USDA Natural Resources Conservation Service

Ecological site NX118A01Y009
Sandy Bottomland

Last updated: 1/03/2019
Accessed: 05/12/2025

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): 118A–Arkansas Valley and Ridges, Eastern Part

118A—Arkansas Valley and Ridges, Eastern Part Major Land Resource Area (MLRA) is in Arkansas (75 percent) and Oklahoma (25 percent) encompassing an area of approximately 6,755 square miles (17,510 square kilometers). The towns of Poteau and Sallisaw, OK, and Booneville, Clarksville, Fort Smith, Greenwood, and Ozark, AR, are in the western part. The Arkansas towns of Conway, Morrilton, Russellville, and Searcy are in the eastern section along with a part of Little Rock in the southeast corner. Interstate 40 passes through from east to west and parallels the northern side of the Arkansas River. The Ozark National Forest and the northern fringe of the Ouachita National Forest occur in this area as does Ft. Chaffee, Camp Joseph T. Robinson, and Little Rock Air Force Base (USDA 2006).

Most of 118A is in the Arkansas Valley Section of the Ouachita Province of the Interior Highlands. Long, narrow ridges and high flat-topped mountains capped with sandstone trend northeastward. Crests are narrow and rolling on ridges and broad and flat on mountaintops. The intervening valleys are broad and smooth. Elevation ranges from 300 ft. (90 m) on the lowest valley floors to 2,750 ft. (840 m) on the mountaintops. The Arkansas River is a major inland navigational river. It flows from the northwestern part of the MLRA, at Robert S. Kerr Lake, in Oklahoma to Little Rock in the southeast.

The ridges and valleys of 118A are underlain by slightly folded to level beds of sandstone and shale, respectively. The area principally consists of the following geologic groups: Savanna, McAlester, Hartshorne sandstone, and the upper and lower Atoka. These are of Pennsylvanian age (formed approximately 300 million years ago). The terrace deposits along the Arkansas River include a complex sequence of unconsolidated gravel, sandy gravel, sands, silty sands, silts, clayey silts, and clays. At least three terrace levels are recognized. The lowest is the youngest.

Classification relationships

This ecological site is found in Major Land Resource Area 118A - the Arkansas Valley and Ridges, Eastern Part. MLRA 118A is located within Land Resource Region N - the East and Central Farming and Forest Region (USDA 2006). In addition, MLRA118A falls within area #37 of EPA Ecoregion Level III - the Arkansas Valley (USEPA 2013). The Sandy Bottomland ecological site occurs in United States Forest Service Ecoregions -255A – the Prairie Parkland (Subtropical) Province, and in M222A – the Ozark Broadleaf Forest-Meadow Province (Bailey 1995). This ecological site is found primarily in 37b - Arkansas River Floodplain of EPA Ecoregion IV (Woods et. al. 1996).

South-Central Interior Large Floodplain - CES202.705
(NatureServe 2017).

Ecological site concept

The Sandy Bottomland ecological site is of limited extent, and occurs on flood plains, stream terraces, and point bars along the Arkansas River floodplain within the Arkansas Valley and Ridges Major Land Resource Area. Floodplain forests and oak woodlands occupied much of this ecological site. Although vegetation was variable, typical species included Acer saccharinum (silver maple), *Platanus occidentalis* (American sycamore), *Liquidambar styraciflua* (sweetgum), and Quercus spp. (oaks). Typical understory grassland species included *Schizachyrium scoparium* (little bluestem). Close to 23 percent of this ecological site has been converted to pasture and hay land. At least 13 percent is used for row crops. This ecological is much drier and sandier than the Loamy Bottomland and the Calcareous Bottomland ecological sites. It is less naturally fertile than the Calcareous Bottomland.

Associated sites

NX118A01Y007	**Seasonally Wet Terraces and Footslopes**

Similar sites

F119XY013AR	**Loamy Floodplain**

Table 1. Dominant plant species

Tree	(1) *Quercus macrocarpa* (2) *Platanus occidentalis*
Shrub	Not specified
Herbaceous	Not specified

Legacy ID

F118AY009AR

Physiographic features

The Sandy Bottomland ecological site occurs on flood plains, stream terraces, and point bars within the Arkansas River floodplain. It is composed of sandy alluvium. Elevation ranges from 120 to 190 m (approximately 395 to 620 ft.) and slopes are 0 to 3 percent. Depth to the seasonal highwater table is usually below 145 cm (57 in.) In some areas, flooding frequency can be frequent – more than a 50 percent chance of flooding in any year, or 50 times in 100 years (USDA 2018).

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Point bar
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Very rare to frequent
Ponding frequency	None
Elevation	120–189 m
Slope	0–3%
Water table depth	145–152 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation for the Arkansas Ridges and Valley, Eastern Part varies from west to east. In the western one-third of this area, average annual precipitation is 41 to 45 inches (1,040 to 1,145 millimeters). It is 45 to

61 inches (1,145 to 1,550 millimeters) in the eastern two thirds of the area. Most of the rainfall occurs as frontal storms in spring and early summer. Some high-intensity, convective thunderstorms occur in summer. Precipitation occurs as rain and snow in January and February. The average seasonal snowfall is 5 inches (125 millimeters). The average annual temperature is 58 to 62 degrees F (14 to 17 degrees C). The freeze-free period averages 240 days and ranges from 220 to 260 days. It is shortest at the higher elevations on ridges. The moderate precipitation generally is adequate for crops and pasture. In the uplands, water for livestock is obtained from small ponds on individual farms. In the valleys, springs, small ponds, and perennial streams provide water for most uses (USDA 2006).

Data for mean annual precipitation, frost-free and freeze-free periods and monthly precipitation for this ecological site are shown below. The original data used in developing the tables was obtained from the USDA-NRCS National Water & Climate Center (2015) climate information database for 3 weather stations throughout MLRA 118A in proximity to this ecological site. All climate station monthly averages for maximum and minimum temperature and precipitation were then added together and averaged to make this table.

Table 3. Representative climatic features

Frost-free period (characteristic range)	190-202 days
Freeze-free period (characteristic range)	203-222 days
Precipitation total (characteristic range)	1,168 mm
Frost-free period (actual range)	189-207 days
Freeze-free period (actual range)	199-227 days
Precipitation total (actual range)	1,143-1,168 mm
Frost-free period (average)	197 days
Freeze-free period (average)	213 days
Precipitation total (average)	1,168 mm

Climate stations used

- (1) FT SMITH RGNL AP [USW00013964], Fort Smith, AR
- (2) WEBBERS FALLS 5 WSW [USC00349445], Webbers Falls, OK
- (3) EUFAULA 6 SSW [USC00342993], Canadian, OK

Influencing water features

This site is influenced by rare to frequent flooding during the year.

Soil features

The soil series associated with this site are: Kiomatia, Kenn, Crevasse, and Ceda. They formed in sandy alluvium from mixed sedimentary geologies. They are well to excessively drained with the seasonal highwater table usually occurring below 145 cm (57 in) depth from the soil surface. Permeability is moderately slow to rapid and the soil is slightly acidic to neutral with pH ranging from 6.10 to 7.3. Typically, there are no root restrictive layers within 203 cm (80 in). Surface textures are mostly loams and sandy loams. Subsoil textures are mostly sandy. Soils data was obtained from the Natural Resources and Conservation Service (NRCS) National Soils Information System database (USDA 2015).

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and shale (2) Alluvium–sandstone and siltstone
Surface texture	(1) Loamy fine sand (2) Cobbly fine sandy loam (3) Gravelly loam

Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Moderately slow to rapid
Soil depth	203 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	3–15%
Available water capacity (0-101.6cm)	5.08–10.92 cm
Calcium carbonate equivalent (0-101.6cm)	0–3%
Electrical conductivity (0-101.6cm)	0–1 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	2–34%
Subsurface fragment volume >3" (Depth not specified)	3–20%

Ecological dynamics

The information in this section including the State and Transition Model (STM) was developed from several sources, including NatureServe's Ecological Systems of the United States (NatureServe 2009), Landfire's Biophysical Settings and Existing Vegetation Type layers (Landfire 2010; Landfire 2013), the Official Soil Series Descriptions (Soil Survey Staff 2018), and ecological site descriptions from adjoining areas. The information presented is representative of very complex vegetation communities. Key indicator plants, animals and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The reference plant community is not necessarily the management goal. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

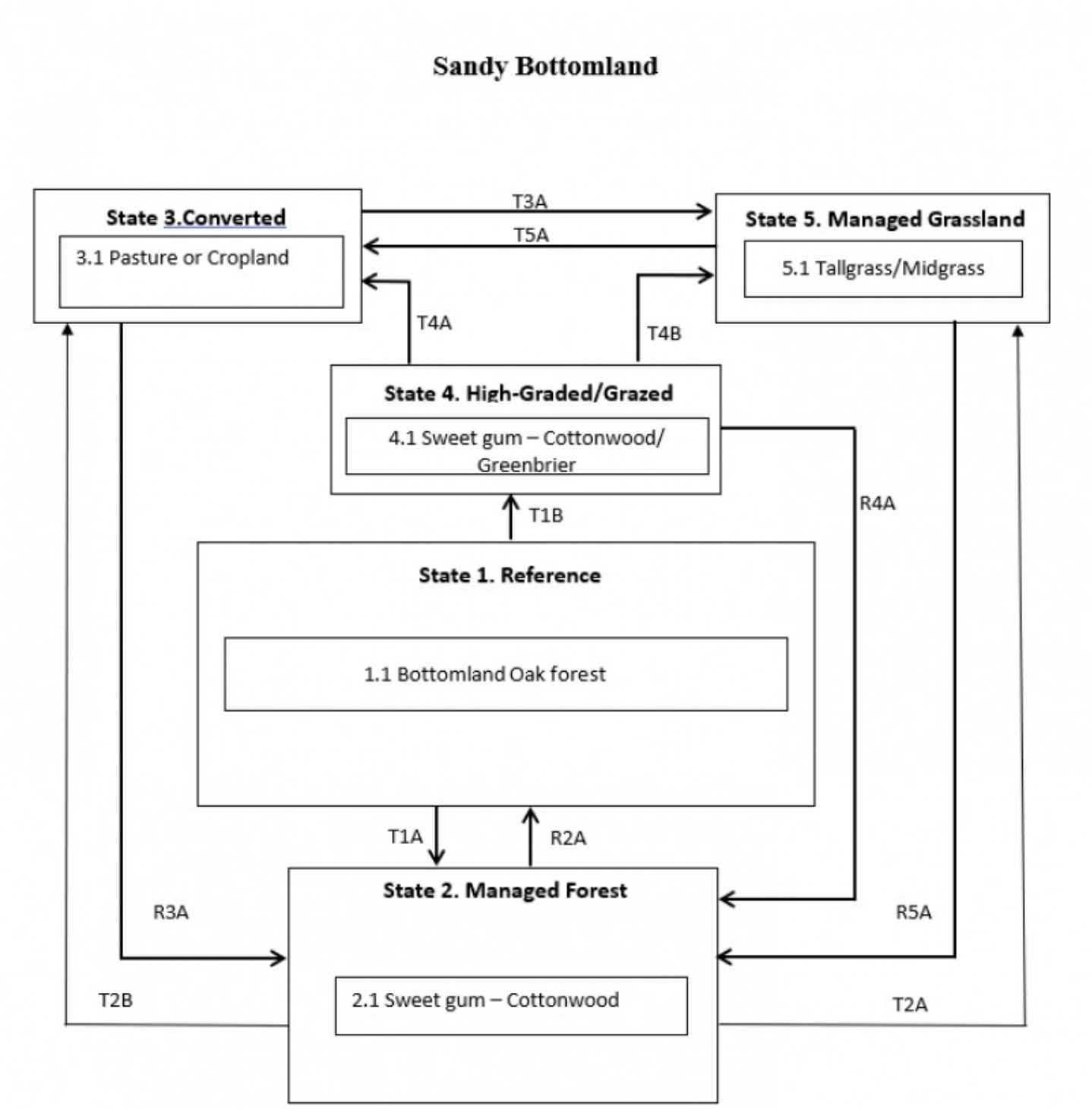
The Sandy Bottomlands of the Arkansas Valley and Ridges Eastern Part are on floodplains and stream terraces that may experience frequent flooding. The reference forest is part of the South-Central Interior Large Floodplain system as defined by NatureServe (NatureServe 2009) or southern floodplain forest (Woods et. al. 2004). Bottomland tree species including *Quercus macrocarpa* (bur oak), *Platanus occidentalis* (American sycamore), *Liquidambar styraciflua* (sweetgum), Salix spp. (willows), *Populus deltoides* (eastern cottonwood), *Fraxinus pennsylvanica* (green ash), *Carya illinoinensis* (pecan), *Celtis occidentalis* (hackberry), and Ulmus spp. (elm) were once extensive. Young stands of these species tend to stabilize the low floodplain and continue to accumulate loamy materials. Consequently, these developing ecological sites tend to be even aged. Young stands are often dense with a sparse understory and ground flora.

Over the long term, these floodplains may become elevated and/or isolated and begin to accumulate more fine sediments, becoming more stable and enduring. Quercus spp. (oaks), *Carya laciniosa* (shellbark hickory) and *Juglans nigra* (black walnut) begin to accumulate in these later stages of succession. Catastrophic floods will often partially or completely knock down the earlier species and regenerate this site creating a mosaic of early to late successional floodplain forests.

Approximately 23 percent of this site has been cleared for temperate pasture and hay land. Natural soil fertility is

low to moderate and the sandiness of the site makes it poorly suited for cropland, however, some areas are planted to row crops. Most areas remain in woodland. Historic rangeland classification is Sandy Bottomland (Brinlee, 1975). Uncontrolled grazing by domestic livestock in the remaining strips of forest is not uncommon and can cause significant damage, killing trees and removing the ground cover, resulting in de-stabilization and degradation of this ecological site. Carefully planned timber harvests can be tolerated in this system, but high grading of the timber will eventually degrade the ecological site.

State and transition model



Code	Event/Activity/Process
T1A	Timber management; harvesting
T1B	Poorly planned harvest (high-grading); uncontrolled grazing
T2A	Land clearing; brush management; range planting; prescribed fire; prescribed grazing
T2B	Land clearing; brush management; conservation tillage; conservation cropping system or pasture and hay planting
R3A, R5A	Tree/shrub establishment; critical area planting; long-term succession (+30-50 years); forest stand improvement; access control
T3A	Range planting; brush management; prescribed fire; prescribed grazing
T4A	Land clearing; brush management; conservation tillage; conservation cropping system or pasture and hay planting
T4B	Land clearing; brush management; range planting; prescribed fire; prescribed grazing
R4A	Forest stand improvement; herbaceous weed control; access control
T5A	Conservation tillage; brush management; conservation cropping system or pasture and hay planting;
R2A	Forest stand improvement; long term succession (+10-20 years); herbaceous weed control
The following conservation practices can be found in FOTG-Field Office Technical Guide, Section IV-Practice Standards and Specifications, USDA, Natural Resources Conservation Service, https://efotg.sc.egov.usda.gov/. Click on your county: Brush management - 314; Conservation tillage – reduced till – 345, no till – 329; Critical area planting – 342; Forest stand improvement – 666; Herbaceous weed control – 315; Land clearing – 460; Pasture and hay planting – 512; Prescribed burning – 338; Prescribed grazing - 528; Range Planting – 550; Tree/shrub establishment – 612;	

State 1
Reference

The historical reference state for this ecological site was presumed to be southern floodplain forest. Natural flooding cycles were the primary processes affecting this ecologic site.

Community 1.1
Bottomland Oak Forest

Bottomland tree species including *Quercus macrocarpa* (bur oak), *Platanus occidentalis* (American sycamore), *Liquidambar styraciflua* (sweetgum), Salix spp. (willows), *Populus deltoides* (eastern cottonwood), *Fraxinus pennsylvanica* (green ash), *Carya illinoinensis* (pecan), *Celtis occidentalis* (hackberry), and Ulmus spp. (elm) were once extensive. The understory was complex, with multiple layers of shade-tolerant species. A highly diverse ground flora was also present. Vines were common and went well into the canopy. Scattered open areas were common. A change to more frequent, higher-intensity floods on the modern landscape creates more frequent canopy gaps and introduces or helps to maintain more flood-tolerant species such as sycamore, eastern cottonwood, green ash or hackberry. Over the long term, these floodplains may become more elevated and/or isolated and accumulate more fine sediments, becoming more stable and enduring. Quercus spp. (oaks), *Carya laciniosa* (shellbark hickory) and *Juglans nigra* (black walnut) begin to accumulate in these later stages of succession. Catastrophic floods will often partially or completely knock down the early species and regenerate this site creating a mosaic of early to late successional floodplain forests.

State 2
Managed Forest

Community 2.1
Sweetgum-Cottonwood Floodplain Forest

Where this state remains, it has often been subjected to very selective timber harvests. While these forested areas may resemble the reference state, the diversity of tree species has been selectively (removal of oak and walnut) altered. *Platanus occidentalis* (American sycamore), *Liquidambar styraciflua* (sweetgum), Salix spp. (willows), *Populus deltoides* (eastern cottonwood), *Fraxinus pennsylvanica* (green ash) may be the dominant tree species.

State 3
Converted

This state is the result of a change in land use. Native vegetation has been tilled and crops or introduced perennial vegetation has been planted.

Community 3.1
Pasture or Cropland

Although the inherent soil fertility of this site is low to medium, approximately 23% has been converted to cool season pasture and hayland. Species include: *Cynodon dactylon* (Bermuda grass), *Schedonorus arundinaceus* (tall fescue) and *Trifolium pratense* (red clover). A very small area is cropland. Crops include: small grains, cotton, soybeans, wheat, and alfalfa.

State 4
High-Graded/Grazed Forest or Woodland

Community 4.1
Sweetgum – Cottonwood/Greenbrier

This state is subjected to uncontrolled grazing and high-graded timber harvests. The grazing will open up the understory and remove much of the diverse ground flora and allow proliferation of aggressive species like Smilax spp. (greenbrier). This can lead to erosion of the topsoil during floods. Grazed units also often undergo timber harvest removing a wide variety of outstanding hardwood trees, further diminishing the structural and compositional diversity.

State 5
Managed Grassland

Conversion to native warm season grasses and forbs has increased in recent years due federal and state cost-share programs and has created a third community phase. On many sites the simple activity of removing most if not all of the canopy will allow existing native grasses and forbs to increase in abundance and create a natural native ground cover.

Community 5.1
Tallgrass/Midgrass

This plant community results following brush control. The vegetation is predominately tallgrasses and midgrasses including big bluestem, *Schizachyrium scoparium* (little bluestem), *Sorghastrum nutans* (Indiangrass), *Panicum virgatum* (switchgrass), and *Panicum anceps* (beaked panicum or panicgrass). Legumes such as slender *Lespedeza virginica* (slender lespedeza), *Lespedeza capitata* (roundhead lespedeza), *Desmodium illinoense* (Illinois tickclover or ticktrefoil) and *Chamaecrista fasciculata* (showy partridge pea) may be abundant on the site depending on which herbicides were used. Woody species continue to reoccur through sprouting or from seedlings. Continual follow-up treatment with annual fire and/or herbicides is necessary to maintain this plant community. Fire can promote hardwood sprouting, but woody production declines as fire frequency increases. Grass production remains highest on annually burned sites (Masters et. al., 2006) which is good for grazing cattle. However, chemical treatment with herbicide may negatively impact some plant species needed for wildlife habitat.

Transition T1A
State 1 to 2

Timber management; harvesting.

Transition T1B
State 1 to 4

Poorly planned harvest (high-grading); uncontrolled grazing

Restoration pathway R2A
State 2 to 1

Eliminating harvests, implementing selective thinning, and allowing long term succession may allow a return to the reference state.

Conservation practices

Forest Stand Improvement
Herbaceous Weed Control

Transition T2B
State 2 to 3

Land clearing; brush management; conservation tillage; conservation cropping system or pasture and hay planting.

Conservation practices

Brush Management
Land Clearing
Forage and Biomass Planting
Residue and Tillage Management, No-Till/Strip Till/Direct Seed

Transition T2A
State 2 to 5

Land clearing, brush management, prescribed fire, and prescribed grazing.

Conservation practices

Brush Management
Prescribed Burning
Land Clearing
Range Planting
Prescribed Grazing

Restoration pathway R3A
State 3 to 2

Transitioning to a Managed Forest state is possible through long-term commitments of time and money. Management would include the following practices: tree/shrub establishment; critical area planting; long-term succession (+30-50 years); forest stand improvement; access control.

Conservation practices

Critical Area Planting
Access Control
Tree/Shrub Establishment
Forest Stand Improvement

Transition T3A
State 3 to 5

Range planting; brush management; prescribed fire; prescribed grazing

Conservation practices

Brush Management
Prescribed Burning
Range Planting
Prescribed Grazing

Restoration pathway R4A
State 4 to 2

A return to the near-reference or managed forest state will require a long-term commitment including the elimination of grazing, planting of trees and perhaps shrub and herbaceous species, and very limited targeted timber harvests and thinning.

Conservation practices

Access Control
Forest Stand Improvement
Herbaceous Weed Control

Transition T4A
State 4 to 3

This conversion takes place with land clearing, conservation tillage and then planting of non-native pasture grass mixes. Maintenance is required with brush management to prevent trees and shrubs from establishing.

Conservation practices

Brush Management
Land Clearing
Forage and Biomass Planting
Residue and Tillage Management, No-Till/Strip Till/Direct Seed

Transition T4B
State 4 to 5

Land clearing; brush management; range planting; prescribed fire; prescribed grazing

Conservation practices

Brush Management
Prescribed Burning

Land Clearing
Range Planting
Prescribed Grazing

Restoration pathway R5A
State 5 to 2

Transitioning to a Managed Forest state is possible through long-term commitments of time and money. Management would include the following practices: tree/shrub establishment; critical area planting; long-term succession (+30-50 years); forest stand improvement; access control.

Conservation practices

Critical Area Planting
Access Control
Tree/Shrub Establishment
Forest Stand Improvement

Transition T5A
State 5 to 3

Conservation tillage; brush management; conservation cropping system or pasture and hay planting.

Conservation practices

Brush Management
Forage and Biomass Planting
Residue and Tillage Management, No-Till/Strip Till/Direct Seed

Additional community tables

Animal community

Ecological Site Interpretations:

Animal Community:
The plant community on this site is suitable for grazing by all classes of livestock and is also well suited for wild turkey and white-tailed deer. The low water holding capacity and rapid percolation rates of this site tend to make it droughty during mid to late summer and early fall, especially during dry years. During these dry periods the native grass and forb vegetation, and occasionally the trees and shrubs, will becom semi-dormant to dormant. The plant communities on this site tend to be relatively fragile and will rapid degrade with overuse. Herbaceous forage will be deficient in protein in the winter. Development and/or supply of livestock water will probably be limited to streams associated with the site or to above ground tanks with water supplied by pipeline from wells, streams and other sources.

This site is associated with the Arkansas, North Canadian and South Canadian Rivers. It is home to a variety of small herbivores, birds and their associated predators. This site is also a foraging area for white-tailed deer. Bald eagles will use some of these sites as feeding areas and could possibly roost in dead trees on the site, especially near Lake Eufaula. Piping plover and interior least tern are other bird species on the threatened or endangered species list that can be associated with this site, especially since many of these areas border sandbars along the Arkansas, North Canadian and South Canadian Rivers.

Hydrological functions

Hydrology Functions:

This site occurs primarily on eastern to southeastern aspects along the North Canadian, South Canadian and Arkansas Rivers. Management of this site is highly important to the health of the associated streams as well as the productivity and maintenance of the site. Riparian areas along this site are of particular importance in that they help prevent streambank erosion. If streambank erosion occurs on this site, it often rapidly accelerates, and frequently endangers the site. Therefore, if the site is properly managed and protected, sediment load in the stream can be reduced and will result in better water quality and improved fishery.

The soils on this site are primarily in hydrologic group A.

Runoff curve numbers should be identified by field investigations using hydrologic cover conditions and hydrologic soil groups. Deteriorated sites are characterized by excessive runoff. The conservationist should refer to Section 4 of the National Engineering Handbook and Chapter 2 of the National Engineering Field Handbook, for more information on runoff curves.

Recreational uses

Recreational Uses:

These areas are frequently used as recreational hunting areas, especially for species such as white-tailed deer and wild turkey.

Wood products

Wood Products:

There are no significant wood products produced on this site

Other products

Other Products:

This site can and does contain archeological Native American sites. Due to this fact, a site assessment should be made for any planned practice or activity that would disturb the soil surface on this site.

Other references

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Contributors

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Approval

Nels Barrett, 1/03/2019

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Doug Wallace and Fred Young at Missouri NRCS State office, personal communication and sharing of state and transition models.

Future Ecological Site Development and Testing Plan

Future work to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final correlated document.

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

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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

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

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

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

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

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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:**
