Ecological site R079XY115KS
Loamy Plains

Last updated: 9/21/2018
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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 wind erosion, 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

This ecological site was formerly known as Loamy Upland R079XY015KS. 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.

Associated sites

R079XY107KS	**Clayey Plains** The Clayey Plains ecological site is adjacent to and in conjunction with the Loamy Plains site. The Clayey Plains site is located on paleoterraces, on plains, and/or uplands. These soils have greater than 35 percent clay content greater than 10 inches from the surface.
R079XY112KS	**Limy Plains** The Limy Plains ecological site is adjacent to and in conjunction with the Loamy Plains site. The Limy Plains site is located on paleoterraces, on plains and/or uplands. The soils characteristic of this site are calcareous to the surface.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

Most of MLRA 79 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%, and Arkansas-Keystone (1106), 18%. 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 Loamy Plains ecological site consists of moderately deep to deep, moderately well to well drained upland soils. These soils formed in loamy alluvium or formed in residuum from siltstone. This site occurs on nearly level to gently sloping areas on paleoterraces on river valleys or uplands. Runoff is very low to medium and permeability is moderate to slow.

Figure 1. MLRA 79 ESD block diagram.

Table 2. Representative physiographic features

Landforms	(1) Paleoterrace
Flooding frequency	None
Ponding frequency	None
Elevation	500 – 790 m
Slope	0 – 10 %
Ponding depth	0 cm
Water table depth	200 cm

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 being the driest months and May and June being 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 data-set is from 1981-2010.

Table 3 Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	200 days
Precipitation total (average)	790 mm

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

Influencing water features

These soils have slow to moderate permeability, high available water capacity, and are moderately well to well drained. Erosion on this site by wind and water is a hazard if vegetation is severely overgrazed or mismanaged.

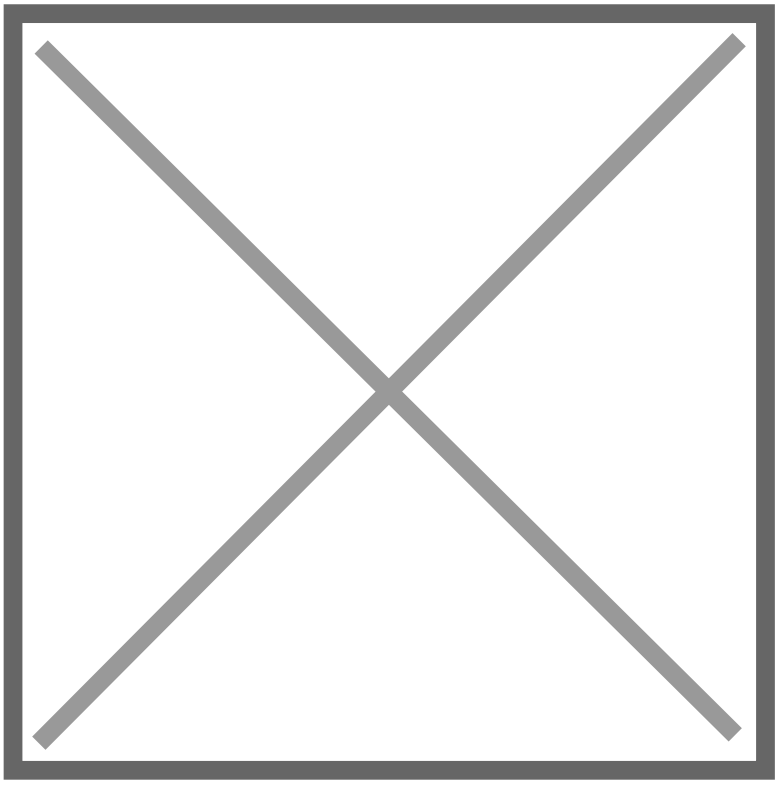

Figure 6. Fig.7-1 from National Range and Pasture Handbook.

Soil features

The soils representing the Loamy Plains ecological site consist of moderately deep to deep upland soils that have silty or loamy surface layers and silty or clayey subsoils. These soils are usually non-calcareous in the surface layer, but may be calcareous in the subsoil and substratum. Soil in this site are generally high in fertility and have a moderate to high available water capacity. The surface layer ranges from a depth of 5 to 15 inches thick.

The major soils common to this site are Farnum, Funmar, Nalim, Nashville, and Ost.

Figure 7. Nalim soil profile, Reno County, Kansas.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Sandy loam (3) Clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderate
Soil depth	50 – 200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	15.75 – 28.96 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 40 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified

Soil reaction (1:1 water) (0-101.6cm)	5.1 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This is a dynamic plant community resulting from the complex interaction of many ecological processes. Vegetation evolved on moderately deep to deep soils under diverse, fluctuating climatic conditions, was grazed by herds of large herbivores, and was periodically burned by intense wildfires.

The soils representing the Loamy Plains ecological site have silty or loamy surfaces and are moderately well drained to well drained. Because of their high water-holding capacities, soil moisture tends to percolate at a moderately slow to moderate rate. The taller grasses that evolved and dominated the original plant community have deep, efficient root systems capable of utilizing moisture throughout most of the soil profile. There is almost no runoff from this site except during intense thunderstorms, so most precipitation enters the root profile, making this site productive. Seed heads of the major grasses often reach 5-6 feet in height.

Fires of various intensity, frequency, and seasonality played an important role in ecological processes. Historically, fires were usually started by lightning and commonly occurred in 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, and may have set fires on an annual basis. Because all of the dominant tallgrasses were rhizomatous, they were able to survive the ravages of intense wildfires and gain a competitive advantage in the plant community. In contrast, most trees and shrubs were suppressed by fire and occurred only sparsely on protected areas. Growth of forbs, especially legumes, was usually enhanced following fires. After a fire there was usually a substantial increase in the abundance of annual forbs. Although temporary, the increase may have lasted 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 herds moved through an area, grazing was probably intense but of short duration. As they moved 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 rain fell after a drought, annual forbs and grasses temporarily occurred in great abundance. As precipitation returned to normal or above-normal, the deeper-rooted grasses responded quickly to their production potentials.

State and Transition Diagram

As utilization of the site for production of domestic livestock replaced that of roaming bison herds, its ecological dynamics were altered. The plant community changed from its original composition, usually in proportion to the season and intensity of grazing livestock. A combination of drought and overgrazing accelerated these changes. The taller grasses and forbs palatable to bison were equally relished and selected by cattle. When repeatedly grazed by cattle, 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 for many years, even plants that initially increased were often replaced by even less desirable, lower-producing plants. In some areas plant cover was reduced to a mixture of native shortgrasses, annual grasses, and forbs.

The occurrence of wildfires and the impact that fire played in maintaining the plant community was diminished with the advent of roads and cultivated fields. Use of prescribed fire as a management tool was virtually eliminated for decades. In the absence of fire, there was a gradual increase of woody species in many areas. In some areas shrubs and trees have spread to the point they have become the 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, as well as noticeable

variations within those illustrated.

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	**Grasses Dominant 60%**			1267-2264	
	big bluestem	ANGE	*Andropogon gerardii*	560-1121	–
	little bluestem	SCSC	*Schizachyrium scoparium*	370-908	–
	Indiangrass	SONU2	*Sorghastrum nutans*	168-560	–
	switchgrass	PAVI2	*Panicum virgatum*	168-560	–
2	**Grasses Subdominant 23%**			448-897	
	sideoats grama	BOCU	*Bouteloua curtipendula*	112-381	–
	western wheatgrass	PASM	*Pascopyrum smithii*	112-381	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	56-191	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0-151	–
	blue grama	BOGR2	*Bouteloua gracilis*	0-151	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0-151	–
	eastern gamagrass	TRDA3	*Tripsacum dactyloides*	0-56	–
3	**Grasses Trace 2%**			0-78	
	sedge	CAREX	*Carex*	0-22	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0-22	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0-22	–
	prairie threeawn	AROL	*Aristida oligantha*	0-17	–
	purple threeawn	ARPU9	*Aristida purpurea*	0-17	–
Forb					
4	**Forbs Subdominant 13%**			151-493	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	28-112	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	28-112	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	28-112	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	6-17	–
	silky sophora	SONU	*Sophora nuttalliana*	6-17	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	6-17	–
	white heath aster	SYER	*Symphyotrichum ericoides*	6-17	–
	prairie fleabane	ERST3	*Erigeron strigosus*	6-17	–
	Indian blanket	GAPU	*Gaillardia pulchella*	6-17	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	6-17	–
	prairie sunflower	HEPE	*Helianthus petiolaris*	6-17	–
	Berlandier's yellow flax	LIBE2	*Linum berlandieri*	6-17	–
	dotted blazing star	LIPU	*Liatris punctata*	6-17	–
	scarlet beeblossom	OESU3	*Oenothera suffrutescens*	6-17	–
	woolly plantain	PLPA2	*Plantago patagonica*	6-17	–
	greenthread	THELE	*Thelesperma*	0-11	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	0-11	–
	blackeyed Susan	RUHI2	*Rudbeckia hirta*	0-11	–

	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	0-11	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	0-11	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	0-11	–
	common yarrow	ACMI2	*Achillea millefolium*	0-11	–
Shrub/Vine					
5	**Shrubs Trace 2%**			22-78	
	leadplant	AMCA6	*Amorpha canescens*	11-28	–
	Jersey tea	CEHE	*Ceanothus herbaceus*	11-28	–
	American plum	PRAM	*Prunus americana*	0-11	–
	prairie rose	ROAR3	*Rosa arkansana*	0-11	–

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

Because of the great variety of forbs and grasses found on this ecological site, it provides excellent habitat for ground-nesting birds including both the eastern and western meadowlark, small rodents such as the deer mouse and prairie vole, and other small furbearers when it is in good to excellent condition. Reptiles including various snakes, lizards, and the box turtle are commonly found. When in poor condition, black-tailed prairie dogs, small rodents such as thirteen-lined ground squirrels, and the black-tailed jackrabbit find this site to be preferred habitat. Hawks and owls, along with furbearers such as coyotes and badgers, are common predators. This site was a historically preferred grazing location for bison, deer, elk, and pronghorn. Today's big game would include the white-tailed deer and turkey along with some pronghorn. Upland game including bobwhite quail, greater prairie chicken, and the eastern cottontail are found on this site as well. 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 http://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. 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 and 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 are in bloom throughout the growing season, especially in those years with average and above-average rainfall, providing much aesthetic appeal to the landscape. This site is subject to both wind and water erosion when mismanaged. Vehicular traffic can lead to gully formation on steeper sites. This site is often an excellent site for deer and quail hunting.

Wood products

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

Other products

Two shrubs, American 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 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, Loamy Upland, USDA, Soil Conservation Service, March, 1967. Range Site Description for Kansas, Loamy Upland, USDA-Soil Conservation Service, September, 1985. Ecological Site Description for Kansas, Loamy Upland (R079XY015KS) located in Ecological Site Information System (ESIS), 2007.

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Contributors

Chris Tecklenburg

Approval

David Kraft, 9/21/2018

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 regard 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 3-2-2017 David Kraft, John Henry, Doug Spencer and Dwayne Rice/original authors 2-15-2005.
Contact for lead author	State Rangeland Management Specialist for Kansas located in Salina 785-823-4500.
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 loam and silt 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.**

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.

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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):** **Nalim OSD: Ap--0 to 15 cm (0 to 6 in.); grayish brown (10YR 5/2), interior, loam, very dark grayish brown (10YR 3/2), interior, moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots throughout; 23.0 percent clay; noneffervescent throughout (HCl, 1 normal); slightly acid, abrupt smooth boundary, trace fine gravel. (15 to 36 cm thick; 6 to 14 in. 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: Group 1 Grasses Dominant 60% 2020 lbs. big bluestem 500-1000, little bluestem 330-810, Indiangrass 150-500, switchgrass 150-500.

    Sub-dominant: Group 2 Grasses Subdominant 23% 800 lbs. sideoats grama 100-340, western wheatgrass 100-340, composite dropseed 50-170, blue grama 0-135, buffalograss 0-135, Canada wildrye 0-135.

    Other: Group 3 Grasses Trace 2% 70 lbs.

    Additional: Forb Subdominant 13% 440 lbs. see functional/structural group sheet for specific forbs. Shrubs Trace 2% 70 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 2,400 lbs in a below-average rainfall year and 5,000 lbs in an above-average rainfall year. The representative value for this site is 3,400 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.
