

United States Department of Agriculture Natural Resources Conservation Service

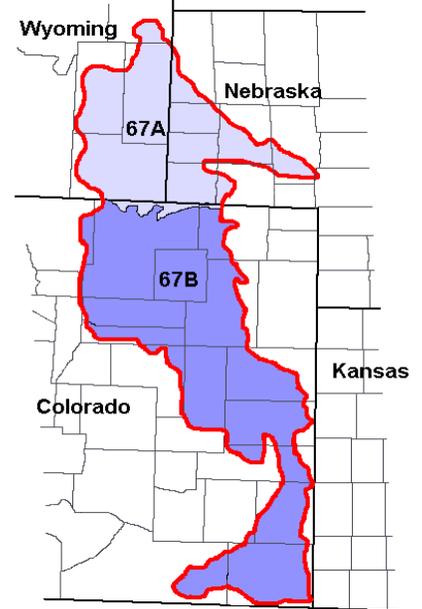
Ecological Site Description

Site Type: Rangeland

Site Name: Sandy Bottomland

Site ID: R067BY031CO

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



Physiographic Features

This site occupies the first flood-plain step between the streambed and higher sandy terraces. It may also be found in a few sandy valleys and drainageways where there is some effect from extra moisture. Topography is nearly level to gently sloping. Surface may be smooth or exhibit minor undulations.

Landform: flood plain, flood-plain step

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	3800	5600
Slope (percent):	0	3
Water Table Depth (inches):	60	60
Flooding:		
Frequency:	rare	frequent
Duration:	very brief	brief
Ponding:		
Depth (inches):	0	0
Frequency:	none	none
Duration:	none	none
Runoff Class:	negligible	very low

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.

Site Type: Rangeland
 MLRA: 67B – Central High Plains, Southern Part

Sandy Bottomland
R067BY031CO

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 may occur 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 deep, somewhat excessive to well drained, and moderately rapid to rapidly permeable. These soils occur on flood plains and flood-plain steps. They formed in alluvium derived from mixed sources. They typically are frequently flooded. Some soils have gravel at depths of 10 to 60 inches. The available water capacity is typically low to moderate. The soil surface layer is typically 3 to 8 inches thick and is loamy sand, sandy loam, and fine sandy loam. The soil moisture regime is ustic aridic. The soil temperature regime is mesic.

The Historic Climax Plant Community (HCPC) should exhibit slight to no evidence of rills. Water flow paths, if any, are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. Wind scoured areas are inherent to this site and some soil movement may be noticeable on various landscape positions. Minor plant pedestalling may occur in these areas. Overall, the soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration.

These soils are susceptible to wind and water erosion where vegetative cover is inadequate.

Major soil series correlated to this ecological site include: Bankard and Glenberg

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

Parent Material Kind: alluvium

Parent Material Origin: mixed

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

Surface Texture Modifier: none

Subsurface Texture Group: sandy

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

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

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

Subsurface Fragments $> 3''$ (% Volume): 25

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	somewhat excessive
Permeability Class:	moderately rapid	rapid
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	7.4	8.4
Available Water Capacity (inches)*:	3	7
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

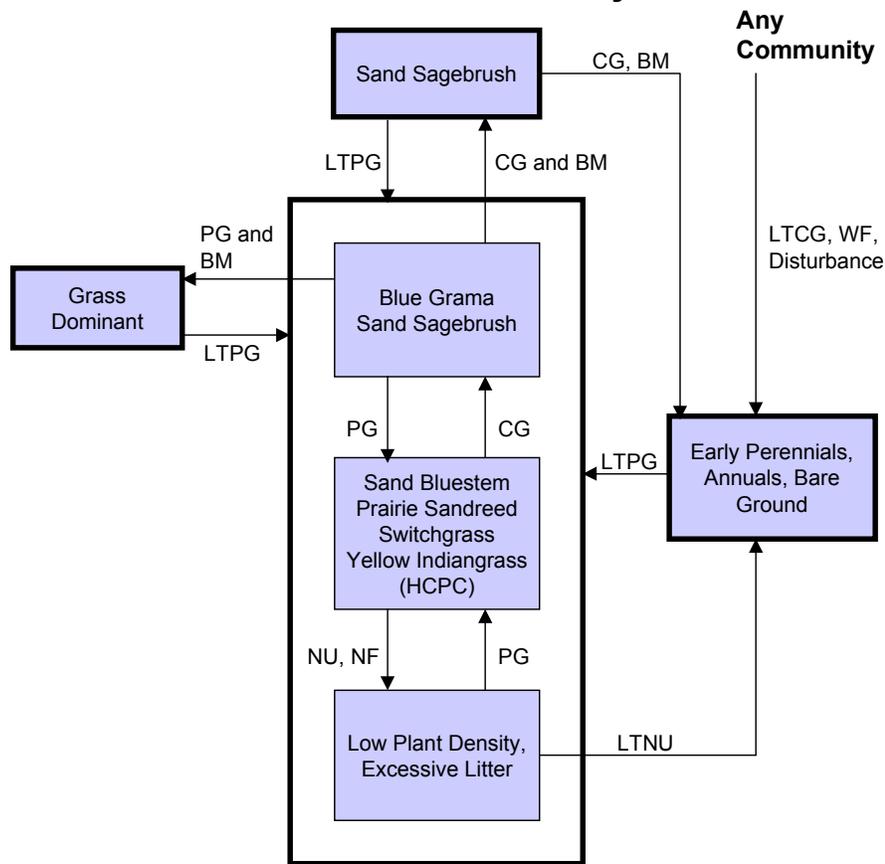
Ecological Dynamics of the Site:

Continuous grazing without adequate recovery opportunities following each grazing event during the growing season will initially cause blue grama and sand sagebrush to increase. Species such as sand bluestem, yellow Indiangrass, switchgrass, prairie sandreed, western sandcherry, leadplant and palatable forbs will decrease in frequency and production. Brush management (spraying) will initially reduce sand sagebrush as well as other important forbs and shrubs. Brush management followed by continuous grazing can eliminate remaining grass leaving established or reestablishing sagebrush. Prescribed grazing that allows adequate recovery periods following brush management will result in a grass dominated plant community. Non-use, continuous grazing, wildfire, brush management or any type of physical disturbance can cause erosion to increase on these fragile soils.

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



BM - brush management, **CG** - continuous grazing without adequate recovery period, **HCPC** - Historic Climax Plant Community, **LTCG** - long term continuous grazing (>25 yrs), **LTNU** - long term non-use (>25 yrs), **LTPG** - long term prescribed grazing (>20yrs), **NF** - no fire, **NU** - non-use, **PG** - prescribed grazing with adequate recovery period, **WF** - wildfire

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Sand Bluestem, Prairie Sandreed, Switchgrass, Indiangrass (HCPC)			
			Group	lbs./acre	% Comp	
GRASSES & GRASS-LIKES			1	1295 - 1573	70 - 85	
sand bluestem	Andropogon hallii	ANHA	1	463 - 555	25 - 30	
prairie sandreed	Calamovilfa longifolia	CALO	1	278 - 463	15 - 25	
switchgrass	Panicum virgatum	PAVI2	1	185 - 370	10 - 20	
Indiangrass	Sorghastrum nutans	SONU2	1	93 - 185	5 - 10	
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	56 - 130	3 - 7	
blue grama	Bouteloua gracilis	BOGR2	1	19 - 93	1 - 5	
little bluestem	Schizachyrium scoparium	SCSC	1	19 - 93	1 - 5	
western wheatgrass	Pascopyrum smithii	PASM	1	19 - 93	1 - 5	
Canada wildrye	Elymus canadensis	ELCA4	1	19 - 56	1 - 3	
sand dropseed	Sporobolus cryptandrus	SPCR	1	19 - 56	1 - 3	
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	1	19 - 56	1 - 3	
sideoats grama	Bouteloua curtipendula	BOCU	1	0 - 56	0 - 3	
blowout grass	Redfieldia flexuosa	REFL	1	19 - 37	1 - 2	
hairy grama	Bouteloua hirsuta	BOHI2	1	19 - 37	1 - 2	
Indian ricegrass	Achnatherum hymenoides	ACHY	1	19 - 37	1 - 2	
red threeawn	Aristida purpurea var. longiseta	ARPUL	1	19 - 37	1 - 2	
sand paspalum	Paspalum setaceum	PASE5	1	19 - 37	1 - 2	
sandhill muhly	Muhlenbergia pungens	MUPU2	1	19 - 37	1 - 2	
inland saltgrass	Distichlis spicata	DISP	1	0 - 19	0 - 1	
prairie junegrass	Koeleria macrantha	KOMA	1	0 - 19	0 - 1	
six-weeks fescue	Vulpia octoflora	VUOC	1	0 - 19	0 - 1	
thickspick wheatgrass	Elymus elymoides ssp. elymoides	ELLAL	1	0 - 19	0 - 1	
sun sedge	Cares inops ssp. heliophila	CAINH2	1	19 - 37	1 - 2	
thinstem flatsedge	Cyperus lupulinus	CYLU2	1	0 - 19	0 - 1	
other native grasses		2GP	1		0 - 5	
FORBS			2	148 - 278	8 - 15	
pacific peavine	Lathyrus polymorphus	LAPO2	2	19 - 56	1 - 3	
dotted gayfeather	Liatris punctata	LIPU	2	19 - 37	1 - 2	
narrowleaf penstemon	Penstemon angustifolius	PEAN4	2	19 - 37	1 - 2	
purple prairie clover	Dalea purpurea var. purpurea	DAPUP	2	19 - 37	1 - 2	
silky prairie clover	Dalea villosa	DAVI	2	19 - 37	1 - 2	
annual buckwheat	Eriogonum annuum	ERAN4	2	0 - 19	0 - 1	
bigtop dalea	Dalea enneandra	DAEN	2	0 - 19	0 - 1	
bush morning-glory	Ipomoea leptophylla	IPLE	2	0 - 19	0 - 1	
deathcamas	Zigadenus venenosus	ZIVE	2	0 - 19	0 - 1	
hairy goldaster	Heterotheca villosa	HEVI4	2	0 - 19	0 - 1	
heath aster	Symphotrichum ericoides	SYERE	2	0 - 19	0 - 1	
Hoods phlox	Phlox hoodii	PHHO	2	0 - 19	0 - 1	
lemon scurfpea	Psoraleidium lanceolatum	PSLA3	2	0 - 19	0 - 1	
Louisiana sagewort	Artemisia ludoviciana	ARLU	2	0 - 19	0 - 1	
nuttails evolvulus	Evolvulus nuttallianus	EVNU	2	0 - 19	0 - 1	
painted milkvetch	Astragalus ceramicus var. filifolius	ASCEF	2	0 - 19	0 - 1	
pale evening-primrose	Oenothera albicaulis	OEAL	2	0 - 19	0 - 1	
plains larkspur	Delphinium carolinianum ssp. virescens	DECAV2	2	0 - 19	0 - 1	
prairie spiderwort	Tradescantia occidentalis	TROC	2	0 - 19	0 - 1	
sand lily	Leucocrinum montanum	LEMO4	2	0 - 19	0 - 1	
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	0 - 19	0 - 1	
snowball sand verbena	Abronia fragrans	ABFR2	2	0 - 19	0 - 1	
stiff sunflower	Helianthus pauciflorus ssp. pauciflorus	HEPAP2	2	0 - 19	0 - 1	
upright prairie coneflower	Ratibida columnifera	RACO3	2	0 - 19	0 - 1	
western ragweed	Ambrosia psilostachya	AMPS	2	0 - 19	0 - 1	
other native forbs	other native forbs	2FP	2	37 - 130	2 - 7	
SHRUBS			3	130 - 278	7 - 15	
western sandcherry	Prunus pumila var. besseyi	PRPUB	3	56 - 185	3 - 10	
leadplant	Amorpha canescens	AMCA6	3	37 - 130	2 - 7	
sand sagebrush	Artemisia filifolia	ARFI2	3	19 - 93	1 - 5	
Arkansas rose	Rosa arkansana	ROAR3	3	0 - 19	0 - 1	
plains pricklypear	Opuntia polyacantha	OPPO	3	0 - 19	0 - 1	
purple pincushion	Escobaria vivipara var. vivipara	ESVIV	3	0 - 19	0 - 1	
skunkbrush sumac	Rhus trilobata	RHTR	3	0 - 19	0 - 1	
small soapweed	Yucca glauca	YUGL	3	0 - 19	0 - 1	
spreading buckwheat	Eriogonum effusum	EREF	3	0 - 19	0 - 1	
other native shrubs	other native shrubs	2SHRUB	3	19 - 93	1 - 5	
Annual Production lbs./acre				LOW	RV*	HIGH
GRASSES & GRASS-LIKES				945	1440	1830
FORBS				135	210	285
SHRUBS				120	200	285
TREES						
TOTAL				1200	1850	2400

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.

Sand Bluestem, Prairie Sandreed, Switchgrass, Indiangrass Plant Community

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores, is well suited for grazing by domestic livestock and can be found on areas that are properly managed with grazing that allows adequate recovery periods following each grazing occurrence during the growing season.

The historic climax plant community consists chiefly of tall warm season grasses. Principle dominants are sand bluestem, prairie sandreed, switchgrass and yellow Indiangrass. Sub-dominant grasses include needleandthread and blue grama. Significant forbs and shrubs are pacific peavine, evening primrose, prairie clovers, leadplant and western sandcherry. The potential vegetation is about 70-85% grasses or grass-like plants, 8-15% forbs and 7-15% shrubs.

Prescribed grazing that allows for adequate recovery periods after each grazing event and proper stocking will maintain this plant community. Continual or repeated spring grazing and summer deferment will reduce the cool season component of this plant community and increase the warm season component. Spring deferment and continual or repeated summer grazing will increase the cool season component and decrease the warm season component of this plant community.

This plant community is well adapted to the Northern Great Plains climatic conditions and is resistant to many disturbances except continuous grazing, plowing, uncontrolled fire events and urban as well as other land use development. The diversity in plant species allows for high drought tolerance. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. This is a sustainable plant community in terms of soil stability, watershed function and biologic integrity.

Production in this community can vary from 1200 to 2400 pounds of air-dry vegetation per acre per year depending on the weather conditions and will average 1850 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 rest periods between grazing events will move this plant community toward the *Blue grama, Sand Sagebrush Plant Community*. Reduced production and erosion are a concern.
- Non-use (rest) and lack of fire will shift 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 *Sand Bluestem, Prairie Sandreed, Switchgrass, Yellow Indiangrass Plant Community (HCPC)*.

Blue Grama, Sand Sagebrush Plant Community

This plant community evolves with continuous grazing without adequate recovery periods between grazing events during the growing season. Sand bluestem, prairie sandreed, yellow Indiangrass, switchgrass, western sandcherry and leadplant have decreased in frequency and production. Blue grama and sand sagebrush has increased and dominates the community. Sand dropseed, red threawn, slimflower scurfpea, hairy goldaster, croton, western ragweed, stickleaf, lupine, loco, and milkvetch have also increased.

This plant community is relatively stable but at risk of losing some of the tall grass species, palatable forbs and shrubs. The reduction of tall grass species, nitrogen-fixing forbs, key shrub component and increased warm season shortgrass has altered the biotic integrity of this plant community. Nutrient cycle, water cycle and energy flow may be impaired. This is an early stage of desertification.

The production varies from 500 to 1300 pounds of air-dry vegetation per acre per year depending on the weather conditions and amount of mid and tall grass species still present. Production will average 950 pounds of air-dry vegetation per acre per 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: 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 and especially continuous grazing with brush management (spraying) will eliminate tall grasses, palatable forbs and shrubs and move this plant community across an ecological threshold to the *Sand Sagebrush Plant Community*. If continued long enough it will move to the *Early Perennials, Annuals and Bare Ground Plant Community*.
- Brush Management (spraying) and prescribed grazing will move this plant community across an ecological threshold toward the *Grass Dominant Plant Community*. Loss of palatable forbs, native legumes and shrubs is a concern.
- Prescribed grazing that allows adequate recovery periods between each grazing event and proper stocking will move this plant community back to the *Sand Bluestem, Prairie Sandreed, Switchgrass, Yellow Indiangrass Plant Community (HCPC)*.

Low Plant Density, Excessive Litter Plant Community

This plant community occurs when grazing is removed for long periods of time in the absence of fire. Plant composition is similar to the HCPC, however, in time, individual species production and frequency will be lower. Much of the nutrients are tied up in excessive litter. The semiarid environment and the absence of animal traffic to break down litter slows nutrient cycling. Aboveground litter also limits sunlight from reaching plant crowns. Many plants, especially bunchgrasses die off. Thick litter and absence of grazing or fire reduce seed germination and establishment. This plant community will change rapidly with prescribed grazing which allows animal impact and adequate recovery periods between grazing events.

Long term non-use/rest (greater than 25 years), will cause plant decadence and mortality to increase and erosion (blowouts, wind scoured areas) may eventually occur as bare ground increases. Once this happens, an ecological threshold has been crossed, and it will require increased energy input in terms of practice cost and management to bring back.

Production can vary from 100 to 1000 pounds of air-dry vegetation per acre per year depending on weather conditions and the plants that are present.

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-67. 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:

- Long term non-use (rest) if continued can move this plant community across an ecological threshold to the *Early Perennials, Annuals and Bare Ground Plant Community*. This transition may take greater than 25 years to accomplish.
- Prescribed grazing that allows for adequate recovery periods following each grazing event can move this plant community toward the *Sand Bluestem, Prairie Sandreed, Switchgrass, Yellow Indiangrass Plant Community (HCPC)*.

Sand Sagebrush Plant Community

This plant community is dominated almost entirely with sand sagebrush with little understory species present. Favorable species that remain are few and are protected by the sagebrush. The plant community is created with continuous grazing that does not allow adequate recovery periods between grazing events combined with brush management (spraying) even if it includes one growing season of deferment following spraying. Brush management initially reduces the sagebrush and, unfortunately, eliminates or greatly reduces most if not all other forbs and shrubs. Continuous grazing then reduces and can eliminate the remaining grass to a point where only reestablishing or established sagebrush remains. Further brush spraying at this point eliminates the sand sagebrush entirely and exposes the soil to wind erosion.

Species diversity and production have dropped substantially. Litter levels are low. Watershed function at this point is greatly reduced. Carbon sequestration is greatly reduced. Nutrient cycle and energy flow has been impaired. Bare areas can form or enlarge rather easily leading to possible blowouts or wind scoured areas. Desertification is obvious.

Production can vary from 50 to 1300 pounds of air-dry vegetation (primarily sand sagebrush) per acre per year depending on the amount of sand sage present and the weather conditions. An average of 500 pounds can be expected primarily from sand sagebrush.

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-67. 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 and/or brush management shifts this plant community to the *Early Perennials, Annuals and Bare Ground Plant Community*. Erosion is a concern.
- Long term prescribed grazing that allows adequate recovery periods following each grazing event can move this plant community back to the *Blue Grama Sand Sagebrush Plant Community* and eventually to the *Sand Bluestem, Prairie Sandreed, Switchgrass, Yellow Indiangrass Plant Community (HCPC)*, if an adequate seed/vegetative source is available.

Grass Dominant Plant Community

This plant community develops with brush management (spraying) and prescribed grazing. The brush management not only controls the sand sagebrush but unfortunately removes most if not all of the other forbs and shrubs. The community can vary from predominately sand dropseed, red threeawn and blue grama to nearly pure stands of prairie sandreed depending on what was present when the brush management was applied, how long ago it was applied, and how long and how the prescribed grazing was applied.

There is little plant diversity since most of the forbs and shrubs have been eliminated by brush control efforts. Nutrient and water cycling is impaired due to lack of deep-rooted shrubs and forbs, and native nitrogen fixing legumes. Erosion can vary, depending on production/density of grasses.

Production can vary from 300 to 1700 pounds of air-dry vegetation per acre per year depending on the grass species present, their density, and weather conditions.

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:

- Long term continuous grazing without adequate recovery periods between grazing events will decrease the dominant grasses. If continued long enough it can lead to the *Early Perennials, Annuals and Bare Ground Plant Community*.
- Long term prescribed grazing that allows adequate recovery periods following each grazing event (without further brush management) and proper stocking will eventually move this plant community toward the *Sand Bluestem, Prairie Sandreed, Switchgrass, Yellow Indiangrass Plant Community (HCPC)* or associated succession plant communities, assuming an adequate seed/vegetative source is available. This transition can take greater than 20 years to achieve.

Early Perennials, Annuals and Bare Ground Plant Community

This plant community will most likely develop with continuous grazing and/or brush management (spraying) from either a grass or sand sagebrush dominated plant community. However, any plant community subjected to long term continuous grazing, brush management (spraying), wildfire or any type of physical disturbance will eventually resemble this plant community. Red threeawn, sand dropseed, sandhill muhly, lemon scurfpea, wormwood, sixweeks fescue and cheatgrass occupy this plant community. More bare ground is apparent and small blowouts can be present.

Production and litter levels are extremely low. The nutrient cycle, water cycle, and energy flow are greatly reduced. Erosion is occurring. Pedestalling is evident. Organic matter/carbon reserves are greatly reduced. Desertification is advanced.

Production can vary greatly (50 – 300 pounds of air-dry vegetation per acre per year) depending on the plant density and weather conditions in any year.

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

- Long term continuous grazing, wildfire, or other disturbance (tillage, etc.) applied to *Any Plant Community* will increase bare ground and erosion.
- Long term prescribed grazing that allows adequate recovery periods between grazing events will eventually move this plant community toward the *Sand Bluestem, Prairie Sandreed, Switchgrass, Yellow Indiangrass Plant Community (HCPC)* or associated successional plant community, assuming an adequate seed/vegetative source is present.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Sand Bluestem, Prairie Sandreed, Switchgrass, Indiangrass Plant Community (HCPC)

The structural diversity in the plant community found on the HCPC is attractive to a number of wildlife species. Common bird species expected on the HCPC 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 reaches of the MLRA. Scaled quail may also use this community.

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 western hognose snake, racer, western box turtle, and six-lined racerunner.

Blue Grama, Sand Sagebrush 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 many HCPC species.

Low Plant Density, Excessive Litter Plant Community

All HCPC species are expected in this plant community, however, the wildlife species are shifting toward the typical shortgrass prairie species such as horned lark, killdeer, long-billed curlew, McCown's longspur, and ferruginous hawk. In addition, mountain plover, black-tailed prairie dog, and burrowing owl might use this community where slopes are less than 5%.

Sand Sagebrush Plant Community

Species typically associated with sand sagebrush communities are pronghorn, scaled quail, lesser and greater prairie chicken, mule deer, and Eastern fence lizard.

Grass Dominant Plant Community

This plant community can be quite variable. The wildlife species expected here would be those listed for the plant community most similar to this community.

Early Perennials, Annuals and Bare Ground Plant Community

The presence of tall species such as kochia, pigweed, sunflower, Russian thistle, and others in this community limit use by mountain plover, prairie dogs, and other species requiring unobstructed visual distances. Most HCPC species are not expected here in large numbers because of the changes in plant community.

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 for feeding, 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-likes							
blowout grass	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
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
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
inland saltgrass	N U U N	N N N N	N U U N	N N N N	N N N N	N U U N	N U U N
little bluestem	U D P U	N D D N	U D P U	N D D N	N D D N	U D P U	U D P U
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
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
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
sand paspalum	N U U N	N U N N	N U U N	N U N N	N U N N	N U U N	N U U N
sandhill muhly	N U N N	N N N N	N U N N	N N N N	N N N N	N U N N	N U N N
sideoats grama	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
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
tall dropseed	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 N
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
Forbs							
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
bigtop dalea	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U D P U
deathcamas	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
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
lemon 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	U U U 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
painted milkvetch	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 U
pale 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
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
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
silky prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U D P U
snowball sand verbena	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
stiff sunflower	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
Shrubs							
Arkansas 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
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
sand sagebrush	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U
skunkbrush 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 (lbs./acre)	Stocking Rate (AUM/acre)
Sand Bluestem, Prairie Sandreed, Switchgrass, Indiangrass (HCPC)	1850	0.59
Blue Grama, Sand Sagebrush	950	0.30
Sand Sagebrush	500	0.16
Grass Dominant	*	*
Low Plant Density, Excessive Litter	*	*

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 potential is high to moderate. Runoff potential for this site varies from moderate to low depending on soil hydrologic group and ground cover. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to NRCS Section 4, National Engineering Handbook (NEH-4) for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

No appreciable wood products are present on the site.

Other Products

None noted.

Supporting Information

Associated Sites

- (067BY002CO) – Loamy (formerly Loamy Plains)
- (067BY015CO) – Sands (formerly Deep Sands)
- (067BY024CO) – Sandy (formerly Sandy Plains)
- (067BY073CO) – Riverbottom

Similar Sites

- (067BY015CO) – Sands (formerly Deep Sands)
[occurs on upland areas and often but not always on a steeper slopes]
- (067BY022CO) – Choppy Sands
[occurs on upland areas, steep slopes]

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 include: Harvey Sprock, Rangeland Management Specialist, NRCS; Ben Berlinger, 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, 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