

## Ecological site R048AY014NM Mountain Valley Dry

Last updated: 3/05/2024  
Accessed: 05/10/2025

### 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.

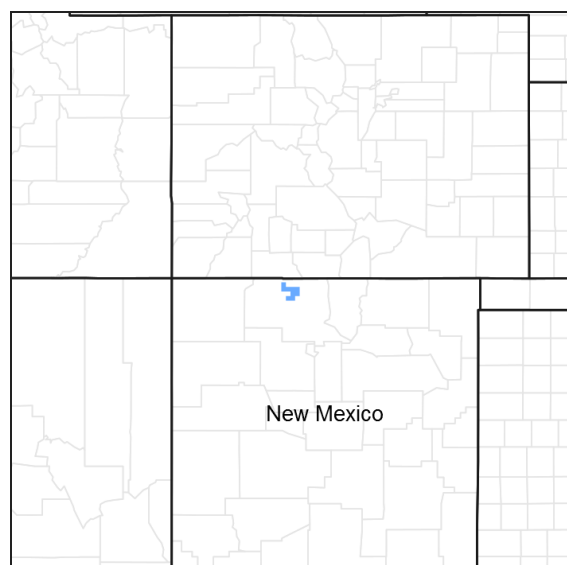


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

### MLRA notes

Major Land Resource Area (MLRA): 048A—Southern Rocky Mountains

This area is in Colorado (76 percent), New Mexico (11 percent), Utah (8 percent), and Wyoming (5 percent). It makes up about 45,920 square miles (119,000 square kilometers). The towns Jemez Springs, Los Alamos, Red River and Eagle Nest, New Mexico, are in this MLRA. This MLRA has numerous national forests, the Carson National Forest and part of the Santa Fe National Forest in New Mexico. The Jemez, Picuris, Santa Clara, and Taos Indian Reservations are in this MLRA. Most of this area is in the Southern Rocky Mountains Province of the Rocky Mountain System. Small parts of the southwest corner and some isolated areas farther west are in the Canyon Lands Section of the same province and division. The Southern Rocky Mountains consist primarily of two belts of strongly sloping to precipitous mountain ranges trending north to south. Several basins, or parks, are between the belts. The ranges include the Sangre de Cristo Mountains, Jemez Mountains, and Tusas Mountains. Elevation typically ranges from 6,500 to 13,167 feet (1,980 to 1,039 meters) in this area. The Rio Grande is a National Wild and Scenic River in northern New Mexico, which is in the southern part of this MLRA.

The mountains in this area were formed mainly by crustal uplifts during the late Cretaceous and early Tertiary periods. The rocks exposed in the mountains are mostly Precambrian igneous and metamorphic rocks, which in many places are flanked by steeply dipping Mesozoic sedimentary rocks. Younger igneous rocks, primarily basalt and andesitic lava flows, tuffs, breccias, and conglomerates, are throughout this area. Representative formations in this area are the Silver Plume and Pikes Peak granites, San Juan Volcanics, and Mancos Shale. Many of the

highest mountain ranges were reshaped by glaciation during the Pleistocene. Alluvial fans at the base of the mountains are recharge zones for local basin and valley fill aquifers. They also are important sources of sand and gravel.

The dominant soil orders in this MLRA are Mollisols, Alfisols, Inceptisols, and Entisols. The soils in the area dominantly have a frigid or cryic soil temperature regime and an ustic or udic soil moisture regime. Mineralogy is typically mixed, smectitic, or paramicaceous. In areas with granite, gneiss, and schist bedrock, Glossocryalfs (Seitz, Granile, and Leadville series) and Haplocryolls (Rogert series) formed in colluvium on mountain slopes. Dystrocryepts (Leighcan and Mummy series) formed on mountain slopes and summits at the higher elevations. In areas of andesite and rhyolite bedrock, Dystrocryepts (Endlich and Whitecross series) formed in colluvium on mountain slopes. In areas of sedimentary bedrock, Haplustolls (Towave series) formed on mountain slopes at low elevations and with low precipitation. Haplocryolls (Lamphier and Razorba series), Argicryolls (Cochetopa series), and Haplocryalfs (Needleton series) formed in colluvium on mountain slopes at high elevations.

## LRU notes

This site is part of the RM-2 sub-resource area. This site is found on the west side of Sangre de Cristo mountains, Tusas Mountains (southern San Juan mountains) and Jemez Mountains.

## Classification relationships

This ecological site is correlated to soil components at the Major Land Resource Area (MLRA) level which is further described in USDA AgHandbook 296.

## Ecological site concept

This site occurs on broad valleys, overflow areas adjacent to intermittent streams and depressional areas subject to run-in of moisture from adjacent sites. However, this site is often highly dissected, and run-in is non-effective. Slopes range from 1 to 8 percent. Elevation ranges from 7,200 to 8,000 feet above sea level.

The soils are deep to very deep and well drained. Surface textures is usually clay loam. Subsoils is usually clay.

This ecological site used to have the ID number of R048BY007NM in RM-2 subresource area in 1982.

## Associated sites

R048AY015NM	<b>Mountain Shale Dry</b> This site occurs on nearly level to sloping landscapes below steeper slopes of interbedded sandstone and shale. Slopes range from 1 to 35 percent. Elevation ranges from 6,800 to 7,700 feet above sea level. Soil depths range from shallow to moderately deep. Surface textures are generally clay loam and are very thin. Subsoils are generally clays. The amount of surface skeletal fragments varies from no fragments to very channery and erosion pavement forms as the surface is eroded. Permeability is slow to very slow. This ecological site used to have the ID number of R048BY008NM in RM-2 subresource area in 1982.
R048AY016NM	<b>Mountain Meadows</b> This site occurs on basins and valleys and below seeps and springs on mountain side slopes. Drainages associated with the site are not dissected and allow the water to fan out. This results in a high water table and even some surface water in the spring and summer. Slopes are less than 5 percent. Elevation ranges from 7,200 to 9,000 feet above sea level. The soils are deep and somewhat poorly drained with a high water table. Depth of the water table ranges from 0 to 60 inches. The surface soil textures are loam, silt loam, or clay loam. Subsoils range from gravelly loam, gravelly clay, clay loam, silty clay loam, silt loam, to clay. The soil profiles are characterized by high amounts of organic matter and dark colors. Permeability is moderate to slow, runoff is medium, and water-holding capacity is high. This ecological site used to have the ID number of R048BY006NM in RM-2 subresource area in 1982.

## Similar sites

R048AY003NM	<b>Mountain Valley</b> This site is located in mountain valleys in the ponderosa pine zone. It has gentle to moderate slopes and receives occasional light overflow from the main stream course or adjacent side slopes. The alluvial slopes immediately adjacent to the main stream are also included in this site. Slopes are 0-5%. Along valley bottoms where drainage is poor, it may blend with the Mountain Meadow ecological site. This site differs from the Mountain Meadow ecological site in the lack of high water table. Elevation ranges from 7,000 to 9,000 feet above sea level. Soils on this site are well drained and deep to very deep. The surface layer is loam, sandy loam or fine sandy loam with subsoil of loam, clay loam, or sandy clay loam. These soils have moderate to moderately high permeability. Runoff is medium. Available water-holding capacity is high. Effective rooting depth is 20 inches to more than 60 inches. Severe gullying can carry off most of the water, and a loss of topsoil greatly reduces water intake. Gullies that carry off extra water will drastically alter the moisture-plant relationship in many areas.
R048AY016NM	<b>Mountain Meadows</b> This site occurs on basins and valleys and below seeps and springs on mountain side slopes. Drainages associated with the site are not dissected and allow the water to fan out. This results in a high water table and even some surface water in the spring and summer. Slopes are less than 5 percent. Elevation ranges from 7,200 to 9,000 feet above sea level. The soils are deep and somewhat poorly drained with a high water table. Depth of the water table ranges from 0 to 60 inches. The surface soil textures are loam, silt loam, or clay loam. Subsoils range from gravelly loam, gravelly clay, clay loam, silty clay loam, silt loam, to clay. The soil profiles are characterized by high amounts of organic matter and dark colors. Permeability is moderate to slow, runoff is medium, and water-holding capacity is high. This ecological site used to have the ID number of R048BY006NM in RM-2 subresource area in 1982.

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Muhlenbergia wrightii</i>

## Physiographic features

This site occurs on broad valleys, overflow areas adjacent to intermittent streams and depressional areas subject to run-in of moisture from adjacent sites. However, this site is often highly dissected, and run-in is non-effective. Slopes range from 1 to 8 percent. Elevation ranges from 7,200 to 8,000 feet above sea level.

**Table 2. Representative physiographic features**

Landforms	(1) Valley side
Runoff class	Very high
Flooding frequency	None
Ponding frequency	None
Elevation	7,200–8,000 ft
Slope	1–8%
Aspect	Aspect is not a significant factor

## Climatic features

The climate is characterized by cold, wet winters in which more than 50 percent of the total annual precipitation is received during the winter. The balance of the precipitation is received in the summer months, some of it in the form of high intensity thunderstorms. Average annual precipitation is about 22 inches but ranges from 16 to 30 inches and yearly fluctuations are common.

The average frost-free period is about 80 days but ranges from 60 days at the highest elevations to 110 days at the lowest elevations; however, the period lengths vary. The average last killing frost in the spring occurs about June 10th. The average first killing frost in the fall occurs about September 20th. Average annual air temperature is 22.6

degrees F in January and 64.5 degrees F in July with extremes ranging from -40 degrees F to 95 degrees F.

Climate data was obtained from <http://www.wrcc.sage.dri.edu/summary/climsmnm.html> web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

**Table 3. Representative climatic features**

Frost-free period (characteristic range)	48-124 days
Freeze-free period (characteristic range)	88-152 days
Precipitation total (characteristic range)	16-30 in
Frost-free period (actual range)	47-125 days
Freeze-free period (actual range)	82-157 days
Precipitation total (actual range)	16-30 in
Frost-free period (average)	86 days
Freeze-free period (average)	120 days
Precipitation total (average)	23 in

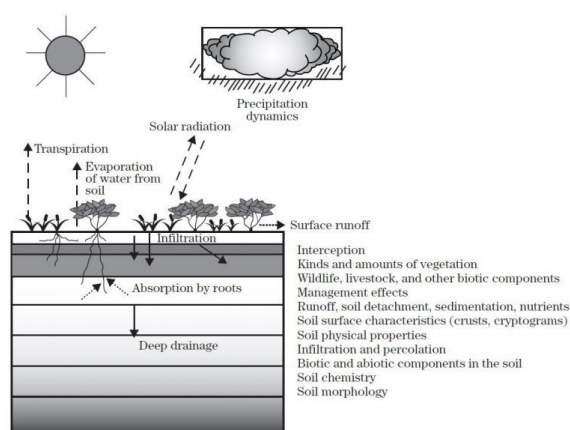
## Climate stations used

- (1) RED RIVER [USC00297323], Questa, NM
- (2) WOLF CANYON [USC00299820], Jemez Springs, NM
- (3) JEMEZ SPRINGS [USC00294369], Jemez Springs, NM
- (4) LOS ALAMOS 13 W [USW00003062], Jemez Springs, NM
- (5) LOS ALAMOS [USC00295084], Los Alamos, NM

## Influencing water features

None.

**Figure 7-1** The hydrologic cycle with factors that affect hydrologic processes



**Figure 8.**

## Soil features

The soils are deep to very deep and well drained. Surface textures is usually clay loam. Subsoils is usually clay.

Characteristic Soils Are:

Roques

**Table 4. Representative soil features**

Parent material	(1) Alluvium–shale
Surface texture	(1) Clay loam
Family particle size	(1) Fine
Drainage class	Well drained
Permeability class	Very slow
Soil depth	60–100 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	5.5–6.5 in
Calcium carbonate equivalent (Depth not specified)	1–5%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	6.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

Deterioration of the potential plant community is indicated by a decrease in western wheatgrass, spike muhly, muttongrass, prairie junegrass and Arizona fescue. Species that increase include blue grama, galleta, mat muhly, bottlebrush squirreltail and woody species.

Below is a State and Transition Model diagram to illustrate the “phases” (common plant communities), and “states” (aggregations of those plant communities) that can occur on the site. Differences between phases and states depend primarily upon observations of a range of disturbance histories in areas where this ESD is represented. These situations include grazing gradients to water sources, fence-line contrasts, patches with differing dates and intensities of fire, herbicide treatment, etc. Reference State 1 illustrates the common plant communities that probably existed just prior to European settlement.

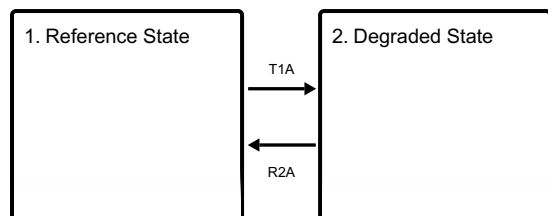
The major successional pathways within states, (“community pathways”) are indicated by arrows between phases. “Transitions” are indicated by arrows between states. The drivers of these changes are indicated in codes decipherable by referring to the legend at the bottom of the page and by reading the detailed narratives that follow the diagram.

The plant communities shown in this State and Transition Model may not represent every possibility but are probably the most prevalent and recurring plant communities. As more monitoring data are collected, some phases or states may be revised, removed, and/or new ones may be added.

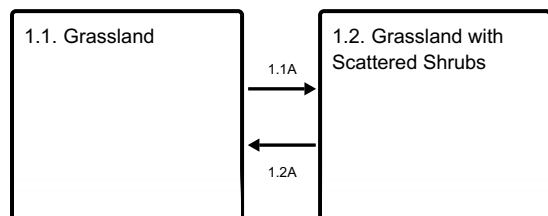
The state and transition model was added to comply with the provisional ecological site instruction. It is a very general model.

## State and transition model

## Ecosystem states



## State 1 submodel, plant communities



## State 1 Reference State

This state represents the natural range of variability on the site. The plant communities within the reference state were shaped and maintained by disturbances such as grazing, browsing, drought, wet years, and fire. The removal or alteration of these processes can cause a shift to an alternative state.

## Community 1.1 Grassland

This is predominantly a grassland site with only scattered shrubs and trees present on the site. Ponderosa pine may be scattered about the site in small amounts. Forbs are usually detectable, especially when in bloom. Because good soil-moisture relationships result from periodic deep wetting, this site may be considerably more productive and begins to green-up earlier than adjacent sites. Other species that could appear on this site include: sleepygrass, mat muhly, Canada wildrye, oatgrass, needle and thread, thistle, penstemon, pussytoes, snowberry, serviceberry, oak, fourwing saltbush and ponderosa pine. Tree, shrub, and half-shrub canopy of this site averages 5 percent.

**Table 5. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	900	1260	1800
Forb	50	70	100
Shrub/Vine	50	70	100
<b>Total</b>	<b>1000</b>	<b>1400</b>	<b>2000</b>

**Table 6. Ground cover**

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	35-39%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	33-37%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%

Bedrock	0%
Water	0%
Bare ground	20-24%

**Figure 10. Plant community growth curve (percent production by month).**  
**NM3307, R048AY014NM Mountain Valley Dry HCPC. R048AY014NM**  
**Mountain Valley Dry HCPC Grassland withj minor components of forbs and shrubs. .**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	5	10	25	30	15	7	0	0

## **Community 1.2**

### **Grassland with Scattered Shrubs**

Western wheatgrass, spike muhly, muttongrass, prairie junegrass and Arizona fescue have decrease on the site. Blue grama, galleta, mat muhly, bottlebrush squirreltail and woody species have increased.

### **Pathway 1.1A**

#### **Community 1.1 to 1.2**

Lack of fire, improper grazing of herbaceous species, and/or drought.

### **Pathway 1.2A**

#### **Community 1.2 to 1.1**

Proper grazing, browsing of shrubs, fire and/or wet climatic cycles.

## **State 2**

### **Degraded State**

This state represents a shift from the reference state. The site has crossed a threshold that will require significant inputs to return to reference conditions, if possible. This has altered the hydrology and energy flow of the plant community.

### **Transition T1A**

#### **State 1 to 2**

Excessive drought periods may also favor certain species. Improper grazing will cause desirable species to decrease and less desirable species to increase. Fire exclusion may lead to an increase in woody canopy scattered across the site.

### **Restoration pathway R2A**

#### **State 2 to 1**

Fire, wetter climatic cycles, and/or proper grazing management can help return the plant community back to grassland. Shrub management may be needed to decrease shrubs.

## **Additional community tables**

**Table 7. Community 1.1 plant community composition**

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				350–490	
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	350–490	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	350–490	–
2				42–140	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	42–140	–
	muttongrass	POFE	<i>Poa fendleriana</i>	42–140	–
3				42–98	
	sedge	CAREX	<i>Carex</i>	42–98	–
4				42–98	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	42–98	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	42–98	–
5				42–98	
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	42–98	–
	Thurber's fescue	FETH	<i>Festuca thurberi</i>	42–98	–
6				42–70	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	42–70	–
7				0–98	
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	0–98	–
8				42–140	
	Grass, native	2GN	<i>Grass, native</i>	42–140	–
<b>Forb</b>					
19				42–98	
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	42–98	–
	Forb, native	2FN	<i>Forb, native</i>	42–98	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	42–98	–
	larkspur	DELPH	<i>Delphinium</i>	42–98	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	42–98	–
	coneflower	RUDBE	<i>Rudbeckia</i>	42–98	–
	vetch	VICIA	<i>Vicia</i>	42–98	–
<b>Shrub/Vine</b>					
10				42–70	
	shrubby cinquefoil	DAFR6	<i>Dasiphora fruticosa</i>	45–75	–
11				14–70	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	14–70	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	14–70	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	14–70	–
	currant	RIBES	<i>Ribes</i>	14–70	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	14–70	–

## Animal community

Grazing:



Approximately 95 percent of the vegetation produced on this site are suitable for grazing or browsing by domestic livestock and wildlife. Grazing pressure on this site may be a problem due to the lush vegetation on this site compared with adjacent sites. Water and salt should be distributed away from this site to prevent its constant overuse. A planned grazing system with periodic grazing and rest is best to maintain the natural balance between plant species and to maintain high productivity.

#### Habitat for Wildlife:

This site provides habitats which support a resident animal community that is characterized by black-tailed jackrabbit, long-tailed vole, golden-mantled ground squirrel, Gunnison's prairie dog, western bluebird, horned lark, leopard frog, smooth green snake. Breeding violet-green swallows and turkey uses these sites. Mule deer and elk use these sites seasonally.

### Hydrological functions

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups.

#### Hydrologic Interpretations

Soil Series-----Hydrologic Group

Roques-----D

### Recreational uses

This site in itself is not noted for its beauty, but it is enhanced by the close proximity to a mountain setting. The site is suited to horseback riding and camping.

### Wood products

Although a few scattered trees may occur on this site, their numbers are few and not capable of a sustained yield of wood products.

### Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index-----Ac/AUM

100 - 76-----1.3 – 1.7

75 – 51-----1.6 – 2.6

50 – 26-----2.5 – 5.2

25 – 0-----5.2+

### Inventory data references

Data collection for this site was done in conjunction with the progressive soil surveys within the State of New Mexico. This site is found in the following soil survey areas: Taos, Sante Fe, Sandoval, Los Alamos, Rio Arriba, Santa Fe National Forest (Coyote, Cuba, Jemez Springs, and Espanola Ranger Districts) and Carson National Forest

These site descriptions were developed as part of a Provisional ESD project using historic soil survey manuscripts, available range site descriptions.

### Other references

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

Don Sylvester  
Elizabeth Wright  
John Tunberg

## Approval

Kirt Walstad, 3/05/2024

## Acknowledgments

Site Development and Testing Plan:

Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document. Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

## 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	05/10/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

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

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

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

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

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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:

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17. Perennial plant reproductive capability:

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