Ecological site R079XY122KS
Sandy Loam

Last updated: 12/08/2020
Accessed: 06/18/2026

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.

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 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) 79--Great Bend Sand Plains

Ecological site concept

This ecological site was formerly known as Sandy R079XY022KS. The Sandy Loam ecological site is made up of well drained and very deep (greater than 60 inches) soils. These soils have a loamy subsurface texture and greater than 52 percent sand throughout the profile. Generally this site is located on paleoterraces (erosional remnant of a terrace) and dunes on paleoterraces with a slope range of 0 to 15 percent.

Associated sites

R079XY121KS	**Sand Plains** The Sand Plains ecological site is commonly located adjacent to and in coordination with the Sandy Loam ecological site. The Sand Plains site can be identified with soils that have more than 70 percent sand in the surface layer. This site also has soils with a clay increase, from lamellae, at 8 inches from the soil surface.
R079XY123KS	**Sand Floodplain** Sand Floodplain ecological site is commonly located adjacent to or in coordination with the Sandy Loam site. This site is located on Floodplains that have a seasonal or perennial high water table greater than 6 feet from the surface. This site has soils with more than 79 percent sand in the surface.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Andropogon hallii* (2) *Schizachyrium scoparium*

Physiographic features

Most of this area is 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. 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 this MLRA, Rattlesnake Creek flows north and the Little Arkansas River flows south into the Arkansas River.

The Sandy Loam ecological site consists of deep, fine sandy loam or sandy loam soils on nearly level to moderately sloping areas on paleoterraces or dunes on paleoterraces on river valleys.

Table 2. Representative physiographic features

Landforms	(1) River valley > Paleoterrace
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	500 – 790 m
Slope	0 – 20 %
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 are 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)	190-200 days
Precipitation total (characteristic range)	710-810 mm
Frost-free period (actual range)	150-180 days
Freeze-free period (actual range)	180-200 days
Precipitation total (actual range)	660-860 mm
Frost-free period (average)	160 days
Freeze-free period (average)	190 days
Precipitation total (average)	760 mm

- (1) KINSLEY 2E [USC00144333], Kinsley, KS
- (2) NORWICH [USC00145870], Norwich, KS
- (3) HUTCHINSON [USC00143929], Hutchinson, KS
- (4) WELLINGTON [USC00148670], Wellington, KS
- (5) HUDSON [USC00143847], Hudson, KS
- (6) HUTCHINSON 10 SW [USC00143930], Hutchinson, KS
- (7) WICHITA [USW00003928], Wichita, KS
- (8) GREENSBURG [USC00143239], Greensburg, KS
- (9) KINGMAN [USC00144313], Kingman, KS
- (10) PRATT [USC00146549], Pratt, KS
- (11) STERLING [USC00147796], Sterling, KS

Influencing water features

The soils on this site are well drained and have a slow to moderately rapid permeability. Water erosion can be a hazard on the steeper portions of this site.

Soil features

The soils representing the Sandy Loam ecological site are somewhat excessively to well drained and moderately deep to very deep. The surface layer of the soils in this site is primarily sandy loam (but the range includes loamy sand textures). The surface layer ranges from a depth of 4 to 20 inches thick. The subsoil and underlying material have a similar texture to the somewhat higher clay content texture as the surface layer. Contrasting sandy or very clayey layers may occur at depths around 40 inches in several of the listed soil series. Soils in this site are generally high in fertility and have a moderate to high available water capacity. These soils are susceptible to erosion, primarily by wind. The potential for wind erosion increases with sandier surface texture and drier climates.

The major soils that characterize this site include Albion, Attica, Hayes, Naron, Poxmash, Saltcreek, Shellabarger, Spelvin, and Zellmont.

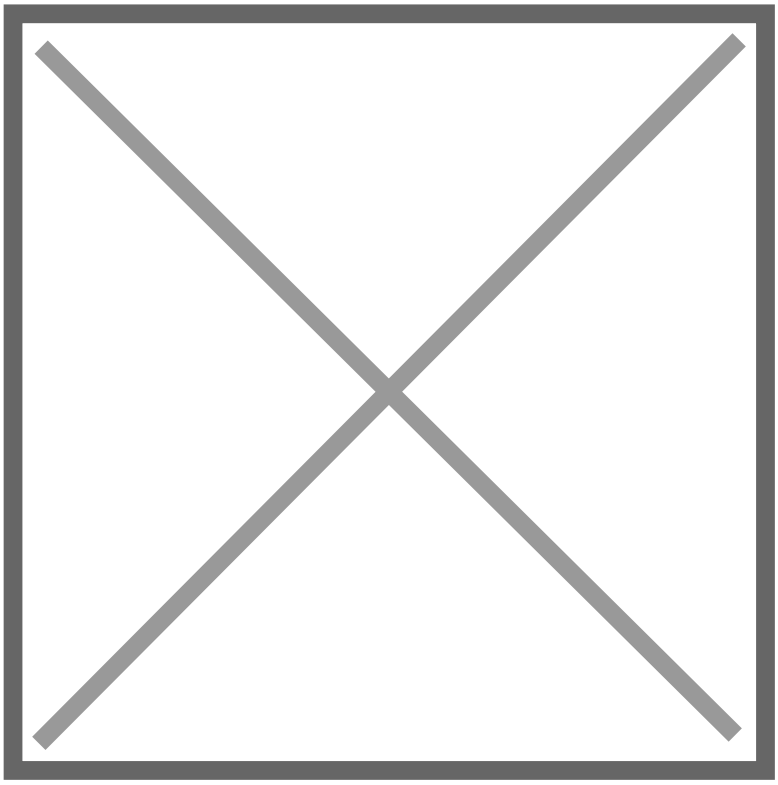

Figure 7.

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Eolian deposits
Surface texture	(1) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately rapid
Soil depth	200 cm
Surface fragment cover <=3"	0 – 10 %
Available water capacity (0-101.6cm)	8.38 – 28.96 cm

Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	4.5 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 30 %

Ecological dynamics

The Sandy Loam ecological site is a dynamic plant community resulting from the complex interaction of many ecological processes. The vegetation evolved on deep to moderately deep soils under a diverse, fluctuating climate. Plants were grazed by herds of large herbivores and periodically subjected to intense wildfires.

The deep, sandy soils characteristic of this site absorbed water moderately rapid and water-holding capacities were moderate. The taller grasses that evolved and dominated the original plant community had deep, efficient root systems capable of utilizing moisture throughout most of the soil profile. Because there is almost no runoff from this site, most precipitation enters the root profile. This site has the potential to be productive. Seedheads of sand bluestem often reach six to seven feet in height.

The original plant community developed with occasional fire as an integral part of ecological processes. Historically fires were started by lightning during spring and early summer months when thunderstorms were most prevalent. It is also recognized that early Native Americans often used fire to attract herds of migratory herbivores, especially bison. These intentional fires probably occurred more frequently than did natural fires, even on an annual basis. All of the dominant tallgrasses were rhizomatous. This enabled them to survive the ravages of even intense wildfires and gave them a competitive advantage over bunchgrasses in the plant community. In contrast, most trees and shrubs were suppressed by fire and occurred only sparsely on protected areas. Growth of perennial forbs, especially legumes, was usually enhanced following a fire event. After an intense fire there was usually a substantial increase in the abundance of annuals. This increase was generally temporary, perhaps lasting for one to two years.

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 intense, both long and of short duration. As herds moved to adjacent areas, vegetation was provided a period of time to recover. 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 development of the plant community. Species composition fluctuated according to the duration and severity of droughts. During prolonged dry cycles, many of the shallow-rooted plants died and production of deeper-rooted plants significantly diminished. 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 in a sequence of years, the deeper-rooted grasses responded and returned to production potentials.

As the utilization of the site for production of domestic livestock replaced that of roaming bison herds, the ecological dynamics were altered and the plant community changed from its original composition. Changes were usually in proportion to the intensity and season of grazing. A combination of drought and overgrazing accelerated these changes. The taller grasses and forbs that were palatable to bison were, with few exceptions, equally relished and selected by cattle. When repeatedly grazed, tallgrasses 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 plants that initially increased were often replaced by even less desirable, lower-producing vegetation. Reduced plant

cover resulting from severe overgrazing, and trailing by livestock led to wind erosion in some areas.

The occurrence of wildfires and the impact that fire played in maintaining the plant community diminished with the advent of roads and cultivated fields. Use of prescribed fire as a management tool, often not an option adopted in modern communities, also diminished. The absence of fire contributed to a gradual increase of shrub species in many areas. In some areas shrubs and trees have spread to the point they have become a dominant influence in the plant community.

The following diagram illustrates some of 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 on the diagram.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrass Dominant 47%**			1177-1580	
	sand bluestem	ANHA	*Andropogon hallii*	1009-1345	–
	Indiangrass	SONU2	*Sorghastrum nutans*	168-336	–
	switchgrass	PAVI2	*Panicum virgatum*	56-168	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	6-56	–
	composite dropseed	SPCO16	*Sporobolus compositus*	0-22	–
2	**Midgrass Subdominant 25%**			448-841	
	little bluestem	SCSC	*Schizachyrium scoparium*	448-785	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	56-168	–
	purple threeawn	ARPU9	*Aristida purpurea*	0-22	–
	thin paspalum	PASE5	*Paspalum setaceum*	0-22	–
3	**Shortgrass Minor 8%**			168-336	
	blue grama	BOGR2	*Bouteloua gracilis*	112-280	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0-56	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0-22	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	0-22	–
4	**Cool-season grass Minor 5%**			56-168	
	sedge	CAREX	*Carex*	6-56	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	6-56	–
	Canada wildrye	ELCA4	*Elymus canadensis*	6-56	–
Forb					
5	**Forbs Subdominant 10%**			168-336	
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	22-50	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	11-39	–
	roundhead lespedeza	LECA8	*Lespedeza capitata*	11-39	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	6-34	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	6-34	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	6-34	–
	yellow sundrops	CASE12	*Calylophus serrulatus*	6-34	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	0-34	–
	white heath aster	SYER	*Symphyotrichum ericoides*	0-34	–
	bractless blazingstar	MENUS	*Mentzelia nuda var. stricta*	0-28	–
	purple poppymallow	CAIN2	*Callirhoe involucrata*	0-28	–

	upright prairie coneflower	RACO3	*Ratibida columnifera*	0-28	–
	common yarrow	ACMI2	*Achillea millefolium*	0-28	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0-28	–
Shrub/Vine					
6	**Shrubs and Cacti Minor 5%**			0-168	
	plains pricklypear	OPPO	*Opuntia polyacantha*	0-34	–
	sand sagebrush	ARFI2	*Artemisia filifolia*	0-34	–
	Chickasaw plum	PRAN3	*Prunus angustifolia*	0-34	–
	fragrant sumac	RHAR4	*Rhus aromatica*	0-34	–
	smooth sumac	RHGL	*Rhus glabra*	0-34	–
	prairie rose	ROAR3	*Rosa arkansana*	0-34	–
	soapweed yucca	YUGL	*Yucca glauca*	0-34	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Table 8. Community 2.1 plant community composition

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

Table 9. Community 3.1 plant community composition

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

Table 10. Community 4.1 plant community composition

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

Table 11. Community 4.2 plant community composition

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

Animal community

Wildlife Where good vegetative cover exists, upland game birds such as bobwhite quail and greater prairie chicken find this site suitable habitat. Lesser prairie chicken are found on the western portions of the site. Big game animals such as white-tailed deer and wild turkey also utilize this rangeland habitat. Small birds like the western kingbird, grasshopper sparrow, and western meadowlark are commonly found, and small mammals such as the skunk, opossum, and cottontail are also present. Soil properties on this site make it a preferred habitat for burrowing mammals such as the plains pocket gopher and badger, along with other small animals that might use the underground burrows as habitat. Predators such as foxes and coyotes are commonly found on this site as are avian predators, hawks, and owls. A variety of snakes, including the bull snake and prairie rattlesnake, as well as lizards and the box turtle, also frequent this site. Maintaining good to excellent vegetative cover on this site is the key to providing good wildlife habitat. In some cases, development of wildlife watering facilities in areas that are remote to natural water sources is also necessary. 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.kdwp.state.ks.us 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 ESD. 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. Infiltration rates are high and runoff potential is low for this site. Following are the estimated withdrawals of freshwater by use in MLRA 79: Public supply—surface water, 6.8%; ground water, 4.0%; Livestock—surface water, 0.4%; ground water, 1.2%; Irrigation—surface water, 0.7%; ground water, 80.6%; Other—surface water, 2.0%; 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 or 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 including bird watching, hiking, outdoor/wildlife photography, and hunting. There are a wide variety of plants in bloom throughout the growing season, especially in those years with average and above rainfall, and they provide much aesthetic appeal to the landscape. There are a number of site considerations because of the fragile nature of the soils, and the potential for severe wind erosion and water erosion on the steeper portions of the site.

Wood products

Other than a few honeylocust and northern catalpa post lots that were planted on this site, it produces no wood products.

Other products

Two shrubs, Chickasaw plum and golden currant, are highly prized for making jellies and jams.

Other information

Site Development and Testing Plan This site went through the approval process.

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 were 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, Sandy. USDA, Soil Conservation Service, March, 1967. Range Site Description for Kansas, Sandy. USDA-Soil Conservation Service, September, 1985. Ecological Site Description for Kansas, Sandy (R079XY022KS), located in Ecological Site Information System (ESIS), 2007.

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Contributors

Chris Tecklenburg

Approval

Curtis Talbot, 12/08/2020

Acknowledgments

The ecological site development process is a collaborative effort, conceptual in nature, dynamic, and is never considered complete. I thank all those who set the foundational work in the mid 2000s in regards to this ESD. I thank all those who contributed to the development of this site. In advance, I thank those who would provide insight, comments, and questions about this ESD in the future. Non-discrimination Statement In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident. Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English. To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture Office of the Assistant Secretary for Civil Rights 1400 Independence Avenue, SW Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov. USDA is an equal opportunity provider, employer, and lender.

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)	Chris Tecklenburg Revision 12-21-2017 David Kraft, John Henry, Doug Spencer and Dwayne Rice Original Authors and date 2-15-2005
Contact for lead author	State Rangeland Management Specialist for Kansas.
Date	12/21/2017
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **The sandy loam textured soils that characterize this site have a low potential for rill formation, therefore no rills or active headcutting are present on the site.**

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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.**

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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.**

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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).**

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

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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.

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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).

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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):** 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.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Shellabarger OSD: Ap--0 to 25 cm, (0 to 10 in.); brown (7.5YR 5/3) interior, sandy loam, dark brown (7.5YR 3/3) interior, moist; 62 percent sand; 11 percent clay; weak fine granular structure; friable, slightly hard; common fine roots; strongly acid, pH 5.4 by 1:1 H2O; clear smooth boundary. (15 to 46 centimeters (6 to 18 inches) thick) BA--25 to 43 cm, (10 to 17 in.); brown (7.5YR 4/3) interior, sandy loam, dark brown(7.5YR 3/3) interior, moist; 58 percent sand; 16 percent clay; weak medium subangular blocky structure; friable, slightly hard; common fine roots; common fine tubular pores; 11 percent fine worm casts; 1 percent nonflat well rounded indurated 2 to 5 millimeter mixed rock fragments; slightly acid, pH 6.3 by 1:1 H2O; clear smooth boundary. (0 to 30 centimeters (0 to 12 inches) thick)

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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.

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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):** 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 increase 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: Tallgrass Dominant 45% 1350 lbs. sand bluestem 900-1200, switchgrass 50-150, Indiangrass 150-300

    Sub-dominant: Midgrass Subdominant 23% 690 lbs. little bluestem 400-700 Grass Subdominant 10% 300 lbs. sideoats grama 50-150, blue grama 100-300, hairy grama 0-50

    Other: Grass Minor 5% 150 lbs. Grass Trace 2% 60 bls

    Additional: Forb Subdominant 10% 300 lbs. Shrubs and Cacti Minor 5% 150 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 2000 lbs in a below average rainfall year and 4000 lbs in an above average rainfall year. The representative value for this site is 3000 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.
