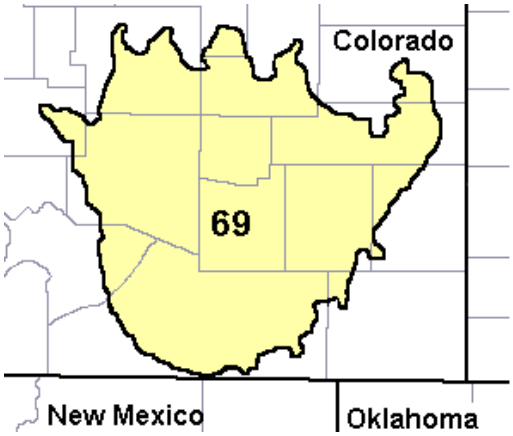
United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description



Site Type: Rangeland

Site Name: Loamy

Site ID: R069XY006CO

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

Physiographic Features

This site occurs on nearly level to gently sloping plains.

Landform: plain, fan, terrace

Aspect: N/A

	Minimum	Maximum
Elevation (feet):	3600	5600
Slope (percent):	0	10
Water Table Depth (inches):	40	60
Flooding:		
Frequency:	none	rare
Duration:	none	very brief
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 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 very deep but also include moderately deep and deep soils. Typically, they are moderately well or well drained and have slow to moderate permeability. Typically, these soils formed in alluvium, loess and eolian deposits derived from mixed calcareous sources. These soils occur on plains, fans, and terraces. The available water capacity is typically high for the deep and very deep soils and low to moderate for the moderately deep soils. The soil surface layer ranges from 3 to 16 inches thick and is typically loam, clay loam or silt loam. The pH of these soils ranges from neutral to moderately alkaline in the surface and subsoil, and moderately alkaline to strongly alkaline in the substratum. The soil moisture regime is typically ustic aridic, but ranges to aridic in the driest areas of MLRA 69. The soil temperature regime is mesic.

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

Major soil series correlated to this ecological site include:
Almagre, Baca, Bacid, Campo, Colby, Fort, Fort Collins, Harvey, Haverson, Haversid, Kim, Manvel, Manzanola, Minnequa, Renohill, Stoneham, Tyrone, Villedry, Weld, Wiley, Wilid

Soils that will be correlated to other MLRA's when outdated soil surveys are updated:
The Baca, Campo, Colby, Fort Collins, Renohill, Weld, and Wiley soils will be correlated to MLRA 67 due to soil classification changes. These soils have an aridic ustic moisture regime.

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

Parent Material Kind: loess, mixed eolian deposits, and alluvium.
Parent Material Origin: calcareous sedimentary deposits.
Surface Texture: loam, silt loam, clay loam
Surface Texture Modifier: none

Subsurface Texture Group: silty clay loam, clay loam, loam, silt loam, clay
Surface Fragments ≤ 3" (% Cover): 0 to 15 percent
Surface Fragments > 3" (%Cover): 0 to 15 percent
Subsurface Fragments ≤ 3" (% Volume): 0 to 45 percent
Subsurface Fragments > 3" (% Volume): 0 to 15 percent

Subsurface fragments do not exceed 35 percent above a depth of 20 inches and do not exceed 60 percent in the lower part of the profile. Typically, these soils average less than 15 percent rock fragments, but some horizons range from gravelly to very gravelly below 20 inches.

	Minimum	Maximum
Drainage Class:	moderately well	well
Permeability Class:	moderate	slow
Depth (inches):	20	60
Electrical Conductivity (mmhos/cm)*:	0	3
Sodium Absorption Ratio*:	0	5
Soil Reaction (1:1 Water)*:	6.8	8.4
Soil Reaction (0.1M CaCl2)*:	6.8	8.4
Available Water Capacity (inches)*:	2.5	7.5
Calcium Carbonate Equivalent (percent)*:	0	40

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

Plant Communities

Ecological Dynamics of the Site:

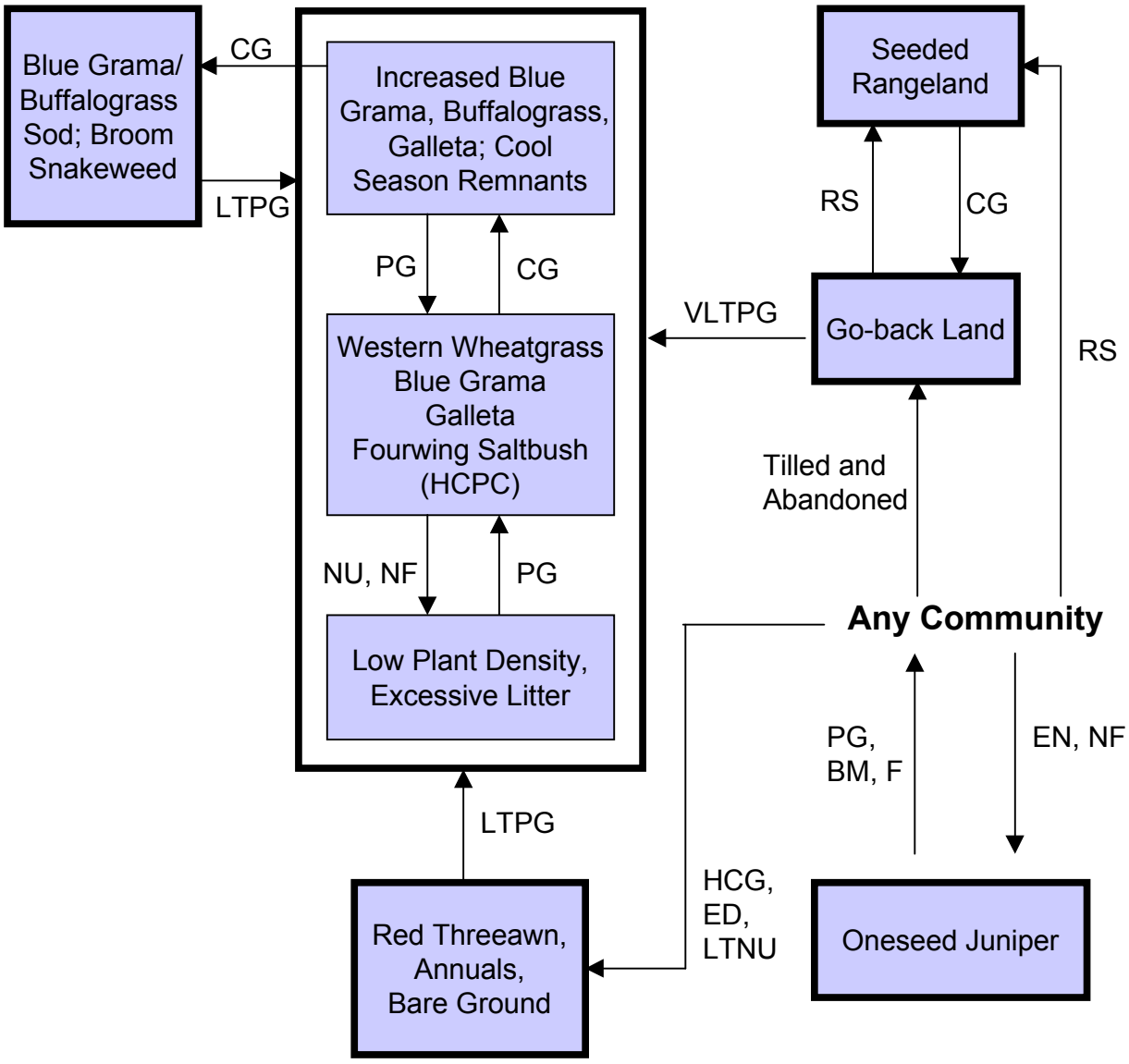
Deterioration of this site, due to continuous grazing without adequate recovery periods following each grazing occurrence, will cause blue grama, buffalograss, galleta and broom snakeweed to increase. Blue grama and/or buffalograss may eventually form a sod. Cool season grasses such as green needlegrass and western wheatgrass will decrease in frequency and production as well as key shrubs such as fourwing saltbush and winterfat. American vetch and other highly palatable forbs will decrease. Red threeawn, annuals and bare ground increases under heavy continuous grazing, excessive defoliation, or long-term non-use. Much of this ecological site has been tilled and used for crop production.

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 w/o adequate recovery opportunity, **ED** - excessive defoliation, **EN** - encroachment, **F** - fire, **HCG** - heavy continuous grazing (>30 yrs), **HCPC** - Historic Climax Plant Community, **LTNU** - long term non-use (>20 yrs), **LTPG** - long term prescribed grazing (>40 yrs), **NF** - no fire, **NU** - non use, **PG** - prescribed grazing with adequate recovery period, **RS** - range seeding, **VLTPG** - very long-term prescribed grazing (>80 yrs)

Plant Community Composition and Group Annual Production

			Western Wheatgrass, Blue Grama, Galleta, Fourwing Saltbush (HCPC)		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES			*1*	*600 - 720*	*75 - 90*
blue grama	Bouteloua gracilis	BOGR2	1	240 - 320	30 - 40
western wheatgrass	Pascopyrum smithii	PASM	1	120 - 200	15 - 25
galleta	Pleuraphis jamesii	PLJA	1	40 - 120	5 - 15
green needlegrass	Nassella viridula	NAVI4	1	16 - 40	2 - 5
buffalograss	Buchloe dactyloides	BUDA	1	0 - 40	0 - 5
sand dropseed	Sporobolus cryptandrus	SPCR	1	8 - 24	1 - 3
sideoats grama	Bouteloua curtipendula	BOCU	1	0 - 24	0 - 3
bottlebrush squirreltail	Elymus elymoides	ELEL5	1	8 - 16	1 - 2
needleandthread	Hesperostipa comata ssp. comata	HECOC8	1	0 - 16	0 - 2
Indian ricegrass	Achnatherum hymenoides	ACHY	1	0 - 8	0 - 1
little annual barley	Hordeum pusillum	HOPU	1	0 - 8	0 - 1
little bluestem	Schizachyrium scoparium	SCSC	1	0 - 8	0 - 1
red threeawn	Aristida purpurea var. longiseta	ARPUL	1	0 - 8	0 - 1
ring muhly	Muhlenbergia torreyi	MUTO2	1	0 - 8	0 - 1
sixweeks fescue	Vulpia octoflora	VUOC	1	0 - 8	0 - 1
tumblegrass	Schedonnardus paniculatus	SCPA	1	0 - 8	0 - 1
sun sedge	Carex inops ssp. heliophila	CAINH2	1	8 - 16	1 - 2
other perennial grasses		2GP	1	8 - 40	1 - 5
FORBS			*2*	*40 - 120*	*5 - 15*
American vetch	Vicia americana	VIAM	2	8 - 16	1 - 2
dotted gayfeather	Liatris punctata	LIPU	2	8 - 16	1 - 2
purple prairie clover	Dalea purpurea var. purpurea	DAPUP	2	8 - 16	1 - 2
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	8 - 16	1 - 2
Colorado four o'clock	Mirabilis multiflora	MIMU	2	0 - 8	0 - 1
Colorado greenthread	Thelesperma filifolium	THFI	2	0 - 8	0 - 1
cutleaf evening-primrose	Oenothera coronopifolia	OECO2	2	0 - 8	0 - 1
hairy goldaster	Heterotheca villosa	HEVI4	2	0 - 8	0 - 1
ironplant goldenweed	Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida	MAPIP4	2	0 - 8	0 - 1
Louisiana sagewort	Artemisia ludoviciana	ARLU	2	0 - 8	0 - 1
narrowleaf penstemon	Penstemon angustifolius	PEAN4	2	0 - 8	0 - 1
narrowleaf poisonvetch	Astragalus pectinatus	ASPE5	2	0 - 8	0 - 1
plains bahia	Picradeniopsis oppositifolia	PIOP	2	0 - 8	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	2	0 - 8	0 - 1
rush skeletonweed	Lygodesmia juncea	LYJU	2	0 - 8	0 - 1
scarlet gaura	Gaura coccinea	GACO5	2	0 - 8	0 - 1
silky crazyweed	Oxytropis sericea	OXSE	2	0 - 8	0 - 1
silky sophora	Sophora nuttalliana	SONU	2	0 - 8	0 - 1
slimflower scurfpea	Psoralidium tenuiflorum	PSTE5	2	0 - 8	0 - 1
variable senecio	Packera neomexicana var. mutabilis	PANEM	2	0 - 8	0 - 1
wavyleaf thistle	Cirsium undulatum	CIUN	2	0 - 8	0 - 1
western ragweed	Ambrosia psilostachya	AMPS	2	0 - 8	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	2	0 - 8	0 - 1
woolly locoweed	Astragalus mollissimus	ASMO7	2	0 - 8	0 - 1
wormwood	Artemisia dracunculus	ARDR4	2	0 - 8	0 - 1
other perennial forbs		2FP	2	8 - 40	1 - 5
SHRUBS			*3*	*40 - 80*	*5 - 10*
fourwing saltbush	Atriplex canescens	ATCA2	3	24 - 96	3 - 12
winterfat	Krascheninnikovia lanata	KRLA2	3	8 - 40	1 - 5
broom snakeweed	Gutierrezia sarothrae	GUSA2	3	0 - 16	0 - 2
walking stick cholla	Opuntia imbricata	OPIM	3	0 - 16	0 - 2
fringed sagebrush	Artemisia frigida	ARFR4	3	0 - 8	0 - 1
pale wolfberry	Lycium pallidum	LYPA	3	0 - 8	0 - 1
plains pricklypear	Opuntia polyacantha	OPPO	3	0 - 8	0 - 1
purple pincushion	Escobaria vivipara var. vivipara	ESVIV	3	0 - 8	0 - 1
rubber rabbitbrush	Ericameria nauseosa ssp. nauseosa var. nauseosa	ERNAN5	3	0 - 8	0 - 1
small soapweed	Yucca glauca	YUGL	3	0 - 8	0 - 1
other shrubs		2SHRUB	3	8 - 24	1 - 3

Annual Production lbs./acre	LOW	RV*	HIGH
GRASSES & GRASS-LIKES	280 -	660	- 990
FORBS	35 -	80	- 125
SHRUBS	35 -	60	- 85
TOTAL	350 -	800	- 1200

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 are 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.

Western Wheatgrass, Blue Grama, Galleta, Fourwing Saltbush 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 prescribed grazing that allows for adequate recovery periods following each grazing event. The potential vegetation is about 75-90% grasses and grass-like plants, 5-15% forbs and 5-10% woody plants.

The major grasses include western wheatgrass, galleta and blue grama. Sub-dominant grasses and grass-likes include buffalograss, green needlegrass, sideoats grama, sand dropseed and sun sedge. Major forbs and shrubs include American vetch, purple prairie clover, scarlet globemallow, dotted gayfeather, fourwing saltbush and winterfat.

This plant community is diverse, stable, and productive. Litter is properly distributed with very little movement off-site and natural plant mortality is low. It is well suited to carbon sequestration, water yield, wildlife use by many species, livestock use and is esthetically pleasing. Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. This community is resistant to many disturbances except continuous grazing, long-term non-use, tillage and/or development into urban or other uses.

Total annual production ranges from 350 to 1200 pounds of air-dry vegetation per acre across MLRA-69 and will average 800 pounds during an average year.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6901
Growth curve name: Warm season/cool season co-dominant; MLRA-69; upland fine textured soils.

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

(monthly percentages of total annual growth)

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

- Continuous grazing without adequate recovery periods between grazing events will shift this plant community to the *Increased Blue Grama, Buffalograss, Galleta; Cool Season Remnants Plant Community.*
- Non-use (rest) and lack of 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 *Western Wheatgrass, Blue Grama, Galleta, Fourwing Saltbush Plant Community (HCPC).*

Increased Blue Grama, Buffalograss, Galleta with Cool Season Remnants Plant Community

This plant community evolved with long-term continuous grazing, moderate stocking, and in some instances heavy winter stocking. Recognition of this plant community will enable the land user to implement key management decisions before a significant economic/ecological threshold is crossed.

Species such as western wheatgrass, purple prairie clover, fourwing saltbush and winterfat have been reduced to remnant amounts. Blue grama and/or buffalograss, and galleta dominate the community. Blue grama and buffalograss will begin to exhibit a sodded appearance under higher moisture regimes. Ring muhly, sand dropseed, red threeawn, sixweeks fescue, bottlebrush squirreltail, plains pricklypear, hairy goldaster and broom snakeweed have increased. This plant community is at risk of losing western wheatgrass. Substantial increases in energy and other resources will be required to replace the lost species.

Total above ground carbon has been reduced due to decreases in forage and litter production. Reduction of rhizomatous wheatgrass, nitrogen fixing forbs, shrub component and increased warm season short grasses has begun to alter the biotic integrity of this community. Water and nutrient cycles may be impaired.

Total annual production can vary from 150 to 700 pounds of air-dry vegetation per acre and will average 400 pounds during an average year.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6903
Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-69; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	15	35	25	15	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 periods between grazing events shifts this plant community across an ecological threshold toward the *Blue Grama/Buffalograss Sod; Broom Snakeweed Plant Community.*
- Prescribed grazing with adequate recovery periods after each grazing occurrence during the growing season with a proper stocking rate will return the plant community back to the *Western Wheatgrass, Blue Grama, Galleta, Fourwing Saltbush Plant Community (HCPC)*.

Low Plant Density, Excessive Litter Plant Community

This plant community occurs when grazing is removed for long periods of time (rest) in the absence of fire. Species composition can be highly variable, but will most likely resemble the vegetation that was present when non-use or rest began. Species production and density will decrease as non-use and fire suppression persists.

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

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

Total annual production can be extremely variable depending on length of non-use.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6902
Growth curve name: Warm season/cool season co-dominant, excess litter; MLRA-69; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	22	33	18	12	5	0	0	0

(monthly percentages of total annual growth)

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

- Prescribed grazing with adequate recovery periods between each grazing event and proper stocking can restore this plant community back to the *Western Wheatgrass, Blue Grama, Galleta, Fourwing Saltbush Plant Community (HCPC)*.

Blue Grama/Buffalograss Sod; Broom Snakeweed Plant Community

This plant community developed with repeated continuous grazing without adequate recovery periods between grazing events and occurs frequently throughout most of MLRA-69. Galleta has been reduced. Green needlegrass, American vetch, purple prairie clover, fourwing saltbush and winterfat have been removed. Western wheatgrass may persist in trace amounts, in protected areas and higher precipitation regimes within the MLRA. Blue grama and buffalograss dominate the community and can form a "sodbound" appearance. Red threeawn, sand dropseed, tumblegrass, bottlebrush squirrletail, sixweeks fescue, plains pricklypear and hairy goldaster will all increase in varying degrees. In some instances, broom snakeweed will significantly increase.

This plant community is resistant to change due to grazing tolerance of buffalograss and blue grama. A significant amount of production and diversity has been lost when compared to the HCPC. Loss of cool season grasses, fourwing saltbush and winterfat, and nitrogen fixing forbs have negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system "root pan", characteristic of sodbound blue grama and buffalograss. Soil loss may be obvious where flow paths are connected.

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

Production ranges from 100 to 400 pounds of air-dry vegetation per acre per year and averages 250 pounds.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6904
Growth curve name: Warm season dominant; MLRA-69; upland fine textured soils.

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

(monthly percentages of total annual growth)

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

- Heavy continuous grazing, excessive defoliation without adequate recovery periods following each grazing event and in some cases, long-term non-use will shift this plant community (or any plant community) toward the *Red threeawn, Annuals, Bare Ground Plant Community*. This transition may take greater than 40 years. Erosion and loss of organic matter/carbon reserves are concerns.

- Long-term prescribed grazing with adequate recovery periods following each grazing event and proper stocking over long periods of time move this plant community toward the *Increased Blue Grama, Buffalograss, Galleta; with Cool Season Remnants Plant Community* and will eventually return to the *HCPC* or associated successional plant community stages assuming an adequate seed/vegetative source is available. This transition is a slow process, which, may take greater than 40 years to accomplish.

Red Threeawn, Annuals, Bare Ground Plant Community

This plant community develops with heavy continuous grazing, excessive defoliation by herbivores and long-term non-use. Red threeawn is the dominant species. Blue grama and/or buffalograss may persist in localized areas. Annuals such as little annual barley, sixweeks fescue, cheatgrass, kochia and Russian thistle are present.

Litter levels are extremely low. Erosion is evident where flow paths are continuous. Rills may occur on steeper slopes. Wind scoured areas may be apparent on knolls or unprotected areas. The nutrient cycle, water cycle and overall energy flow are greatly impaired. Organic matter/carbon reserves are greatly reduced. This community is not stable. Desertification is obvious.

Total annual production can vary from 0 to 150 pounds of air-dry vegetation per acre.

The following is the growth curve of this plant community expected during a normal year:
Growth curve number: CO6901
Growth curve name: Warm season/cool season co-dominant; MLRA-69; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	5	10	20	30	20	10	3	2	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 periods between each grazing event and proper stocking can eventually move this community back to the *Historic Climax Plant Community* or associated successional plant community stages, assuming an adequate seed source is available. This transition will take a long time (40 to 80 years or more) to achieve.
- Range seeding followed by prescribed grazing may be used as an alternative to convert this plant community to a *Seeded Rangeland* community, which can closely resemble the *HCPC* however, at a substantial cost.

Oneseed Juniper Plant Community

This plant community is typically found adjacent to a juniper seed source. Invasion of the juniper has occurred. Lack of fire and long-term non-use accelerate the invasion. Prescribed grazing, brush management and fire can be used to prevent encroachment.

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

The following is the growth curve of the dominant species expected during a normal year:
Growth curve number: CO6904
Growth curve name: Warm season dominant; MLRA-69; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	0	15	45	25	15	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 the plant community it came from prior to invasion.

Go-back Land

Go-back land is created when the soil is tilled or farmed (sodbusted) and abandoned. All of the native plants are destroyed, soil organic mater is reduced, soil structure is changed and a plowpan or compacted layer is formed. Residual synthetic chemicals often remain from past farming operations and erosion processes may be active.

Go-back land evolves through several plant communities beginning with an early annual plant community, which initiates the revegetation process. Plants such as Russian thistle, kochia and other annuals begin to establish. These plants give some protection from erosion and start to build minor levels of soil organic matter. This early annual plant community lasts for two to several years. Red threeawn, sand dropseed and several other early perennials can dominate the plant community for five to eight years or more. Buffalograss establishes next and dominates for many years. Eventually western wheatgrass, blue grama and other natives become reestablished. Broom snakeweed can be a major component on some go-back areas. Invasive/noxious plants such as field bindweed and cheatgrass can become established on some go-back fields.

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

- Very long-term prescribed grazing that allows adequate recovery periods following each grazing event and proper stocking will most likely take this plant community to a blue grama/buffalograss dominated plant community and eventually back to the *HCPC* assuming an adequate seed/vegetative source is available. This process takes many years (40-80 years or more) to achieve.
- Range seeding followed with prescribed grazing can be used to convert *Go-back Land* to *Seeded Rangeland, which* can resemble the *HCPC.*

Seeded Rangeland

This plant community can vary considerably depending on the degree of erosion, the species seeded, the stand that was established, how long ago the stand was established and the management of the stand since establishment.

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

- Continuous grazing without adequate recovery period between grazing events can shift this plant community to *Go-back Land.*

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, riparian area, spring, or stock pond 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.

Western Wheatgrass, Blue Grama, Galleta, Fourwing Saltbush Plant Community- Historic Climax Plant Community (HCPC); and Increased Blue Grama, Buffalograss, Galleta Community
The grasses, forbs, and shrubs in these plant communities provide habitat for reptiles such as western rattlesnake and bullsnake. The structural diversity in the plant community on this site provides habitat for Cassin's and Brewer's sparrow, and lark bunting. Ferruginous and Swainson's hawks commonly use these communities. Small mammals such as white-tailed jackrabbit, badger, swift fox, and several species of mice are common in these plant communities. Pronghorn is a typical ungulate found in these communities.

Low Plant Density, Excessive Litter Plant Community; Blue Grama/Buffalograss Sod; Broom Snakeweed Plant Community; Red Threeawn, Annuals, Bare Ground Plant Community; and Go-back Land Plant Community
Reptiles using these plant communities are similar to the HCPC species. As vegetation becomes shorter and bare ground increases, conditions improve for lesser earless lizard and Texas horned lizard. The loss of vertical and species diversity in these plant communities results in a shift of the bird community to burrowing owl and mountain plover. With the exception of the hawk species, HCPC bird species would not be common in these communities. Most mammals will be the same as in the HCPC, however black-tailed jackrabbit and black-tailed prairie dog use will increase because of the changing plant community.

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.

Seeded Rangeland
The wildlife species expected on seeded rangeland would be those listed for the plant community the seeding most resembles.

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

Common Name	Cattle				Sheep				Horses				Deer				Antelope				Bison				Elk			
Grasses and Grass-likes																												
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
buffalograss	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D	D	D	P	D
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 needlegrass	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D	U	P	D	D
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
little annual barley	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N
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
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 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
sixweeks fescue	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N	N	D	N	N
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
tumblegrass	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
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
hairy goldaster	U	U	D	U	N	N	N	N	U	U	D	U	N	N	N	N	N	N	N	N	U	U	D	U	N	N	N	N
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	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
narrowleaf poisonvetch	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
plains bahia	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
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
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
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
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	N	N	N	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
scarlet gaura	U	U	D	U	U	D	D	U	U	U	D	U	U	D	D	U	U	D	D	U	U	U	D	U	U	U	D	U
silky crazyweed	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
silky sophora	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
wavyleaf thistle	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
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
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																												
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
fourwing saltbush	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P	P	D	D	P
fringed sagebrush	U	N	N	U	U	D	D	U	U	N	N	U	U	D	D	U	U	D	D	U	U	N	N	U	U	N	N	U
pale wolfberry	N	N	U	N	N	U	D	U	N	N	U	N	N	U	D	U	N	U	D	U	N	N	U	N	N	N	U	N
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
rubber rabbitbrush	N	N	N	D	D	D	D	D	N	N	N	D	D	D	D	D	D	D	D	D	N	N	N	D	N	N	N	D
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
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
winterfat	P	P	D	P	P	P	P	P	P	P	D	P	P	P	P	P	P	P	P	P	P	P	D	P	P	P	D	P

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)
Western Wheatgrass, Blue Grama, Galleta, Fourwing Saltbush (HCPC)	800	0.26
Blue Grama, Buffalograss, Galleta; w/Remnant Cool Seasons	400	0.13
Blue Grama/Buffalograss Sod; Broom Snakeweed	250	0.08
Low Plant Density, Excessive Litter	*	*
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. Soils in hydrologic group A and B dominate this site. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to NRCS Section 4, National Engineering Handbook (NEH-4) for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

None noted.

Other Products

None noted.

Supporting Information

Associated Sites

(069XY058CO) – Limestone Breaks
(069XY037CO) – Saline Overflow
(069XY026CO) – Sandy

Similar Sites

(069XY046CO) – Shaly Plains
[less productive, and has alkali sacaton component]

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

This site is specific to Colorado (formerly Loamy Plains).

Field Offices

Canon City, Colorado Springs, Cheyenne Wells, Eads, Holly, 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