USDA Natural Resources
Conservation Service

Ecological site R079XY180KS
Shallow Red Plains

Last updated: 9/21/2018
Accessed: 05/19/2024

General information

Approved. An approved ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model, enough information to identify the ecological site, and full documentation for all ecosystem states contained in the state and transition model.

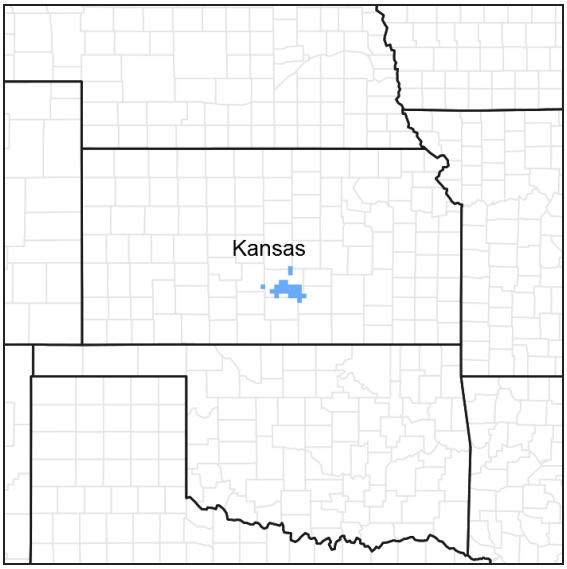


Figure 1. Mapped extent

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): 079X–Great Bend Sand Plains

MLRA 79 is located entirely in Kansas. It makes up about 7,405 square miles (19,185 square kilometers). Great Bend, Hutchinson, and Wichita are in this MLRA. U.S. Highways 50, 54, and 56 cross the area. The western part of McConnell Air Force Base and the Quivira National Wildlife Refuge are in this area.

Following are the various kinds of land use in this MLRA: Cropland-private, 67%; Grassland-private, 23%; Federal, 1%; Forest-private, 1%; Urban development-private, 5%; Water-private, 1%; Other-private, 2%.

Nearly all of this area is in farms or ranches. Most of the area is used as cropland. Cash-grain farming is the principal enterprise. Hard winter wheat is the major crop, but grain sorghum and alfalfa also are grown. The grassland in the area consists of sandy soils and steeply sloping areas. It supports native grasses grazed by beef cattle.

The major soil resource concerns are the hazards of wind and water erosion, maintenance of the content of organic matter in the soils, and soil moisture management. The major management concerns on grassland are plant health and vigor, and control of noxious and invasive weeds.

Conservation practices on cropland generally include high residue crops in the cropping system; systems of crop residue management, such as no-till and strip-till systems; conservation crop rotations; wind stripcropping; and nutrient and pest management. Conservation practices on rangeland generally include brush management, prescribed burning, control of noxious weeds, pest management, watering facilities, and proper grazing use.

Classification relationships

Major land resource area (MLRA): 079-Great Bend Sand Plains

Ecological site concept

The Shallow Red Plains (079XY180) ecological site was formerly named Shallow Prairie (R080AY029KS). This site occurs on nearly level to very gently sloping soils on pediments in river valleys of the Great Bend Sand Plains of MLRA 79. The Shallow Red Plains ecological site is characteristic of shallow soils ((less than 20 inches)that formed in residuum derived from Permian red shale. Soil surface textures range from silty clay loam to clay loam. The slopes range from 0 to 12 percent.

Associated sites

R079XY115KS	**Loamy Plains** This site sits adjacent to and in conjunction with the Sodic Plains ecological site. The Loamy Plains ecological site is made up of moderately deep to deep, moderately well to well drained upland soils. This site has a silty or loamy surface texture and is non-calcareous to the surface. Generally, the Loamy Plains ecological site is located on paleoterraces and/or uplands with a slope range of 0 to 12 percent.
R079XY107KS	**Clayey Plains** This site sites adjacent to and in conjunction with the Sodic Plains ecological site. The Clayey Plains ecological site is characterized by soils that are very deep, moderately well to well drained, and on paloeterraces in river valleys formed in alluvium. The slopes range from 0 to 6 percent. The surface texture is clay loam to silt loam with a clay increase of greater than 35 percent within 12 inches from the surface.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium* (2) *Bouteloua curtipendula*

Physiographic features

Most of MLRA 79 is located in the Plains Border Section of the Great Plains Province of the Interior Plains. The eastern third is in the Osage Plains Section of the Central Lowland Province of the Interior Plains. The undulating to rolling plains in this area generally have narrow valleys, but broad flood plains and terraces are along the Arkansas River and its larger tributaries. The elevation ranges from 1,650 to 2,600 feet (505 to 795 meters), increasing from east to west.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Middle Arkansas (1103), 82 percent, and Arkansas-Keystone (1106), 18 percent. The Arkansas River bisects the northern part of this MLRA, and the Ninnescah River crosses the southern part. In MLRA 79, Rattlesnake Creek flows north and the Little Arkansas River flows south into the Arkansas River.

The Shallow Red Plains ecological site consists of shallow, well drained soils that formed in residuum derived from Permian shale. This site occurs on nearly level to strongly sloping plains. Runoff is high to very high and permeability is very slow. The slopes range from 0 to 12 percent.

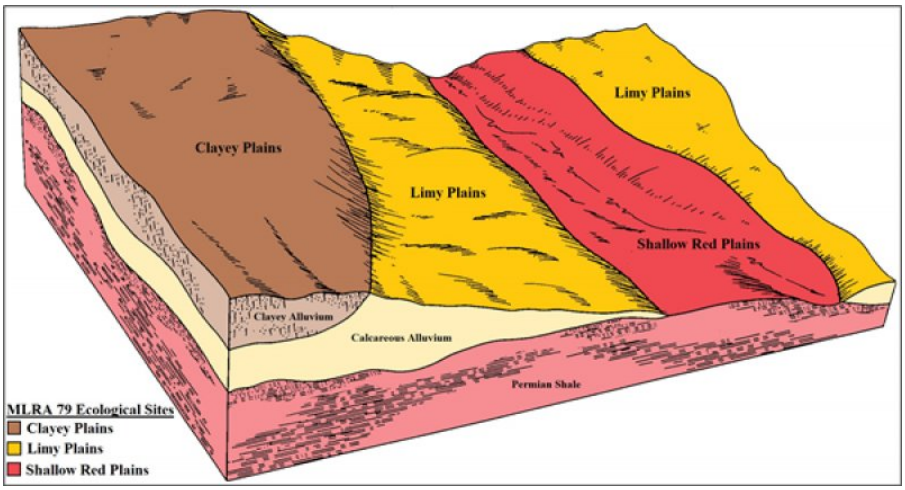


Figure 2.

Table 2. Representative physiographic features

Landforms	(1) River valley > Pediment
Runoff class	High to very high
Flooding frequency	None
Ponding frequency	None
Elevation	503–792 m
Slope	0–12%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation in MLRA 79 is 25 to 33 inches (635 to 840 millimeters). Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The maximum precipitation occurs from the middle of spring to early in autumn. The annual snowfall ranges from about 14 inches (35 centimeters) in the southern part of the area to 20 inches (50 centimeters) in the northern part. The average annual temperature is 55 to 57 degrees F (13 to 14 degrees C). The freeze-free period averages 197 days, increasing in length from northwest to southeast. Precipitation is usually evenly distributed throughout the year with the exception of November through February as the driest months and May and June as the wettest months. Summer precipitation occurs during intense summer thunderstorms. The following weather data originated from weather stations chosen across the geographical extent of the ecological site, and will likely vary from the data for the entire MLRA. The climate data derives from the Natural Resources Conservation Service (NRCS) National Water and Climate Center. The dataset is from 1981-2010.

Table 3. Representative climatic features

Frost-free period (characteristic range)	150-160 days
Freeze-free period (characteristic range)	189-195 days
Precipitation total (characteristic range)	787-813 mm
Frost-free period (actual range)	146-162 days
Freeze-free period (actual range)	187-197 days
Precipitation total (actual range)	787-838 mm
Frost-free period (average)	155 days
Freeze-free period (average)	192 days
Precipitation total (average)	813 mm

Climate stations used

- (1) HUTCHINSON 10 SW [USC00143930], Hutchinson, KS
- (2) KINGMAN [USC00144313], Kingman, KS
- (3) WICHITA [USW00003928], Wichita, KS

Influencing water features

These soils are well drained. Water permeability is very slow. Red Shale Plains soils are shallow to shale bedrock and therefore have a low water holding capacity. Consequently, water is not available in adequate amounts for plant growth during dry cycle stress periods and decreases total annual forage production during dry years.

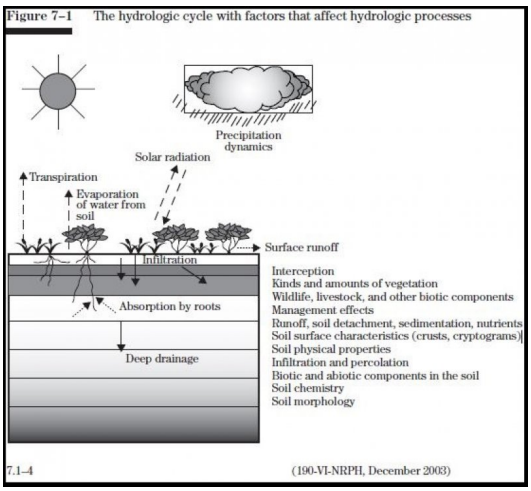


Figure 9.

Soil features

The Shallow Red Plains ecological site is characterized by the Jamash soil component. This soil is shallow, well drained, and located on pediment in river valleys formed in residuum. This site has a silty clay loam and clay loam surface textures. The only soil common to this site is Jamash.

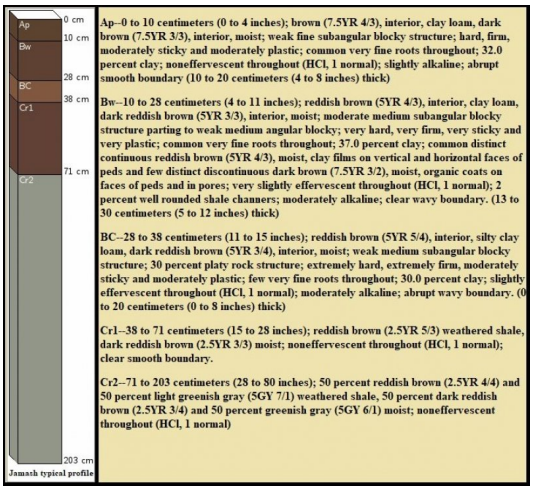


Figure 10.

Table 4. Representative soil features

Parent material	(1) Residuum–shale
Surface texture	(1) Silty clay loam (2) Clay loam

Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Very slow
Depth to restrictive layer	38–71 cm
Soil depth	0–51 cm
Available water capacity (4.6-7.1cm)	Not specified
Calcium carbonate equivalent (0-12.7cm)	Not specified
Clay content (88.9-114.3cm)	Not specified
Electrical conductivity (0-5.1cm)	Not specified
Soil reaction (1:1 water) (15.5-21.3cm)	Not specified
Subsurface fragment volume <=3" (0-86.4cm)	Not specified

Ecological dynamics

This is a dynamic plant community due to the complex interaction of many ecological processes. The vegetation evolved under a diverse and fluctuating climate on fragile soils, while grazed by herds of large herbivores and periodically subjected to intense wildfires.

The silty clay loam and clay loam surface soils over shale that are a characteristic of this site absorb water very slow. Water-holding capacities are moderate to high, even though soil moisture tends to percolate slowly through the profile. The taller grasses that evolved and dominated the original plant community have root systems capable of utilizing moisture throughout most of the profile.

Concentration of grass roots in the surface soil permits good oxygen and carbon dioxide exchange and efficient water uptake after precipitation events. Deeper roots that penetrate the clayey subsoil generally provide sufficient moisture to sustain limited plant growth during most dry periods. Runoff from this site is common once surface soils become saturated. The soil-plant moisture relationship is good and the site can be productive, except during periods of extended drought. Seed heads of the major grasses often reach four to five feet in height.

The Shallow Red Plains ecological site developed with fires of various intensities, frequencies, and seasons of year playing important parts in ecological processes. Historically, wildfires were infrequent and commonly started by lightning. They often occurred in spring and early summer when thunderstorms were most prevalent, but also in late summer and fall during dry weather periods. It is also known that Native Americans often used fire in early spring to stimulate growth of fresh forage that would attract herds of migratory bison. These intentional fires probably occurred more frequently, even on an annual basis at some preferred hunting locations.

All of the dominant mid- and tallgrasses were rhizomatous, enabling them to survive very intense wildfires and gain a competitive advantage in the plant community. By contrast, most trees and shrubs were suppressed by fire and occurred very sparsely on protected areas. Growth of forbs, especially legumes, usually improved following a fire event. After a fire there was usually a substantial, but temporary (1-2 years), increase in the abundance of annual forbs as well.

Grazing history had a major impact on the dynamics of the site. The vegetative community developed under a grazing regime that consisted primarily of periodic grazing by large herds of bison. As the herds moved through an area, grazing was probably intense but of short duration. As herds typically moved on to adjacent areas, the vegetation was afforded a period of recovery. Other grazing and feeding animals such as deer, rabbits, insects, and numerous burrowing rodents had secondary influences on plant community development.

Variations in climate, especially drought cycles, also had a major impact upon the plant community's development. Species composition fluctuated according to the duration and severity of droughts. During prolonged dry cycles, many of the shallow-rooted plants died out and the production of deeper-rooted plants significantly decreased. When sufficient rainfall occurred following an extended dry period, annual forbs and annual grasses would temporarily occur in great abundance. As precipitation returned to normal or above normal, the deeper-rooted grasses responded quickly to production potentials.

Typically, growth of warm-season grasses on this site begins during the period of May 1 to May 15and continues until mid-September. As a general rule, 70 percent of total production is completed by mid-July. This varies only slightly from year to year depending upon temperature and precipitation patterns. Cool-season grasses generally have two short growing periods, one in the fall (September and October) and again in the spring (April, May, and June).

As European settlers began utilizing the site for production of domestic livestock within fenced pastures in place of roaming bison herds, its ecological dynamics and physical aspects were altered. This caused the plant community to shift from its original composition. These changes were usually in proportion to the season and intensity of use by grazing livestock and were accelerated by a combination of drought and overgrazing. The taller grasses and forbs palatable to bison were equally selected and consumed by cattle. When repeatedly grazed by cattle throughout each growing season, these grasses were weakened and gradually replaced by the increase and spread of less-palatable midgrasses and forbs. Where the history of overgrazing by domestic livestock was more intense, even the plants that initially increased were often replaced by less desirable, lower- producing plants. In some areas plant cover was reduced to a mixture of native shortgrasses, annual grasses, and forbs.

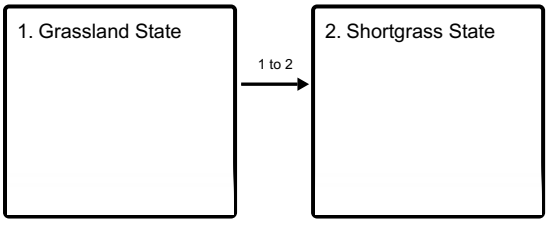
The frequency and role that fires played in maintaining the plant community was reduced with the advent of roads, cultivated fields, and fire suppression techniques developed by European settlers. Use of prescribed fire as a management tool, often limited as an option in modern societies, also diminished. In the absence of periodic, intense fires, there has been a gradual increase of woody species in many areas. In some areas shrubs and trees have invaded and encroached to the point they have become the dominant influence in the plant community.

The slightly to gently rolling topography characteristic of the Shallow Red Plains ecological site was attractive to European settlers who sought to build agrarian lifestyles. Extensive areas of this site were brought under cultivation and used to grow wheat, corn, and sorghum. Tillage and crop production caused total destruction of the original native plant community and often major degradation of the inherent structure and fertility of the surface soil layer. Many acres that were formerly used for cultivated crops have been reseeded or allowed to revegetate naturally.

The following diagram illustrates the pathways that the vegetation on this site may take from the Reference Plant Community as influencing ecological factors change. There may be other states or plant communities not shown in the diagram as well as noticeable variations within those illustrated.

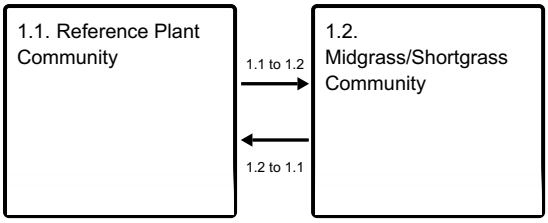
State and transition model

Ecosystem states



1 to 2 - Long-term, heavy stocking rates

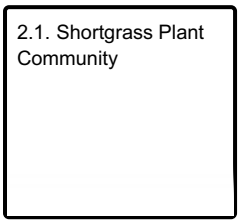
State 1 submodel, plant communities



1.1 to 1.2 - Long-term, heavy stocking rates

1.2 to 1.1 - Forage and animal balance

State 2 submodel, plant communities



State 1
Grassland State

The Grassland State defines the ecological potential and the natural range of variability resulting from the natural disturbance regime of the Shallow Red Plains ecological site. This state is supported by empirical data, historical data, local expertise, and photographs. It is defined by two native plant communities that are a result of periodic fire, drought, and grazing. These events are part of the natural disturbance regime and climatic process. The Reference Plant Community consists of warm-season mid-, tall- and shortgrasses, cool season, and sod-forming grasses, forbs, and shrubs. The Midgrass and Shortgrass Plant Community is made up primarily of warm-season mid- and shortgrasses.

Characteristics and indicators. Midgrasses account for greater than 40% by weight of the Grassland State. When shortgrasses become the dominant species this state has crossed a threshold into the Shortgrass State.

Resilience management. Managing for the midgrass (little bluestem and sideoats grama) key forage species by incorporating a forage and animal balance, will sustain the Grassland State and prevent a species composition change resulting in a transition to the Shortgrass State.

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass
- sideoats grama (*Bouteloua curtipendula*), grass
- big bluestem (*Andropogon gerardii*), grass
- Indiangrass (*Sorghastrum nutans*), grass
- Canada wildrye (*Elymus canadensis*), grass
- switchgrass (*Panicum virgatum*), grass
- blue grama (*Bouteloua gracilis*), grass
- buffalograss (*Bouteloua dactyloides*), grass
- composite dropseed (*Sporobolus compositus var. compositus*), grass

Community 1.1
Reference Plant Community

The interpretive plant community for this site is the Reference Plant Community. This community represents the original plant community that existed prior to European settlement. The site is characterized as a grassland essentially free of trees and large shrubs. It is dominated by warm, mid- and tallgrasses, including little bluestem, sideoats grama, big bluestem, Indiangrass, Canada wildrye, and switchgrass. The major midgrass species is little bluestem. Combined, little bluestem and sideoats grama will account for approximately 48 percent of the vegetation

produced annually. Other prevalent grasses include big bluestem, Indiangrass, Canada wildrye, and switchgrass that account for 25 percent of the vegetation produced annually. Scattered throughout are minor (5-10 percent) amounts of Scribner's rosette grass, composite dropseed, western wheatgrass, sand dropseed, blue grama, buffalograss, and hairy grama.. The Shallow Red Plains ecological site supports a wide variety of forb and legume species which are intermixed throughout the sward. They include Nuttall's sensitive-briar, common yarrow, Cuman ragweed, white sagebrush, upright prairie clover, purple poppymallow, Maximilian sunflower, Illinois bundleflower, white heath aster, dotted blazing star, velvety goldenrod. A small amount of annual plants are common most years. They often occur as a result of soil disturbances by rodents and other digging animals. They may also be abundant in years when normal precipitation returns after an extended drought period. Prickly pear is a low-growing sub-shrub that can occur on the site.

Resilience management. The Reference Plant Community is stable when properly managed. A prescribed grazing program that incorporates periods of deferment during the growing season benefits mid- and tallgrasses and even the more palatable forb species. Soils are susceptible to wind erosion and excessive grazing. Trailing by livestock can impair the stability of the site. Growth of warm-season grasses on this site typically begins during the period of April 25 to May 10 and continues until late September. As a general rule, 75 percent of total production is completed by mid-July. This varies only slightly from year to year depending on temperature and precipitation patterns. There are exceptions. For example, some plants of big bluestem will occasionally initiate spring growth in early April following mild winter temperatures. Also, it is not unusual for other warm-season grasses such as Indiangrass and little bluestem to have some new leaf growth arising from basal buds in late October following moderate fall temperatures. Cool- season grasses and grass-like plants generally have two primary growth periods, one in the fall (September and October) and again in the spring (April, May, and June). Some growth may occur in winter months during periods of unseasonably warm temperatures. Numerous forbs and a few cool-season grasses form leaf rosettes in the fall that remain green throughout the winter. These plants then initiate rapid growth in early spring. Total annual production ranges from 1,400 to 3,600 pounds of air-dry vegetation per acre and averages about 2,400 pounds.

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass
- sideoats grama (*Bouteloua curtipendula*), grass

Community 1.2
Midgrass/Shortgrass Community

The composition of this plant community resembles that of the Reference Plant Community. Comparatively, there has been a decrease in the amount of the more palatable mid- and tallgrasses and forbs and a subsequent increase in shortgrasses. The dominant grasses are little bluestem, sideoats grama, blue grama, buffalograss, and composite dropseed. A number of shortgrasses have increased in abundance as the mid- and tallgrass species have been reduced by overgrazing. These include big bluestem, Indiangrass, Canada wildrye, and switchgrass. This site supports pricklypear and may be scattered more abundantly throughout the site. Shrubs will usually not comprise over 5 percent of the total production.

Resilience management. Prescribed grazing that incorporates periods of deferment during the growing season will improve the vigor and recovery of the more palatable mid-, tallgrasses, and forbs.

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass
- sideoats grama (*Bouteloua curtipendula*), grass
- blue grama (*Bouteloua gracilis*), grass
- buffalograss (*Bouteloua dactyloides*), grass
- composite dropseed (*Sporobolus compositus var. compositus*), grass

Pathway 1.1 to 1.2
Community 1.1 to 1.2

The following describes the mechanisms of change from Plant Community 1.1 to Plant Community 1.2. Long-term (>20 years) management that includes, heavy stocking rates and use of the native vegetation throughout the year;

management that is void of a forage and animal balance; inadequate rest and recovery of native grasses during the growing season.

Pathway 1.2 to 1.1
Community 1.2 to 1.1

The following describes the mechanisms of change from Plant Community 1.2 to Plant Community 1.1. Management (10-15 years) that includes adequate rest and recovery of the key forage species (little bluestem and sideoats grama) within the Reference Plant Community; and, if woody species are present, prescription fires every 6-8 years will be necessary for their removal and/or maintenance.

Conservation practices

Prescribed Grazing

State 2
Shortgrass State

With heavy, continuous grazing, blue grama and buffalograss will become the dominant species and have a sod-bound appearance. Unable to withstand the grazing pressure, only a remnant population of western wheatgrass remains. Species diversity has been reduced further. Water infiltration is reduced and runoff is increased due to the sod nature of the blue grama and buffalograss. Specific dynamic soil property changes between the Grassland State and the Sod-bound State has been documented. As plant community cover decreases from bunchgrasses to more of the sod grasses there is a decrease in infiltration and interception and an increase in surface runoff (Thurow T., 2003).

Characteristics and indicators. Shortgrass species make up greater than 40 percent by weight of the plant community.

Resilience management. This state is stable and does not transition to another state.

Dominant plant species

- blue grama (*Bouteloua gracilis*), grass
- buffalograss (*Bouteloua dactyloides*), grass
- composite dropseed (*Sporobolus compositus*), grass
- prairie threeawn (*Aristida oligantha*), grass

Community 2.1
Shortgrass Plant Community

This plant community is dominated by shortgrasses. It develops following many years of heavy grazing, generally in small pastures associated with a farming-oriented enterprise. Such pastures are often used as holding areas in anticipation of seasonal wheat pasture or other cropland forages. Major grasses are blue grama, buffalograss, composite dropseed. Annual grasses including Japanese brome, cheatgrass, tumblegrass, prairie threeawn, purple threeawn, and witchgrass are common during seasons of normal or above-normal precipitation. Major forbs are camphorweed, Cuman ragweed, horseweed, and blackeyed susan. In a few isolated areas where overgrazing was primarily done by sheep, the resulting plant community is completely dominated by shortgrasses, as essentially all tallgrasses and midgrasses have been eliminated. The major perennial grasses are blue grama, red lovegrass, foxtail barley, tumblegrass, Fendler threeawn, and, in some locations, false buffalograss. With normal or above-normal precipitation, numerous annual grasses including prairie threeawn, little barley, sixweeks fescue, and cheatgrass will occur.

Resilience management. Although productivity is significantly reduced when compared to the Reference Plant Community, this plant community can be managed as a stable shortgrass community. Prescribed grazing that includes a forage and animal balance will sustain this plant community.

Dominant plant species

- blue grama (*Bouteloua gracilis*), grass
- buffalograss (*Bouteloua dactyloides*), grass
- composite dropseed (*Sporobolus compositus var. compositus*), grass

Transition 1 to 2
State 1 to 2

Long-term management (approximately 30 years) without a forage and animal balance and heavy, stocking rates without adequate recovery periods between grazing events will convert the Grassland State to a Shortgrass State made up of blue grama and buffalograss sod. Drought, in combination with this type of management, will quicken the rate at which this transition occurs.

Constraints to recovery. The hydrologic and nutrient cycles are the ecological processes affected. There is an increase in evaporation rate, runoff, and in bulk density. There is a decrease in infiltration, a change in plant composition, and the functional and structural groups have changed dominance. These are all examples of the soil and vegetation properties that have compromised the resilience of the Grassland State, and therefore transitioned to a Shortgrass State.

Context dependence. The amount of time it takes for this transition to occur will vary.

Additional community tables

Animal community

The Shallow Red Plains ecological site is good prairie wildlife habitat when maintained in good to excellent condition. It provides nesting sites for a number of ground nesting bird species including eastern and western meadowlarks, and the upland sandpiper.

Big game animals such as white-tailed deer, pronghorn, and the bison historically used this site commonly for grazing.
Many small mammals, reptiles and amphibians are found on this site as well. Larger predators such as the coyote are attracted by these smaller animals as are avian predators such as hawks and owls.

Some animals are important because of their threatened and endangered status and require special consideration. Please check the Kansas Department of Wildlife and Parks (KDWP) website at www.ksoutdoors.com for the most current listing for your county.

Grazing Interpretations

Calculating Safe Stocking Rates: Proper stocking rates should be incorporated into a grazing management strategy that protects the resource, maintains or improves rangeland health, and is consistent with management objectives. In addition to usable forage, safe stocking rates should consider ecological condition, trend of the site, past grazing use history, season of use, stock density, kind and class of livestock, forage digestibility, forage nutritional value, variation of harvest efficiency based on preference of plant species, and/or grazing system, and site grazeability factors (such as steep slopes, site inaccessibility, or distance to drinking water).

Often the current plant community does not entirely match any particular Community Phase as described in this Ecological Site Description. Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of inventory data will permit the establishment of a safe initial stocking rate.

No two years have exactly the same weather conditions. For this reason, year-to-year and season- to-season fluctuations in forage production are to be expected on grazing lands. Livestock producers must make timely adjustments in the numbers of animals or in the length of grazing periods to avoid overuse of forage plants when production is unfavorable, and to make advantageous adjustments when forage supplies are above average.

Initial stocking rates should be improved through the use of vegetation monitoring and actual use records that include number and type of livestock, the timing and duration of grazing, and utilization levels. Actual use records over time will assist in making stocking rate adjustments based on the

variability factors.

Average annual production must be measured or estimated to properly assess useable forage production and stocking rates.

Hydrological functions

Water is the primary factor limiting forage production on this site. Soils characterizing this site are somewhat poorly to well drained and have slow to very slow permeability.

Following are the estimated withdrawals of freshwater by use in MLRA 79: public supply—surface water, 6.8% and ground water, 4.0%; livestock—surface water, 0.4% and ground water, 1.2%; irrigation—surface water, 0.7% and ground water, 80.6%; other—surface water, 2.0% and ground water, 4.3%. The total withdrawals average 740 million gallons per day (2,800 million liters per day). About 90 percent is from ground water sources, and 10 percent is from surface water sources. The source of water for crops and pasture is the moderate, somewhat erratic precipitation. In the northern part of the area, the Arkansas River is a potential source of irrigation water, but it currently is little used for this purpose. The Ninnescah River is another potential source of surface water in the area. Deep sand in the High Plains Ogallala aquifer yields an abundance of good-quality ground water. This aquifer provides water primarily for irrigation, but also for domestic supply and livestock in rural areas, and for industry and public supply in Wichita and in other towns or cities in the MLRA. The ground water in this aquifer has the lowest levels of total dissolved solids of any aquifer in Kansas, 340 parts per million (milligrams per liter).

Recreational uses

This site provides opportunities for a variety of outdoor activities which might include bird watching, hiking, outdoor/wildlife photography, and hunting. A wide variety of plants in bloom throughout the growing season provide much aesthetic appeal to the landscape, especially in those years with average and above-average rainfall. This site is subject to sheet erosion when mismanaged.

Wood products

This site generally does not produce trees of sufficient size for commercial harvest.

Other products

Other products are generally not produced on this site.

Other information

Because of its landscape setting with broad vistas, this site may be attractive to many for homesites and other developments. However, the high clay content (high shrink-swell potential) of these soils can create foundation problems and severely limit their suitability for septic systems and access roads.

Inventory data references

Information presented here has been derived from NRCS clipping data, numerous ocular estimates and other inventory data. Field observations from experienced range-trained personnel was used extensively to develop this ecological site description.

NRCS contracted the development of MLRA 79 ESDs in 2005. Extensive review and improvements were made to those foundational ESDs in 2017-2018 which provided an approved product.

Range Condition Guides and Technical Range Site Descriptions for Kansas, Shallow Prairie, USDA, Soil Conservation Service, March, 1967.

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Approval

David Kraft, 9/21/2018

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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.

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Date	09/05/2018
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** no rills or active headcutting are present on the site.

2. **Presence of water flow patterns:** There are no water flow patterns evidenced by litter, soil, or gravel redistribution, or pedestalling of vegetation or stones that break the flow of water as a result of overland flow.

3. **Number and height of erosional pedestals or terracettes:** There is no evidence of pedestals or terracettes that would indicate the movement of soil by water and/or by wind on this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Less than 10% bare ground is found on this site. It is the remaining ground cover after accounting for ground surface covered by vegetation (basal and canopy {foliar cover}, litter, standing dead vegetation, gravel/rock, and visible biological crust (e.g., lichen, mosses, algae).

5. **Number of gullies and erosion associated with gullies:** No evidence of accelerated water flow resulting in downcutting of the soil.

6. **Extent of wind scoured, blowouts and/or depositional areas:** No wind-scoured or blowout areas where the finer particles of the topsoil have blown away, sometimes leaving residual gravel, rock, or exposed roots on the soil surface. Also, there are no areas of redeposited soil onto this site from another site due to the wind, i.e., depositional areas.

7. **Amount of litter movement (describe size and distance expected to travel):** No evidence of litter movement (i.e., dead plant material that is in contact with the soil surface).

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surfaces may be stabilized by soil organic matter which has been fully incorporated into aggregates at the soil surface, adhesion of decomposing organic matter to the soil surface, and biological crusts. A soil stability kit will score a range from 4-6.

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

   Ap--0 to 10 centimeters (0 to 4 inches); brown (7.5YR 4/3), interior, clay loam, dark brown (7.5YR 3/3), interior, moist; weak fine subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common very fine roots throughout; 32.0 percent clay; noneffervescent throughout (HCl, 1 normal); slightly alkaline; abrupt smooth boundary (10 to 20 centimeters (4 to 8 inches) thick)

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Functional and structural groups are that of the Reference Plant Community (see functional and structural group worksheet). Note changes to plant communities if different than that of the functional and structural group worksheet.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** There is no evidence of a compacted soil layer less than 6 inches from the soil surface. Soil structure is similar to that described in indicator 9. Compacted physical features will include platy, blocky, dense soil structure over less dense soil layers, horizontal root growth, and increased bulk density (measured by weighing a known volume of oven-dry soil).

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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: Grasses-Dominant: 48%, 1150 lbs. little bluestem 800-1080 lbs; sideoats grama 150-360 lbs;

    Sub-dominant: Grasses-Subdominant: 25%, 600 lbs. big bluestem 100-360 lbs; Indiangrass 50-240 lbs; Canada wildrye 25-120 lbs; switchgrass 25-120 lbs
    Grasses-Minor: 10% 240 lbs.
    Grasses-Minor: 5% 120 lbs.

    Other: Forbs-Minor: 10% 240 lbs. See functional/structural group sheet

    Additional: Shrubs-Trace: 2% 50 lbs.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Recruitment of plants is occurring and there is a mixture of many age classes of plants. The majority of the plants are alive and vigorous. Some mortality and decadence is expected for the site, due to drought, unexpected wildfire, or a combination of the two events. This would be expected for both dominant and subdominant groups.

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14. **Average percent litter cover (%) and depth (in):** Plant litter is distributed evenly throughout the site. There is no restriction to plant regeneration due to depth of litter. When prescribed burning is practiced, there will be little litter the first half of the growing season.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** All species (e.g., native, seeded, and weeds) alive in the year of the evaluation, are included in the determination of total above ground production. Site potential (total annual production) ranges from 1,400 lbs in a below-average rainfall year and 3,600 lbs in an above-average rainfall year. The representative value for this site is 2,400 lbs. production per year.

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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:** There are no noxious weeds present. Invasive plants make up a small percentage of plant community, and invasive brush species are < 5% canopy.

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17. **Perennial plant reproductive capability:** Plants on-site exhibit the required vigor and growth to be able to reproduce vegetatively or by seed. Current management activities do not adversely effect the capability of plants to reproduce.