United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Limy Upland (formerly Loamy Slopes in Colorado)

Site ID: R072XY012KS

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 moderately steep uplands or high terraces. This site consists of very deep to moderately deep upland soils with silty (or loamy) to clayey surface layers and subsoils. On moderately steep areas, this site is characterized by slopes broken with a series of short and shallow slope slips, commonly referred to as “catsteps.” On all slopes a primary identifying feature for this site is the presence of calcium carbonate at or near the soil surface. 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 or absent by such things as overgrazing and fire events. Livestock trailing on this site often leads to the formation of gullies.

Landform: hill, plain

Aspect: N/A

	Minimum	Maximum
Elevation (feet):	2500	5000
Slope (percent):	6	30
Water Table Depth (inches):	60	60
Flooding:		
Frequency:	none	none
Duration:	none	none
Ponding:		
Depth (inches):	0	0
Frequency:	none	none
Duration:	none	none
Runoff Class:	low	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

There are no influencing water features on this site.

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

Stream Type: None

Representative Soil Features

The soils in this site are moderately deep to very deep, and have thin to thick, calcareous surface layers; (calcium carbonate is usually at the surface and throughout the entire soil depth, but may be leached in the upper 1 to 4 inches in non-cultivated areas). Soil texture for both surface and subsoil layer of these soils range from silty (or loamy) through clayey. Depth to caliche or fractured sedimentary bedrock is 20 to more than 80 inches. Soils in this site generally have low to moderately low organic matter content in the surface layer.

The Historic Climax Plant Community (HCPC) should exhibit broken flow paths, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers and exhibit slight to no evidence of rills or pedestaled plants where slopes are gentle. The soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration.

Major soil series correlated to this ecological site include: Atchison, Bufton, Campus, Colby, Dioxice, Elkader, Kimst, Mansic, Mansker, Manvel, Penden, Sidney, Sulco, and Sully. Other soil series that have been correlated to this site include: Armo, Coly

Parent Material Kind: loess, residuum
Parent Material Origin: mixed
Surface Texture: loam, sandy loam
Surface Texture Modifier: none

Subsurface Texture Group: loamy
Surface Fragments ≤ 3" (% Cover): 0 - 5
Surface Fragments > 3" (%Cover): 0 - 2
Subsurface Fragments ≤ 3" (% Volume): 0 - 40
Subsurface Fragments > 3" (% Volume): 0 - 15

	Minimum	Maximum
Drainage Class:	well	somewhat excessively
Permeability Class:	slow	moderate
Depth (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	14
Sodium Absorption Ratio*:	0	9
Soil Reaction (1:1 Water)*:	7.4	9.0
Soil Reaction (0.1M CaCl2)*:	N/A	N/A
Available Water Capacity (inches)*:	4.8	12.4
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). 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.

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 climate largely dictates the plant communities for 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.

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 mid-grass species and shift the plant community toward short-grass species.

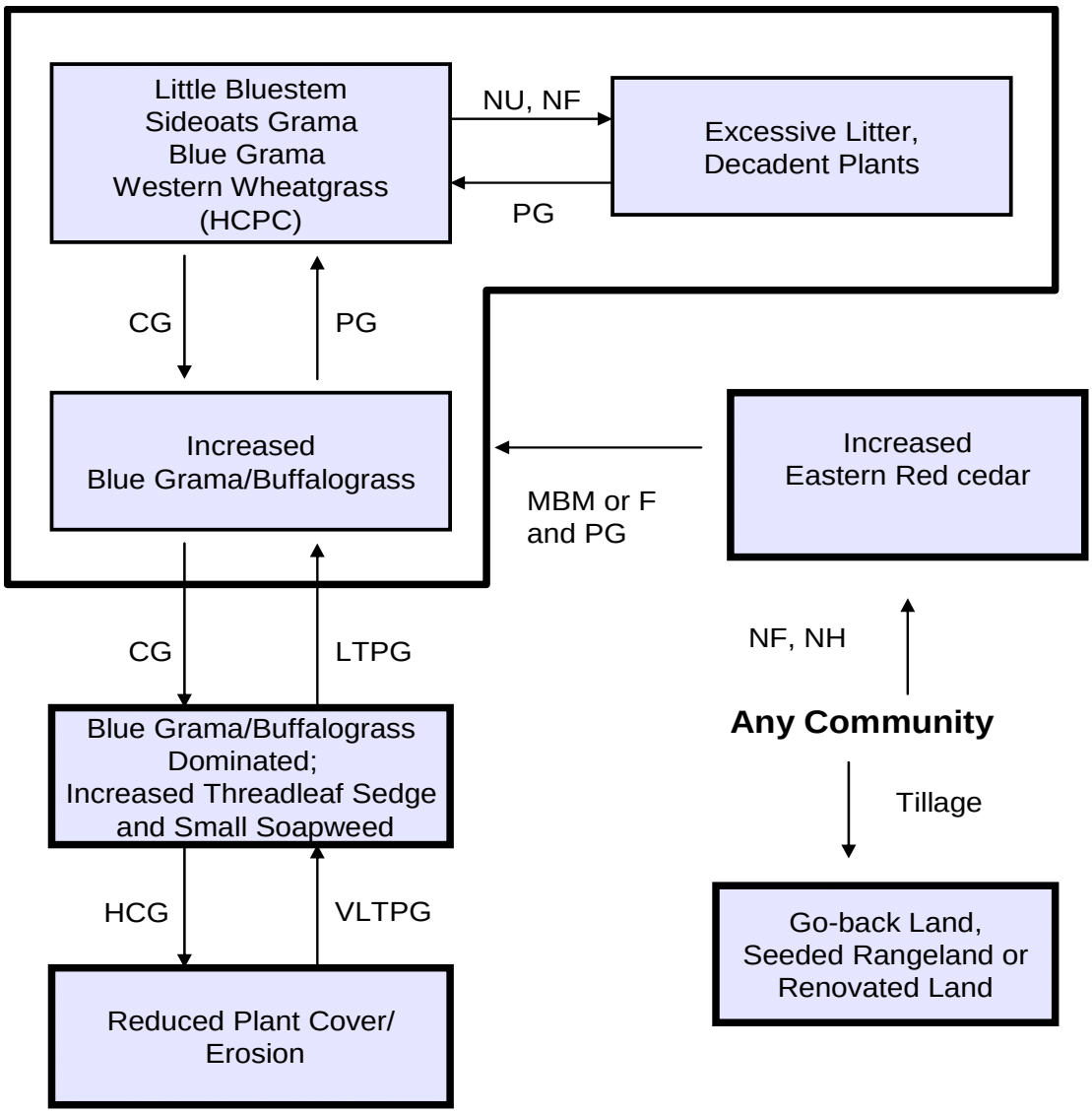
Erosion in the form of gullies caused by concentrated flow and livestock trailing is a common problem on the steeper portion of the site. These problems are accentuated with long term continuous grazing pressure.

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 June15. Native warm season plants begin growth about May 15, and continue to about August 1. 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 periods, **E -** encroachment, **F**- fire, **HCG -** heavy continuous grazing, **HCPC** - Historic Climax Plant Community, **LTPG** - long term prescribed grazing (>40 years), **MBM** - mechanical brush management, **NU** - non use, **PG** - prescribed grazing with adequate recovery periods, **VLTPG -** very long term prescribed grazing (>80 years), **NF** – no fire; **NH** – no harvest

Plant Community Composition and Group Annual Production

			Little Bluestem, Sideoats Grama, Blue Grama, Western Wheatgrass (HCPC)		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*1*	*1155 - 1485*	*70 - 90*
little bluestem	Schizachyrium scoparium	SCSC	1	248 - 495	15 - 30
sideoats grama	Bouteloua curtipendula	BOCU	1	248 - 413	15 - 25
blue grama	Bouteloua gracilis	BOGR2	1	165 - 330	10 - 20
big bluestem	Andropogon gerardii	ANGE	1	83 - 248	5 - 15
western wheatgrass	Pascopyrum smithii	PASM	1	165 - 330	10 - 20
green needlegrass	Nassella viridula	NAVI4	1	17 - 165	1 - 10
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	0 - 165	0 - 10
buffalograss	Bouteloua dactyloides	BODA2	1	17 - 83	1 - 5
hairy grama	Bouteloua hirsuta	BOHI2	1	0 - 83	0 - 5
plains muhly	Muhlenbergia cuspidata	MUCU3	1	0 - 83	0 - 5
prairie junegrass	Koeleria macrantha	KOMA	1	17 - 83	1 - 5
red threeawn	Aristida purpurea var. longiseta	ARPUL	1	0 - 33	0 - 2
sand dropseed	Sporobolus cryptandrus	SPCR	1	0 - 33	0 - 2
switchgrass	Panicum virgatum	PAVI2	1	0 - 83	0 - 5
sun sedge	Carex inops ssp. heliophila	CAINH2	1	17 - 50	1 - 3
threadleaf sedge	Carex filifolia	CAFI	1	17 - 33	1 - 2
other perennial grasses		2GP	1	0 - 83	0 - 5
FORBS			*2*	*83 - 248*	*5 - 15*
coneflower	Dracopis spp.	DRACO3	2	17 - 50	1 - 3
cutleaf ironplant	Machaeranthera pinnatifida	MAPI	2	0 - 33	0 - 2
dotted gayfeather	Liatris punctata	LIPU	2	17 - 33	1 - 2
Nuttall's sensitive-briar	Mimosa nuttallii	MINU6	2	0 - 33	0 - 2
purple prairie clover	Dalea purpurea	DAPU5	2	17 - 33	1 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	0 - 33	0 - 2
heath aster	Symphyotrichum ericoides	SYER	2	0 - 17	0 - 1
Hood's phlox	Phlox hoodii	PHHO	2	0 - 17	0 - 1
Lambert crazyweed	Oxytropis lambertii	OXLA3	2	0 - 17	0 - 1
penstemon	Penstemon spp.	PENST	2	0 - 17	0 - 1
rush skeletonplant	Lygodesmia juncea	LYJU	2	0 - 17	0 - 1
scarlet gaura	Gaura coccinea	GACO5	2	0 - 17	0 - 1
silverleaf scurfpea	Pediomelum argophyllum	PEAR6	2	0 - 17	0 - 1
slimflower scurfpea	Psoralidium tenuiflorum	PSTE5	2	0 - 17	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	2	0 - 17	0 - 1
other perennial forbs		2FP	2	17 - 83	1 - 5
SHRUBS			*3*	*83 - 248*	*5 - 15*
fringed sagebrush	Artemisia frigida	ARFR4	3	0 - 33	0 - 2
prairie rose	Rosa arkansana	ROAR3	3	0 - 83	0 - 5
small soapweed	Yucca glauca	YUGL	3	17 - 33	1 - 2
fourwing saltbush	Atriplex canescens	ATCA2	3	17 - 83	1 - 5
western snowberry	Symphoricarpos occidentalis	SYOC	3	0 - 83	0 - 5
winterfat	Krascheninnikovia lanata	KRLA2	3	17 - 83	1 - 5
broom snakeweed	Gutierrezia sarothrae	GUSA2	3	17 - 50	1 - 3
plains pricklypear	Opuntia polyacantha	OPPO	3	17 - 33	1 - 2
green sagewort	Artemisia dracunculus	ARDR4	3	0 - 33	0 - 2
skunkbush sumac	Rhus trilobata	RHTR	3	0 - 17	0 - 1
other shrubs		2SHRUB	3	0 - 83	0 - 5

Annual Production lbs./acre	LOW	RV*	HIGH
GRASSES & GRASS-LIKES	840 -	1320	- 1800
FORBS	80 -	165	- 275
SHRUBS	80 -	165	- 275
TOTAL	1000 -	1650	- 2350

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.

Plant Community Narratives

Little Bluestem, Sideoats Grama, Blue Grama, Western Wheatgrass Plant Community

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). Little bluestem, sideoats grama, blue grama, and western wheatgrass are the primary species in this community. Secondary species include big bluestem, needleandthread, buffalograss, switchgrass, threadleaf sedge, and sun sedge. Big bluestem and switchgrass are most likely to be present in the areas of MLRA 72 that receive at least 18 inches of average annual precipitation. The community has a very diverse forb population, most of which occur in small amounts. Key shrubs include fourwing saltbush, winterfat, small soapweed, and prairie rose. Fourwing saltbush and winterfat are more prevalent in the western portion of the MLRA.

Grass and grass-like plants comprise approximately 70-90% of production, forbs 5-15%, and shrubs 5-15%.The Historic Climax Plant Community (HCPC) serves as the basis for all other interpretations.

This plant community is diverse and productive. Plant litter is uniformly distributed and provides protection from soil erosion reduces evaporation from the soil surface and promotes water infiltration into the soil profile. This plant community is well suited to drought conditions due to the diversity of species with various rooting depths.

Total annual production ranges from 1000 to 2350 pounds of air-dried vegetation per acre per year and will average 1650 pounds.

The following is the growth curve expected during a normal year:
Growth Curve Number: KS7201
Growth Curve Name: Cool season/warm season co-dominant, upland fine textured soils

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	10	20	30	20	10	5	3	0	0

(monthly percentages of total annual growth)

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

- Continuous grazing will convert the HCPC to the *Increased Blue Grama/Buffalograss Plant Community*
- Prescribed grazing with adequate recovery periods between grazing events will maintain the *Little Bluestem, Sideoats Grama, Blue Grama, Western Wheatgrass Plant Community (HCPC)*.
- Non-use and/or no-fire can shift the HCPC to an *Excessive Litter, Decadent Plants Community*.

Increased Blue Grama/Buffalograss Plant Community

This plant community evolved with continuous grazing without adequate recovery periods between each grazing event during the growing season. Recognition of this plant community will enable the land user to implement key management decisions before a significant economic/ecological threshold is crossed.

Blue grama and buffalograss have increased in abundance and production. Species such as green needlegrass and purple prairie clover have been reduced to remnant amounts. Fourwing saltbush and winterfat have been reduced to remnant amounts in the western portion of the MLRA. Little bluestem and sideoats grama have been somewhat reduced. Threadleaf sedge, sand dropseed, red threeawn, and small soapweed have increased. This plant community is at risk of losing green needlegrass, western wheatgrass, and key shrubs. Once these key species are completely removed and other plants have increased, it will take a long time to bring them back by management alone.

Total aboveground carbon has been reduced due to decreases in forage and litter production. Reduction of western rhizomatous wheatgrass, nitrogen fixing forbs, the shrub component and an increase in warm season short grasses has begun to alter the biotic integrity of this community. Water and nutrient cycles are impaired. This is an early stage of desertification.

Total annual production ranges from 700 to 1800 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: KS7202
Growth Curve Name: Warm season dominant/ cool-season subdominant; upland fine textured soils

Photo by Jeff Nichols, NRCS, Nebraska, 2008

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	3	10	40	35	10	2	0	0	0

(monthly percentages of total annual growth)

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

- Continuous grazing will shift this plant community across an ecological threshold to a *Blue Grama/Buffalograss Dominated; Increased Threadleaf Sedge and Small Soapweed Plant Community.* This transition leads to a dramatically altered plant community.
- Prescribed grazing that allows for adequate recovery periods will move this plant community back to the *Little Bluestem, Sideoats Grama, Blue Grama, Western Wheatgrass Plant Community (HCPC).*

Excessive Litter, Decadent Plants Community

This plant community develops when grazing is removed (non-use or rest) for long periods of time in the absence of fire. Little bluestem and small soapweed are the dominant plants.

Much of the nutrients are tied up in excessive litter. The semiarid environment and the absence of animal traffic to break down litter slow nutrient recycling. Aboveground litter also limits sunlight from reaching plant crowns. Many plants, especially bunchgrasses (little bluestem) die off. Thick litter and absence of grazing or fire reduce seed germination and establishment.

In advanced stages, plant mortality can increase and erosion may eventually occur if bare ground increases. Once this happens it will require increased energy input in terms of practice cost and management to bring back.

Total annual production ranges from 500 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: KS7203
Growth Curve Name: Excess Litter; upland fine textured soils

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	18	25	20	15	12	5	0	0

(monthly percentages of total annual growth)

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

- Prescribed grazing with adequate recovery periods following each grazing event will shift this plant community back to the *Little Bluestem, Sideoats Grama, Blue Grama, Western Wheatgrass Plant Community (HCPC)*.

Blue Grama/Buffalograss Dominated; Increased Threadleaf Sedge and Small Soapweed Plant Community

Blue grama and buffalograss are the dominant species. Threadleaf sedge, threeawn, sand dropseed, and small soapweed have increased. Little bluestem, sideoats grama, and western wheatgrass have been reduced to remnant populations. Big bluestem, green needlegrass, and switchgrass have been removed. Other shrubs such as pricklypear and broom snakeweed typically increase.

Prairie dog presence can affect production and speed of transition depending upon colony density, livestock/prairie dog competition, and precipitation patterns.

This plant community is resistant to change due to grazing tolerance of buffalograss and blue grama. A significant amount of production and diversity has been lost when compared to the HCPC. Loss of cool season grasses, shrub component, and nitrogen fixing forbs have negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system, “root pan”, characteristic of blue grama and buffalograss. Off-site flooding is likely due to increased runoff rates. The water cycle is impaired. Soil loss may be obvious where flow paths are connected.

It will take a very long time to restore this plant community back to the HCPC with improved management. Renovation would be very costly.

Total annual production ranges from 300 to 1100 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: KS7202
Growth Curve Name: Warm season dominant, cool season subdominant

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	3	10	40	35	10	2	0	0	0

(monthly percentages of total annual growth)

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

- Heavy Continuous grazing and overstocking will cause this plant community to move to the *Reduced Plant Cover/ Erosion Plant Community*.
- Long term prescribed grazing with adequate recovery periods between grazing events will move this plant community toward the *Increased Blue Grama/Buffalograss Plant Community* and eventually to the *HCPC* or associated successional plant communities assuming an adequate seed/vegetative source is available.

Reduced Plant Cover/Erosion Plant Community

This plant community develops with longer term continuous grazing. Blue grama, buffalograss, red threeawn, ring muhly and broom snakeweed are the dominant plants. Erosion has increased. Flow paths, rills and small gullies are common. The nutrient cycle, water cycle and overall energy flow have been severely impaired. Desertification occurs.

Total annual production ranges from 50 to 500 pounds of air-dried vegetation per acre per year.

The following is the growth curve expected during a normal year:
Growth Curve Number: KS7205
Growth Curve Name: Early successional, bare ground; upland fine textured soils

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	15	45	20	10	3	0	0	0

(monthly percentages of total annual growth)

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

- Very Long Term Prescribed grazing with adequate recovery periods between grazing events and proper stocking will eventually move this plant community to the *Blue Grama/Buffalograss Dominated; Increased Threadleaf Sedge and Small Soapweed* Plant Community.

Increased Eastern Red Cedar

This plant community is typically found adjacent to an eastern redcedar seed source. Cedar encroachment has occurred. Lack of fire, non-use by browsing animals, and lack of timber harvest accelerate the invasion. Brush management and/or fire in conjunction with prescribed grazing can be used to prevent encroachment. Encroachment is more likely to take place where average annual precipitation is greater than 19 inches.

In higher canopy cover situations, soil erosion will increase. The water cycle is significantly altered under higher canopies. Infiltration is reduced because of interception of rainfall by the canopy and runoff is increased.

Total annual production during an average year varies significantly, depending on the production level prior to encroachment and 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 toward an herbaceous plant community.

Go-back Land, Seeded Rangeland or Renovated Land

This group includes three separate vegetation states that are highly variable. They are derived through distinct management scenarios, and are not related sucessionally. Infiltration, runoff and soil erosion varies depending on the vegetation present.

Go-back Land

This plant community is created when the soil is tilled or farmed (sodbusted), and abandoned. All of the native plants are killed, soil organic matter/carbon reserves are reduced, soil structure is changed, and a plowpan or compacted layer can be formed which decreases water infiltration. Synthetic chemicals may remain as a residual from farming operations. In early successional stages, this community is not stable. Erosion is a concern.

An annual plant community such as Russian thistle, kochia, annual bromes, foxtail (bristlegrass) and other introduced annuals invade the community initially. These plants give some protection from erosion and start to rebuild organic matter. This plant community is gradually replaced by early

perennial species such as threeawn and dropseed. Little bluestem, buffalograss or blue grama can become established depending upon whether a remnant seed source is available. Eventually other perennial warm and cool season species can establish. This successional process takes many years as the soil is being developed. The process is speeded up with prescribed grazing.

Seeded Rangeland

This plant community can vary considerably depending on how eroded the soil was, the species seeded, the stand that was established, how long ago the stand was established and the management of the stand since establishment. Prescribed grazing with adequate recovery periods will be needed to maintain productivity and desirable species. Species diversity on seeded rangeland is often lower and native forb species generally take longer to re-establish.

Renovated Rangeland

This plant community is the result of mechanical treatment to a sod bound plant community. The purpose of mechanical treatment is to improve production and plant composition. These mechanical treatments include such things as contour furrowing, contour pitting, terracing, chiseling, disking and inter-seeding. Many of these treatments were implemented during the 1930's through the 1960's and have shown to have no significant long-term benefits for improving production. Many of these practices result in a permanently rough ground surface. Inter-seeding may be beneficial depending upon stand achieved and management used after seeding.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations (under development)

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-likes							
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
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
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
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
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
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
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
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
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
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
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
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
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
Forbs							
cutleaf ironplant	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U 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
Nuttall's sensitive-briar	U D D U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D 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
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
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P P 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
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
scarlet gaura	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U U D U
silverleaf scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
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
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
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
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
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 U D 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
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
prairie rose	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 D U
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
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
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
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
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
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
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

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	Production (lbs./acre)	*Stocking Rate (AUM/acre)
Little Bluestem, Sideoats Grama, Blue Grama, W. Wheatgrass (HCPC)	1650	0.45
Increased Blue Grama/Buffalograss	1200	0.33
Blue Grama/Buffalograss Dominated	700	0.19
Reduced Plant Cover/ Erosion	**	**
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 and C, with localized areas in hydrologic group D. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short grasses form a strong sod and dominate the site. 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

Fencepost, firewood, mulch and seedling harvest of cedar trees.

Other Products

None noted.

Supporting Information

Associated Sites

(072XA015KS) – Loamy Upland
(072XA016KS) – Loess Breaks
(072XA013KS) – Loamy Lowland
(072XA028KS) – Shallow Limy
(072XA009KS) – Siltstone Plains

Similar Sites

(072XA015KS) – Loamy Upland
[less slope, not as calcareous at the soil surface, trace amounts of little bluestem and sideoats grama]
(072XA009CO) – Siltstone Plains
[gentle slopes 0-6%]

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, NRCS, Nebraska; David Kraft, State Rangeland Management Specialist, NRCS, Kansas; Joan Gienger, District Conservationist, NRCS, Kansas; Ted Houser, District Conservationist, NRCS, 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