USDA Natural Resources Conservation Service

Ecological site R049XY216CO
Sandy Divide

Last updated: 4/09/2025
Accessed: 04/11/2026

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 049X–Southern Rocky Mountain Foothills

MLRA 49 is in Colorado (58 percent), Wyoming (27 percent), and New Mexico (15 percent). It makes up about 11,130 square miles (28,845 square kilometers). The major cities in or adjacent to this MLRA are Laramie, Wyoming; Fort Collins, Boulder, Denver, Colorado Springs, and Pueblo, Colorado; and Santa Fe and Las Vegas, New Mexico. Interstates 25, 70, and 80 cross the MLRA. Part of the Medicine Bow National Forest is in the northern tip of this area, in Wyoming; parts of the Roosevelt, Pike, and San Isabel National Forests are in this area in Colorado; and part of the Santa Fe National Forest is in the southern end of this area, in New Mexico. The Rocky Flats Nuclear Arsenal, Peterson Air Force Base, most of the Air Force Academy grounds, and part of the Fort Carson Military Reservation are in the part of this area in Colorado.

Almost half of this area is in the Southern Rocky Mountains and Wyoming Basin Provinces in the Rocky Mountain System. The rest is in the Colorado Pediment, Raton, and High Plains Sections of the Great Plains Province of the Interior Plains. The northern part of the MLRA consists of the Laramie Mountains. The central and southern parts generally are bounded on the east by the Great Plains and on the west by the Southern Rocky Mountains. Elevation ranges from 5,000 feet (1,525 meters) to 8,000 feet (2,440 meters) in most of the MLRA, but small mountains in the area are as high as 10,000 feet (3,050 meters). The Laramie and North Platte Rivers and their associated tributaries are the principal streams in the Wyoming portion of the MLRA. The Cache La Poudre, Big Thompson, Saint Vrain, South Platte, Arkansas, Saint Charles, Huerfano, Cucharas, and Purgatoire Rivers, Clear Creek, Fountain Creek, and their associated tributaries are the principal streams in the Colorado portion. The Vermejo, Cimarron, Pecos, and Mora Rivers and their associated tributaries are the principal streams in the New Mexico portion.

This area has been impacted by the geologic processes of uplift, folding, and faulting and by subsequent erosion and deposition. The Southern Rocky Mountains were uplifted 50 to 70 million years ago during the Laramide uplift. Most of this MLRA is adjacent to this uplift and was also affected. The uplift induced erosion of the relatively soft Late Pennsylvanian to Cretaceous sedimentary rocks from the uplands and dissected the underlying crystalline Precambrian rocks. The relief of the area was reduced by a combination of erosion of uplands and alluvial filling. Approximately 7 million years ago, a large portion of the area was uplifted again to elevations of 14,000 feet (4,270 meters) or more at the core of the Laramide uplift. Since then, precipitation occurring as both rain and snow led to the renewal of erosion and subsequent alluvial fills. The Wyoming portion of the MLRA, the Laramie Mountains, consists primarily of Precambrian plutonic rocks with Pennsylvanian and Permian sedimentary rocks folded and faulted at the margin of the range. The Colorado and New Mexico portions of the area consist primarily of remnants of the uplifted and folded Pennsylvanian through Cretaceous sedimentary rocks forming hogbacks, ridges, and hills, the ranges of which trend in a general north-south direction, parallel to the uplifted Southern Rocky Mountains. Tertiary volcanic flows filled valleys in some areas. After extensive erosion, these more resistant volcanic rocks now form prominent mesas, such as North and South Table Mountains near Golden, Colorado, and Fishers Peak Mesa near the Colorado-New Mexico border. Stream erosion from the eastern front of the Southern Rocky Mountains fostered the creation of a sequence of large alluvial fan remnants, pediments, and terrace deposits in this MLRA.

The average annual precipitation is 12 to 25 inches (305 to 635 millimeters) in most of this area, but it ranges from 10 to 35 inches (255 to 890 millimeters), generally increasing with elevation. The highest precipitation occurs in the Laramie Mountains, in Wyoming, and the lowest precipitation occurs in the Arkansas River Valley, above Salida, Colorado. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Winter precipitation occurs as snow. The average annual temperature is 36 to 54 degrees F (2 to 12 degrees C). The freeze-free period averages 140 days and ranges from 90 to 195 days, decreasing in length with elevation and from south to north.

The dominant soil orders in this MLRA are Mollisols, Alfisols, Inceptisols, and Entisols. The soils in the Colorado and New Mexico portions of the MLRA dominantly have a frigid or mesic soil temperature regime. Those in the Wyoming portion have a frigid or cryic soil temperature regime. A few of the higher peaks and some north aspects have a cryic soil temperature regime. Most of the soils in the area have an ustic soil moisture regime, but those on the higher peaks and on some north aspects have a udic soil moisture regime. The soils in the area dominantly have smectitic or mixed mineralogy. They are very shallow to very deep and are dominantly well drained. The texture is dominantly loamy in soils that formed in material weathered from igneous and metamorphic rocks and is dominantly loamy or clayey in soils that formed in material weathered from sedimentary rocks. Some of the most extensive and representative great groups are Haplustolls (Baller series), Argiustolls (Nederland, Nunn, Santa Fe, and Enmedio series), Haplustalfs (Fort Collins, Stoneham, and Dargol series), Haplustepts (Stout series), Ustorthents (Lorencito

and Saruche series), and Paleustolls (Flatirons series). (USDA-NRCS, 2006)

Classification relationships

NRCS:
Major Land Resource Area 49, Southern Rocky Mountain Foothills (United States Department of Agriculture, Natural Resources Conservation Service, 2006).

USFS:
M331Ib – North Front Range; M331Ic – North Laramie Mountains; M331Id – South Laramie Mountains; and M331Ii – Northern Arkansas Granitics – 39 mile Mountain M331I – Northern Parks and Ranges M331 - Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

M331Fb – Wet Mountains; M331Fc – Wet Mountain Valley; M331Ff – Raton Basin; M331Fg – Sangre de Cristo Mountains Woodland; and M331Fh – Sangre de Cristo Mountains Coniferous Forest M331F – Southern Parks and Rocky Mountain Range M331 - Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

331If – Arkansas Valley Tablelands; 331Ig- Arkansas Valley High Tablelands; 331Ih – Black Forest; and 331Ii – Southern Front Range Foothills < 331I – Arkansas Tablelands < 331 Great Plains – Palouse Dry Steppe

331Ha – Southern Denver-Julesburg Basin; 331Hc – Eastern Central High Plains; 331He – Northern Front Range Foothills and 331Hf – Denver-Julesburg Basin < 331H – Central High Plains < 331 Great Plains – Palouse Dry Steppe

EPA:
21b – Crystalline Subalpine Forests, 21c – Crystalline Mid-Elevations Forests, 21d - Foothill Shrublands, 21e – Sedimentary Subalpine Forests, and 21f – Sedimentary Mid-Elevation Forests, 21j – Grassland Parks < 21 Southern Rockies < 6.2 Western Cordillera < 6 Northwestern Forested Mountains North American Deserts (Griffith, 2006).

25c – Moderate Relief Plains, 25d – Flat to Rolling Plains, and 25l – Front Range Fans < 25 High Plains < 9.4 South Central Semi-Arid Prairies < 9 Great Plains (Griffith, 2006).

26e – Piedmont Plains and Tablelands, 26f- Mesa de Maya/Black Mesa, 26h- Pinyon-Juniper Woodlands and Savannas, 26i – Pine-Oak Woodlands, 26j – Foothills Grasslands, 26k – Sandsheets, and 26l – Upper Canadian Plateau < 26 Southwestern Tablelands < 9.4 South Central Semi-arid Prairies < 9 Great Plains (Griffith, 2006).

USGS:
Southern Rocky Mountain Province, Colorado Piedmont and Raton

Ecological site concept

R049XY216CO Sandy Divide occurs on alluvial fans, hills, valley sides, hillsides, flats, mesa and plateaus. Slopes is between 1 to 25 percent. Soils are moderately deep to very deep in depth (20 to 100 inches). Soils are derived from alluvium from arkose or sedimentary rock; and/or residuum from arkose or sedimentary rock or sandstone and shale. Soil surface texture is sandy loam, loamy sand or gravelly sandy loam. Family particle size is coarse-loamy or fine-loamy. It is a Mountain Muhly– Little Bluestem community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 19 inches.

Associated sites

R048AY222CO	**Loamy Park** This site occurs on flood plains, flood-plain steps, hills, fans and stream terrace. Slopes is between 0 to 15%. Soils are very deep (60+ inches). Soils are derived from alluvium or colluvium. Soil surface texture is usually loam or sandy loam with fine-loamy textured subsurface. It is an Arizona Fescue – Mountain Muhly community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.

Similar sites

R049XY036CO	**Overflow** This site occurs on flood plains, terraces, valley floor and stream terraces. Slopes is between 0 to 9%. Soils are greater than 60 inches in depth. Soils are derived from slopes alluvium from sandstone and shale. Soil surface texture is loam or fine sandy loam. Family particle size is fine-loamy. It is a Western Wheatgrass– Green Needlegrass community. It has an aridic ustic moisture regime. The effective precipitation ranges from 11 to 18 inches.
R049XB210CO	**Sandy Foothill** This site occurs on gently sloping to rolling hills and uplands. Slopes is between 0 to 10%. Soils are greater than 40 inches. Soils are derived from alluvium, eolian deposits, eolian sands, and residuum primarily from arkosic sedimentary rock and sandstone. Soil surface texture is loamy sand, sandy loam or fine sandy loam. Family particle size is coarse-loamy or sandy. It is a Big Bluestem– Prairie Sandreed community. It has an aridic ustic moisture regime. The effective precipitation ranges from 12 to 16 inches.
R049XY031CO	**Sandy Bottomland** This site occurs on flood plains and stream terraces. Slopes is between 0 to 4%. Soils are greater than 60 inches in depth. Soils are derived from alluvium from arkose. Soil surface texture is loamy coarse sand. Family particle size is sandy. It is a Switchgrass– Sand Bluestem community. It has a typic ustic moisture regime. The effective precipitation ranges from 14 to 19 inches.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Muhlenbergia montana* (2) *Schizachyrium scoparium*

Physiographic features

The site is almost exclusively the Black Forest zone (Douglas, Western Elbert, and northern El Paso Counties) of Colorado's front range. Topography is gently sloping to rolling. Slopes are not oriented in any definable direction and generally range from 1 to 25 percent. Elevation ranges from 6,500 to 7,500 feet. This site is present at the higher elevations of MLRA 49.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Hill (3) Valley side (4) Hillside (5) Flat (6) Mesa (7) Plateau
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	1,981–2,286 m
Slope	1–25%
Aspect	Aspect is not a significant factor

Climatic features

Precipitation averages 16 to 19 inches annually with 30 to 40 percent coming as snowfall. Average snowfall is approximately 62 inches annually. The average distribution of precipitation is as follows:

Cool-season plants generally start growth from April 10 to April 30. Warm-season plants usually begin their growth from May 1 to May 30 and continue their growth until the end of August to late September. Early spring showers and high intensity summer thunderstorms followed by warm, dry periods are a common occurrence. The length of the growing season is 120 to 130 days with the average frost dates occurring around May 20 in the spring and around September 25 in the fall. The average annual temperature is 46

degrees F with the hottest temperature occurring during the months of July and August.

Table 3. Representative climatic features

Frost-free period (characteristic range)	105-120 days
Freeze-free period (characteristic range)	133-141 days
Precipitation total (characteristic range)	406-483 mm
Frost-free period (actual range)	101-120 days
Freeze-free period (actual range)	130-143 days
Precipitation total (actual range)	406-483 mm
Frost-free period (average)	113 days
Freeze-free period (average)	137 days
Precipitation total (average)	457 mm

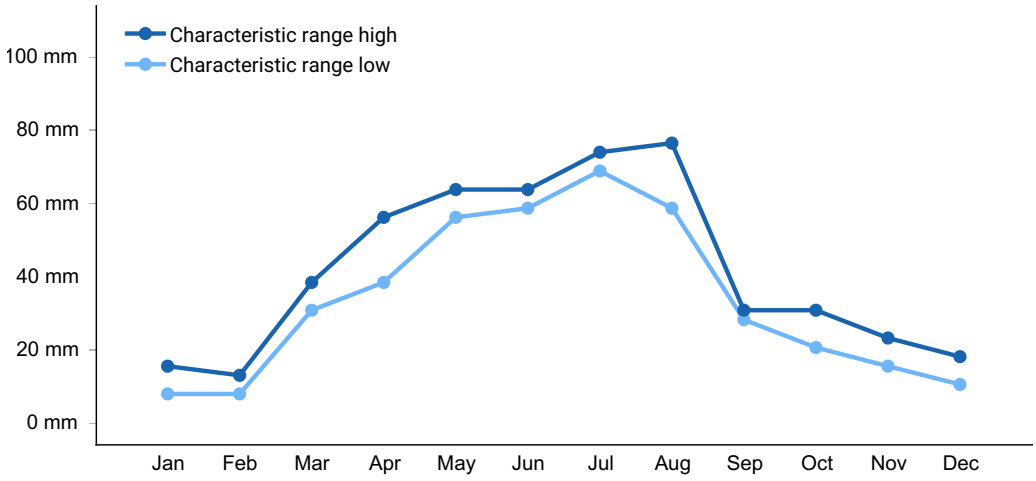


Figure 1. Monthly precipitation range

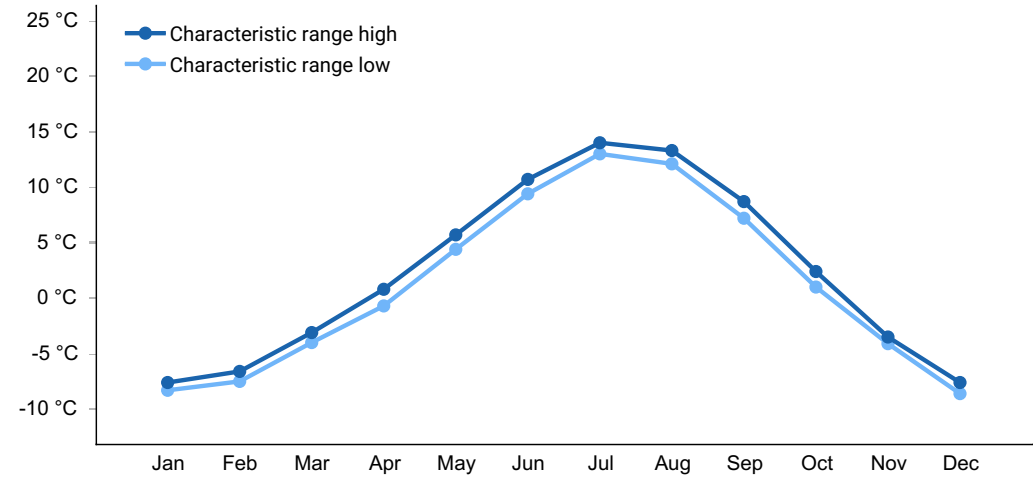


Figure 2. Monthly minimum temperature range

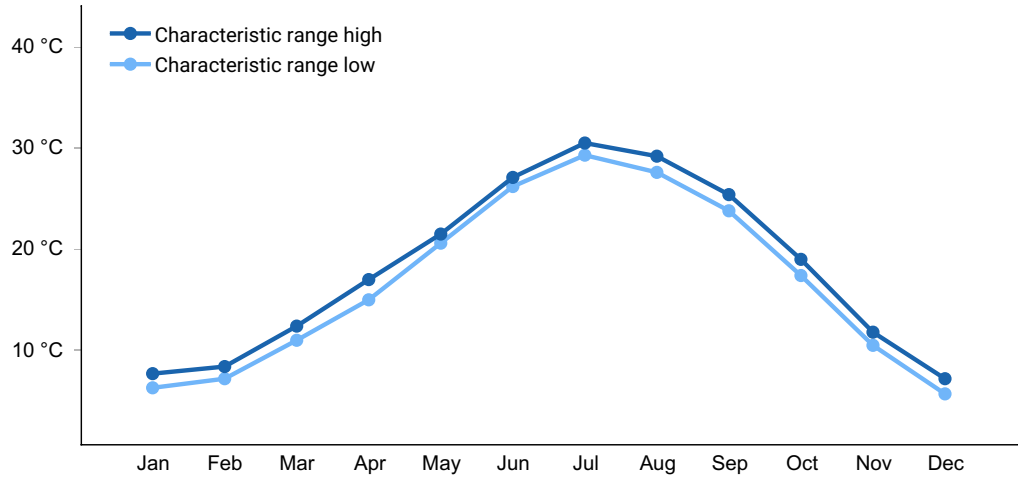


Figure 3. Monthly maximum temperature range

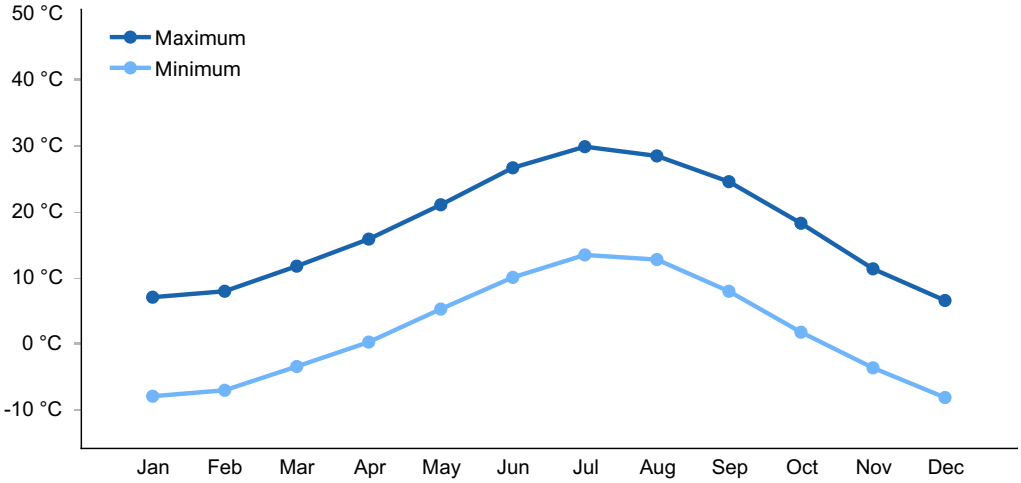


Figure 4. Monthly average minimum and maximum temperature

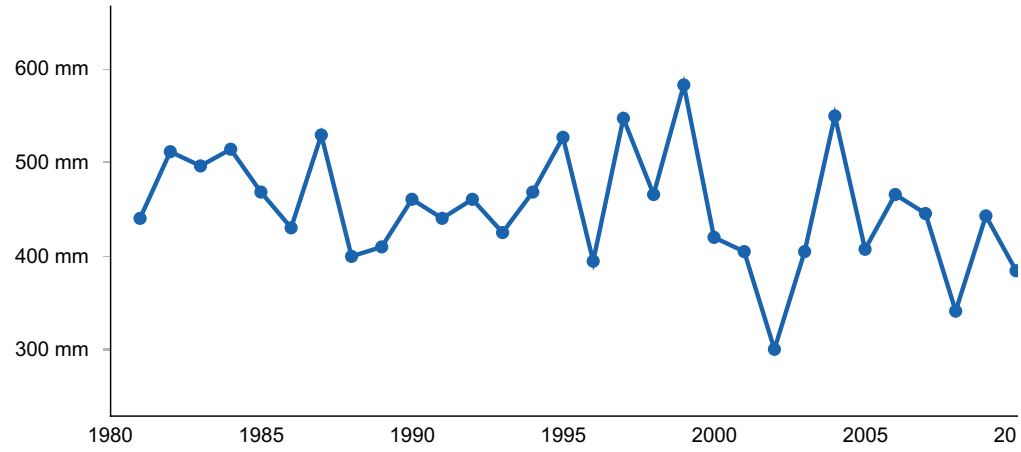


Figure 5. Annual precipitation pattern

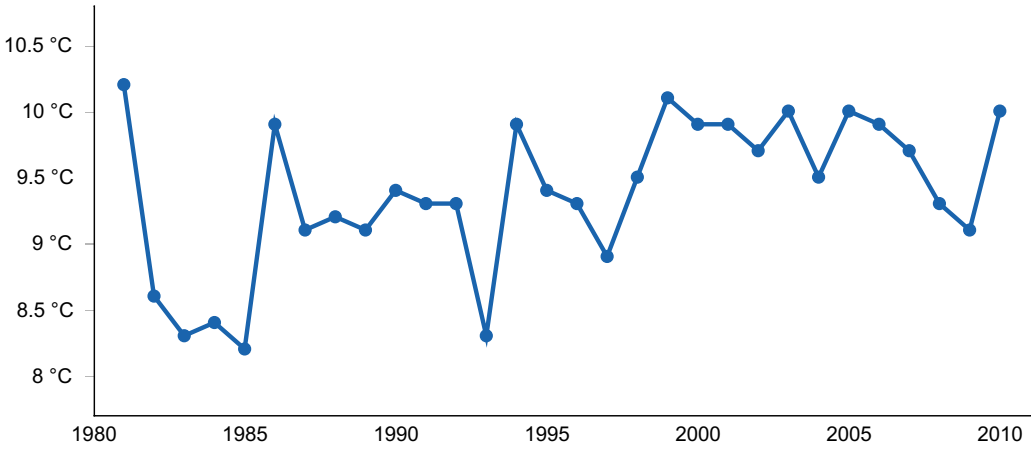


Figure 6. Annual average temperature pattern

Climate stations used

- (1) CASTLE ROCK [USC00051401], Castle Rock, CO
- (2) PARKER [USC00056323], Parker, CO
- (3) PARKER 6 E [USC00056326], Parker, CO
- (4) ELIZABETH 2NW [USC00052631], Elizabeth, CO
- (5) COLORADO SPRINGS MUNI AP [USW00093037], Colorado Springs, CO

Influencing water features

None

Wetland description

N/A

Soil features

The soils of this site are moderately deep to deep. They are well drained to somewhat excessively drained and occur on fans, side-slopes, and hilltops. The surface textures are sandy loam, gravelly sandy loam, and loamy sand. The surface soils vary in reaction from a pH of 5.6 to 7.8. These soils are formed in alluvium and residual material derived from arkosic sandstone. Bluerim soils are formed from interbedded sandstone and shale.

Permeability varies from moderate slow to moderately rapid with a moderate to high water holding capacity. Generally, runoff is medium and the erosion hazard is moderate for most of the soils associated with this ecological site.

Major soil associated with this site:

Soil Series Name - Surface Texture - Slope Ranges

Bluerim sandy loam 8-20%
Crowfoot loamy sand 3-8%
Crowfoot loamy sand 8-15%
Crowfoot sandy loam 5-15%
Cruckton sandy loam 1-9%
Cruckton sandy loam 7-15%
Perrypark sandy loam 3-20%
Peyton sandy loam 1-8%
Peyton sandy loam 8-15%
Pring gravelly sandy loam 1-25%
Tomah loamy sand 3-8%
Tomah loamy sand 8-15%

Table 4. Representative soil features

Parent material	(1) Alluvium–arkose (2) Alluvium (3) Residuum–arkose (4) Residuum–sandstone and shale (5) Alluvium–sedimentary rock (6) Residuum–sedimentary rock
Surface texture	(1) Sandy loam (2) Loamy sand (3) Gravelly sandy loam
Family particle size	(1) Fine-loamy (2) Coarse-loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	102–254 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–3%
Available water capacity (Depth not specified)	8.13–15.75 cm
Calcium carbonate equivalent (Depth not specified)	0%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	5.6–7.8

Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

The information in this ESD, including the state-and-transition model diagram (STM), was developed using historical data, and professional experience. The information is representative of a dynamic set of plant communities that represent the complex interaction of several ecological processes. The plant composition has been determined by study of rangeland relic areas, areas protected from excessive disturbance, seasonal use pastures, short duration/time-controlled grazing strategies, and historical accounts.

The Sandy Divide ecological site is characterized by four states: Reference, Shortgrass Dominated, Increased *Bare Ground*, and Invaded States. The Reference State is characterized by dominant warm-season mid and tallgrass (mountain muhly, little bluestem, big bluestem, prairie sandreed), and secondary cool-season midgrass (needleandthread, western wheatgrass, Arizona fescue). The Shortgrass State is characterized by a warm-season short bunchgrass (blue grama) and warm-season bunchgrass (sand dropseed). The Annuals and Forbs State is characterized by early successional warm-season bunchgrass (Fendler threeawn), cool- season short bunchgrass (squirreltail), annual grasses, annual forbs, and soapweed yucca. The Invaded State has been disturbed by equipment, and includes early successional annual plants as well as invasive species (knapweeds, yellow toadflax).

The degree of grazing has a significant impact on the ecological dynamics of the site. This region was historically occupied by large grazing animals such as bison and elk, along with pronghorn and mule deer. Grazing by these large herbivores, along with climatic and seasonal weather fluctuations, had a major influence on the ecological dynamics of the site.

Historically, it is believed, grazing patterns by herds of large ungulates was driven by water distribution, precipitation events, drought events, and fire. It is believed that grazing periods would have been shorter, followed by longer recovery periods. These large migrating herds impacted the ecological processes of nutrient and hydrologic cycles, by urination, trampling (incorporation of litter into the soil surface), and breaking of surface crust, to increase water infiltration.

The soil moisture regime is favorable to the production of mid and tallgrass species giving this range site a mixed prairie aspect. The plant community is about 75 to 85 percent grasses and grass-like plants, 10 to 15 percent forbs and 5 to 10% shrubs (air-dry weight). Mountain muhly, big bluestem, little bluestem, prairie sandreed, Arizona fescue, needle and thread and western wheatgrass make up most of the plant community and provide about 60 to 75 percent of the total production. Grasses such as blue grama, muttongrass

and prairie junegrass are secondary in the plant community. Small amounts of sand dropseed, sun sedge, hairy grama, spreading buckwheat and white sagebrush (aka Louisiana sagewort) are scattered throughout the plant community.

This site developed with occasional fires being part of the ecological processes. Historic fire frequency (pre-industrial), is estimated at 10 to 12 years (Guyette, 2012), randomly distributed, and started by lightning at various times throughout the growing season. Dendroecological reconstructions of fire history showed that fires burned during years of extreme drought (2011. Schoennagel, Sherriff, Veblen).

Early human inhabitants were also likely to start fires for various reasons (deliberately or accidentally). Both of these types of fire events likely impacted the site by leaving mosaic vegetation patterns. The impact of fire over the past 50 years has been relatively insignificant due to wildfire suppression and the lack of acceptance of prescribed fire as a management tool. However, prolonged drought, coupled with fire suppression has increased the frequency and intensity of periodic wildfires in the area.

Deterioration of this site, due to continuous grazing without adequate recovery periods following each grazing occurrence and/or overstocking, will cause blue grama to increase. Cool-season grasses such as needle-and-thread, Arizona fescue and western wheatgrass will decrease. Warm-season grasses such as big bluestem, little bluestem and palatable forbs will also decrease. Sand dropseed, Fendler threeawn, annuals and bare ground increase under heavy continuous grazing. Lack of grazing and lack of fire initially causes increased herbaceous litter. Decadence of bunchgrasses, such as mountain muhly, needle-and-thread and big bluestem, and lower vigor vegetation is expected to occur with non-use and lack of fire. This also allows invasive species like diffuse knapweed, spotted knapweed, cheatgrass, toadflax and other similar vegetation to establish. Grazing which allows adequate recovery periods following each grazing event and proper stocking will maintain the palatable plants.

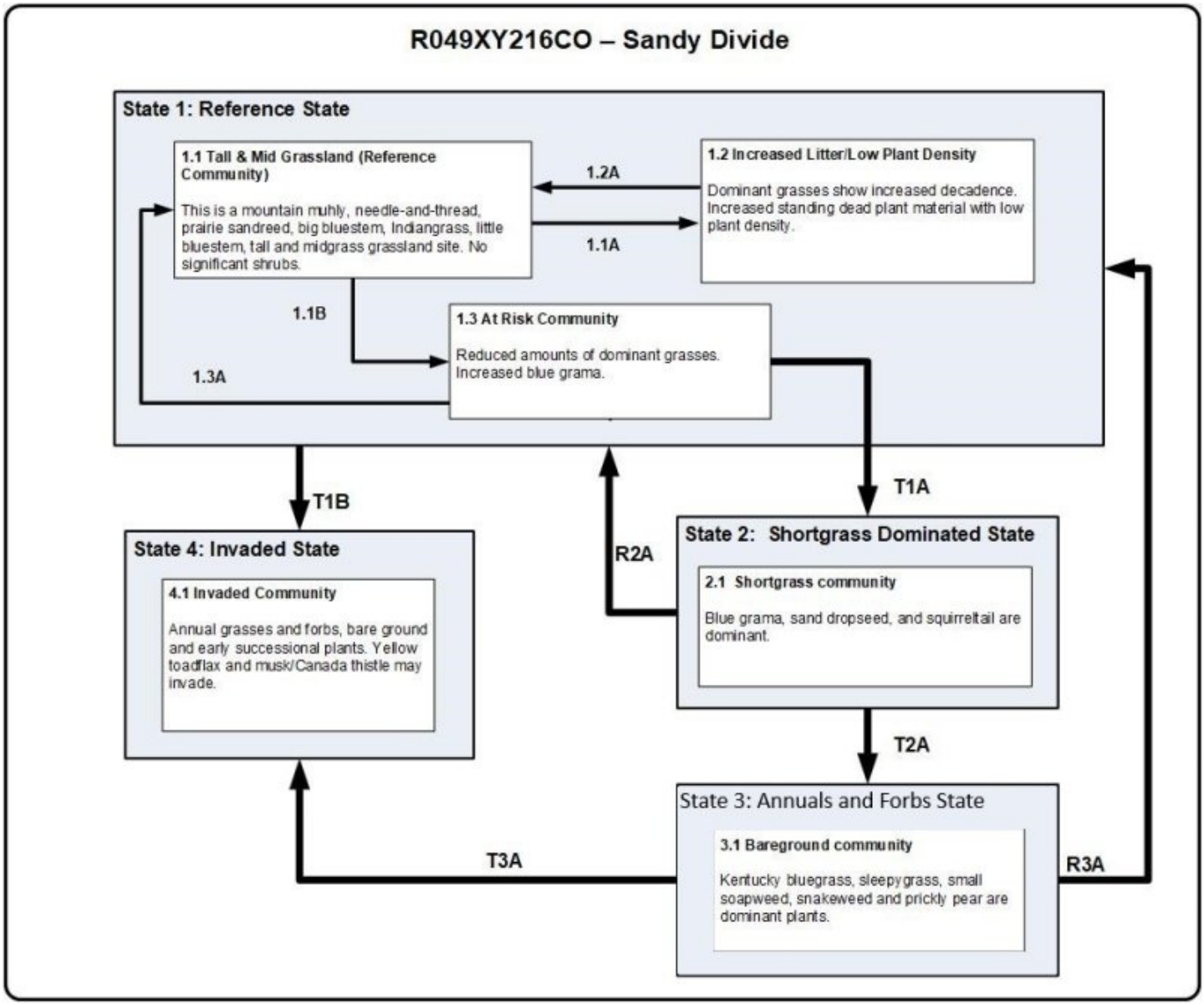
Drought and/or early killing frost cycles have historically impacted the vegetation. Changes in species composition will vary depending upon the duration and severity of the drought and/or frost cycle.

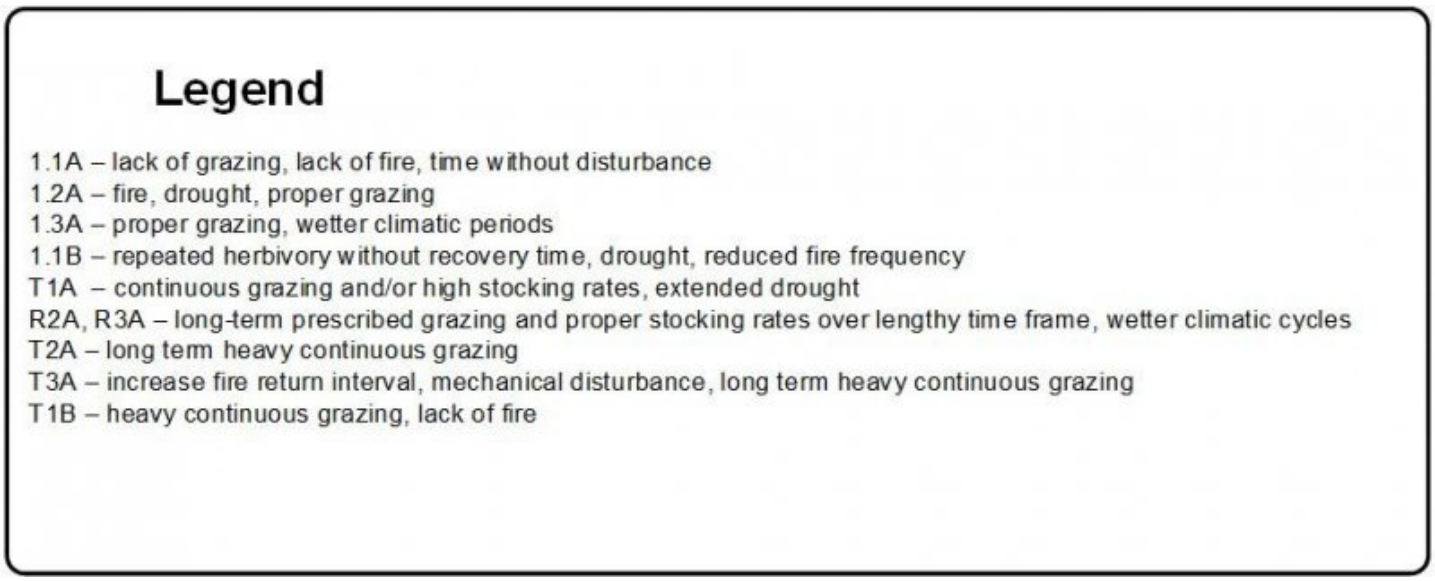
Some of this ecological site has been tilled and used for crop production. Today, much of this site is urban/suburban residence and small acreage development. Residential development leads to fire suppression. This is an important site for livestock grazing, especially beef cattle. Today the management of livestock grazing has been a major influence on the ecological dynamics of the site. This management, coupled with the effects of annual climatic variations, largely dictates the plant communities for the site.

The following diagram illustrates the common plant communities that can occur on the site and the pathways (arrows) among communities. Bold lines surrounding each plant community or communities represent ecological thresholds and a plant community state. Community phase pathways in the reference state represent shifts in the plant community

within the natural range of variability. Transition and Restoration pathways represent the plant community crossing an ecological threshold between states. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

State and transition model





State 1
Reference

The plant community is about 85-90% grasses, 10-15% forbs, and 5-10% shrubs (air-dry weight). Mid and tall grasses dominate giving this site a rolling, continuous grassland cover. Tall grasses are scattered throughout the community. This is a mountain muhly, needleandthread, prairie sandreed, big bluestem, Indiangrass, little bluestem tall and midgrass dominate the plant community and produce about 55% of the climax vegetation. There are no significant shrubs on this site. Plants such as blue grama, sun sedge, prairie Junegrass, western wheatgrass, thickspike wheatgrass, hairy grama, bottlebrush squirreltail, sand dropseed, rose pussytoes, narrowleaf penstemon, Norwegian cinquefoil and woods rose occur in scattered amounts throughout the climax plant community. Minor forbs such as skyrocket gilia, wormwood, Nutall larkspur, drummond milkvetch, sand lily, sand lupine, silvery lupine, and grassy deathcamas are also present in the plant community. Basal area (the area of ground surface covered by perennial vegetation at ground level) is approximately 25-30%.

Community 1.1
Reference Plant Community

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	953	1715	2382
Forb	112	202	280
Shrub/Vine	56	101	140
Total	**1121**	**2018**	**2802**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass and Grasslike Plants**			953–2522	
	mountain muhly	MUMO	*Muhlenbergia montana*	303–381	–
	Arizona fescue	FEAR2	*Festuca arizonica*	202–303	–
	little bluestem	SCSC	*Schizachyrium scoparium*	202–303	–
	big bluestem	ANGE	*Andropogon gerardii*	202–303	–
	blue grama	BOGR2	*Bouteloua gracilis*	61–202	–
	prairie sandreed	CALO	*Calamovilfa longifolia*	101–202	–
	Parry's oatgrass	DAPA2	*Danthonia parryi*	101–202	–
	needle and thread	HECO26	*Hesperostipa comata*	101–202	–
	western wheatgrass	PASM	*Pascopyrum smithii*	101–202	–
	muttongrass	POFE	*Poa fendleriana*	101–202	–
	Sandberg bluegrass	POSE	*Poa secunda*	40–101	–
	switchgrass	PAVI2	*Panicum virgatum*	40–101	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	40–101	–
	Indiangrass	SONU2	*Sorghastrum nutans*	1–101	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	20–101	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	1–101	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	1–40	–
	squirreltail	ELEL5	*Elymus elymoides*	1–40	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–20	–
Forb					
2	**Forbs**			112–336	
	Richardson's geranium	GERI	*Geranium richardsonii*	20–61	–
	rosy pussytoes	ANRO2	*Antennaria rosea*	20–61	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	20–61	–
	common starlily	LEMO4	*Leucocrinum montanum*	20–61	–
	Forb, native	2FN	*Forb, native*	1–61	–
	broadbeard beardtongue	PEAN4	*Penstemon angustifolius*	20–40	–

	pineywoods geranium	GECA3	*Geranium caespitosum*	20–40	–
	Norwegian cinquefoil	PONO3	*Potentilla norvegica*	1–20	–
	cutleaf anemone	PUPAM	*Pulsatilla patens ssp. multifida*	1–20	–
	prairie spiderwort	TROC	*Tradescantia occidentalis*	1–20	–
	grassy deathcamas	ZIVEG	*Zigadenus venenosus var. gramineus*	1–20	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	1–20	–
	scarlet gilia	IPAG	*Ipomopsis aggregata*	1–20	–
	dotted blazing star	LIPU	*Liatris punctata*	1–20	–
	sand lupine	LUAM	*Lupinus ammophilus*	1–20	–
	silvery lupine	LUAR3	*Lupinus argenteus*	1–20	–
	Drummond's milkvetch	ASDR3	*Astragalus drummondii*	1–20	–
	twolobe larkspur	DENU2	*Delphinium nuttallianum*	1–20	–
	tarragon	ARDR4	*Artemisia dracunculus*	1–20	–
Shrub/Vine					
3	**Shrubs and Half-Shrubs**			56–224	
	prairie sagewort	ARFR4	*Artemisia frigida*	61–101	–
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	20–61	–
	Woods' rose	ROWO	*Rosa woodsii*	20–61	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	1–61	–

Animal community

Native Animal Community Associated with the Potential Plant Community:
The principal species associated with this site include mule deer, pronghorn, cottontail, plains sharp-tailed grouse, small mammals, and nongame birds.

Livestock Grazing:
This site provides excellent forage for cattle and horses during the spring, summer, and early fall season. It also provides good forage for sheep, antelope and deer due to the good complement of forbs and shrubs in the plant community.

The animal forage preference changes as the growing season progresses. This coupled

with the fact that this site has a good complement of cool and warm season plants, make it important that planned deferment and rotation be scheduled. This level of grazing management will insure maximum utilization of the available forage while maintaining the desirable plants.

Cool season plants such as needleandthread, Arizona fescue, muttongrass, and western wheatgrass are very nutritious during the early spring. Therefore it is necessary to periodically defer grazing in the spring so that these cool season grasses are not grazed out and replaced by less desirable species. Warm season plants such as mountain muhly, big bluestem, little bluestem, prairie sandreed, sideoats grama, and blue grama will benefit by deferment from grazing during the late spring and early summer months.

Vegetative palatability will influence proper use considerations. The season of use, kind of grazing animal, past grazing use, and the plant composition will directly influence animal preference and performance.

Major Poisonous Plants to Livestock:

Plant Common Name - Livestock Affected - Type of Poisoning - Season Serious

Grassy deathcamas - usually sheep but can affect cattle and horses - cumulative, 1/2 lb will poison sheep - spring and summer other forage scarce

Nuttal larkspur - cattle - cumulative - alkaloids - spring and early summer other forage scarce

silvery lupine - all livestock occassionally may be affected - acute, alkaloids - other forage scarce especially dangerous in seed stage

Drummond milkvetch - suspected in cattle, horses, and sheep - cumulative, also selinium concentration suspected - all, but especially spring

Wildlife Values:
This site has a high value for wildlife because of the excellent habitat produced. This is due to the amount of cover and protection afforded by the taller grasses, and the abundance of forbs produced.

Wildlife numbers will decline on sites that have deteriorated due to excessive grazing by livestock. Most affected are mule deer, pronghorn, plains sharp-tailed grouse, and cottontail.

Endangered Plants and Animals:
The plains sharp-tailed grouse is listed as endangered by the Colorado Division of Wildlife. This species is associated with this site in Douglas County.

Hydrological functions

Soils in this site are grouped into "A" and "B" hydrologic groups, as outlined in the "Soils of Colorado Loss Factors and Erodibility Hydrologic Groupings 1979 Handbook". Field investigations are needed to determine hydrologic cover conditions and hydrologic curve numbers. Refer to NRCS "National Engineering Handbook", Section 4, and "Peak Flows in Colorado Handbook" for more information.

Recreational uses

This site has good to excellent aesthetic appeal and natural beauty due to the numberous forbs and shrubs that bloom from spring to summer. The recreation provided through hunting for antelope is generally good on this site.

Wood products

No potential production on this site.

Inventory data references

Location of Typical Examples of the Site:
a. SW 1/4, 34, T.8S., R.63W., Elbert County
b. NW 1/4, 7, T.10S., R.66W., Douglas County
c. Four miles north of Falcon, El Paso County

Counties in Which this Site Occurs:
Douglas, Elbert and El Paso

Other references

Chapman, S.S., G.E. Griffith, J.M. Omernik, A.B. Price, J. Freeouf, and D.L. Schrupp. 2006. Ecoregions of Colorado. (2-sided color poster with map, descriptive text, summary tables, and photographs). U.S. Geological Survey, Reston, VA. Scale 1:1,200,000.

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored.

Soil Conservation Service (SCS). November 1988. Range Site Description for Sandy Divide #216. : USDA, Denver Colorado.

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the

Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Contributors

Ben Berlinger
Suzanne Mayne-Kinney

Acknowledgments

Project Staff:
Suzanne Mayne-Kinney, Ecological Site Specialist, NRCS MLRA, Grand Junction SSO
Chris Fabian, MLRA Soil Survey Leader, NRCS MLRA Fort Collins SSO
Alan Stuebe, MLRA Soil Survey Leader, NRCS MLRA Alamosa SSO

Program Support:
Ben Berlinger, Retired CO Rangeland Management Specialist, Rocky Ford
Rachel Murph, NRCS CO State Rangeland Management Specialist, Denver
Scott Woodhall, NRCS MLRA Ecological Site Specialist-QA Phoenix, AZ
Eva Muller, Regional Director, Rocky Mountain Regional Soil Survey Office, Bozeman, MT
B.J. Shoup, CO State Soil Scientist, Denver
Eugene Backhaus, CO State Resource Conservationist, Denver

--Site Development and Testing Plan--:

Future work to validate and further refine the information in this Provisional Ecological Site Description is necessary. This will include field activities to collect low-, medium-, and high-intensity sampling, soil correlations, and analysis of that data.

Additional information and data are required to refine the Plant Production and Annual Production tables for this ecological site. The extent of MLRA 49 must be further investigated.

Field testing of the information contained in this Provisional ESD is required. As this ESD is moved to the Approved ESD level, reviews from the technical team, quality control, quality assurance, and peers will be conducted.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	04/09/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

---

14. **Average percent litter cover (%) and depth (in):**

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

---

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment**

and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

---

17. **Perennial plant reproductive capability:**
