Ecological site R079XY120KS
Saline Subirrigated

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 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 Saline Subirrigated ecological site (R079XY120) is made up of poorly drained to somewhat poorly drained and very deep soils. These soils have a seasonal or perennial high water table greater than 2 feet and less than 6 feet from the surface. This site has a high concentration of salts that include a sodium absorption ratio (SAR) of greater than 13 at depths greater than 7 inches from the soil surface. Generally this site is located on floodplains and stream terraces in major river valleys.

Associated sites

R079XY113KS	**Loamy Floodplain** The Loamy Floodplain ecological site sits adjacent to and in conjunction with the Saline Subirrigated site. This site occurs on nearly level or gently sloping alluvial lands that are subject to flooding. The Loamy Floodplain soils do not have a seasonal or perennial high water table that is less than 6 feet from the surface. This site is well drained.
R079XY132KS	**Subirrigated** This site sits adjacent to and in conjunction with the Saline Subirrigated 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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

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.

The Saline Subirrigated ecological site consists of very deep, poorly drained to somewhat poorly drained soils. These are saline-alkali soils that formed in alluvial sediments. This site occurs on nearly level floodplains and stream terraces of major stream valleys.

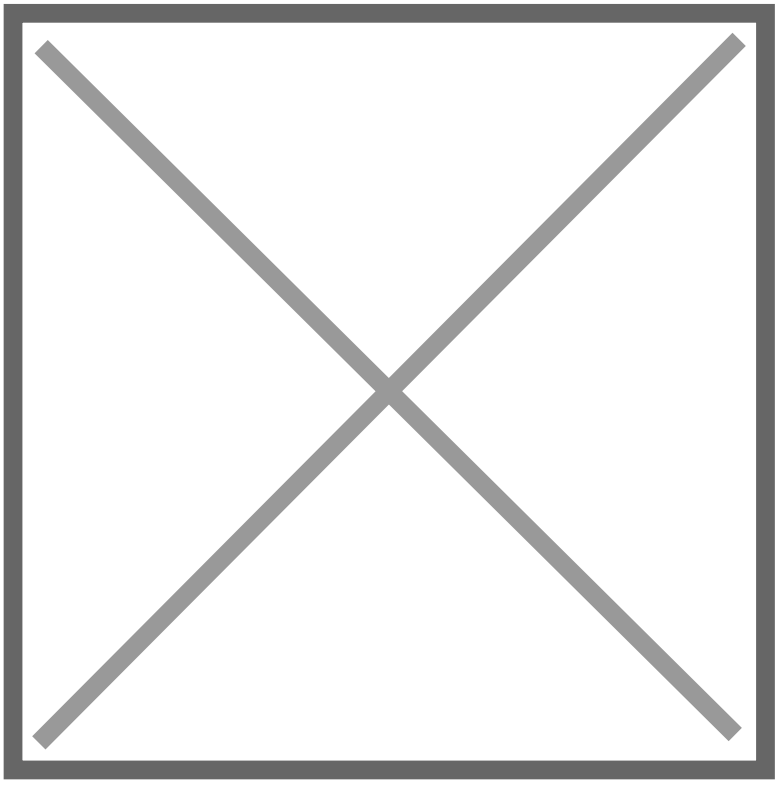

Figure 1.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Flood plain

Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	500 – 790 m
Slope	0 %
Ponding depth	0 – 30 cm
Water table depth	60 – 180 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 (average)	180 days
Freeze-free period (average)	200 days
Precipitation total (average)	790 mm

- (1) GREAT BEND [USC00143218], Great Bend, KS
- (2) HUDSON [USC00143847], Hudson, KS
- (3) HUTCHINSON [USC00143929], Hutchinson, KS
- (4) HUTCHINSON 10 SW [USC00143930], Hutchinson, KS
- (5) WICHITA [USW00003928], Wichita, KS
- (6) STERLING [USC00147796], Sterling, KS

Influencing water features

The soils on this site are somewhat poorly to poorly drained. Permeability is moderately slow to slow. Normally the water table occurs between 2-6 feet below the soil surface during the growing season. The Saline Subirrigated ecological site is commonly flooded.

Soil inclusions with this wetland type may occur within this site.

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-and clay- dominated, riffle-pool channel with a well developed flood plain. 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.

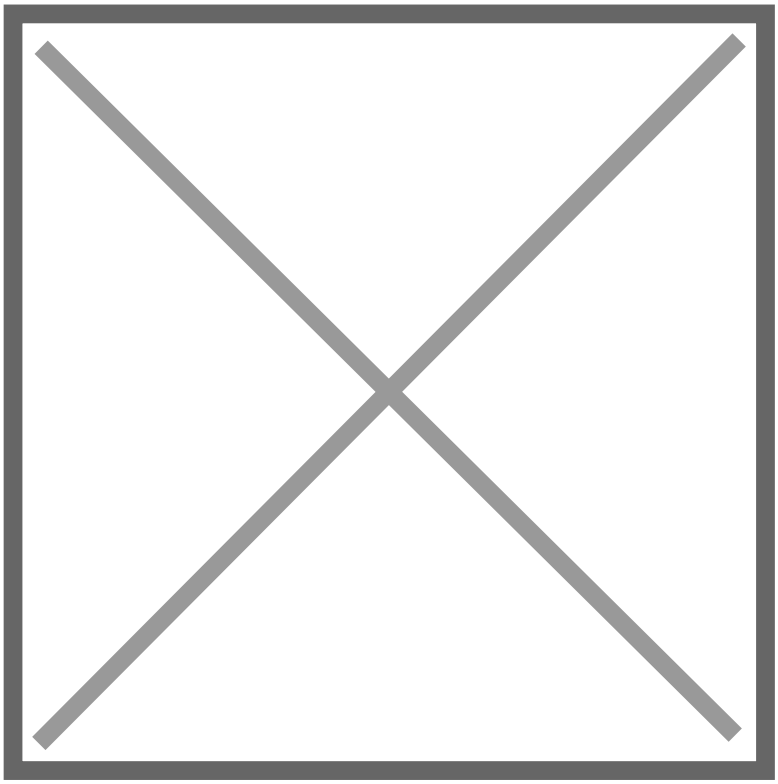

Figure 6.

Soil features

The soils representing the Saline Subirrigated ecological site are distinguished by their saline-alkali properties. These soils are deep and have loamy surface layers and the subsoils range from loamy to clayey. They commonly have a high water table, usually found between 2-6 feet below the surface during the growing season. Alkalinity and/or salinity are limitations and influence the kinds of plants found on this site as well as the annual productivity. Flooding, along with its attendant scouring and sedimentation, is the primary erosion hazard on this site.

The major soils that characterize this site include Abbyville, Buhler, Kisiwa, Ninnescah (map unit 5846), and Lesho (map unit).

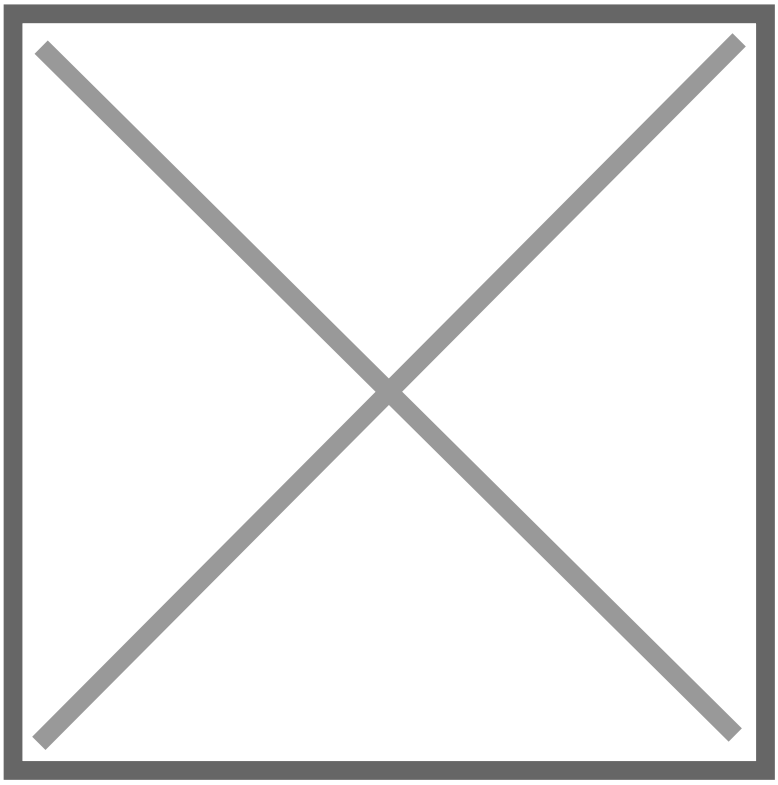

Figure 7.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Sandy clay loam (3) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Very slow to rapid
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	16.51 – 26.67 cm

Calcium carbonate equivalent (0-101.6cm)	0 – 30 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 30
Soil reaction (1:1 water) (0-101.6cm)	6.1 – 10
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 due to the complex interaction of many ecological processes. The vegetation evolved under a diverse and fluctuating climate on fragile soils, while grazed by herds of large herbivores and periodically subjected to intense wildfires.

These are deep, nearly level, somewhat poorly drained, saline and alkali soils on low terraces bordering floodplains. The taller grasses that evolved and dominated the original plant community had deep, efficient root systems capable of utilizing moisture that was nearly always within 2 to 5 feet of the surface. Seed heads of the major grasses often reach 6-7 feet in height.
Runoff is moderate, and the site may flood three or more times per year. The Saline Subirrigated ecological site can be productive except where inhibited by high salt or sodium concentrations.

The Saline Subirrigated ecological site developed with occasional fires playing an important role in ecological processes. Historically, fires were infrequent and were usually started by lightning during spring and early summer thunderstorms. It is also known that early Native Americans often used fire to attract herds of migratory herbivores, especially bison. These intentional fires probably occurred more frequently than that of the natural disturbance regime. All of the dominant tallgrasses were rhizomatous, enabling them to survive the ravages of even intense wildfires and gain a competitive advantage in the plant community. By 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 a fire event. After a fire there was typically a substantial increase in the abundance of annual forbs as well. This increase was temporary, but 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 the herds moved through an area, grazing was probably intense but of short duration. As herds typically moved on to adjacent areas, the vegetation was afforded a period of recovery. Other grazing and feeding animals such as deer, rabbits, insects, and numerous burrowing rodents had secondary influences on plant community development.

Variations in climate had only minimal impact upon the development of the plant community due to the ever-present water table. The deeper-rooted major grasses would continue to benefit from the water table even during periods of extended drought. Occasional flooding that resulted from intense thunderstorms was usually brief in duration and the resulting inundation only temporarily affected major plants. Several of the tallgrasses, especially prairie cordgrass, had extensive rhizomes which enabled them to endure and recover from occasional siltation deposited during flood events.

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

As utilization of the area for production of domestic livestock replaced that of roaming bison herds, the ecological dynamics of the site were altered. In many areas the plant community changed from its original composition. Fencing enabled continuous grazing that in many areas led to overgrazing and accelerated changes in the vegetation. Alterations in the plant community were usually in proportion to when grazing occurred as well as its intensity. The 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 diminished in the plant community. They were replaced by the increase and spread of less palatable midgrasses and forbs. Where the history of overgrazing by domestic livestock was more intense, even the plants that initially increased were often replaced by even less desirable, and usually lower-producing plants.

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, often not an option in modern communities, also diminished. The absence of fire has contributed to a gradual increase of shrub and tree species in many areas. In some locations shrubs and trees have spread to the point 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.

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	**Grasses Dominant 53%**			1569-3363	
	prairie cordgrass	SPPE	*Spartina pectinata*	1009-2118	–
	switchgrass	PAVI2	*Panicum virgatum*	673-1692	–
	saltgrass	DISP	*Distichlis spicata*	560-1267	–
	western wheatgrass	PASM	*Pascopyrum smithii*	224-846	–
	Indiangrass	SONU2	*Sorghastrum nutans*	112-426	–
	big bluestem	ANGE	*Andropogon gerardii*	112-426	–
2	**Grasses Subdominant 35%**			897-1838	
	alkali sacaton	SPAI	*Sporobolus airoides*	897-2118	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	224-846	–
	Canada wildrye	ELCA4	*Elymus canadensis*	112-426	–
	buffalograss	BODA2	*Bouteloua dactyloides*	112-426	–
	blue grama	BOGR2	*Bouteloua gracilis*	112-426	–
3	**Grasses Minor 5%**			112-426	
	cosmopolitan bulrush	BOMA7	*Bolboschoenus maritimus*	78-213	–
	sedge	CAREX	*Carex*	78-213	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0-56	–
Forb					
4	**Forb Minor 5%**			168-426	
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	34-90	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	34-73	–
	sessileleaf ticktrefoil	DESE	*Desmodium sessilifolium*	22-56	–

	common sunflower	HEAN3	*Helianthus annuus*	22-56	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	11-45	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	11-45	–
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	11-45	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	11-45	–
	purple prairie clover	DAPU5	*Dalea purpurea*	11-45	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	6-22	–
Shrub/Vine					
5	**Shrubs and Cacti Trace 2%**			0-168	
	leadplant	AMCA6	*Amorpha canescens*	0-34	–
	false indigo bush	AMFR	*Amorpha fruticosa*	0-34	–
	willow baccharis	BASA	*Baccharis salicina*	0-34	–
	common buttonbush	CEOC2	*Cephalanthus occidentalis*	0-34	–
	roughleaf dogwood	CODR	*Cornus drummondii*	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

The plant diversity associated with the Saline Subirrigated ecological site, wetland inclusions, and the fact that it is frequently in riparian areas makes this site excellent wildlife habitat for white-tailed deer, wild turkey, bobwhite quail, and pheasant. Furbearers such as mink, raccoon, skunk, and opossum are common, as are predators like the bobcat, coyote, and red fox. When in good to excellent condition, the site is especially valuable as winter cover for many of these same species. A variety of birds are common to the site and may include scissortailed flycatchers, eastern and western kingbirds, brown thrasher, mourning dove, and red-winged blackbird. Hawks and owls commonly use this habitat, and bald eagles are occasional visitors. Waterfowl are commonly seen during their spring and fall migrations. Many species of amphibians (toads and frogs) along with numerous reptiles (lizards and snakes) reside on the site. Some animals are important because of their threatened and endangered status and require special consideration. Please check the Kansas Department of Wildlife and Parks (KDWP) website at www.ksoutdoors.com for the most current listing for your county. Grazing Interpretations Calculating Safe Stocking Rates: Proper stocking rates should be incorporated into a grazing management strategy that protects the resource, maintains or improves rangeland health, and is consistent with management objectives. In addition to usable forage, safe stocking rates should consider ecological condition, trend of the site, past grazing use history, season of use, stock density, kind and class of livestock, forage digestibility, forage nutritional value, variation of harvest efficiency based on preference of plant species, and/or grazing system, and site grazeability factors (such as steep slopes, site inaccessibility, or distance to drinking water). Often the current plant community does not entirely match any particular Community Phase as described in this Ecological Site Description. Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of inventory data will permit the establishment of a safe initial stocking rate. No two years have exactly the same weather conditions. For this reason, year-to-year and season-to-season fluctuations in forage production are to be expected on grazing lands. Livestock producers must make timely adjustments in the numbers of animals or in the length of grazing periods to avoid overuse of forage plants when production is

unfavorable, and to make advantageous adjustments when forage supplies are above average. Initial stocking rates should be improved through the use of vegetation monitoring and actual use records that include number and type of livestock, the timing and duration of grazing, and utilization levels. Actual use records over time will assist in making stocking rate adjustments based on the variability factors. Average annual production must be measured or estimated to properly assess useable forage production and stocking rates.

Hydrological functions

These have a high water table which normally varies from 2-6 feet below the soil surface. Runoff potential for this site is very low to high. 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 is very desirable for outdoor recreational pursuits because of its plant and wildlife diversity. Big game, white-tailed deer, and wild turkey are abundant and commonly hunted on this site, 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. Recreation can be a high value use, but excessive wetness due to the prevalent high water table is a significant site consideration. Common flooding may also be a hazard.

Wood products

Eastern redcedar can reach logging size on this site.

Other products

Except for use as rangeland, wildlife habitat, and recreation, common flooding, and the relatively high alkalinity and/or salinity content of the soils can severely limit the use of this site.

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, Saline Subirrigated, USDA, Soil Conservation Service, March, 1967. Range Site Description for Kansas, Saline Subirrigated, USDA-Soil Conservation Service, September, 1985. Ecological Site Description for Kansas, Saline Subirrigated (R079XY020KS) 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.

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Date	04/03/2018
Approved by	
Approval date	
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 5% 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 5-6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** From Abbyville series description: A--0 to 8 inches (0 to 20 centimeters); dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine roots throughout; 17 percent clay; noneffervescent throughout (HCl, 1 normal); moderately alkaline; abrupt smooth boundary. (2 to 9 inches thick; 5 to 23 centimeters 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 pedastalling. Interspacial 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 53% or 4,000lbs.: prairie cordgrass 900-1,890, switchgrass 600-1,510, inland saltgrass 500-1,130, western wheatgrass 200-755, big bluestem 100-380, Indiangrass 100-380

    Sub-dominant: Grasses sub-dominant 35% or 2,640lbs, alkali sacaton 800-1,890, composite dropseed 200-755, blue grama 100-380, buffalograss 100-380, Canada wildrye 100-380

    Other: Other grasses minor 5% 380 lbs. sedge, rush, Scribner's rosette grass Forbs Minor 5% 380 lbs.

    Additional: Shrubs trace 2% 150 lbs

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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.

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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): 5,750-9,250 lbs/acre. Representative value is 7,550 lbs/forage/acre. Below-normal precipitation during the growing season expect 5,750 lbs/forage/acre; and above-normal precipitation during the growing season expect 9,250 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.**

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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: 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.**
