Ecological site R073XY107KS
Sandy Floodplain

Last updated: 8/17/2020
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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): 073X–Rolling Plains and Breaks

This ESD is located in the Rolling Plains and Breaks Major Land Resource Area (MLRA) 73 of the Central Great Plains Winter Wheat and Range Region of the United States. MLRA 73 is in Kansas (78 percent) and Nebraska (22 percent). It makes up about 21,485 square miles (13,750,400 acres). The towns of Hays, Great Bend, and Dodge City, Kansas, and Alma, Curtis, Holdrege, and McCook, Nebraska are in this MLRA. The MLRA is bisected by Interstate 70. The Platte River is at the northern edge of the area, and the Arkansas River is at the southern edge.

Classification relationships

Major land resource area (MLRA): 073-Rolling Plains and Breaks

Ecological site concept

This site occurs on nearly level to moderately sloping floodplains and low terraces. The Sandy Floodplain site is characterized by soils with greater than 52 percent sand in the surface. The soils characteristic of this site formed in sandy alluvium from mixed sources.

Associated sites

R073XY103KS	**Subirrigated** The Subirrigated ecological site occurs adjacent to and in conjunction with Sandy Floodplain. This site occurs on nearly level to very gently sloping areas along drainageways of uplands and sand hills, below permanent springs, and on floodplains in valleys with high water tables. This site is subject to flooding except for positions on interdunes. The soils have a seasonal high water table within the root zone that limits the species capable of long-term survival within the site. This site receives runoff from areas higher on the landscape.
R073XY111KS	**Sandy Plains** The Sandy Plains ecological site occurs adjacent to and in conjunction with the Sandy Floodplain sites. The Sandy Plains ecological site occurs on plains.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	Not specified

Physiographic features

The western half of MLRA 73 and areas along the Arkansas River have remnants of the Tertiary river-laid sediments washed out onto the plains from erosion of the prehistoric Rocky Mountains in Colorado. In the valley of the Arkansas River, the wind reworked these sediments, forming a hummocky dune surface of eolian sand. A loess mantle occurs on the higher ground in the western half of the area. The Tertiary-age Ogallala and White River Formations cover Cretaceous Pierre Shale in the northern part of the area. The Ogallala Formation consists of loose to well cemented sand and gravel, and the White River Formation consists of ashy claystone and sandstone. Pierre Shale and Niobrara Chalk are at the surface in the valleys of the Republican, Smoky Hill, and Saline Rivers. Fort Hays limestone of the Niobrara Formation and Blue Hill shale of the Carlile Formation are at the surface in the valleys of the Saline and Smoky Hill Rivers. Shale can be seen exposed in the eastern half of this MLRA, in Kansas. Quaternary and more recent sand and gravel partially cover the shale in the river valleys.

The Sandy Floodplain site occurs on nearly level to moderately sloping floodplains, upland drainageways, alluvial fans, and terraces. This site consists of deep, well drained to excessively well drained soils formed in stratified moderately coarse alluvium on bottomlands. The surface layer textures are sandy or loamy. The Sandy Floodplain site receives runoff from areas higher on the landscape and flooding frequency ranges from rare to occasional while flooding duration is very brief to brief. Sedimentation is usually rare, but is common on alluvial fans and terraces. The water table may enter the root zone, but is not the dominant factor controlling vegetative growth. This site often occupies the first bench between the streambed and higher sandy land.

Figure 1. MLRA 73 Ecological Site block diagram.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Alluvial fan (3) Terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	490 – 850 m
Slope	0 – 10 %
Ponding depth	0 cm
Water table depth	60 – 150 cm

Climatic features

For MLRA 73 the average annual precipitation is 19 to 30 inches (48 to 76 centimeters). Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The maximum precipitation occurs from the middle of spring to the early autumn months. Precipitation in winter occurs as snow. The annual snowfall ranges from about 17 inches (45 centimeters) in the southern part of

the area to 24 inches (60 centimeters) in the northern part. The average annual temperature is 48 to 56 degrees F (9 to 14 degrees C). The freeze-free period averages 180 days and ranges from 145 to 210 days, increasing in length from northwest to southeast. 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)	150 days
Freeze-free period (average)	170 days
Precipitation total (average)	640 mm

- (1) WEBSTER DAM [USC00148648], Stockton, KS
- (2) CAMBRIDGE [USC00251415], Cambridge, NE
- (3) HARLAN CO LAKE [USC00253595], Republican City, NE
- (4) OXFORD 6NNW [USC00256454], Oxford, NE
- (5) ALTON 1 W [USC00140201], Alton, KS
- (6) DODGE CITY [USW00013985], Dodge City, KS
- (7) BELOIT [USC00140693], Beloit, KS
- (8) HOXIE [USC00143837], Hoxie, KS
- (9) NESS CITY [USC00145692], Ness City, KS

Influencing water features

This site is made up of alluvial soils that have a water table greater than 6 feet from the surface. Fluctuations with this water table occur and there could be times throughout the year that it is less than 6 feet from the surface. Water influences this site due to landform position. This site is adjacent to streams and is in a water receiving position.

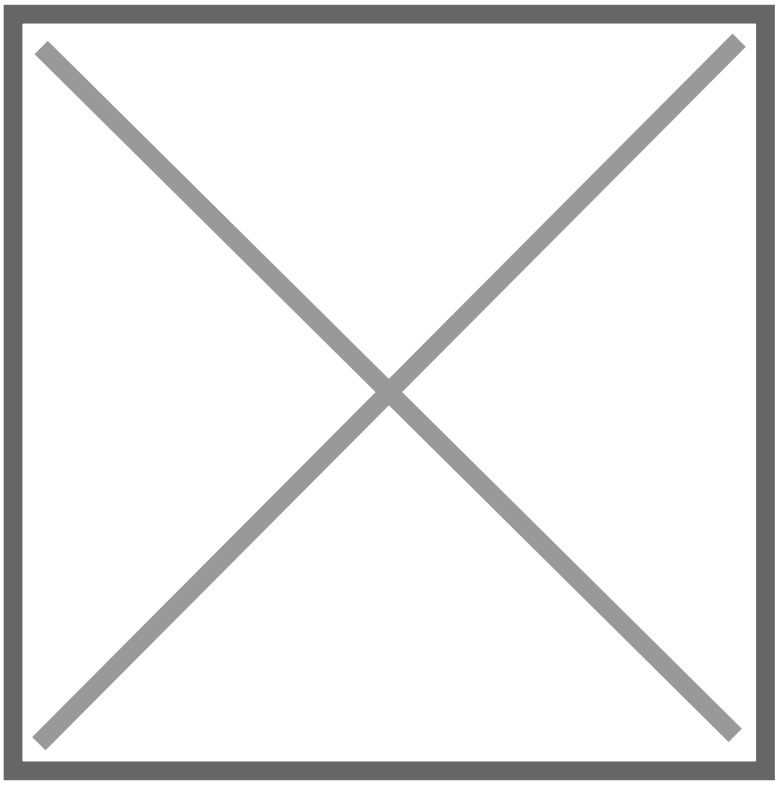

Figure 6. Fig.7-1 from National Range and Pasture Handbook.

Soil features

The soils on this site are moderately deep to deep and range from well drained to excessively well drained. The parent material is local alluvium formed in stratified moderately coarse alluvium bottomlands. The surface soil is from 4 to 20 inches thick, generally is light colored, and ranges widely from very fine sandy loam to loamy fine sand in texture. The underlying material is light colored and also ranges widely in texture. Carbonates are often leached from the upper soil profile, but may occur throughout in some soils. The content of organic matter is generally low to moderately low. Available water capacity ranges from very low to moderate. Flooding is rare to occasional, depending on landform, and normally is very brief.

Major soil series correlated to this ecological site are Bridgeport, Inavale, McCook, and Munjor.

These attributes represent 0-40 inches in depth or to the first restrictive layer.

Figure 7. Inavale soil series.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Sandy loam (3) Loamy sand
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Very rapid
Soil depth	0 – 150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	13.13 – 24.31 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)	6.7 – 10
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The grasslands of Major Land Resource Area (MLRA) 73, the Rolling Plains and Breaks, are located in south-central Nebraska and central Kansas. The site evolved under sub-humid (20-40 inch precipitation range) climates, characterized by much the same weather extremes of temperatures, rainfall, and snowfall we are familiar with today. As a result of glacial activity and other natural forces, then and later, plants have migrated from their places of origin, so that today MLRA 73 grasslands are simple-to-complex mixtures of perennial grasses and forbs, plus a few native annuals and biennials. Species composition has been modified by the introduction of Kentucky bluegrass and cool-season annual and perennial grasses, particularly Japanese brome (Launchbaugh and Owensby, 1978).

Through the ages to modern times, wildfires – many started by lightning, but most by primitive people – influenced development of fire-tolerant grasses and suppressed woody vegetation (Sauer, 1950). Certain woody plants, however, always were present as natural components of some grasslands. Browsing by animals and frequent prairie fires were largely responsible for maintaining “normal” amounts of woody species (Dyksterhuis, 1958). In primitive time, numerous large herbivores subjected herbaceous vegetation to grazing stress. After the last glacial retreat, bison emerged as the major dominant large grazer, although the prairies and plains simultaneously supported many pronghorn antelope, elk, deer, prairie dogs, rabbits, rodents, and insects. And each exerted grazing pressures on the vegetation (Launchbaugh and Owensby, 1978). There is little doubt that during and long before Spanish explorations into this area, most of the grassland was used almost continuously throughout the year by one roving herd of buffalo after another and other grazing animals (early exploration accounts reviewed by Dary in 1974; diaries of early Kansas residents cited by Choate and Fleharty in 1975). Grazing and trampling by bison and their associates were often intensive, as was uncontrolled grazing by livestock in the late 1800s after most of the wild grazers had been eliminated.

The plant communities for the Sandy Floodplain ecological site are dynamic due to the complex interaction of many ecological processes. The interpretive plant community for this site is the Reference Plant Community. The Reference Community has been determined by the study of rangeland relic areas, areas protected from excessive disturbance, areas under long term rotational grazing strategies, literature of plant communities from the early 1900s, and local expertise. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

This ecological site is made up of a Grassland State, a Woody State, and a Tillage State. The Grassland State is characterized by non-broken land (no tillage), warm-season bunchgrasses, sod forming grasses, forbs, and shrubs. The Woody State is characterized by a community made up of eastern redcedar, Siberian elm, Russian Olive, and cottonwood with few remnant native grasses making up the understory and forbs. The Tillage State has been mechanically disturbed (broken) by equipment and includes either a variety of reseeded warm-season bunch and sod-forming grasses or early successional plants to include the latter as well as annual grasses and forbs.

Vegetation changes are expected within this ecological site and will be dependent on the site's geographical location inside Major Land Resource Area (MLRA) 73. Variation in precipitation east and west is not as affected as is temperature north and south. The northern part of MLRA 73 is characterized by cooler temperatures and shorter growing season in respect to the southern end. As a result, cool-season bunchgrasses and sod-formers proliferate. Growth of native cool-season plants begins about April 15, and continues to about June 15. Native warm-season plants begin growth about May 15, and continue to about August 15. Green-up of cool-season plants may occur in September and October if adequate moisture is available (weather data from National Climate Data Center, 1980-2010).

The Sandy Floodplain ecological site developed with occasional fires as part of the ecological processes. Historically, it is believed that the fires were infrequent, randomly distributed, and started by lightning at various times throughout the season when thunderstorms were

likely to occur. It is also believed that pre-European inhabitants may have used fire as a management tool for attracting herds of large migratory herbivores (bison, elk, deer, and pronghorn). The impact of fire over the past 100 years has been relatively insignificant due to the human control of wildfires and the lack of acceptance of prescribed fire as a management tool in the sub-humid, High Plains and Smoky Hills area.

The degree of herbivory (feeding on herbaceous plants) has a significant impact on the dynamics of the site. Historically, periodic grazing by herds of large, migratory herbivores was a primary influence. Secondary influences of herbivory by species such as prairie dogs, grasshoppers, gophers, and root-feeding organisms impacted the vegetation historically, and continue to this day.

The management of herbivory by humans through grazing of domestic livestock and/or manipulation of wildlife populations has been a major influence on the ecological dynamics of the site. This management, coupled with the High Plains and Smoky Hills climate, largely dictates the plant communities for the site.

Drought cycles were part of the natural range of variability within the site and historically have had a major impact upon the vegetation. The species composition changes according to the duration and severity of the drought cycle (Albertson and Weaver, 1940).

This site appears on nearly level bottomland adjacent to streams in the area. It is seldom found as extensive areas, but rather occurs as isolated pockets. Management of this ecological site by itself is difficult.

The general response of this site to long-term continuous grazing pressure is to gradually lose the vigor and reproductive potential of the tall- and midgrass species, and shift the plant community toward cool-season and annual species.

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

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	**Warm-season tallgras dominant 60%**			1373-2550	
	sand bluestem	ANHA	*Andropogon hallii*	785-1569	–
	switchgrass	PAVI2	*Panicum virgatum*	196-588	–
	Indiangrass	SONU2	*Sorghastrum nutans*	196-588	–
	prairie sandreed	CALO	*Calamovilfa longifolia*	118-224	–
	composite dropseed	SPCO16	*Sporobolus compositus*	0-34	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0-34	–
2	**Warm-season mid-, shortgrass subdominant 15%**			118-588	
	little bluestem	SCSC	*Schizachyrium scoparium*	196-588	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	118-224	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	0-118	–
	blue grama	BOGR2	*Bouteloua gracilis*	0-34	–
3	**Cool-season minor 10%**			84-196	
	western wheatgrass	PASM	*Pascopyrum smithii*	118-224	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0-118	–
	sedge	CAREX	*Carex*	0-34	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0-34	–
	thin paspalum	PASE5	*Paspalum setaceum*	0-34	–
Forb					
4	**Forb minor component 10%**			106-392	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	17-67	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	17-67	–

	Texas croton	CRTE4	*Croton texensis*	17-67	–
	prairie sunflower	HEPE	*Helianthus petiolaris*	17-67	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	6-22	–
	lemon scurfpea	PSLA3	*Psoralidium lanceolatum*	6-22	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	6-22	–
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	6-22	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	6-22	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	6-22	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	6-22	–
Shrub/Vine					
5	**Trees, shrubs, and cacti minor component 5%**			22-196	
	sand sagebrush	ARFI2	*Artemisia filifolia*	0-56	–
	eastern cottonwood	PODE3	*Populus deltoides*	0-56	–
	western sandcherry	PRPUB	*Prunus pumila var. besseyi*	0-56	–
	soapweed yucca	YUGL	*Yucca glauca*	0-56	–

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 3.2 plant community composition

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

Animal community

Animal Community Wildlife Interpretations This ecological site is characterized by sandy soils that are nearly level to weakly hummocky and are usually associated with the sandy rivers and streams. These sites have historically been subject to frequent flooding, sorting, scouring, and redeposition. Therefore, vegetative composition can change quickly and frequently. As a result, virtually none of these sites have been cultivated. Since these areas are not farmed, they are often utilized for wintering areas by livestock, especially where trees are present. Overutilization by livestock tends to degrade terrestrial as well as aquatic wildlife habitat. Historically these sites have supported a diversity of wildlife because of the mixture of forbs and grasses and the nearly steady supply of water. These forbs and grasses were utilized by a number of large mammals including deer, elk, and bison. Due to all landscape's inherent heterogeneity, some areas were not grazed uniformly by these historic large herds of grazing animals. This type of grazing enhanced habitat for wildlife by creating a mosaic pattern, or patchiness, of vegetative structural diversity throughout the landscape. Wildlife native to the site depend on a plant community diverse in species and structure. This need is evident in the variability of known habitat requirements of grassland associated wildlife. If cottonwood trees become established on these sites, the types of wildlife species using the area will shift from grassland species to woodland species. Striped skunks, opossums, porcupines, and whitetail deer habitat will increase. Habitat also becomes more suitable for northern bobwhite quail and turkeys. In recent times cottonwood trees have begun dying off as a result of irrigation and a corresponding reduction in the water table. With the loss of water flows, very few new trees are able to replace them. These dead cottonwood trees have created ideal habitat for species that utilize dead "snags" such as northern flickers, red-headed woodpeckers, wood ducks, and raccoons. The site's close proximity to permanent or seasonal water in streams generally meets the needs of wildlife requiring open water for drinking. Seasonal pools present during the spring offer breeding habitat for amphibians. Periodic events such as prolonged drought, wildfire, disease, or high insect numbers will alter plant community diversity and structure and associated wildlife species. The Reference Plant Community The high diversity of grasses and forbs in this community provides habitat for a diverse group of insects. Areas with high forb diversity will generally support more insects such as the leaf-hoppers important to young grassland nesting birds. Grasshoppers, associated with grasses, are a critical food source for birds in later stages of development. Plains garter

snakes and northern water snakes are common reptiles on the site. Areas with high forb and insect populations coupled with nearby roost trees offer suitable brood habitat for wild turkeys. Reference Plant Communities with tall-, native, warm-season bunchgrasses, and openings at ground level offer suitable northern bobwhite quail nesting habitat. Small mammals such as white-footed mice are common and will attract raptors such as red-tailed hawks, great-horned owls, and eagles if suitable perches are available. Small mammals also provide prey for coyotes and other predators. Animal Community – Grazing Interpretations Grazing by domestic livestock is one of the major income-producing industries in the area. Rangelands in this area provide yearlong forage under prescribed grazing for cattle, sheep, horses, and other herbivores. During the dormant period, livestock may need supplementation based on reliable forage analysis. 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 principal factor limiting forage production on this site. The soils on this site are moderately deep to deep and range from well drained to excessively well drained. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff.

Recreational uses

The sandy nature of this site limits its use primarily to rangeland. Large areas, however, are cultivated successfully when high residue-producing crops are grown and the residues are managed to prevent wind erosion.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

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 individuals involved in developing the Sandy Floodplain (formerly Sandy Lowland) ESD in 2002 include Darrell Beougher, Jon Deege, Lorne Denetclaw, Sharla Schwien, Joel Willhoft, Dwayne Rice, and Bob Tricks from Kansas; and Nadine Bishop, Kristin Dickinson, Kim Stine, Dana Larson, and Chuck Markley from Nebraska. Range Condition Guides and Technical Range Site Descriptions for Kansas, Sandy Lowland, USDA, Soil Conservation Service, August, 1967. Range Site Description for Kansas, Sandy Lowland, USDA-Soil Conservation Service, September, 1983. Ecological Site Description for Kansas, Sandy Lowland (R073XY023KS) located in Ecological Site Information System (ESIS), 2007.

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Contributors

Chris Tecklenburg

Approval

David Kraft, 8/17/2020

Acknowledgments

The ecological site development process is a collaborative effort, conceptual in nature, dynamic and is never considered complete. I thank all those who set the foundational work in the early 2000s in regards to this ESD. I thank all those who contributed to the development of this site. In advance, I thank those who would provide insight, comments and questions about this ESD in the future. Non-discrimination Statement In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program,

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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.

Author(s)/participant(s)	Chris Tecklenburg Revision 5-05-2017 David Kraft, John Henry, Doug Spencer and Dwayne Rice Original Authors 2-2005
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Date	09/30/2019
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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2. **Presence of water flow patterns:** **There is no evidence of water flow patterns, soil deposition or erosion on the site.**

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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:** There are no gullies present on the site.

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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.

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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 sufficient to intercept the majority of raindrops. Soil organic matter is incorporated into aggregates at the surface, and/or adhesion of decomposing organic matter is present, and/or biological crusts are present on the surface. 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):** OSD from Inavale series; A--0 to 8 inches; dark grayish brown (10YR 4/2) moist, loamy fine sand; weak coarse granular structure; loose; slightly alkaline; clear smooth boundary. AC--8 to 17 inches ; grayish brown (10YR 5/2) moist, loamy sand; single grained; loose; slightly alkaline; abrupt smooth boundary. C--17 to 79 inches; light brownish gray (10YR 6/2) moist, fine sand; single grained; loose; thin strata of finer and coarser textured sediments; slightly alkaline.

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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 community composition or distribution. Plant composition and spatial distribution are adequate to prevent any rill formation and/or pedastalling. Plant rooting patterns, litter production, decomposition processes, and spatial distribution are adequate to establish good infiltration and prevent all runoff.

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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 animal impact or cultural practices.

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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: Warm-season tallgrasses Dominant-60%. Sand bluestem 700-1400, Indiangrass 175-525, switchgrass 175-525, prairie sandreed 105-200, composite dropseed 0-30, sand dropseed 0-30.

    Sub-dominant: Warm-season mid-, shortgrass sub-dominant 15%. little bluestem 175-525, sideoats grama 105-200, sand lovegrass 0-105, blue grama 0-30.

Other: Cool-season grasses minor component 10%. Canada wildrye 0-105, western wheatgrass 105-200, sedge 0-30, Scribner's rosette grass 0-30, thin paspalum 0-30.

Additional: Forbs Minor component 10%. Trees, Shrubs, and Cacti Minor 5%.

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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. Plant litter at 45-55% cover, at a depth of .25 of an inch.**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** **3,000 pounds of production per ac/yr for a below average year, 4,500 pounds of production per ac/yr for an above average year. Relative value is 3,000 pounds of production per ac/yr.**

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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:** **The number and distribution of tillers or rhizomes is assessed on perennial plants occupying the evaluation area. No reduction in vigor or capability to produce seed or vegetative tillers given the constraints of climate and herbivory.**
