium derived from sandstone and shale. These soils are characterized by a root restrictive layer (either a horizon of clay accumulation or bedrock) within 50cm and greater than 35 percent clay by weight in the particle size control section. Soils are typically well drained.

Where this site is associated with soils characterized by water table (somewhat poorly or moderately well drained) the water table is present in the winter and early spring when native vegetation is not actively growing. The soil profile is characterized by less than 35 percent rock fragments by volume.

The soil series associated with this site are the Bengal, Burwell, Carnasaw, Counts, Dennis, Enders, Endsaw, Eram, Homa, Steedman, and Talihina.

Table 4. Representative soil features

Parent material	(1) Colluvium–sandstone and shale (2) Residuum–sandstone and shale
Surface texture	(1) Silt loam (2) Loam (3) Gravelly, cobbly, stony fine sandy loam (4) Clay loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to well drained
Permeability class	Slow to moderate
Depth to restrictive layer	20–60 in
Soil depth	20–80 in
Surface fragment cover <=3"	8–14%
Surface fragment cover >3"	0–4%
Available water capacity (Depth not specified)	4.1–8.8 in
Soil reaction (1:1 water) (Depth not specified)	5.1–6
Subsurface fragment volume <=3" (Depth not specified)	5–10%
Subsurface fragment volume >3" (Depth not specified)	0–4%

Ecological dynamics

The Clayey Upland reference state consists of a tall grass prairie, characterized by open grasslands with very few trees and shrubs. The vegetation that characterizes this state are generally tall grass species such as big bluestem, switchgrass, little bluestem, and indiangrass (Shiflet 1994). Forb species are also common, with species such as stiff goldenrod, dotted blazing star, white heath aster, roundhead lespedeza, and prairie violet occurring on this state. Scattered small stands of oak trees could also be present. (Landfire 2010; NatureServe 2009).

Fire has significant influence on this ecological site. The historical average fire return interval was likely between 1 to 10 years (Hallgren, 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). Drought occurs on 5 to 10 year intervals (Oklahoma Water Resource Board, 2011).

The Clayey Upland ecological site consists of four identified states: Reference, Encroached, Pasture, and Eroded.

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.

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.

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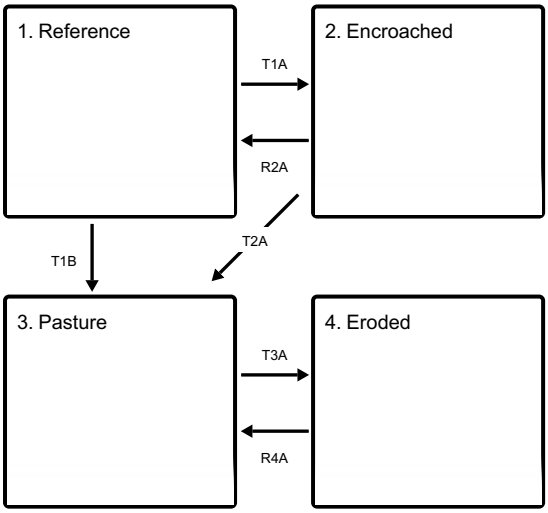
State and transition model

Ecosystem states



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

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

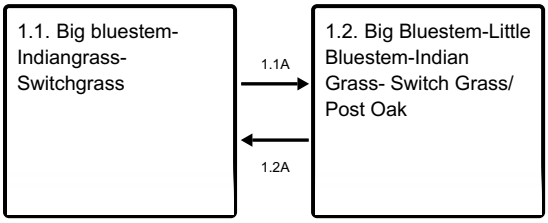
R2A - Tree thinning, brush management, prescribed fire, and grazing.

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

T3A - Abusive agricultural practices, drought

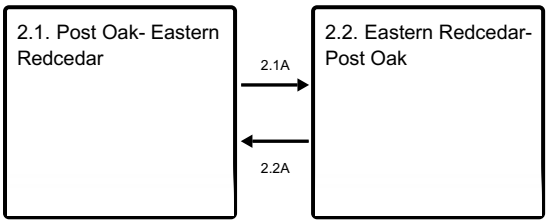
R4A - Establish ground cover

State 1 submodel, plant communities



1.2A - Excessive fire behavior, Insect Infestation

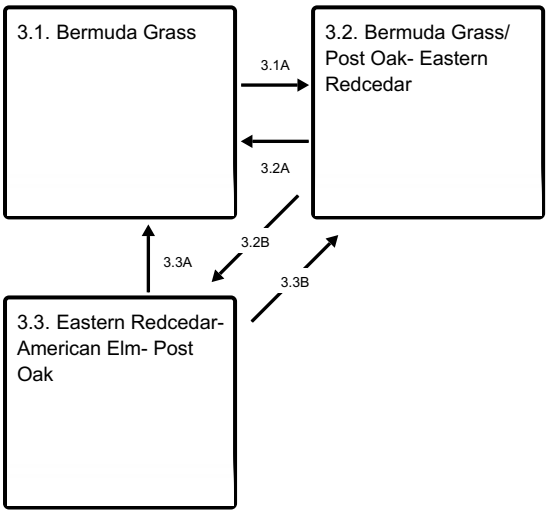
State 2 submodel, plant communities



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

4.1. Yellow Bluestem-Prairie Threeawn

State 1
Reference

The reference state (grassland) consists of tall grass and midgrass species. Drivers- Fire frequency between 1 to 10 years (Hallgren, 2011), climate (decadal scale), insect and disease presence or establishment (oak wilt, beetles), and wildlife grazing or browsing. Feedbacks- Fire tolerant grasses dominate the ecological site, fire intervals suppress woody vegetation growth. Wildlife 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 tall grass prairie, characterized by open grasslands with very few trees and shrubs. The vegetation that characterizes this state are generally tall grass species such as big bluestem, switchgrass, little bluestem, and indiangrass (Shiflet 1994). Forb species are also common, with species such as stiff goldenrod, dotted blazing star, white heath aster, roundhead lespedeza, and prairie violet occurring on this state. Scattered small stands of oak trees could also be present. (Landfire 2010; NatureServe 2009).

Dominant plant species

- big bluestem (*Andropogon gerardii*), grass
- little bluestem (*Schizachyrium*), grass
- Indiangrass (*Sorghastrum*), grass
- switchgrass (*Panicum virgatum*), grass

Community 1.1
Big bluestem- Indiangrass- Switchgrass

The community phase is dominated by tall grass species such as big bluestem, indiangrass, and switchgrass. Other common grasses include hairy grama, dropseed, and purpletop. Forbs and legumes include sunflower, lespedezas, prairie clovers, Cuman or western ragweed, and sageworts. Scattered stands of oak trees are also present.

Community 1.2
Big Bluestem-Little Bluestem-Indian Grass- Switch Grass/ Post Oak

This community phase is dominated by grass and forb species, with increasing canopy cover provided by tree species.

Pathway 1.1A
Community 1.1 to 1.2

Possible reasons for increased canopy cover are fire suppression (less fire=more woody vegetation growth), overgrazing (overgrazing grasses= less fuel for fires), and regeneration of woody species.

Pathway 1.2A
Community 1.2 to 1.1

Possible reasons for decreased canopy cover are excessive fire behavior (higher intensity fire=more woody vegetation consumption), climatic shifts, and insect/disease outbreaks. Periodic wildfire reduces size and number of trees and shrubs. This community phase pathway may follow years with above average herbaceous production, resulting in more fine fuels.

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 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).

Dominant plant species

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

Community 2.1
Post Oak- Eastern Redcedar

This community phase is characterized by overstory canopy cover ranging from 25 to 50 percent. Overstory consists mainly of oak species with hickory with eastern red cedar present.

Community 2.2
Eastern Redcedar- Post Oak

This community phase is characterized by an overstory canopy cover ranging from 50 to 75 percent. Overstory consists mainly of eastern redcedar. Oak and hickory trees may be present, however, ecosystem dynamics are dominated by eastern redcedar.

Pathway 2.1A
Community 2.1 to 2.2

Possible reasons for increased canopy cover are fire suppression (less fire=more woody vegetation growth) and woody plant 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. 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

Absence of fire and natural regeneration over time.

Pathway 3.2A
Community 3.2 to 3.1

Removal/reduction of trees and shrubs.

Pathway 3.2B
Community 3.2 to 3.3

Absence of fire and natural regeneration over time.

Pathway 3.3A
Community 3.3 to 3.1

Removal/reduction of trees and shrubs.

Pathway 3.3B
Community 3.3 to 3.2

Removal/reduction of trees and shrubs.

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 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.

Dominant plant species

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

Community 4.1
Yellow Bluestem-Prairie Threeawn

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 is eliminated.

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 description 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	10/12/2024
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):**

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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:**

---

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:**

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17. **Perennial plant reproductive capability:**