

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Sandstone Breaks

Site ID: R067BY056CO

Major Land Resource Area: 67B – Central High Plains, Southern Part

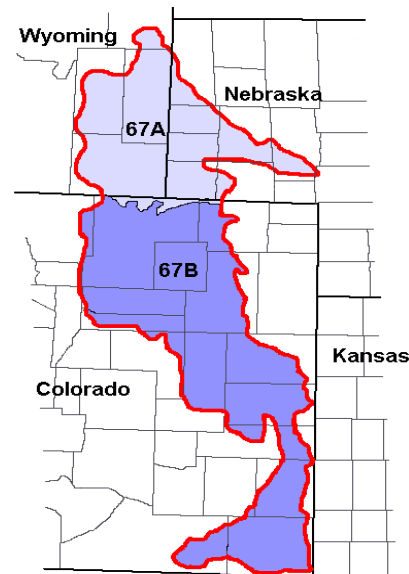
Physiographic Features

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

Landform: hills, plains

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	3800	5600
Slope (percent):	0	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:	very low	high



Climatic Features

The mean average annual precipitation varies from 12 to 16 inches per year depending on location and ranges from less than 8 inches to over 20 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 but averages 35 to 45 inches per year. Winds are estimated to average about 9 miles per hour annually, ranging from 10 miles per hour during the spring to 9 miles per hour during late summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring periods of high winds with gusts to more than 90 miles per hour.

The average length of the growing season is 142 days, but varies from 129 to 154 days. The average date of first frost in the fall is September 28, and the last frost in the spring is about May 9. July is the hottest month and December and January are 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 -35 degrees F or lower.

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

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	129	154
Freeze-free period (days):	151	178
Mean Annual Precipitation (inches):	12	16

Average Monthly Precipitation (inches) and Temperature (°F):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.36	12.0	45.1
February	0.26	0.38	15.9	50.9
March	0.83	0.87	22.3	58.9
April	1.28	1.38	30.1	69.1
May	2.32	2.49	39.9	78.0
June	1.93	2.57	49.0	88.7
July	1.42	2.31	55.0	93.9
August	1.07	2.38	53.5	91.9
September	1.02	1.40	43.8	83.8
October	0.89	1.00	32.5	72.9
November	0.52	0.53	20.9	57.4
December	0.34	0.37	11.9	46.9

Climate Stations		Period	
Station ID	Location or Name	From	To
CO0945	Briggsdale	1948	2000
CO4076	Holly	1918	2000
CO9147	Windsor	1948	1990

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

Influencing Water Features

Wetland Description:	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
None	None	None	None	None

Stream Type: None

Representative Soil Features

The soils of this site are very shallow to moderately deep, somewhat excessively drained, and moderately to rapidly permeable. These soils occur on hills and plains. Some soils have bedrock at depths of 10 to 40 inches. The available water capacity is typically very low to low. The soil surface layer is typically 2 to 9 inches thick.

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: Tassel, Terry, Treon, Tullock, Bernal, and Travessilla

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

Parent Material Kind: residuum

Parent Material Origin: sandstone

Surface Texture: fine sandy loam, loamy fine sand, stony fine sandy loam

Surface Texture Modifier: stony

Subsurface Texture Group: loamy

Surface Fragments $\leq 3''$ (% Cover): 0-20

Surface Fragments $> 3''$ (%Cover): 0-15

Subsurface Fragments $\leq 3''$ (% Volume): 0-25

Subsurface Fragments $> 3''$ (% Volume): 0-10

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	somewhat excessively
Permeability Class:	moderate	rapid
Depth (inches):	10	40
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	6.6	9.0
Available Water Capacity (inches)*:	2	6
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:

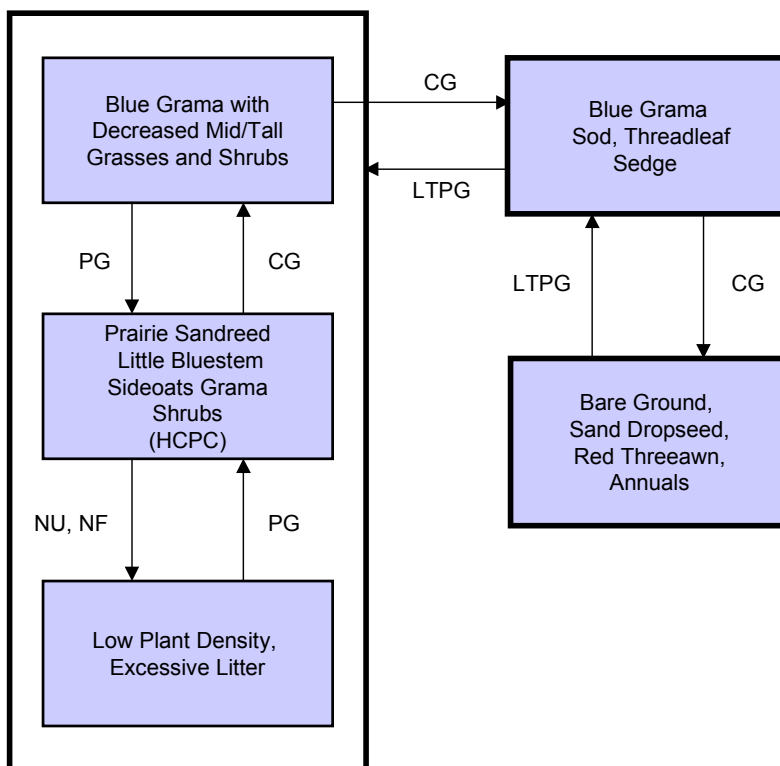
Continuous grazing without adequate recovery periods following each grazing occurrence, will initially cause prairie sandreed, little bluestem, sideoats grama, Indiangrass, sand bluestem, switchgrass, palatable forbs and shrubs to decrease in frequency and production. Grasses and grass-like plants such as blue 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 eventually form into a patchy sodbound appearance. 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 result in large amounts of bare ground. Species such as red threeawn, sand dropseed, small soapweed, broom snakeweed, wormwood, pricklypear cactus and cheatgrass will increase or invade.

Tillage is not recommended on this site due to steep shallow soils and associated low production potential.

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 duration/time controlled grazing and historical accounts.

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, **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

			Prairie Sandreed, Little Bluestem, Sideoats Grama and Shrubs (HCPC)		
COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1	770 - 990	70 - 90
little bluestem	Schizachyrium scoparium	SCSC	1	110 - 165	10 - 15
prairie sandreed	Calamovilfa longifolia	CALO	1	110 - 165	10 - 15
sideoats grama	Bouteloua curtipendula	BOCU	1	55 - 165	5 - 15
blue grama	Bouteloua gracilis	BOGR2	1	55 - 110	5 - 10
sand bluestem	Andropogon hallii	ANHA	1	22 - 110	2 - 10
big bluestem	Andropogon gerardii	ANGE	1	22 - 77	2 - 7
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	22 - 77	2 - 7
Indiangrass	Sorghastrum nutans	SONU2	1	0 - 55	0 - 5
switchgrass	Panicum virgatum	PAVI2	1	0 - 55	0 - 5
western wheatgrass	Pascopyrum smithii	PASM	1	11 - 33	1 - 3
Canada wildrye	Elymus canadensis	ELCA4	1	11 - 22	1 - 2
prairie junegrass	Koeleria macrantha	KOMA	1	11 - 22	1 - 2
sand dropseed	Sporobolus cryptandrus	SPCR	1	11 - 22	1 - 2
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	11 - 22	1 - 2
bottlebrush squirreltail	Elymus elymoides ssp. elymoides	ELELE	1	0 - 11	0 - 1
green muhly	Muhlenbergia racemosa	MURA	1	0 - 11	0 - 1
hairy grama	Bouteloua hirsuta	BOHI2	1	0 - 11	0 - 1
Indian ricegrass	Achnatherum hymenoides	ACHY	1	0 - 11	0 - 1
plains muhly	Muhlenbergia cuspidata	MUCU3	1	0 - 11	0 - 1
red threeawn	Aristida purpurea var. longiseta	ARPUL	1	0 - 11	0 - 1
ring muhly	Muhlenbergia torreyi	MUTO2	1	0 - 11	0 - 1
sun sedge	Carex inops ssp. heliophila	CAINH2	1	11 - 33	1 - 3
threadleaf sedge	Carex filifolia	CAFI	1	11 - 22	1 - 2
other perennial grasses		2GP	1	11 - 55	1 - 5
FORBS			2	55 - 165	5 - 15
dotted gayfeather	Liatris punctata	LIPU	2	11 - 22	1 - 2
purple prairie clover	Dalea purpurea	DAPU5	2	11 - 22	1 - 2
American vetch	Vicia americana	VIAM	2	0 - 11	0 - 1
annual buckwheat	Eriogonum annuum	ERAN4	2	0 - 11	0 - 1
Colorado greenthread	Thelesperma filifolium	THFI	2	0 - 11	0 - 1
cutleaf evening-primrose	Oenothera coronopifolia	OECO2	2	0 - 11	0 - 1
hairy goldaster	Heterotheca villosa	HEVI4	2	0 - 11	0 - 1
heath aster	Symphyotrichum ericoides	SYER	2	0 - 11	0 - 1
ironplant goldenweed	Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida	MAPIP4	2	0 - 11	0 - 1
Louisiana sagewort	Artemisia ludoviciana	ARLU	2	0 - 11	0 - 1
narrowleaf penstemon	Penstemon angustifolius	PEAN4	2	0 - 11	0 - 1
Nuttall's evolvulus	Evolvulus nuttallianus	EVNU	2	0 - 11	0 - 1
pacific peavine	Lathyrus polymorphus	LAPO2	2	0 - 11	0 - 1
prairie spiderwort	Tradescantia occidentalis	TROC	2	0 - 11	0 - 1
rush skeletonweed	Lygodesmia juncea	LYJU	2	0 - 11	0 - 1
sand lily	Leucocrinum montanum	LEMO4	2	0 - 11	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	0 - 11	0 - 1
slimflower scurfpea	Psoraleidium tenuiflorum	PSTE5	2	0 - 11	0 - 1
stemless hymenoxys	Tetranneuris acaulis	TEAC	2	0 - 11	0 - 1
stickleaf mentzelia	Mentzelia decapetala	MEDE2	2	0 - 11	0 - 1
Texas croton	Croton texensis	CRTE4	2	0 - 11	0 - 1
upright prairie coneflower	Ratibida columnifera	RACO3	2	0 - 11	0 - 1
variable senecio	Packera neomexicana var. mutabilis	PANEM	2	0 - 11	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	2	0 - 11	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	2	0 - 11	0 - 1
woolly locoweed	Astragalus mollissimus	ASMO7	2	0 - 11	0 - 1
wormwood	Artemisia dracunculus	ARDR4	2	0 - 11	0 - 1
other perennial forbs		2FP	2	11 - 55	1 - 5
SHRUBS			3	55 - 165	5 - 15
chokecherry	Prunus virginiana var. virginiana	PRVIV	3	11 - 33	1 - 3
western sandcherry	Prunus pumila var. besseyi	PRPUB	3	11 - 33	1 - 3
fourwing saltbush	Atriplex canescens	ATCA2	3	11 - 22	1 - 2
golden currant	Ribes aureum	RIAU	3	11 - 22	1 - 2
spreading buckwheat	Eriogonum effusum	EREF	3	11 - 22	1 - 2
wax currant	Ribes cereum	RICE	3	11 - 22	1 - 2
winterfat	Krascheninnikovia lanata	KRLA2	3	11 - 22	1 - 2
skunkbush sumac	Rhus trilobata	RHTR	3	0 - 22	0 - 2
broom snakeweed	Gutierrezia sarothrae	GUSA2	3	0 - 11	0 - 1
leadplant	Amorpha canescens	AMCA6	3	0 - 11	0 - 1
plains pricklypear	Opuntia polyacantha	OPPO	3	0 - 11	0 - 1
purple pincushion	Escobaria vivipara var. vivipara	ESVIV	3	0 - 11	0 - 1
small soapweed	Yucca glauca	YUGL	3	0 - 11	0 - 1
other native shrubs		2SHRUB	3	11 - 33	1 - 3
Annual Production lbs./acre			LOW RV* HIGH		
GRASSES & GRASS-LIKES			600 - 880 - 1260		
FORBS			50 - 110 - 170		
SHRUBS			50 - 110 - 170		
TOTAL			700 - 1100 - 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 or annual production of a normal or representative year.

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.

Prairie Sandreed, Little Bluestem, Sideoats 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-like, 5-15% forbs and 5-15% woody plants.

Mid and tall grasses dominate this community. The principal grasses are prairie sandreed, little bluestem and sideoats grama. Secondary grasses are blue grama, switchgrass and needleandthread. Other important grasses are sand bluestem, big bluestem and Indiangrass. Threadleaf and sun sedge are common. Dominant forbs are American vetch, dotted gayfeather, purple prairie clover and upright prairie coneflower. Key shrubs are chokecherry, western sandcherry, golden and wax currant.

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 700 to 1600 pounds of air-dry weight and will average 1100 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6709

Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-67B; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	7	25	35	15	10	5	1	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 *Prairie Sandreed, Little Bluestem, Sideoats 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, 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, chokecherry and currants are present in reduced amounts. Needleandthread 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.

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 350 to 950 pounds of air-dry weight and will average 650 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6710

Growth curve name: Warm season dominant; MLRA-67B; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	40	20	10	5	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 Sod, Threadleaf Sedge Plant Community*.
- Prescribed grazing with adequate recovery opportunities between grazing events and proper stocking will move this plant community toward the *Prairie Sandreed, Little Bluestem, Sideoats 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.

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 250 to 900 pounds of air-dry vegetation per acre and will average 600 pounds during an average year.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6711

Growth curve name: Warm season dominant, cool season sub-dominant, excess litter; MLRA-67B; upland coarse texture soil.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	8	20	35	17	10	5	3	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 *Prairie Sandreed*, *Little Bluestem*, *Sideoats Grama* and *Shrubs Plant Community (HCPC)*.

Blue Grama Sod, Threadleaf Sedge Plant Community

This plant community developed with continued grazing without adequate recovery periods between grazing events. The dominant species are blue grama and threadleaf sedge. These species have developed into a sodbound condition occurring in localized colonies exhibiting a mosaic appearance. Tall grasses have been removed with the exception of prairie sandreed, which may exist in remnant amounts. 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, fringed sagebrush and small soapweed.

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 500 pounds of air-dry vegetation per acre per year and will average 350 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6712

Growth curve name: Warm season/cool season co-dominant; MLRA-67B; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	1	7	48	27	15	2	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 significantly increased. Remnant amounts of blue grama can still be found in localized areas. 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 50 to 150 pounds of air-dry vegetation per acre and will average 100 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6710

Growth curve name: Warm season dominant; MLRA-67B; upland coarse textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	40	20	10	5	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 Sod, Threadleaf Sedge Plant Community* assuming an adequate seed/vegetative source is available. This transition may take 40 years or more to achieve.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Prairie Sandreed, Little Bluestem, Sideoats Grama and Shrubs Plant Community

The structural diversity in the plant community found on the HCPC is attractive to a number of wildlife species. Common bird species expected on this community include Cassin's and Brewer's sparrow, chestnut collared longspur, lark bunting, western meadowlark, and ferruginous and Swainson's hawks. The combination of mid-tall grasses and shrubs provides habitat for greater and lesser prairie chicken in the eastern parts of this site. Scaled quail may also use this site.

White-tailed and black-tailed jackrabbit, badger, pronghorn, coyote, swift fox, plains pocket gopher, long-tailed weasel, and several species of mice are mammals that commonly use this plant community. Reptiles using this community include western rattlesnake, bullsnake, plains garter snake (if water is in home range), western hognose snake, racer, western box turtle, and six-lined racerunner.

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 make it less attractive to the HCPC species.

Low Plant Density, Excessive Litter Plant Community

Although the HCPC species are still expected here, the degraded habitat conditions will limit wildlife carrying capacity.

Blue Grama Sod, Threadleaf Sedge Plant Community and Bare Ground, Sand Dropseed, Red Threeawn, Annuals Plant Community

Habitat conditions associated with these communities favor the long-billed curlew, McCown's longspur, burrowing owl, mountain plover, killdeer, and horned lark. Ferruginous and Swainson's hawks are frequent users of these communities. The loss of shrubs and taller grasses in these plant communities results in a shift of bird species away from the HCPC birds. Lark bunting, chestnut-collared longspur, and western meadowlark use declines and Cassin's sparrow stop using the communities altogether.

Most mammals will be the same as in the HCPC, however jackrabbit, black-tailed prairie dog, desert cottontail, and thirteen-lined ground squirrel use will increase because of the changing plant community. Reptiles using these communities are the same as in the HCPC.

Other Potential Species

The plains spadefoot is the only common species of frog or toad inhabiting grasslands in Eastern Colorado. This species requires water for breeding. Tiger salamanders may be found on grassland sites, but require a water body for breeding. Either of these species may be found in any plant community if seasonal water requirements are met. Mule and white-tailed deer may use this ecological site, however the shrub cover is too low to provide escape or hiding cover. On ecological site locations near riparian areas, deer will use the vegetation for feeding. Big brown bats will use any plant community on this ecological site if a building site is in the area. 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.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-like							
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
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
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
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
plains muhly	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 U D U
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
prairie sandreed	U D D U	U D U U	U D D U	U D U U	U D U U	U D D U	U D D U
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
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
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
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
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	U D U U	U D U U	U D D U	U D D U
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
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
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 P N D	U P N D	U D U D	U D U 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
annual buckwheat	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
Colorado green thread	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
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	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 D 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
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 U 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 D U 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	U U 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
rush skeletonweed	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
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	U D 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
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 hymenoxys	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
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	U U U 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
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
Shrubs							
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
chokecherry	D T T D	D T T D	D T T D	D T T D	D T T D	D T T D	D T T D
currant	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
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
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
purple pincushion	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
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
spreading buckwheat	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
western sandcherry	D P P D	D U U D	D P P D	D U U D	D U U D	D P P D	D 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	Production	Stocking Rate
	(lbs./acre)	(AUM/acre)
Prairie Sandreed, Little Bluestem, Sideoats Grama, Shrubs (HCPC)	1100	0.35
Blue Grama w/Decreased Mid/Tall Grasses/Shrubs	650	0.21
Blue Grama Sod, Threadleaf Sedge	350	0.11
Low Plant Density, Excessive Litter	*	*
Sand Dropseed, Red Threeawn, Annuals, Bare Ground	*	*

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

No appreciable wood products are present on the site.

Other Products

None noted.

Supporting Information

Associated Sites

- (R067BY024CO) – Sandy (formerly Sandy Plains)
- (R067BY015CO) – Sands (formerly Deep Sands)
- (R067BY002CO) – Loamy (formerly Loamy Plains)
- (R067BY008CO) – Loamy Slopes

Similar Sites

- (R067BY060CO) – Limestone Breaks
[shallow calcareous soil, lower overall production]
- (R067BY063CO) – 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; Harvey Sprock, Rangeland Management Specialist, NRCS; James Borchert, Soil Scientist, NRCS; Terri Skadeland, Biologist, NRCS.

State Correlation

This site is unique to Colorado.

Field Offices

Akron, Brighton, Burlington, Byers, Cheyenne Wells, Eads, Flagler, Fort Collins, Fort Morgan, Greeley, Holly, Hugo, Kiowa, Lakewood (metro), Lamar, Longmont, Simla, Springfield, Sterling

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://hpccsun.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