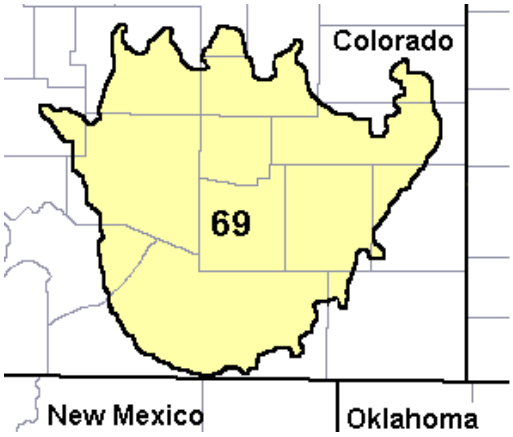
United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description



Site Type: Rangeland

Site Name: Sandstone Breaks

Site ID: R069XY053CO

Major Land Resource Area: 69 – Upper Arkansas Valley Rolling Plains

Physiographic Features

This site occurs on nearly level to very steep ridges or breaks. Sandstone out-cropping is common and can include vertical sandstone cliffs.

Landform: hill, plain, scarp, ridge, canyon

Aspect: N/A

	Minimum	Maximum
Elevation (feet):	3600	5600
Slope (percent):	1	60
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:	high	very high

Climatic Features

The mean average annual precipitation varies from 10 to 14 inches per year depending on location and ranges from 5 inches to over 24 inches per year. Approximately 75 percent of the annual precipitation occurs during the growing season from mid-April to late-September. Snowfall can vary greatly from year to year and can range from 20 to 40 inches per year. Winds are estimated to average about 6 to 7 miles per hour annually. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 60 miles per hour.

The average length of the growing season is 155 days, but varies from 147 to 162 days. The average date of first frost in the fall is October 10, and the last frost in the spring is about May 5. July is the hottest month and January is the coldest. It is not uncommon for the temperature to exceed 100 degrees F during the summer. Summer humidity is low and evaporation is high. The winters are characterized with frequent northerly winds, producing severe cold with temperatures dropping to as low as -35 degrees F.

Growth of native cool season plants begins about April 15 and continues to about June 1. Native warm season plants begin growth about May 1and continue to about August 15. Regrowth of cool season plants occurs in September and October of most years, depending on moisture.

	Minimum	Maximum
Frost-free period (days):	147	162
Freeze-free period (days):	169	186
Mean Annual Precipitation (inches):	10	14

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.28	0.27	12.1	46.4
February	0.14	0.36	15.3	52.9
March	0.25	0.68	20.7	61.5
April	0.73	1.16	28.9	71.8
May	0.90	2.21	38.6	81.1
June	0.83	1.79	47.6	91.4
July	2.34	2.38	53.4	96.2
August	1.62	2.00	51.7	93.7
September	1.04	1.12	43.3	86.0
October	0.90	0.78	32.2	74.2
November	0.49	0.51	21.0	58.1
December	0.43	0.27	14.1	48.6

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
CO6763	Pueblo Army Depot	1971	2000
CO3828	Haswell	1922	2001
CO7287	Rush	1924	2001
CO4834	Las Animas	1930	2001

For detailed information visit the Western Regional Climate Center at http://www.wrcc.dri.edu/ website.

Influencing Water Features

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

Stream Type: None

Representative Soil Features

The soils of this site are dominantly very shallow and shallow. These soils are well drained and have moderate to moderately rapid permeability. They occur on hills, ridges, scarps, canyons, and plains. Typically these soils formed in slope alluvium and residuum from sandstone. The available water capacity is typically very low or low. The surface layer ranges from 2 to 7 inches thick and is typically sandy loam, fine sandy loam, or loam. Some soils are gravelly or channery. Sandstone occurs at depths of 6 to 20 inches. The pH generally ranges from neutral to moderately alkaline. The soil moisture regime is ustic aridic but ranges to aridic in the driest areas of MLRA 69. The soil temperature regime is mesic.

Exposed areas of sandstone 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 wind scouring, 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: Travessilla

Other soil series that have been correlated to this site include: none

Parent Material Kind: slope alluvium, residuum
Parent Material Origin: sandstone
Surface Texture: sandy loam, fine sandy loam
Surface Texture Modifier: channery, gravelly

Subsurface Texture Group: sandy loam, fine sandy loam
Surface Fragments ≤ 3" (% Cover): 0 to 35 percent
Surface Fragments > 3" (%Cover): 0 to 15 percent
Subsurface Fragments ≤ 3" (% Volume): 0 to 35 percent
Subsurface Fragments > 3" (% Volume): 0 to 15 percent

Rock fragment content does not typically exceed 35 percent.

	Minimum	Maximum
Drainage Class:	well	well
Permeability Class:	moderate	moderately rapid
Depth (inches):	6	20
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	2
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl2)*:	6.6	8.0
Available Water Capacity (inches)*:	0.5	2.5
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

Ecological Dynamics of the Site:

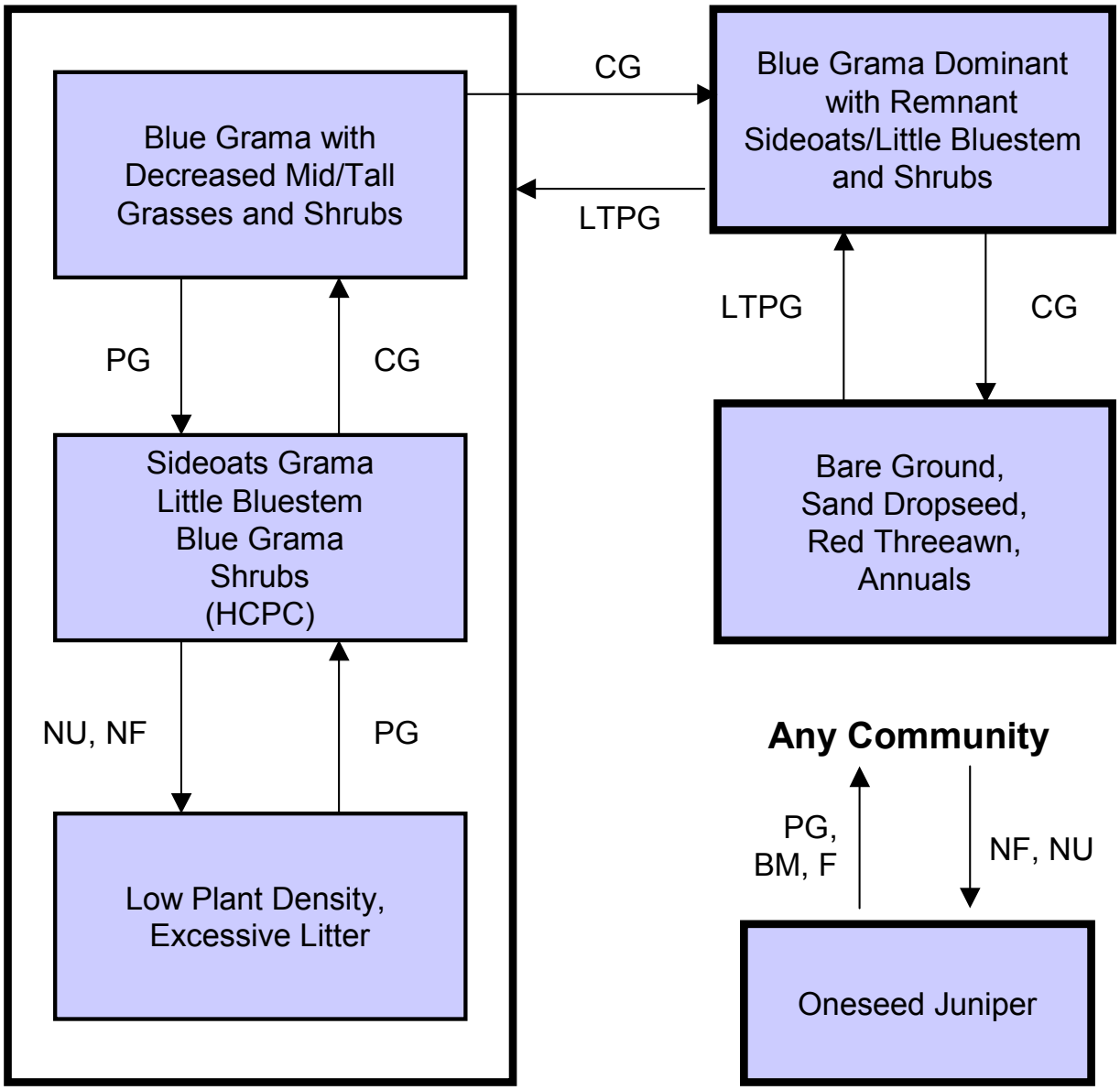
Continuous grazing without adequate recovery periods following each grazing occurrence, will initially cause prairie sandreed, little bluestem, sideoats grama, Indiangrass, big bluestem, sand bluestem, switchgrass, palatable forbs and shrubs to decrease in frequency and production. Grasses and grass-like plants such as blue grama, black grama, hairy grama and threadleaf sedge will increase. If adequate recovery periods between grazing events are not allowed during the growing season, blue grama will begin to dominate the plant community. Mid and tall grasses can eventually be removed from the plant community. Over the long-term, continuous use without adequate recovery opportunities between grazing events will cause species such as red threeawn, sand dropseed, small soapweed, broom snakeweed, wormwood, prickleypear cactus and cheatgrass to increase or invade. Oneseed juniper is usually present in small amounts.

Drier and warmer climatic conditions exist in the central portion of MLRA-69. This area includes the eastern half of Pueblo county, northern Otero, extreme northwestern Bent, western edge of Kiowa, southern edge of Lincoln and all of Crowley County. These conditions are primarily caused by a rain shadow effect from the southern Rocky Mountains. Evapotranspiration rates (atmospheric demand) will be higher in this area of MLRA-69. Total annual production will typically be lower.

The historic climax plant community (description follows the plant community diagram) has been determined by study of rangeland relic areas, areas protected from excessive disturbance, seasonal use pastures, short durationl/time controlled grazing and historical accounts.

The following is a diagram that 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 will be discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



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

Plant Community Composition and Group Annual Production

			Sideoats Grama, Little Bluestem, Blue Grama, Shrubs (HCPC)		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*1*	*700 - 900*	*70 - 90*
sideoats grama	Bouteloua curtipendula	BOCU	1	100 - 200	10 - 20
blue grama	Bouteloua gracilis	BOGR2	1	100 - 150	10 - 15
little bluestem	Schizachyrium scoparium	SCSC	1	50 - 150	5 - 15
prairie sandreed	Calamovilfa longifolia	CALO	1	30 - 70	3 - 7
western wheatgrass	Pascopyrum smithii	PASM	1	30 - 70	3 - 7
big bluestem	Andropogon gerardii	ANGE	1	20 - 70	2 - 7
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	20 - 70	2 - 7
sand bluestem	Andropogon hallii	ANHA	1	20 - 70	2 - 7
Indiangrass	Sorghastrum nutans	SONU2	1	10 - 50	1 - 5
New Mexico feathergrass	Hesperostipa neomexicana	HENE5	1	0 - 50	0 - 5
switchgrass	Panicum virgatum	PAVI2	1	0 - 50	0 - 5
black grama	Bouteloua eriopoda	BOER4	1	10 - 30	1 - 3
hairy grama	Bouteloua hirsuta	BOHI2	1	0 - 30	0 - 3
Indian ricegrass	Achnatherum hymenoides	ACHY	1	0 - 30	0 - 3
sand dropseed	Sporobolus cryptandrus	SPCR	1	10 - 20	1 - 2
galleta	Pleuraphis jamesii	PLJA	1	0 - 20	0 - 2
bottlebrush squirreltail	Elymus elymoides ssp. elymoides	ELELE	1	0 - 10	0 - 1
pinyon ricegrass	Piptochaetium fimbriatum	PIFI	1	0 - 10	0 - 1
plains muhly	Muhlenbergia cuspidata	MUCU3	1	0 - 10	0 - 1
ring muhly	Muhlenbergia torreyi	MUTO2	1	0 - 10	0 - 1
slim tridens	Tridens muticus var. elongatus	TRMUE	1	0 - 10	0 - 1
spike muhly	Muhlenbergia wrightii	MUWR	1	0 - 10	0 - 1
sun sedge	Carex inops ssp. heliophila	CAINH2	1	10 - 30	1 - 3
threadleaf sedge	Carex filifolia	CAFI	1	10 - 20	1 - 2
other perennial grasses		2GP	1	10 - 30	1 - 3
FORBS			*2*	*50 - 150*	*5 - 15*
dotted gayfeather	Liatris punctata	LIPU	2	10 - 20	1 - 2
purple prairie clover	Dalea purpurea	DAPU5	2	10 - 20	1 - 2
American vetch	Vicia americana	VIAM	2	0 - 10	0 - 1
cutleaf evening-primrose	Oenothera coronopifolia	OECO2	2	0 - 10	0 - 1
ironplant goldenweed	Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida	MAPIP4	2	0 - 10	0 - 1
Louisiana sagewort	Artemisia ludoviciana	ARLU	2	0 - 10	0 - 1
manyflower gromwell	Lithospermum multiflorum	LIMU3	2	0 - 10	0 - 1
narrowleaf penstemon	Penstemon angustifolius	PEAN4	2	0 - 10	0 - 1
Nuttall's evolvulus	Evolvulus nuttallianus	EVNU	2	0 - 10	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	2	0 - 10	0 - 1
prairie spiderwort	Tradescantia occidentalis	TROC	2	0 - 10	0 - 1
Rocky Mountain zinnia	Zinnia grandiflora	ZIGR	2	0 - 10	0 - 1
rush skeletonplant	Lygodesmia juncea	LYJU	2	0 - 10	0 - 1
sand lily	Leucocrinum montanum	LEMO4	2	0 - 10	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	0 - 10	0 - 1
slimflower scurfpea	Psoralidium tenuiflorum	PSTE5	2	0 - 10	0 - 1
tenpetal blazingstar	Mentzelia decapetala	MEDE2	2	0 - 10	0 - 1
Texas croton	Croton texensis	CRTE4	2	0 - 10	0 - 1
threadleaf groundsel	Senecio flaccidus var. flaccidus	SEFLF	2	0 - 10	0 - 1
variable senecio	Packera neomexicana var. mutabilis	PANEM	2	0 - 10	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	2	0 - 10	0 - 1
woolly locoweed	Astragalus mollissimus	ASMO7	2	0 - 10	0 - 1
wormwood	Artemisia dracunculus	ARDR4	2	0 - 10	0 - 1
other perennial forbs		2FP	2	10 - 30	1 - 3
SHRUBS			*3*	*50 - 150*	*5 - 15*
skunkbush sumac	Rhus trilobata	RHTR	3	10 - 30	1 - 3
true mountainmahogany	Cercocarpus montanus	CEMO2	3	10 - 30	1 - 3
Bigelow sage	Artemisia bigelovii	ARBI3	3	0 - 20	0 - 2
spreading buckwheat	Eriogonum effusum	EREF	3	0 - 20	0 - 2
fourwing saltbush	Atriplex canescens	ATCA2	3	0 - 10	0 - 1
fringed sagebrush	Artemisia frigida	ARFR4	3	0 - 10	0 - 1
golden currant	Ribes aureum	RIAU	3	0 - 10	0 - 1
green plume rabbitbrush	Ericameria nauseosa ssp. nauseosa var. glabrata	ERNAG	3	0 - 10	0 - 1
leadplant	Amorpha canescens	AMCA6	3	0 - 10	0 - 1
New Mexico hoptree	Humulus lupulus	HULU	3	0 - 10	0 - 1
small soapweed	Yucca glauca	YUGL	3	0 - 10	0 - 1
walking stick cholla	Opuntia imbricata	OPIM	3	0 - 10	0 - 1
western sandcherry	Prunus pumila var. besseyi	PRPUB	3	0 - 10	0 - 1
other shrubs		2SHRUB	3	10 - 30	1 - 3
TREES			*4*	*0 - 10*	*0 - 1*
oneseed juniper	Juniperus monosperma	JUMO	4	10 - 30	1 - 3
pinyon pine	Pinus edulis	PIED	4	0 - 10	0 - 1

Annual Production lbs./acre	LOW	RV*	HIGH
GRASSES & GRASS-LIKES	510 -	795	-1275
FORBS	45 -	100	-155
SHRUBS	45 -	100	-155
TREES	0 -	5	-15
TOTAL	600 -	1000	-1600

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

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition table shown above has been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as "Desired Plant Communities". According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Sideoats Grama, Little Bluestem, Blue Grama and Shrubs 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 community developed with grazing by large herbivores and is suited to grazing by domestic livestock. Historically, fires likely occurred infrequently. This plant community can be found on areas where grazed plants receive adequate periods of recovery during the growing season. The potential vegetation is about 70-90% grasses and grass-likes, 5-15% forbs and 5-15% woody plants.

Mid and short warm season grasses and shrubs dominate this community. The principal grasses are sideoats grama, little bluestem, blue grama, and prairie sandreed. Little bluestem increases in abundance on north facing aspects. Secondary grasses are switchgrass, sand bluestem, big bluestem, Indiangrass, western wheatgrass, and needleandthread. Threadleaf and sun sedge are common. Dominant forbs are American vetch, dotted gayfeather, and purple prairie clover. Key shrubs are skunkbush sumac, true mountainmahogany, Bigelow sagebrush, golden and wax currant. A lightly stocked overstory of oneseed juniper and pinyon pine is usually present.

This is a sustainable plant community in terms of soil stability, watershed function and biological integrity. Litter is properly distributed where vegetative cover is continuous. Some litter movement may occur on steeper, wind swept slopes. Decadence and natural plant mortality is very low. Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. This community is resistant to many disturbances except continuous grazing, tillage and/or development into urban or other uses. Areas having lost all vegetation, such as livestock and vehicle trails are subject to wind and water erosion.

Total annual production, during an average year, ranges from 600 to 1600 pounds of air-dry weight and will average 1000 pounds.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6905
Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-69; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	10	22	35	15	10	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 periods between grazing events will shift this plant community to the *Blue Grama with Decreased Mid/Tall Grass and Shrubs Plant Community*.
- Non-use (rest) and no fire will move this plant community to the *Low Plant Density, Excessive Litter Plant Community*.

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

Blue Grama with Decreased Mid/Tall Grasses and Shrubs Plant Community

This plant community developed with continuous grazing without adequate recovery periods during the growing season. Blue grama has increased and is the dominant specie. Prairie sandreed, switchgrass, sand bluestem, big bluestem and Indiangrass have been significantly reduced. Little bluestem and sideoats grama are still present as secondary grasses. American vetch, purple prairie clover, leadplant, western sandcherry, true mountainmahogany and currants are present in reduced amounts. Needleandthread, western wheatgrass and New Mexico feathergrass may initially increase or decrease depending on the season of grazing use. Louisiana sagewort, western ragweed, hairy goldaster, slimflower scurfpea, small soapweed and fringed sagebrush have increased. The tree component has increased slightly.

Plant frequency, vigor and production have decreased. Reduction of tall, mid and rhizomatous wheatgrass, nitrogen-fixing forbs, shrub component and increased warm season short grass has begun to alter the biotic integrity of this community. Water and nutrient cycles are becoming impaired. Litter levels have been reduced. Wind scoured areas and pedestalled plants may be evident.

Total annual production, during an average year, ranges from 300 to 900 pounds of air-dry weight and will average 550 pounds.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6905
Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-69; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	10	22	35	15	10	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 Dominant with Remnant Sideoats/Little Bluestem and Shrubs Plant Community*.
- Prescribed grazing with adequate recovery opportunities between grazing events and proper stocking will move this plant community toward the *Sideoats Grama, Little Bluestem, Blue Grama and Shrubs Plant Community (HCPC)*.

Low Plant Density, Excessive Litter Plant Community

This plant community developed under many years of non-use (rest) and lack of fire. Plant species resemble the HCPC however, frequency and production will be reduced. Eventually, litter levels can become high enough to cause stagnation and mortality of various species such as Indiangrass, sand bluestem, switchgrass and little bluestem. Bunchgrasses typically develop dead centers and rhizomatous grasses can form small decadent communities due to a lack of stimulation by grazing animals. Some plants are inaccessible to grazing due to topography and rocky conditions thereby enhancing plant decadence and mortality.

Management changes can easily shift this plant community toward the HCPC. Non-disturbance will initially increase litter levels, minimizing soil erosion. In advanced stages of non-use (rest) or lack of fire, plants will begin to die off and bare areas will increase causing an erosion concern.

Total annual production can vary from 150 to 800 pounds of air-dry vegetation per acre and will average 350 pounds during an average year.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6906
Growth curve name: Warm season dominant, cool season sub-dominant, excess litter; MLRA-69; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	10	25	30	15	10	3	2	0	0

(monthly percentages of total annual growth)

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

- Prescribed grazing which allows for adequate recovery opportunity between grazing events and proper stocking will shift this plant community toward the *Sideoats Grama, Little Bluestem, Blue Grama and Shrubs Plant Community (HCPC)*.

Blue Grama Dominant with Remnant Sideoats/Little Bluestem and Shrubs Plant Community

This plant community developed with continued grazing without adequate recovery periods between grazing events. Blue grama dominates the plant community and may develop into a patchy sodbound appearance on areas that are more accessible to grazing animals. Sideoats grama and little bluestem may still be present in small amounts on steeper slopes. Forbs and shrubs that continue to increase are western ragweed, hairy goldaster, Bigelow sagebrush, fringed sagebrush, broom snakeweed, and small soapweed. Oneseed juniper and pinyon pine have significantly increased.

Species diversity and production have been significantly decreased due to the major reduction of mid and tall grass species and key shrubs. Energy flow, water cycle and mineral cycle have been negatively affected. Litter levels are very low and unevenly distributed. Soil erosion may be a concern on steeper slopes and exposed areas. Desertification is advanced.

Production ranges from 100 to 600 pounds of air-dry vegetation per acre per year and will average 300 pounds.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6907
Growth curve name: Warm season dominant; MLRA-69; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	30	40	20	5	0	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 periods between grazing events will shift this plant community across an ecological threshold toward the *Bare Ground, Sand Dropseed, Red Threeawn, Annuals Plant Community*.
- Long-term prescribed grazing that allows adequate recovery periods between grazing events and proper stocking will move this plant community toward the *Blue Grama with Decreased Mid/Tall Grass and Shrubs Plant Community* and eventually to the *HCPC* or associated plant communities assuming an adequate seed/vegetative source is available. This transition may take upwards of 40 years or more to achieve.

Bare Ground, Sand Dropseed, Red Threeawn, Annuals Plant Community

This plant community formed by continuous grazing without adequate recovery periods during the growing season. Bare ground has increased. Remnant amounts of species found in higher successional plant communities can still be found in localized areas due to the inherent geologic formation and relief of the site. The dominant perennial plants are sand dropseed and red threeawn. Annuals such as sixweeks fescue, Russian thistle, kochia and cheatgrass have increased or invaded.

Soil erosion hazard has increased due to the increase of bare ground and may be severe on steeper slopes. All ecological functions are impaired. Desertification is obvious.

Total annual production can vary from 25 to 200 pounds of air-dry vegetation per acre and will average 100 pounds.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6905
Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-69; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	10	22	35	15	10	3	0	0	0

(monthly percentages of total annual growth)

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

- Long-term prescribed grazing with adequate recovery opportunities between grazing events and proper stocking will move this plant community toward the *Blue Grama Dominant with Remnant Sideoats Grama/Little Bluestem and Shrubs Plant Community* assuming an adequate seed/vegetative source is available. This transition may take 40 years or more to achieve.

Oneseed Juniper Plant Community

Oneseed juniper has significantly increased due to the lack of fire and long-term non-use. This tree component has significantly altered the hydrology cycle as well as the landscape appearance. Prescribed grazing, brush management and fire can be used to maintain acceptable juniper levels.

In higher canopy cover situations, the soil erosion will increase. The water cycle is significantly altered under dense canopies. Infiltration is reduced because of interception of rainfall by the canopy. Runoff may or may not increase depending on the condition of the herbaceous component.

Total annual production can vary from 50 to 200 pounds of air-dry vegetation per acre and will average 100 pounds.

The following is the growth curve of the dominant species expected during a normal year:
Growth curve number: CO6907
Growth curve name: Warm season dominant; MLRA-69; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	30	40	20	5	0	0	0	0

(monthly percentages of total annual growth)

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Brush management, fire and prescribed grazing will move this plant community back to plant community from which it came.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

The variety of grasses, forbs, and shrubs found on this ecological site in the various plant communities provides habitat for a wide range of wildlife species. Historic large grazers that influenced these plant communities were bison, elk, and pronghorn. Changes over time have resulted in the loss of bison, the reduction in elk numbers, and pronghorn population swings. Domestic grazers now share these habitats with wildlife. The grassland communities of eastern Colorado are home to many bird species. Changes in the composition of the plant community when moving from the HCPC to other communities on this ecological site may result in dramatic species shifts in the bird community. The occasional wetland found on this ecological site provides essential seasonal water needed for reproductive habitat by amphibians. Because of a lack of permanent water, fish are not commonly expected on this ecological site. Mule and white-tailed deer may use this ecological site, however the shrub cover is too low to expect more than occasional use. The gray wolf, black-footed ferret, and wild bison used this ecological site in historic times. The wolf and ferret are thought to be extirpated from Eastern Colorado. Bison are currently found only as domestic livestock.

Sideoats Grama, Little Bluestem, Blue Grama and Shrubs Plant Community
The grasses, forbs, and shrubs in this plant community provide habitat for reptiles such as western rattlesnake and bullsnake. If water is available for breeding, spadefoot toads may be found here. The structural diversity in the plant community on this site provides habitat for Cassin's and Brewer's sparrow, lark bunting, scaled quail. Ferruginous and Swainson's hawks are commonly seen on this site. The combination of mid-tall grasses and shrubs provides habitat for lesser prairie chicken in the eastern part of this ecological site. Small mammals such as white-tailed jackrabbit, badger, swift fox, and several species of mice are common in this plant community. Pronghorn is a typical ungulate found in this community.

Blue Grama with Decreased Mid/Tall Grasses and Shrubs Plant Community
All HCPC species are expected in this plant community, however, the loss of some of the vegetative structural diversity in this plant community makes it less attractive to the HCPC species.

Low Plant Density, Excessive Litter; Blue Grama Sod with Remnant Sideoats/Little Bluestem and Shrubs; and Bare Ground, Sand Dropseed, Red Threeawn, Annuals Plant Communities
As these communities develop into an open landscape the wildlife species will shift away from HCPC species and toward the species that prefer unvegetated areas and short plants. Texas short- lizard, six-lined racerunner, and black-tailed jackrabbit would be expected more frequently here than in the HCPC. In addition, mountain plover, black-tailed prairie dog, and burrowing owl might use these communities where slopes are less than 5% and vision is unobstructed.

Oneseed Juniper Plant Community
Because of the increased shrub cover in this community, use by some of the grassland reptiles and birds will decline, being replaced by species that need woody cover. Although the western rattlesnake and coachwhip will continue to use this community as the vegetation changes to shrubs, other reptiles such as the collared lizard may begin using this community because of the increase in juniper. Birds such as flickers, chickadees, robins, and blue jays will be expected in this community. Mule and white-tailed deer are expected to increase on this plant community because of the improved cover adjacent to grassland. Desert cottontails may take advantage of the edge created by this community.

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
Canada wildrye	U	D	U	U	N	U	N	N	U	D	U	U	N	U	N	N	N	U	N	N	U	D	U	U	U	D	U	U
galleta	N	N	U	N	N	N	U	N	N	N	U	N	N	N	U	N	N	N	U	N	N	N	U	N	N	N	U	N
green muhly	U	D	D	U	N	U	N	N	U	D	D	U	N	U	N	N	N	U	N	N	U	D	D	U	U	D	D	U
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
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
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
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
New Mexico feathergrass	N	P	D	U	N	D	D	U	N	P	D	U	N	D	D	U	N	D	D	U	N	P	D	U	N	P	D	U
pinyon ricegrass	U	P	D	U	U	D	D	U	U	P	D	U	U	D	D	U	U	D	D	U	U	P	D	U	U	P	D	U
prairie sandreed	U	D	D	U	U	D	U	U	U	D	D	U	U	U	D	U	U	U	D	U	U	D	D	U	U	D	D	U
sand 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
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
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
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
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
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																												
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
Colorado four o'clock	U	D	D	U	D	P	P	U	U	D	D	U	D	P	P	U	D	P	P	U	U	D	D	U	U	D	D	U
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
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
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
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
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
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
Nuttall's evolvulus	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
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
prairie spiderwort	U	U	U	U	N	N	N	N	U	U	U	U	N	N	N	N	N	N	N	N	U	U	U	U	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
sand lily	U	D	U	U	N	U	U	N	U	D	U	U	N	U	U	N	N	U	U	N	U	D	U	U	N	U	U	N
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
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
stemless actinea	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
Texas croton	U	U	U	U	N	N	N	N	U	U	U	U	N	N	N	N	N	N	N	N	U	U	U	U	N	N	N	N
threadleaf groundsel	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
variable senecio	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
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
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
wormwood	N	N	U	N	N	U	U	N	N	N	U	N	N	U	U	N	N	U	U	N	N	N	U	N	N	N	U	N
Shrubs																												
Bigelow sage	U	N	U	U	D	U	D	U	U	N	U	U	D	U	D	U	D	U	D	U	U	N	U	U	U	N	U	U
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
golden 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
green plume 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
leadplant	U	P	D	U	U	P	D	U	U	P	D	U	U	P	D	U	U	P	D	U	U	P	D	U	U	P	D	U
New Mexico hoptree	N	N	U	N	U	U	D	U	N	N	U	N	U	U	D	U	U	U	D	U	N	N	U	N	N	N	U	N
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
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
true mountainmahogany	D	U	U	U	P	U	U	D	D	U	U	U	P	U	D	P	U	N	N	U	D	U	U	U	P	U	U	D
walking stick cholla	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 sandcherry	D	P	P	D	D	U	U	D	D	P	P	D	P	U	D	P	D	U	U	D	D	P	P	D	P	U	U	P
Trees																												
oneseed juniper	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

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)
Sideoats Grama, Little Bluestem, Blue Grama, Shrubs (HCPC)	1000	0.32
Blue Grama w/Decreased Mid/Tall Grasses/Shrubs	550	0.17
Blue Grama Dominant w/Remnant Sideoats/Little Bluestem and Shrubs	300	0.09
Low Plant Density, Excessive Litter	*	*
Bare Ground, Sand Dropseed, Red Threeawn, Annuals	*	*
Oneseed Juniper	*	*

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.

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

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group A. Infiltration is moderate to high and runoff potential for this site is moderate depending on 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

Fence posts and firewood are potential wood products.

Other Products

None noted.

Supporting Information

Associated Sites

(069XY026CO) – Sandy
(069XY019CO) – Sands
(069XY006CO) – Loamy

Similar Sites

(069XY058CO) – Limestone Breaks
[shallow calcareous soil, lower overall production]
(069XY064CO) – Gravel Breaks
[gravelly loam soils, less prairie sandreed, lower production]

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: Ben Berlinger, Rangeland Management Specialist, NRCS; Scott Woodall, Rangeland Management Specialist, NRCS; Lee Neve, Soil Scientist, NRCS; Julie Elliott, Rangeland Management Specialist, NRCS; Terri Skadeland, Biologist, NRCS.

State Correlation

N/A

Field Offices

Canon City, Colorado Springs, Eads, Hugo, Lamar, Las Animas, Pueblo, Rocky Ford, Simla, Springfield, Trinidad, Walsenburg

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)

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Site Description Approval

/s/ 03/25/2004

State Range Management Specialist Date