

Ecological site R049XD202CO

Loamy Foothill

11-14 PZ

Last updated: 3/10/2025
Accessed: 10/05/2026

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 comprises approximately 11,130 square miles running north to south, from south-central Wyoming (27 percent), the length of the Front Range of Colorado (58%), and into north-central New Mexico (15 percent). Almost half of this area occurs in the Southern Rocky Mountains and Wyoming Basin Provinces in the Rocky Mountain system. The remainder is in the Colorado Pediment, Raton, and High Plains Section of the Great Plains Province of the Interior Plains. The northern part 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 (excerpts from USDA Ag. H.B. 296). Average elevation ranges from 5,000 to 8,000 feet. Mean Annual Precipitation ranges from 10 to 22 inches across the entire MLRA 49. Due to the extent of MLRA 49, approximately 530 miles north to south, it was logical to describe it at the Land Resource Unit (LRU) level. LRU 49D (shaded portion of location map) describes the drier portion of MLRA 49 (11-14 inches P.Z.) of the Arkansas River, including the Royal Gorge. LRU 49D begins at Fort Carson (south of Colorado Springs) and extends through Canon City, west along the Upper Arkansas River Canyon to Salida. The southern extent ends at the Fremont/Custer County line near Wetmore. There is an isolated patch of 49D in Huerfano County near Gardner. The majority of the LRU occurs in Fremont County.

Ecological site concept

The 49D Loamy Foothill was drafted from the existing Loamy Foothill Range Site (49BY202CO, November 1989). The concept was expanded based on soil temperature and moisture regimes, climate, and geology. This site occurs on fans, fan remnants and swales on loamy to fine loamy soils derived from alluvium. It is a Western Wheatgrass - Blue grama - Winterfat community in the Pinyon-Juniper Zone.

Similar sites

EX049X04X208	Clayey Foothill MLRA 49 LRU D Clayey Foothill ecological site is very similar to Loamy Foothill with lower total annual production, and a higher cool season grass component. Soil texture on Clayey Foothill is higher clay content on the surface and subsurface horizons.
--------------	---

Table 1. Dominant plant species

Tree	(1) <i>Juniperus monosperma</i> (2) <i>Pinus edulis</i>
Shrub	(1) <i>Krascheninnikovia lanata</i>
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Bouteloua gracilis</i>

Physiographic features

The dominant landforms applicable to this ecological site are fans, fan remnants and hills. The aspect has no influence on this site. The site occurs within an elevation range of 5,200 to 7,000 feet with slopes ranging from 0 to 10 percent. The site occurs in an upland position and is unaffected by a water table, flooding or water ponding.

Figure 1. Loamy Foothill

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Fan remnant (3) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,590 – 2,130 m
Slope	0 – 10 %
Ponding depth	0 cm
Water table depth	150 cm
Aspect	Aspect is not a significant factor

Climatic features

The mean average annual precipitation varies from 11 to 14 inches per year depending on location and ranges from 5 inches to over 21 inches per year. Approximately 50 to 75 percent of the annual precipitation occurs during the growing season from mid-May to late-September. The Rocky Mountains to the west intercept much of the precipitation from Pacific storms during the winter. Snowfall averages 36 inches annually. Wind speeds average 9.4 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 70 miles per hour typically from the southwest.

The average length of the growing season is 160 days, but varies from 131 to 182 days. The average date of first freeze in the fall is September 26, and the last freeze in the spring is about May 9. July is the hottest month and January is the coldest. Summer temperatures are moderate, with average highs in the low 80s and occasionally reaching the high 80s. Summer nights are comfortably cool, with lows averaging in the low 50s. Higher elevations can receive a dusting of snow as early as September. Summer humidity is low with moderate evaporation rates.

Cool season plants generally begin growth from April 15 to May 1. Southern exposures can exhibit cool season growth as early as March 15. Native warm season plants typically begin growth about May 15 to June 1 and continue to about August 1. Regrowth of cool season plants occurs in September of most years, depending on soil moisture availability.

Table 3 Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	160 days
Precipitation total (average)	330 mm

Influencing water features

None

Soil features

The soils of this site are very deep to moderately deep. Typically they are well drained with moderate to slow permeability. They formed in alluvium from mixed sources on fans, terraces and in drainageways. Available water capacity is high in deep and very deep soils. The surface layer ranges from 0 to 25 inches and is typically loam or fine sandy loam but may include clay loam and silty clay loam. The pH is slightly acid to moderately alkaline in the surface and subsoil. It is neutral to moderately alkaline in the substratum. The soil moisture regime is ustic aridic but ranges to aridic ustic in areas with higher moisture. The soil temperature regime is mesic but ranges to frigid at higher elevations.

The Reference Plant Community should show slight to no evidence of rills; wind scoured areas or pedestalled plants. There are typically no water flow patterns but if present they are short and disconnected. The soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration. Stability class rating anticipated to be 5-6 in interspace at soil surface. Soil surface is stabilized by decomposing organic matter. Biological crusts (lichens, algae, cyanobacteria, mosses) may be present on or just below soil surface.

Major soil series correlated to this ecological site include: Neville, Nunn and Potts.

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone
Surface texture	(1) Loam (2) Clay loam (3) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	50 – 180 cm
Surface fragment cover <=3"	0 – 30 %
Surface fragment cover >3"	0 – 20 %

Available water capacity (0-101.6cm)	10.16 – 22.86 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 40 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

This site developed with occasional fires being part of the ecological processes. It is believed that the fires were historically infrequent, randomly distributed, and started by lightning at various times throughout the growing season. 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.

Drought and insects/disease cycles historically have had a major impact upon the vegetation. The species composition changes according to the duration and severity of the drought cycle.

Deterioration of this site, due to continuous grazing (without adequate recovery periods), will cause blue grama, galleta, and broom snakeweed to increase. Blue grama will eventually form a sodbound community if continuous grazing is not reversed. Cool season grasses such as western wheatgrass, New Mexico feathergrass, and green needlegrass 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. Threeawn, snakeweed, annuals and bare ground increase under heavy continuous grazing or long-term non-use. Long term continuous grazing by livestock or wildlife, long term non-use and absence of fire promote the increase/encroachment of one-seed juniper and/or pinyon. Much of this ecological site has been converted to small acreage home sites.

The Reference Community has been determined by study of rangeland relic areas, areas protected from excessive disturbance, seasonal use pastures, prescribed grazing and historical accounts.

The following is a State and Transition Diagram that illustrates the states and the common plant communities that can occur on this ecological site. The pathways among communities are represented by fine-line arrows. Bold lines surrounding each state represent ecological thresholds. The bold-line arrows indicate transitions away from and restoration pathways back toward states across thresholds. The ecological processes will be discussed in more detail in the Community narrative descriptions following the diagram.

These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. The plant composition table shown below 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 to the model. None of these plant communities should necessarily be thought of as "Desired Plant Communities". Desired Plant Communities will be determined by the decision-makers and will meet the needs of the resources. 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 version of the Ecological Site Description.

State and transition model

Figure 6. S&T Diagram Loamy Foothill 49D

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Grass/Grasslike			532-1345	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	177-295	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	177-295	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	12-59	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	36-59	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	12-59	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	12-59	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	36-59	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	12-36	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0-36	–
	muttongrass	POFE	<i>Poa fendleriana</i>	12-36	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	12-36	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0-24	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	12-24	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	12-24	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	12-24	–
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	0-24	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	12-24	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	12-24	–
	threeawn	ARIST	<i>Aristida</i>	12-24	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0-12	–
	hairy woollygrass	ERPI5	<i>Erioneuron pilosum</i>	0-12	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0-12	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0-12	–
Forb					
2	Forbs			163-280	
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	12-24	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	12-24	–
	purple prairie clover	DAPUP	<i>Dalea purpurea var. purpurea</i>	12-24	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	12-24	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	12-24	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	12-24	–
	slimflower scurfpea	PSTE5	<i>Psoraleidium tenuiflorum</i>	12-24	–

	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	12-24	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	12-24	–
	American vetch	VIAM	<i>Vicia americana</i>	12-24	–
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus</i> var. <i>flaccidus</i>	0-12	–
	lacy tansyaster	MAPIP	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i>	0-12	–
	beardtongue	PENST	<i>Penstemon</i>	0-12	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-12	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0-12	–
	stickseed	LAPPU	<i>Lappula</i>	0-12	–
	Lewis flax	LILE3	<i>Linum lewisii</i>	0-12	–
	Drummond's milkvetch	ASDR3	<i>Astragalus drummondii</i>	0-12	–
	plains milkweed	ASPU	<i>Asclepias pumila</i>	0-12	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	0-12	–
	James' cryptantha	CRCIJ	<i>Cryptantha cinerea</i> var. <i>jamesii</i>	0-12	–
Shrub/Vine					
3	Shrubs			101-280	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	12-59	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	12-36	–
	rabbitbrush	CHRY9	<i>Chrysothamnus</i>	12-24	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	12-24	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	12-24	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	12-24	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	12-24	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0-12	–
	spiny star	ESVIV	<i>Escobaria vivipara</i> var. <i>vivipara</i>	0-12	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-12	–
Tree					
4	Trees			0-24	
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	0-12	–
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	0-12	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 10. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Animal community

Wildlife Interpretations: The diversity of grasses, forbs, and shrubs found in the various plant communities on this ecological site provide habitat for a large number of wildlife species. The wildlife species found on this site are reflective of the transitional nature of the site, situated between the forested habitats in MLRA 48A with grassland habitats in MLRA 69. Historic large grazers that influenced these plant communities were elk, mule deer, and possibly bison. Changes in the composition of the plant community when moving from the Reference Community to other communities on this ecological site may result in dramatic species shifts in the bird community. The friable soils make this community attractive to reptiles and burrowing mammals. 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. Reference Plant Community; Western Wheatgrass, Blue Grama, winterfat Plant Community: The balance of grasses, forbs, and shrubs in this community provide habitat for a variety of vertebrate species. Pollinators are attracted to the forbs expected in this community. The fine textured soils are not attractive to many reptile species, however, western rattlesnake, bullsnake, coachwhip, and six-lined racerunner may use the site to meet all or parts of their life requisites. Birds such as black-billed magpie, vesper and lark sparrow, and red-tailed hawks will use this community. The presence of desirable grasses and the topographical variations attract mule deer and elk to this community to some degree. White-tailed jackrabbit, coyote, Northern pocket gopher, badger, long-tailed weasel, and several species of mice are small mammals that commonly use this plant community for food and cover. Blue Grama Sod Plant Community: The loss of forbs in this plant community will reduce pollinator insect use. Reptiles in this community will be similar to the Reference Plant Community species. The sparrows will be less likely here because of the loss of shrubs and the uniformity of grass height in this community. Deer will no longer find browse plants. Small mammals will still use the site. Broom Snakeweed, Annuals and Bare Ground Plant Community: The loss of desirable shrubs and forbs, combined with the increase in bare ground will result in a change in wildlife species when compared with the Reference Plant Community. Grasshoppers will be the common insect. Western rattlesnake and other reptiles using the Reference Plant Community will still be found here. Lack of food and cover will result in less use by black-billed magpie and the sparrows expected in the Reference Plant Community, however use by hawks will probably continue because it will be easy to spot prey in this community. Gunnison's prairie dog will use the site. Deer and elk will not be able to meet their life requisites on this site. Juniper and/or Pinyon (>5 feet high) Plant Community: The vegetative differences between the grass dominated HCPC plant community and this woody plant community will result in major differences in wildlife use between the two communities. The increased woody cover will attract Foothills bird species such as pinyon jay, green-tailed towhee, black-headed grosbeak, dark-eyed junco, and Virginia's warbler, and, if adequate water is available, wild turkey would be found in this community. The woody cover improves escape and hiding cover for species such as mule deer, elk, and black bear. Mountain lion may be attracted to the site as a source of prey species such as mule deer. Bobcat will find the site attractive because of the dense brushy cover. Bighorn sheep may be found in canyons and rock outcrop areas in this plant community. Six-lined racerunner and badger will stop using this site because of the dense woody vegetation.

Recreational uses

The Reference State of this ecological site will provide quality recreational uses such as small game hunting, camping, and hiking.

Wood products

The Tree Dominated state of this ecological site will provide fence posts and fire wood.

Inventory data references

Inventory data is based on vegetation and soil sampling of locations representing the ecological site concept. Other information incorporated into the Ecological Site is from long-term observations, range inventory data from experienced range-trained personnel, literature review, and historical accounts of vegetation present at the time of settlement. Data collection for this Ecological Site was done in conjunction with the progressive soil surveys within the Southern Rocky Mountain Foothills (MLRA 49) of Colorado. It has been mapped and correlated with soils in the following soil surveys: Fremont and Huerfano counties.

Other references

Data collection for this ecological site was done in conjunction with the progress soil surveys within the Southern Rocky Mountain Foothills (MLRA 49) of Colorado. It has been mapped and correlated with soils in the following soil surveys: Fremont and Huerfano Counties.

Abella, Scott R. 2008. Managing Gambel Oak in southwestern ponderosa pine forests: The status of our knowledge. Faculty Publications (SEPA). Paper 349. University of Nevada, Las Vegas

Allen, Robert B., Robert K. Peet and William L. Baker. 1991. Gradient analysis of latitudinal variation in southern Rocky Mountain forests. *Journal of Biogeography* 18, 123-139

Banzhaf, William H., et al. 1986. Gambel Oak in Colorado's Front Range. Potentials of noncommercial forest biomass for energy. Excerpt from Univ. of Ariz. School of Renewable Natural Resources. Technical Bulletin No. 256

Crofutt, Geo A. 1981. Crofutt's Grip-Sack Guide of Colorado. Johnson Publishing Company. Edited by Francis B. Rizzari, Richard A.

Goodman, George J. and Cheryl A. Lawson. 1995. Retracing Major Stephen H. Long's 1820 Expedition: The Itinerary and Botany. University of OK Press

Jackson, Donald. 1966 The journals of Zebulon Montgomery Pike with letters & related documents. Univ. of Oklahoma Press, First Edition.

NOAA Western Regional Climate Center. 2215 Raggio Parkway Reno, NV 89512 (<http://www.wrcc.dri.edu>)

Peet, Robert K. 1978. Forest vegetation of the Colorado Front Range; Patterns of species diversity. Vegetatio Vol. 37, 2: 65-78

Soil Survey Staff, USDA-NRCS Official Soil Series Descriptions. Available online at <http://soils.usda.gov/technical/classification/osd/index.html>. Accessed [April 3, 2013].

Soil Survey Staff. USDA-NRCS U.S. General Soil Map (STATSGO2). Available online at <http://soildatamart.nrcs.usda.gov>. Accessed [April 3, 2013].

USDA, NRCS. Grazing Lands Technology Institute, Revision 1, December 2003, issued September 1997. National Range and Pasture Handbook at [http://www.co.nrcs.usda.gov/ Home / Land Use / Range & Pasture / National Range and Pasture Handbook](http://www.co.nrcs.usda.gov/Home/LandUse/Range%20and%20Pasture/NationalRangeandPastureHandbook).

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. <http://nasis.nrcs.usda.gov>

USDA, NRCS. 2013. The PLANTS Database (<http://plants.usda.gov>, 6 September 2013). National Plant Data Team, Greensboro, NC 27401-4901 USA.

USDA-NRCS Soil Survey of Fremont County Area, Colorado, Issued December, 1995 in cooperation with Colorado Agricultural Experiment Station and USDI –BLM

USDA-Soil Conservation Service (SCS). Soil Survey of Huerfano County Area, Colorado, Issued July, 1983 in cooperation with Colorado Agricultural Experiment Station

USDA-NRCS Agriculture Handbook 296, issued 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin

Whiteley, Lee. 1999. The Cherokee Trail: Bent's Old Fort to Fort Bridger. Denver Posse of Westerners, Inc.

Contributors

Ben P. Berlinger, Kimberly A. Diller
K. Diller
Lee A. Neve
Mike Cassell

Approval

Kirt Walstad, 3/10/2025

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)	M. Cassell, B. Berlinger, K. Diller
--------------------------	-------------------------------------

Contact for lead author	Kimberly Diller, Ecological Site Specialist USDA-NRCS, Pueblo MLRA Soil Survey 200 S. Santa Fe Ave Pueblo, CO 81003 (719) 543-8386, Ext 125 kimberly.diller@co.usda.gov
Date	04/30/2008
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills: None.

2. Presence of water flow patterns: Typically none, if present short and disconnected.

3. Number and height of erosional pedestals or terracettes: None.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):
5% or less bare ground, with bare patches generally less than 3-6 inches in diameter. Extended drought can cause bare ground to increase upwards to 10-20% with bare patches reaching upwards to 7-15 inches in diameter.

5. Number of gullies and erosion associated with gullies: None.

6. Extent of wind scoured, blowouts and/or depositional areas: None.

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

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):
Stability class rating anticipated to be 5-6 in interspace at soil surface. Soil surface is stabilized by decomposing organic matter. Biological

crusts (lichens, algae, cyanobacteria, mosses) may be present on or just below soil surface.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Average SOM is 1-3%. Soils are deep and well drained. Surface texture ranges from clay loam, loam to stony loam. A-horizon ranges from 4 to 8 inches in depth with light brownish-gray to very dark grayish-brown, or light brown to dark brown color, and a fine to medium granular to a weak to medium subangular blocky structure.
-

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy from sod forming grasses and bunchgrass basal cover reduce bare ground. Raindrop impact is reduced as well as overland flow, providing increased time for infiltration to occur. Dense stands of blue grama can limit infiltration due to high root densities. Extended drought may reduce short/mid bunchgrass basal cover resulting in decreased infiltration and increased runoff following intense storms.
-

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

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: None.

Sub-dominant: cool season rhizomatous > warm season short bunchgrass > cool season mid bunchgrass/grasslikes > shrubs >

Other: Minor: warm season mid bunchgrass> forbs > warm season tall bunchgrass >leguminous forbs = warm season mid weakly rhizomatous grass **Trace:** Trees > biological crusts

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Typically minimal. Expect slightly more bunchgrass mortality during and following drought. Lack of disturbance will increase occurrence of decadence.
-

14. **Average percent litter cover (%) and depth (in):** 20-30% litter cover at 0.25 inch depth. Litter cover during and following extended drought ranges from 10-15%.
-

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 450 pounds/acre low precipitation years; 1050 pounds/acre average precipitation years; 1600 pounds/acre above average precipitation years. After extended drought or the first growing season following wildfire, production may be significantly reduced by 150 – 250 pounds/acre or more.
-

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: Invasive plants should not occur in reference plant community. Cheatgrass, Russian thistle, kochia, other non-native annuals may invade following extended drought or after fire assuming a seed source is available. Sleepygrass is a native perennial grass that can invade. Oneseed juniper and Pinyon pine may encroach from other sites.

17. Perennial plant reproductive capability: The only limitations are weather-related, wildfire, natural disease, and insects that may temporarily reduce reproductive capability.
