

Ecological site R079XY113KS Loamy Floodplain

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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 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 Loamy Floodplain (R079XY113KS) ecological site was formerly named Loamy Lowland (R079XY013KS). This site is formed from loamy alluvium and located on floodplains. Soils representing this site do not have a seasonal or perennial high water table (less than five feet from the soil surface). The Loamy Floodplain ecological site is well drained with slopes ranging from 0 to 3 percent.

Associated sites

R079XY115KS	<p>Loamy Plains</p> <p>The Loamy Plains ecological site sits adjacent to and in conjunction with the Loamy Floodplain site. 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.</p>
R079XY132KS	<p>Subirrigated</p> <p>This site sits adjacent to and in conjunction with the Loamy Floodplain ecological site. The Subirrigated ecological site is characterized by somewhat poorly drained soils that have a seasonal or perennial high water table greater than 2 feet and less than 6 feet from the surface. This site is located on floodplains and interdunes. The Subirrigated site occurs on level to nearly level eolian and alluvial lands usually adjacent to major streams.</p>

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Andropogon gerardii</i> (2) <i>Sorghastrum nutans</i>

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. 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.

This site occurs in floodplains on nearly level lands that are subject to rare to frequent flooding. The deep alluvial soils have loamy to silty surface layers and subsoils.

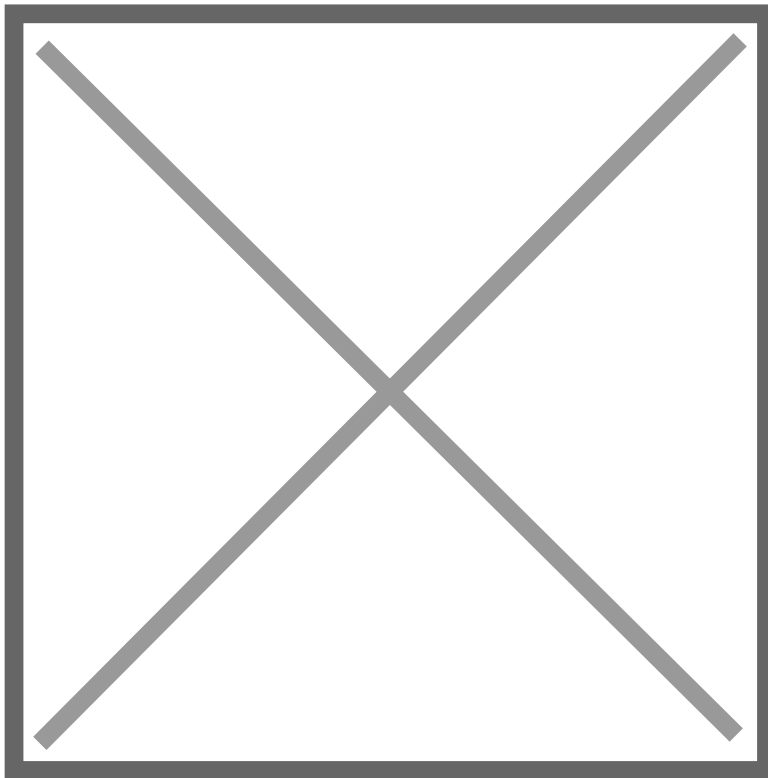


Figure 1.

Table 2. Representative physiographic features

Landforms	(1) River valley > Flood plain
Runoff class	Negligible to low

Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	500 – 790 m
Slope	0 %
Water table depth	150 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)	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)	690-860 mm
Frost-free period (average)	160 days
Freeze-free period (average)	190 days

Precipitation total (average)	790 mm
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- (1) WELLINGTON [USC00148670], Wellington, KS
- (2) KINGMAN [USC00144313], Kingman, KS
- (3) PRATT [USC00146549], Pratt, KS
- (4) STERLING [USC00147796], Sterling, KS
- (5) HUTCHINSON 10 SW [USC00143930], Hutchinson, KS
- (6) KINSLEY 2E [USC00144333], Kinsley, KS
- (7) WICHITA [USW00003928], Wichita, KS
- (8) NORWICH [USC00145870], Norwich, KS

Influencing water features

A distinguishing feature of the Loamy Floodplain ecological site is that all soils on this site are occasionally or frequently flooded. Plant growth is enhanced when water tables occasionally reach into the root zone during wetter periods. Soils are well drained and with moderately to moderately rapid permeability. Available water capacity is high.

Stream Types:

(Rosgen System) C6, F6, and E6 are potential stream types found on this site. The C6 stream type is slightly entrenched, meandering, silt-clay dominated, riffle-pool channel with a well developed floodplain. The C6 stream type can be found in low relief basins typical of interior lowlands such as the Great Plains area. F6 stream types are entrenched, meandering, gentle gradient streams deeply incised in cohesive sediments of silt and clay. Characteristics of F6 streams include very high width/depth ratios, moderate sinuosity, and low to moderate meander width ratios. E6 stream types have channels with low to moderate sinuosity, gentle to moderately steep gradients, and very low width/depth ratios. E6 stream systems are very stable. Streambank disturbance through abuse or other disturbances within the watershed can lead to stream degradation, and eventually to a change in the stream type to a less stable system.

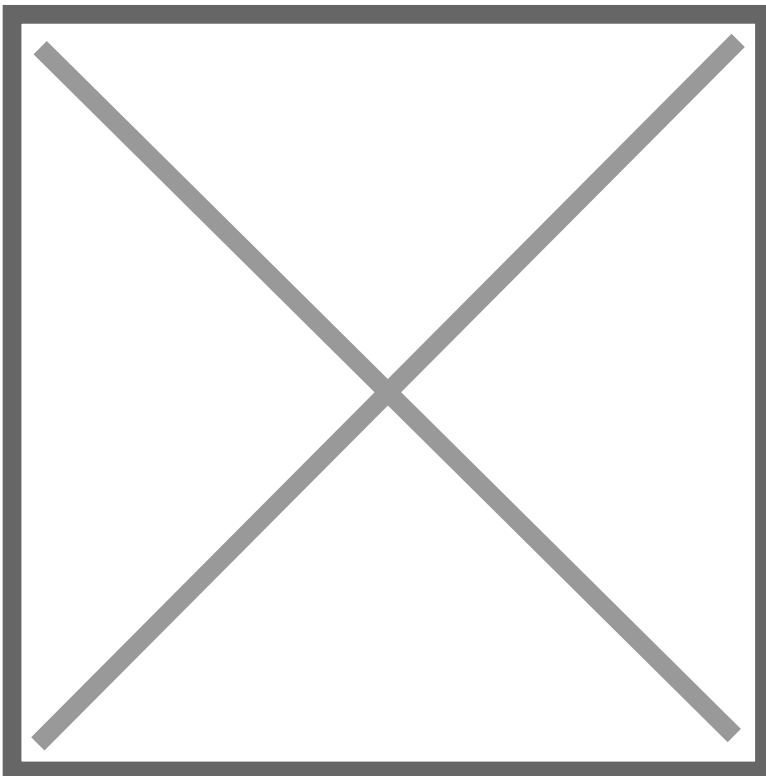


Figure 8.

Soil features

The soils on this site are alluvial soils occurring in the floodplain. They are deep with loamy to silty surface layers and subsoils. The soils are subject to recurrent flooding, channeling, and deposition as site considerations.

Major soils associated with this site are Elandco, Canadian, Kaskan, Kaski, and Mahone.

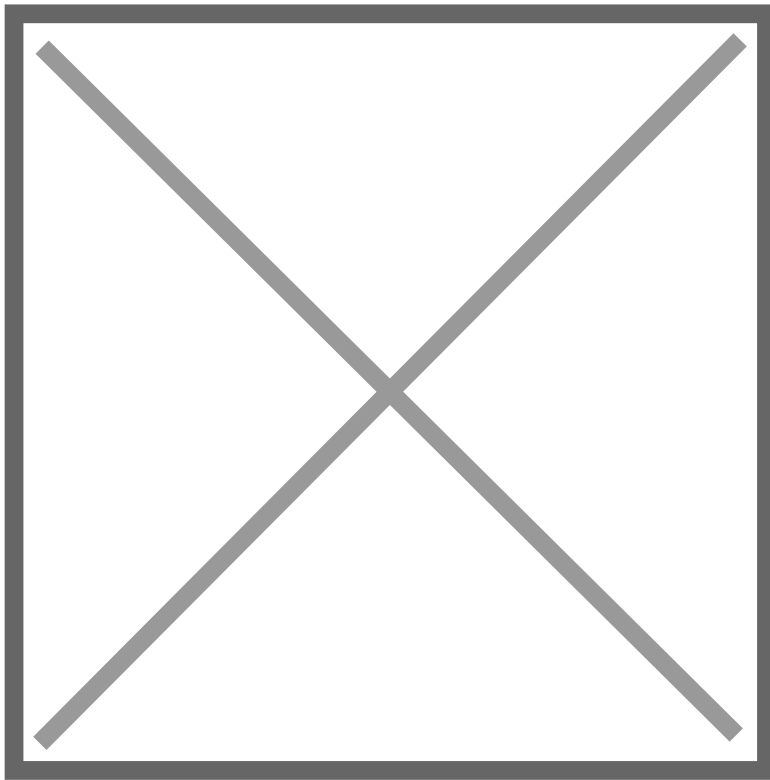


Figure 9.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam (2) Loam (3) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to moderate
Soil depth	200 cm
Available water capacity (0-101.6cm)	20.83 – 28.96 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %

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 – 20 %

Ecological dynamics

The Loamy Floodplain ecological site is a dynamic plant community due to the complex interaction of many ecological processes. The vegetation evolved on deep, fertile soils on lowlands that were occasionally flooded, exposed to a diverse and fluctuating climate, grazed by herds of large herbivores, and periodically subjected to intense wildfires. The plants that evolved were dominant on the original plant community and well adapted to the floodplain soils, climatic, and biological conditions.

The deep, fertile soils representative of this site have loamy surfaces and often receive extra moisture from overflow or from run-in sites located on adjacent slopes. Some locations have water tables that are within reach of the deep-rooted tallgrasses, while other areas have seasonal water tables that only benefit plant growth during portions of the year. These soils generally occur on broad, nearly level bottomlands that are usually adjacent to rivers or streams. A large portion of the Loamy Floodplain site is located along the major rivers, including the Arkansas, Little Arkansas, Rattlesnake, Chikaskia, and the North and South Forks of the Ninnescah. This site may also occur along narrow upland drainageways. Occasional flooding and siltation may occur in some locations from stream overflow. Due to landscape position and the availability of water, the Loamy Floodplain ecological site is productive.

The plant community developed with occasional fires as an important part of the site's ecological processes. Historically, fires were infrequent and were usually started by lightning during spring and early summer thunderstorms. 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, even annually in some locations. Because all of the dominant tallgrasses were rhizomatous, they were able to survive the ravages of even intense wildfires and gain a competitive advantage in the plant community. Trees and shrubs were suppressed by fire over most of the site. However, trees historically occurred in varying amounts on protected areas, generally along stream- and riverbanks and in oxbows.

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 could be intense but was usually of short duration. As herds moved to adjacent areas, vegetation was typically given time for recovery. This grazing regime was altered during extended periods of drought. Because of its proximity to streams, grazing animals were attracted to the site and utilization was much more concentrated than during normal periods. Other grazing and feeding animals such as elk, deer, rabbits, rodents, and insects had secondary influences on the development of the plant community.

Variations in climate alone had only minor impacts on the plant community. Even though fluctuations in precipitation directly influenced site productivity from year to year, plant community composition usually remained stable. Available water capacity was high and the deep-rooted tallgrasses benefited from moisture stored throughout the soil profile and, in some cases, from seasonal water tables.

Occasional flooding resulting from intense thunderstorms was usually of brief duration, and the periods of inundation only temporarily affected the major plants. All of the major plants had rhizomes, which facilitated in their recovery from occasional siltation deposited during flood events.

State and Transition Diagram

As utilization of the area for production of domestic livestock replaced roaming bison herds, the ecological dynamics of the site were

altered and the plant community often changed from its original composition. Fencing enabled continuous grazing and, in many areas, this led to overgrazing and substantial changes in the vegetation. Alterations in the plant community were usually in proportion to the season and intensity of grazing. With few exceptions, taller grasses and forbs palatable to bison were equally relished and selected by cattle and other domestic livestock. When repeatedly overgrazed, these grasses were weakened and gradually reduced in size and numbers. They were replaced in the plant community 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 even less desirable and usually lower-producing plants.

The occurrences of wildfire and the impact that fire played in maintaining the plant community were diminished with the advent of roads and cultivated fields. Use of prescribed fire as a management tool, often not an option in modern communities, also decreased. In the absence of fire, a rapid increase of shrub and tree species often occurs. In some locations they have spread to the point where they have become a major influence in the plant community.

Some areas of the site that were formerly “broken out” and farmed for many years have since been returned to the production of native plant communities. Portions of these areas were reseeded and established to a prescribed mixture of plants. Other areas were allowed to reestablish naturally without the benefit of seeding, and are in various stages of plant succession.

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 68%			2802-3620	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	1681-2959	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	280-801	–
	eastern gamagrass	TRDA3	<i>Tripsacum dactyloides</i>	168-532	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	168-532	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	56-269	–
2	Grasses Subdominant 15%			280-796	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	168-532	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	56-224	–
	vine mesquite	PAOB	<i>Panicum obtusum</i>	56-168	–
	composite dropseed	SPCOC2	<i>Sporobolus compositus var. compositus</i>	56-168	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	56-168	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0-112	–
	sedge	CAREX	<i>Carex</i>	0-112	–
3	Grasses Trace 2%			0-106	
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	0-112	–
	prairie threeawn	AROL	<i>Aristida oligantha</i>	0-28	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	0-28	–
Forb					
4	Forbs Minor 10%			280-532	
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	28-56	–
	Illinois bundleflower	DEIL	<i>Desmanthus illinoensis</i>	17-45	–
	pitcher sage	SAAZG	<i>Salvia azurea var. grandiflora</i>	11-34	–
	Nuttall's sensitive-briar	MINU6	<i>Mimosa nuttallii</i>	11-34	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	11-34	–
	stiff goldenrod	OLRIR	<i>Oligoneuron rigidum var. rigidum</i>	6-22	–
	slimflower scurp pea	PSTE5	<i>Psoraleidum tenuiflorum</i>	6-22	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	6-22	–

	ashy sunflower	HEMO2	<i>Helianthus mollis</i>	6-22	-
	oldplainsman	HYARA	<i>Hymenopappus artemisiifolius var. artemisiifolius</i>	6-22	-
	tall blazing star	LIAS	<i>Liatris aspera</i>	6-22	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	6-22	-
	butterfly milkweed	ASTU	<i>Asclepias tuberosa</i>	6-22	-
	yellowspine thistle	CIOC2	<i>Cirsium ochrocentrum</i>	6-22	-
	nineanther prairie clover	DAEN	<i>Dalea enneandra</i>	6-22	-
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	6-22	-
	compassplant	SILA3	<i>Silphium laciniatum</i>	6-22	-
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	6-22	-
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	6-22	-
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	6-22	-
	Baldwin's ironweed	VEBA	<i>Vernonia baldwinii</i>	0-11	-
	showy milkweed	ASSP	<i>Asclepias speciosa</i>	0-11	-
	common milkweed	ASSY	<i>Asclepias syriaca</i>	0-11	-
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-11	-
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0-6	-
	hoary verbena	VEST	<i>Verbena stricta</i>	0-6	-

Shrub/Vine

5	Trees and Shrubs Minor 5%			168-269	
	leadplant	AMCA6	<i>Amorpha canescens</i>	0-62	-
	false indigo bush	AMFR	<i>Amorpha fruticosa</i>	0-62	-
	eastern cottonwood	PODE3	<i>Populus deltoides</i>	0-39	-
	coralberry	SYOR	<i>Symphoricarpos orbiculatus</i>	0-39	-
	American plum	PRAM	<i>Prunus americana</i>	0-28	-
	prairie rose	ROAR3	<i>Rosa arkansana</i>	0-22	-
	common hackberry	CEOC	<i>Celtis occidentalis</i>	0-22	-
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0-22	-

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 4.2 plant community composition

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

Wildlife The plant diversity associated with this site and the fact that it is commonly part of a riparian area makes it excellent wildlife habitat. The site often has scattered cottonwood and willow trees and occasional mottes of low brush, which create a preferred habitat for white-tail deer, wild turkey, bobwhite quail, pheasant, the fox squirrel, and eastern cottontail. Furbearers such as mink, raccoon, skunk, and opossum are common as are predators such as bobcats, coyotes, and the red fox. When in good to excellent condition, this site is especially valuable as winter cover for many wildlife species including white-tailed deer, pheasant, quail, and cottontail. Because of the variety of woody plant species present, birds such as the scissor-tailed flycatcher, eastern and western kingbirds, brown thrasher, morning dove, and red-winged blackbird are common to the site. During the spring and fall, migrating waterfowl are common. Avian predators such as hawks and owls commonly use this habitat, as do bald eagles on an occasional basis. 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&T) 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. 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 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). Hydrologic group B soils on this site include Elandco, Kaskan, and Kaski. Mahone soil is in hydrologic group C. These soils have deep loamy to silty surface layers and subsoils. They are well drained and have moderately slow to moderate permeability. Please refer to the NRCS National Engineering Handbook Section 4 (NEH-4) for runoff quantities and hydrologic curves when making hydrology determinations.

Recreational uses

This site is often used for outdoor recreational pursuits because of the plant and wildlife diversity. Big game such as white-tailed deer and wild turkey are abundant and commonly hunted, along with a wide variety of small game such as pheasant, quail, rabbits, squirrels, and raccoons. In addition, this site provides opportunities for bird watching, hiking, outdoor/wildlife photography, and a variety of other outdoor activities. There are a wide variety of plants in bloom throughout the growing season that provide much aesthetic appeal to the landscape. Recurrent flooding and sediment deposition are a site hazard.

Wood products

In some locations there have been commercial harvests of eastern cottonwood. Some hardwoods are cut for firewood.

Other products

None.

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, Loamy Lowland, USDA, Soil Conservation Service, March, 1967. Range Site Description for Kansas, Loamy Lowland, USDA-Soil Conservation Service, September, 1985. Ecological Site Description for Kansas, Loamy Lowland (R079XY013KS) located in the Ecological Site Information System (ESIS), 2007.

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Contributors

Chris Tecklenburg

Approval

David Kraft, 9/21/2018

Acknowledgments

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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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Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.
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2. **Presence of water flow patterns:** There is little, if any, evidence of soil deposition or erosion. Water generally flows evenly over the entire landscape.
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3. **Number and height of erosional pedestals or terracettes:** There is no evidence of pedestaled plants or terracettes on the 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. Cover can be defined as live plants, litter, rocks, moss, lichens, etc.
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5. **Number of gullies and erosion associated with gullies:** None
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6. **Extent of wind scoured, blowouts and/or depositional areas:** There is no evidence of wind erosion creating bare areas or denuding vegetation.
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7. **Amount of litter movement (describe size and distance expected to travel):** Plant litter is distributed evenly throughout the site. During major flooding events, this site slows water flow and captures litter and sediment.
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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):** Plant canopy is large enough to intercept the majority of raindrops. A soil fragment will not “melt” or lose its structure when immersed in water for 30 seconds. There is no evidence of pedestaled plants or terracettes. Soil stability scores will 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):** From Elandco series description: A1--0 to 14 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; hard, firm; many roots and wormcasts; common fine and medium pores; slightly alkaline; clear smooth boundary. (8 to 20 inches thick) A2--14 to 27 inches; very dark grayish brown (10YR 3/2) silty clay loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; hard, firm; many roots and pores; slightly alkaline; clear smooth boundary. (12 to 22 inches thick) A3--27 to 40 inches; dark brown (10YR 3/3) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, firm; many roots and pores; slightly alkaline; clear smooth boundary. (0 to 20 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:** There is no negative effect on water infiltration and/or runoff due to plant composition or distribution. Plant composition and distribution are adequate to prevent any rill formation and/or pedestalling. Interspatial distribution is consistent with expectation for the site.
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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 compacted soil layers due to cultural practices. Soil structure is conducive to water movement and root penetration.
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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 68% or 3230 lbs.: big bluestem 1500-2640, Indiangrass 250-715, eastern gamagrass 150-475, switchgrass 150-475, little bluestem 50-240

Sub-dominant: Grasses subdominant 15% or 710 lbs.: western wheatgrass 150-475, Canada wildrye 50-200, sideoats grama 50-150, composite dropseed 50-150, vine mesquite 50-150

Other: Grasses trace 2% or 95 lbs.: prairie cordgrass 0-100, prairie threeawn 0-25, purple threeawn 0-25

Additional: Forbs Minor 10% or 475 lbs. Trees and Shrubs Minor 5% or 240 lbs.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

The majority of plants are alive and vigorous. Some mortality and decadence is expected for the site. This in part is due to drought, unexpected wildfire, or a combination of the two events. This would be expected for both dominant and subdominant groups.

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):**

3870-6080 lbs/acre. Representative value is 4750 lbs/forage/acre. Below-normal precipitation during the growing season expect 3870 lbs/forage/acre; and above-normal precipitation during the growing season expect 6080 lbs/forage/acre. If utilization has occurred, estimate the annual production removed or expected and include this amount when making the total site production estimate.

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: None.**
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17. **Perennial plant reproductive capability:** The number and distribution of tillers or rhizomes is assessed relative to the expected production of the perennial, warm-season midgrasses and shortgrasses.
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