United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Shallow Limy
(formerly Limestone Breaks in Co)

Site ID: R072XA028KS

Major Land Resource Area: 72 – Central High Tableland
Due to the climatic gradient (effective precipitation, growing season, etc.) within MLRA 72, the plant communities will differ between the northern and southern portions of this major land resource area. A transition zone within these two areas generally lies on either side of the Smokey Hill River drainage. Judgment will need to be used when determining which Ecological Site Description best fits field conditions within this transition zone.

Physiographic Features

This site occurs on nearly level to very steep uplands (including vertical rock faces) that are comprised of sandstone, limestone, and siltstone or shale bedrock at shallow depths. This site produces runoff to areas lower on the landscape. This site is subject to severe erosion by water if the vegetative cover is reduced by overgrazing and fire events. Vehicular traffic on this site is very limited to impossible.

Landform: hill, plain

Aspect: N/A

	Minimum	Maximum
Elevation (feet):	2000	5000
Slope (percent):	0	60
Water Table Depth (inches):	60	>80
Flooding:		
Frequency:	none	none
Duration:	none	none
Ponding:		
Depth (inches):	0	0
Frequency:	none	none
Duration:	none	none
Runoff Class:	low	very high

Climatic Features

Annual precipitation ranges from 16 to 20 inches per year. Hourly winds are estimated to average about 10 miles per hour annually, ranging from 15-30 miles per hour during the spring to 5-15 miles per hour during late summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

	Minimum	Maximum
Frost-free period (days):	141	155
Freeze-free period (days):	161	174
Mean Annual Precipitation (inches):	16	20

Average Monthly Precipitation (inches) and Temperature (ºF):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.41	9.7	43.0
February	0.39	0.51	14.8	48.3
March	0.85	1.13	22.7	55.5
April	1.50	1.98	33.5	65.7
May	2.60	3.31	44.9	75.2
June	2.56	3.53	54.9	85.4
July	2.55	3.04	60.7	92.1
August	2.16	2.30	58.5	90.2
September	1.23	1.54	47.0	81.7
October	1.04	1.09	34.0	70.4
November	0.50	0.63	21.1	54.3
December	0.41	0.42	12.8	44.9

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
CO1121	Burlington, CO	1918	2001
CO9243	Wray, CO	1918	2001
KS3153	Goodland WSO, KS	1948	2001
NE4900	Lodgepole, NE	1948	2001
NE6065	North Platte WSO AP, NE	1948	2001

For local climate stations that may be more representative, refer to http://www.hprcc.unl.edu or http://www.wcc.nrcs.usda.gov.

Influencing Water Features

Wetland Description:	System	Subsystem	Class	Sub-class
None	None	None	None	None

Stream Type: None

Representative Soil Features

The soils on this site range from less than 10 to 20 inches deep over caliche or fractured sedimentary bedrock. These soils have loamy to sandy surface layers and subsoils. They are calcareous throughout and have very low to low available water capacity. Vertical rock faces are common. Soils in this site generally have moderately low organic matter.

Exposed areas of limestone and bare ground are inherent to this site. Where slopes are gentle, water flow paths should be broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers and exhibit slight to no evidence of rills, wind scoured areas or pedestaled plants.

As slopes become steep and bare areas increase, expect to find evidence of water flow patterns and pedestaled plants. Sub-surface soil layers, where not affected by bedrock, are non-restrictive to water movement and root penetration.

Major soil series correlated to this ecological site include: Canlon, Canyon, Penrose and Potter,

Other soil series that have been correlated to this site include: Travessilla (very shallow <10 inches), rock land

Parent Material Kind: residuum
Parent Material Origin: limestone
Surface Texture: loam, loamy sand, loamy fine sand
Surface Texture Modifier: gravelly, very gravelly, channery (modifiers not present in all profiles)

Subsurface Texture Group: loamy
Surface Fragments ≤ 3" (% Cover): 0 - 35
Surface Fragments > 3" (%Cover): 0 - 15
Subsurface Fragments ≤ 3" (% Volume): 0 - 60
Subsurface Fragments > 3" (% Volume): 0 - 25

	Minimum	Maximum
Drainage Class:	well	somewhat excessively
Permeability Class:	slow	moderate
Depth (inches):	0	20
Electrical Conductivity (mmhos/cm):*	0	2
Sodium Absorption Ratio:*	0	0
Soil Reaction (1:1 Water):*	7.4	8.4
Soil Reaction (0.1M CaCl2):*	N/A	N/A
Available Water Capacity (inches)*:	1.5	4.3
Calcium Carbonate Equivalent (percent)*:	0	40

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

Plant Communities

Ecological Dynamics of the Site:
The plant community for this site is dynamic due to the complex interaction of many ecological processes. The interpretive plant community for this site is the Historic Climax Plant Community (HCPC). The HCPC has been determined by the study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing strategies. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

This site developed with occasional fires being 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). Trees have escaped the effects of fire and 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 semi-arid, High Plains area.

The vegetation on this site is impacted by topography. The percent (steepness) and aspect of the slope interact with the other ecological processes to further influence the vegetative dynamics of the site.

Drought cycles have historically had a major impact upon the vegetation of this site. The species composition changes according to the duration and severity of the drought cycle. Initially, the shorter rooted species die out and the deeper-rooted species persist. Eventually the opened up spaces will go through secondary succession as higher precipitation cycles return.

This site generally occurs on the more sloping parts of the landscape. The flatter slopes of this site and adjacent more level sites are preferred by livestock, which can lead to a grazing distribution problem. Water locations, salt placement, and other aids help distribute grazing on this site. Other management techniques such as concentrated grazing and/or grazing systems also help distribute grazing more evenly.

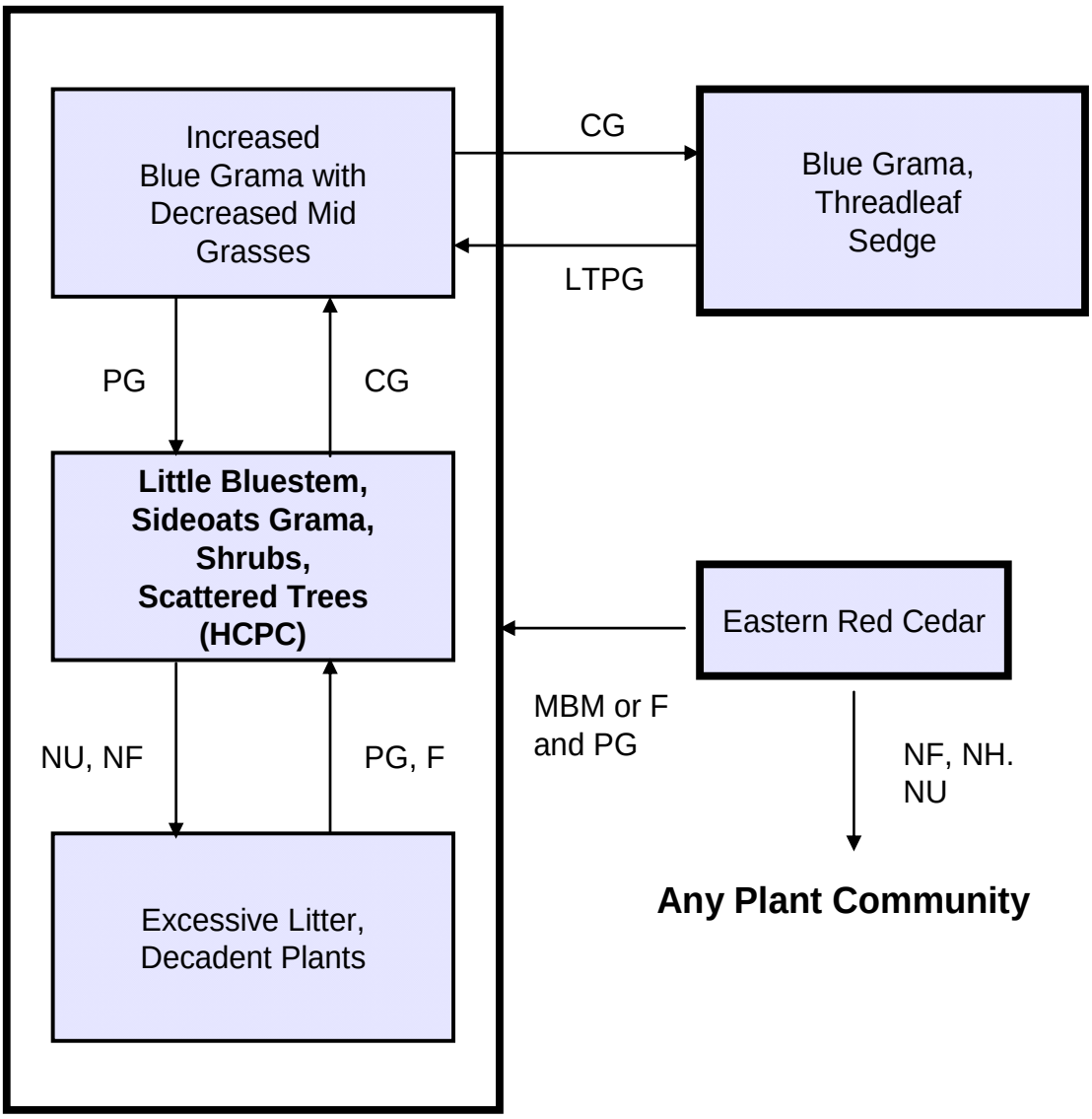
Erosion, caused by concentrated flow and livestock trailing is a common problem on the steeper portion of the site. These problems are accentuated with long term heavy grazing pressure.

The tall and mid-grass species generally escape excessive grazing pressure on the steeper less accessible areas. The tall and mid grasses maintained on the steep areas help provide a source for these species to repopulate the site after long periods of drought and/or overgrazing. The use of grazing management that includes needed distribution tools, proper stocking, and adequate recovery periods during the growing season, helps restore this site to its productive potential.

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. Fall green up of cool season plants may occur in September and October if adequate moisture is available.

The following diagram illustrates the common plant communities that can occur on the site and the transition pathways (arrows) among communities. Bold lines surrounding each plant community or communities represent ecological thresholds. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CG - continuous grazing without adequate recovery opportunity, **F** - fire, **HCPC** - Historic Climax Plant Community, **LTPG** - long term prescribed grazing (>40 years), **MBM** - mechanical brush management, **NF** - no fire, **NH** - non- harvest , **NU** - non-use, **PG** - prescribed grazing with adequate recovery opportunity

Plant Community Composition and Group Annual Production

			Little Bluestem, Sideoats Grama (HCPC)		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*1*	*840 - 960*	*70 - 80*
Indian ricegrass	Achnatherum hymenoides	ACHY	1	0 - 12	0 - 1
big bluestem	Andropogon gerardii	ANGE	1	60 - 180	5 - 15
red threeawn	Aristida purpurea var. longiseta	ARPUL	1	0 - 12	0 - 1
sideoats grama	Bouteloua curtipendula	BOCU	1	180 - 240	15 - 20
blue grama	Bouteloua gracilis	BOGR2	1	60 - 120	5 - 10
hairy grama	Bouteloua hirsuta	BOHI2	1	12 - 60	1 - 5
buffalograss	Bouteloua dactyloides	BODA2	1	0 - 12	0 - 1
threadleaf sedge	Carex filifolia	CAFI	1	12 - 36	1 - 3
sun sedge	Carex inops ssp. heliophila	CAINH2	1	12 - 36	1 - 3
bottlebrush squirreltail	Elymus elymoides ssp. elymoides	ELELE	1	0 - 12	0 - 1
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	0 - 12	0 - 1
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	0 - 60	0 - 5
prairie junegrass	Koeleria macrantha	KOMA	1	0 - 12	0 - 1
plains muhly	Muhlenbergia cuspidata	MUCU3	1	12 - 36	1 - 3
ring muhly	Muhlenbergia torreyi	MUTO2	1	0 - 12	0 - 1
green needlegrass	Nassella viridula	NAVI4	1	12 - 60	1 - 5
switchgrass	Panicum virgatum	PAVI2	1	60 - 120	5 - 10
western wheatgrass	Pascopyrum smithii	PASM	1	60 - 120	5 - 10
tumblegrass	Schedonnardus paniculatus	SCPA	1	0 - 12	0 - 1
little bluestem	Schizachyrium scoparium	SCSC	1	180 - 240	15 - 20
Indiangrass	Sorghastrum nutans	SONU2	1	24 - 60	2 - 5
sand dropseed	Sporobolus cryptandrus	SPCR	1	0 - 12	0 - 1
sixweeks fescue	Vulpia octoflora	VUOC	1	0 - 12	0 - 1
other perennial grasses		2GP	1	12 - 60	1 - 5
FORBS			*2*	*120 - 180*	*10 - 15*
western ragweed	Ambrosia psilostachya	AMPS	2	0 - 12	0 - 1
green sagewort	Artemisia dracunculus	ARDR4	2	0 - 12	0 - 1
Louisiana sagewort	Artemisia ludoviciana	ARLU	2	0 - 12	0 - 1
mat loco	Astragalus kentrophyta	ASKE	2	0 - 12	0 - 1
woolly locoweed	Astragalus mollissimus	ASMO7	2	0 - 12	0 - 1
James' cryptantha	Cryptantha cinerea var. jamesii	CRCIJ	2	0 - 12	0 - 1
purple prairie clover	Dalea purpurea var. purpurea	DAPUP	2	12 - 24	1 - 2
sulfur-flower buckwheat	Eriogonum umbellatum	ERUM	2	0 - 12	0 - 1
hairy goldaster	Heterotheca villosa	HEVI4	2	0 - 12	0 - 1
dotted gayfeather	Liatris punctata	LIPU	2	12 - 24	1 - 2
rush skeletonplant	Lygodesmia juncea	LYJU	2	0 - 12	0 - 1
ironplant goldenweed	Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida	MAPIP4	2	0 - 12	0 - 1
cutleaf evening-primrose	Oenothera coronopifolia	OECO2	2	0 - 12	0 - 1
Lambert crazyweed	Oxytropis lambertii	OXLA3	2	0 - 12	0 - 1
silky crazyweed	Oxytropis sericea	OXSE	2	0 - 12	0 - 1
sessile nailwort	Paronychia sessiliflora	PASE	2	0 - 12	0 - 1
Wyoming feverfew	Parthenium alpinum	PAAL6	2	0 - 12	0 - 1
narrowleaf penstemon	Penstemon angustifolius	PEAN4	2	0 - 12	0 - 1
Hood's phlox	Phlox hoodii	PHHO	2	0 - 12	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	2	0 - 12	0 - 1
slimflower scurfpea	Psoralidium tenuiflorum	PSTE5	2	0 - 12	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	2	0 - 12	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	0 - 12	0 - 1
desert princesplume	Stanleya pinnata var. pinnata	STPIP	2	0 - 12	0 - 1
heath aster	Symphyotrichum ericoides	SYER	2	0 - 12	0 - 1
stemless hymenoxys	Tetraneuris acaulis	TEAC	2	0 - 12	0 - 1
Colorado greenthread	Thelesperma filifolium	THFI	2	0 - 12	0 - 1
American vetch	Vicia americana	VIAM	2	0 - 12	0 - 1
other perennial forbs		2FP	2	0 - 60	0 - 5
SHRUBS			*3*	*120 - 180*	*10 - 15*
fringed sagebrush	Artemisia frigida	ARFR4	3	0 - 12	0 - 1
fourwing saltbush	Atriplex canescens	ATCA2	3	0 - 36	0 - 3
rubber rabbitbrush	Ericameria nauseosa ssp. nauseosa var. nauseosa	ERNAN5	3	0 - 12	0 - 1
broom snakeweed	Gutierrezia sarothrae	GUSA2	3	0 - 12	0 - 1
winterfat	Krascheninnikovia lanata	KRLA2	3	0 - 60	0 - 5
plains pricklypear	Opuntia polyacantha	OPPO	3	0 - 12	0 - 1
chokecherry	Prunus virginiana	PRVI	3	12 - 36	1 - 3
skunkbush sumac	Rhus trilobata	RHTR	3	12 - 24	1 - 2
golden currant	Ribes aureum	RIAU	3	12 - 24	1 - 2
wax currant	Ribes cereum	RICE	3	0 - 24	0 - 2
western snowberry	Symphorocarpus occiddentalis	SYOC	3	12 - 24	1 - 2
small soapweed	Yucca glauca	YUGL	3	0 - 12	0 - 1
other shrubs		2SHRUB	3	12 - 36	1 - 3
TREES			*4*	*12 - 120*	*1 - 10*
hackberry	Celtis occidentalis	CEOC	4	12 - 36	1 - 3
Rocky mountain juniper	Juniperus scopulorum	JUSC2	4	12 - 36	1 - 3
Eastern redcedar	Juniperus virginiana	JUVI	4	12 - 84	1 - 7

Annual Production lbs./acre	LOW	RV*	HIGH
GRASSES & GRASS-LIKES	360 -	834	- 1205
FORBS	115 -	150	- 185
SHRUBS	115 -	150	- 185
TREES	10 -	66	- 125
TOTAL	600 -	1200	- 1700

Plant

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. *RV = Representative value.

Community Narratives

Little Bluestem, Sideoats Grama Plant Community

This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This plant community can be found on areas that are grazed and where the grazed plants receive adequate periods of recovery during the growing season. The potential vegetation is about 70-80% grasses and grass-likes, 10-15% forbs, 10-15% shrubs, and 1-10% trees.


Photo by Jeff Nichols, NRCS, Nebraska, 2008

The principal grasses that dominate this community are little bluestem and sideoats grama. Secondary grasses are switchgrass, big bluestem, blue grama, needleandthread, and western wheatgrass. Threadleaf sedge and sun sedge are common. Dominant forbs include purple prairie clover, dotted gayfeather, mat loco, sessile nailwort and Hood's phlox. Winterfat, fourwing saltbush, are found on the western reaches of the MLRA. Skunkbush sumac, wax currant, chokecherry, western snowberry and golden current are key shrubs. Eastern redcedar and/or Rocky Mountain juniper, and hackberry occur in varying amounts depending upon fire frequency, and topography.

The nutrient cycle, water cycle and energy flow are functioning properly. Litter is uniformly distributed where vegetative cover is continuous. Some litter movement may occur on steeper slopes. Decadence and natural plant mortality is low. This community is resistant to many disturbances except continuous grazing, and/or development into urban or other uses.

Total annual production ranges from 600 to 1700 pounds of air-dried vegetation per acre per year and will average 1200 pounds.

The following is the growth curve expected during a normal year:
Growth Curve Number: KS7211
Growth Curve Name: Warm season dominant, cool season sub-dominant; upland shallow soils

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	8	19	30	18	15	6	2	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery periods between grazing events will shift this plant community to the *Increased Blue Grama with Decreased Mid Grass Plant Community*.
- Non-use (rest) and no fire will move this plant community to the *Excessive Litter, Decadent Plants Community*. No fire, no harvest and non-use will convert this and "Any Plant Community" plant community to the *Eastern Redcedar Plant Community.*

- Prescribed grazing that allows for adequate recovery opportunity following each grazing event and proper stocking will maintain the *Little Bluestem, Sideoats Grama, Shrubs, Scattered Trees Plant Community (HCPC).*

Increased Blue Grama with Decreased Mid Grass Plant Community

This plant community developed with continuous grazing without adequate recovery periods during the growing season. The dominant grass is blue grama. Threadleaf sedge and small soapweed have increased. Little bluestem and sideoats grama are still present. Big bluestem, switchgrass, and western wheatgrass have been significantly reduced. Forbs and shrubs that have increased are mat loco, sessile nailwort, Hood's phlox, hairy goldaster, western ragweed, slimflower scurfpea, small soapweed, and fringed sagebrush. Purple prairie clover, winterfat, fourwing saltbush, currants, and skunkbush sumac have been significantly reduced. Trees are present. Plant production and litter levels are lower compared to the HCPC. Soil erosion may be a concern at this point especially on high travel or impact areas. Some flow paths may be connected and rills may be present. Water cycle and nutrient cycle are beginning to be affected by the reduction of key warm/cool season species, forbs and shrubs.

Total annual production ranges from 300 to 1000 pounds of air-dried vegetation per acre per year and will average 700 pounds.

The following is the growth curve expected during a normal year:
Growth Curve Number: KS7212
Growth Curve Name: Warm season dominant; upland shallow soils

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	2	10	45	25	15	3	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery opportunities between grazing events will shift this plant community across an ecological threshold to the *Blue Grama, Threadleaf Sedge Plant Community*.
- No fire, no harvest and non-use will convert this and "Any Plant Community" plant community to the *Eastern Redcedar Plant Community.*
- Prescribed grazing that allows for adequate recovery periods between grazing events and proper stocking will move this plant community to the *Little Bluestem, Sideoats Grama, Shrubs, Scattered Trees Plant Community (HCPC)***.**

Excessive Litter, Decadent Plants Community

This plant community developed under many years of non-use (rest) and lack of fire. Plant species resemble the HCPC, however, species frequency and production will be reduced. Eventually, litter levels can become high enough to cause stagnation and mortality of various species such as little bluestem, sideoats grama, and blue grama. Bunchgrasses typically develop dead centers and rhizomatous grasses form small communities because of a lack of stimulation by grazing animals. Removal of fire will increase Eastern red cedar dominance, especially on the eastern portion of the resource area.

Initially, high surface litter levels will minimize erosion. Advanced stages of non-use (rest) or lack of fire can result in lower vigor in plants, causing an increase in bare areas. These areas can be susceptible to water erosion, especially on steeper slopes.

Total annual production ranges from 200 to 800 pounds of air-dried vegetation per acre per year.

The following is the growth curve expected during a normal year:
Growth Curve Number: KS7213
Growth Curve Name: Excess litter; upland shallow soils

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	18	35	20	12	5	3	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Prescribed grazing that allows for adequate recovery opportunity between grazing events or fire followed by prescribed grazing will shift this plant community to the *Little Bluestem, Sideoats Grama, Shrubs, Scattered Trees Plant Community (HCPC)*.

Blue Grama, Threadleaf Sedge Plant Community

This plant community developed with continuous grazing without adequate recovery periods between grazing events. The dominant species are blue grama and threadleaf sedge. Hairy grama and red threeawn have increased. Most mid grasses, key forbs and shrubs that were present in the HCPC have been removed. Little bluestem and sideoats grama may exist in remnant amounts on steeper slopes. Forbs and shrubs that continue to increase are mat loco, sessile nailwort, Hood's phlox, fringed sagebrush, broom snakeweed and small soapweed. In the absence of fire, Eastern redcedar increases in the eastern portion of the resource area.

A major shift in species composition and plant functional groups has taken place. Nutrient and water cycles have been negatively affected due to the loss of nitrogen fixing forbs and deeper-rooted plants. Soil erosion is a concern. Rills and pedestaled plants with exposed roots are apparent.

Total annual production ranges from 200 to 600 pounds of air-dried vegetation per acre per year and will average 350 pounds.

The following is the growth curve expected during a normal year:
Growth Curve Number: KS7212
Growth Curve Name: Warm season dominant; upland shallow soils

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	2	10	45	25	15	3	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Non-use (rest) and no fire will move this plant community to the *Excessive Litter, Decadent Plants Community*. No fire, no harvest and non-use will convert this and "Any Plant Community" plant community to the *Eastern Redcedar Plant Community.*
- Long term prescribed grazing that allows for adequate recovery opportunities between grazing events and proper stocking will move this plant community toward the *Increased Blue Grama with Decreased Mid Grass Plant Community* and will eventually return to the *HCPC* or associated successional plant communities assuming an adequate seed/vegetative source is/are available. This transition may take upwards of 40 years or more to achieve.

Eastern Redcedar Plant Community

Eastern redcedar tends to dominate in the central to eastern portion of the MLRA, while Rocky Mountain juniper occurs in the western portions of the MLRA. There are areas within the MLRA where these two species overlap. Remnant populations were able to escape wildfire devastation due to rough topography providing protection and random patterns of wildfires. Early pioneers and settlers harvested much of the timber for lumber, fence posts, and firewood. Total annual production during an average year varies significantly, depending on the percentage of canopy cover.

Transitions or pathways leading to other plant communities are as follows:

Mechanical brush management or fire combined with prescribed grazing will move this plant community to the *Increased Blue Grama with Decreased Mid Grasses Plant Community* and will eventually return to the *HCPC* or associated successional plant communities assuming an adequate seed source exists.

Ecological Site Interpretations (under development)

Animal Community – Wildlife Interpretations

Historically, the predominance of grasses and forbs on this site supported grazers and mixed feeders such as bison, elk, deer and pronghorn and a variety of grassland associated birds and small mammals. Due to the heterogeneity inherent in all landscapes, 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.

Adjacent sites that are more productive are often preferred by grazing animals. This can lead to overgrazing on this site due to the lower productivity and fragile nature of the soils, especially under continuous grazing systems.

Skunkbrush sumac, wax current and golden current may be present and locally abundant on this site. Low growing shrubs offer escape and thermal cover for several species of wildlife. Undisturbed sites are at risk from tree invasion from species such as eastern red cedar. Limestone or sandstone outcroppings are common on this site and provide specialized habitat for many species not found elsewhere.

Periodic events such as prolonged drought, wildfire, disease, or high insect numbers will alter plant community diversity and structure and associated wildlife species. Plant community structure is highly dependant on rainfall since the water holding capacity of the site is very low.

Little Bluestem, Sideoats Grama, Shrubs, Scattered Trees (HCPC) Plant Community
The high diversity of grasses and forbs in this community provides habitat for a diverse group of insects. These sites often have very diverse forb populations. 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. Reptiles such as the prairie lizard and the Great Plains rat snake can often be found in the limestone outcroppings common to this site. Rock outcroppings also provide nesting sites for ferruginous hawks that feed on pocket gophers and prairie dogs that inhabit nearby upland sites. Rock crevices can be potential roost sites for a bat called the small-footed myotis. Rock wrens may also use these areas to nest.

With reduced cover of the taller native bunch grasses and a decrease in residual plant cover that is usually associated with the degradation of the HCPC, nesting habitat for ground nesting birds begins to decline. Species composition of small mammals can shift rapidly in response to changes in the plant community structure due to overgrazing or other disturbances such as wildfire. Many forbs beneficial to wildlife may not be reduced by grazing in this plant community and will continue to provide habitat for wildlife.

Increased Blue Grama with Decreased Mid Grass Plant Community
Habitat value is generally low for most species of wildlife as the plant community is simplified as the structural height and diversity of the herbaceous vegetative cover declines. The period of high levels of nutrition for grazing animals is shortened considerably with a decrease in grass and forb diversity.

Excessive Litter, Decadent Plants Community
This community generally has very low habitat value for most wildlife species because of the reduction of plant structural and species diversity. Excessive liter does not offer suitable nesting or brood rearing habitat for ground nesting birds. Excessive ground litter may provide increased habitat for small herbivorous mammals such as voles.

Blue Grama, Threadleaf Sedge Plant Community
Species likely to benefit from the reduced cover include McCown's longspur and horned larks.

Eastern Red Cedar Plant Community
Cedar and other tall woody encroachment, rather then most brush species, is the more serious threat to native prairie wildlife. Cedars have the potential to make large expanses of native prairie virtually useless for grassland dependant species. Care should be taken for site selection of windbreaks that include cedars if they are in close proximity to large expanses of native prairie due to the risk of encroachment. Shrubs are often a natural component of the prairie landscape and can provide habitat for several species.

Animal Preferences (Quarterly – 1,2,3,4[†])

Common Name	Cattle				Sheep				Horses				Deer				Antelope				Bison				Elk			
Grasses and Grass-likes																												
red threeawn	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
sideoats grama	U	D	P	U	U	D	P	U	U	D	P	U	U	D	P	U	U	D	P	U	U	D	P	U	U	D	P	U
needleandthread	U	P	D	D	N	D	N	D	U	P	D	D	N	D	N	D	N	D	N	D	U	P	D	D	U	P	D	D
prairie junegrass	U	D	U	D	N	D	N	U	U	D	U	D	N	D	N	U	N	D	N	U	U	D	U	D	U	D	U	D
blue grama	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D
threadleaf sedge	U	D	U	D	U	P	N	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D
bottlebrush squirreltail	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U
plains muhly	U	U	D	U	U	U	D	U	U	U	D	U	N	N	N	N	N	N	N	N	U	U	D	U	U	U	D	U
buffalograss	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D
Indian ricegrass	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D
sun sedge	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D
thickspike wheatgrass	U	D	D	U	N	D	N	N	U	D	D	U	N	D	N	N	N	D	N	N	U	D	D	U	U	D	D	U
ring muhly	N	N	N	N	U	U	U	U	N	N	N	N	U	U	U	U	U	U	U	U	N	N	N	N	N	N	N	N
green needlegrass	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D
switchgrass	U	D	D	U	U	D	U	U	U	D	D	U	N	N	N	N	N	N	N	N	U	D	D	U	U	D	D	U
western wheatgrass	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D
big bluestem	U	D	P	D	U	D	U	U	U	D	P	D	U	D	U	U	U	D	U	U	U	D	P	D	U	D	P	D
tumblegrass	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
sand dropseed	U	D	U	N	N	U	D	N	U	D	U	N	N	U	D	N	N	U	D	N	U	D	U	N	U	D	U	N
little bluestem	U	D	P	U	N	D	D	N	U	D	P	U	N	D	D	N	N	D	D	N	U	D	P	U	U	D	P	U
Indiangrass	U	D	P	D	U	D	U	U	U	D	P	D	U	D	U	U	U	D	U	U	U	D	P	D	U	D	P	D
sixweeks fescue	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N
hairy grama	U	D	P	U	D	P	P	D	U	D	P	U	D	P	P	D	D	P	P	D	U	D	P	U	U	D	P	U
Forbs																												
Louisiana sagewort	U	U	U	U	U	U	D	U	U	U	U	U	U	U	D	U	U	U	D	U	U	U	U	U	U	U	D	U
western ragweed	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U	U	D	U	U
mat loco	U	U	U	U	U	D	U	U	U	U	U	U	U	D	U	U	U	D	U	U	U	U	U	U	U	D	U	U
woolly locoweed	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
James' cryptantha	N	N	N	N	N	N	U	N	N	N	N	N	N	N	U	N	N	N	U	N	N	N	N	N	N	N	N	N
purple prairie clover	U	P	P	D	U	P	P	U	U	P	P	D	U	P	P	U	U	P	P	U	U	P	P	D	U	P	P	D
sulfur-flower buckwheat	N	N	N	N	N	U	N	N	N	N	N	N	N	U	N	N	N	U	N	N	N	N	N	N	N	N	N	N
hairy goldaster	U	U	D	U	N	N	N	N	U	U	D	U	N	N	N	N	N	N	N	N	U	U	D	U	N	N	N	N
dotted gayfeather	U	U	D	U	U	D	P	U	U	U	D	U	U	D	P	U	U	D	P	U	U	U	D	U	U	U	D	U
rush skeletonplant	U	U	U	U	N	N	N	N	U	U	U	U	N	N	N	N	N	N	N	N	U	U	U	U	U	U	U	U
ironplant goldenweed	U	D	D	U	U	P	P	U	U	D	D	U	U	P	P	U	U	P	P	U	U	D	D	U	U	D	D	U
cutleaf evening-primrose	U	U	U	U	N	U	U	N	U	U	U	U	N	U	U	N	N	U	U	N	U	U	U	U	U	U	U	U
Lambert crazyweed	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
silky crazyweed	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
sessile nailwort	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Wyoming feverfew	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
narrowleaf penstemon	U	D	U	U	U	P	P	U	U	D	U	U	U	P	P	U	U	P	P	U	U	D	U	U	U	P	P	U
Hood's phlox	U	D	U	U	U	P	P	U	U	D	U	U	U	P	P	U	U	P	P	U	U	D	U	U	U	P	P	U
woolly Indianwheat	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
slimflower scurfpea	N	N	N	N	N	U	U	N	N	N	N	N	N	U	U	N	N	U	U	N	N	N	N	N	N	N	N	N
prairie coneflower	U	U	D	U	U	P	P	U	U	U	D	U	U	P	P	U	U	P	P	U	U	U	D	U	U	P	P	U
scarlet globemallow	U	D	D	U	U	P	P	U	U	D	D	U	U	P	P	U	U	P	P	U	U	D	D	U	U	D	D	U
desert princesplume	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
green sagewort	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
stemless hymenoxys	U	U	U	U	N	U	N	N	U	U	U	U	N	U	N	N	N	U	N	N	U	U	U	U	N	U	N	N
Colorado greenthread	U	U	U	U	N	N	N	N	U	U	U	U	N	N	N	N	N	N	N	N	U	U	U	U	U	U	U	U
American vetch	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D
heath aster	U	U	D	U	U	U	P	U	U	U	D	U	U	U	P	U	U	U	P	U	U	U	D	U	U	U	P	U
Shrubs																												
plains pricklypear	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
fourwing saltbush	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P
fringed sagebrush	U	N	N	U	U	D	D	U	U	N	N	U	U	D	D	U	U	D	D	U	U	N	N	U	U	N	N	U
rubber rabbitbrush	N	N	N	D	D	D	D	D	N	N	N	D	D	D	D	D	D	D	D	D	N	N	N	D	N	N	N	D
chokecherry	D	T	T	D	D	T	T	D	D	T	T	D	P	U	D	P	D	U	U	D	D	T	T	D	P	U	U	P
western snowberry	U	U	U	U	U	U	U	U	U	U	U	U	D	U	D	D	U	U	U	U	U	U	U	U	D	U	U	U
broom snakeweed	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
small soapweed	D	P	N	D	D	P	N	D	D	P	N	D	D	P	N	D	D	P	N	D	D	P	N	D	D	P	N	D
winterfat	P	P	D	P	P	P	P	P	P	P	D	P	P	P	P	P	P	P	P	P	P	P	D	P	P	P	D	P
skunkbush sumac	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D	D	U	U	D
wax currant	U	D	D	U	U	P	P	D	U	D	D	U	U	P	P	D	U	U	U	U	U	D	D	U	U	P	P	D

N = not used; **U** = undesirable; D = desirable; P = preferred; T = toxic

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists suggested initial stocking rates for cattle under continuous grazing (year long grazing or growing season long grazing) under normal growing conditions however, *continuous grazing is not recommended.* These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity.

Plant Community	Total Production (lbs./acre)	*Stocking Rate (AUM/acre)
Little Bluestem, Sideoats Grama, Shrubs/Trees (HCPC)	1200	0.33
Increased Blue Grama w/Decreased Mid Grasses	700	0.19
Blue Grama, Threadleaf Sedge	350	0.10
Excessive Litter, Decadent Plants	**	**

* Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25% harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

** Highly variable; stocking rate needs to be determined on site.

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.

Hydrology Functions (under development)

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B, with localized areas in hydrologic group A. Infiltration is moderate to high and runoff potential for this site is moderate depending on soil hydrologic group and ground cover. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to NRCS Section 4, National Engineering Handbook (NEH-4) for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting, hiking, photography, bird watching and other opportunities. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

This site provides resources for fence posts, firewood, mulch, lumber and tree seedlings for transplanting.

Other Products

None noted.

Supporting Information

Associated Sites

(072XA015KS) – Loamy Upland
(072XA012KS) – Limy Upland

Similar Sites

(072XA056KS) – Sandstone Breaks
[sandy, less calcareous soils]

(072XA039KS) – Shallow Siltstone
[less production, more western wheatgrass, less tall grasses]

(072XA010KS) – Gravelly Hills
[gravelly soils]

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. Specific data information is contained in individual landowner/user case files and other files located in county NRCS field offices.

Those involved in developing this site description include: Harvey Sprock, Rangeland Management Specialist, NRCS, Colorado; Josh Saunders, Rangeland Management Specialist, NRCS Colorado ; Herman Garcia, State Rangeland Management Specialist, Colorado ; Carol Eakins, Rangeland Management Specialist, NRCS, Nebraska; Chuck Markley, Soil Scientist, NRCS, Nebraska; Jeff Nichols, Rangeland Management Specialist, NRCS, Nebraska; Mary Schrader, Resource Conservationist NRCS, Nebraska; Dana Larsen, State Rangeland Management Specialist, Nebraska; Joan Gienger, District Conservationist, NRCS, Kansas; Ted Houser, District Conservationist, NRCS, Kansas; David Kraft, State Rangeland Management Specialist, Kansas.

State Correlation

This site has been correlated with Colorado, Kansas, and Nebraska in MLRA -72.

Field Offices

Colorado: Akron, Burlington, Cheyenne Wells, Eads, Flagler, Holly, Holyoke, Julesburg, Sterling, Yuma, Wray

Kansas: Atwood, Colby, Goodland, Gove, Hoxie, Oakley, Oberlin, Sharon Springs, St. Francis

Nebraska: Curtis, Grant, Hayes Center, Imperial, Kimball, McCook, North Platte, Ogallala, Oshkosh, Sidney, Trenton

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://hpcc.unl.edu)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (http://wcc.nrcs.usda.gov)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (http://nasis.nrcs.usda.gov)

USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Site Description Approval

State Range Management Specialist (Kansas)	Date
State Range Management Specialist (Colorado)	Date
State Range Management Specialist (Nebraska)	Date