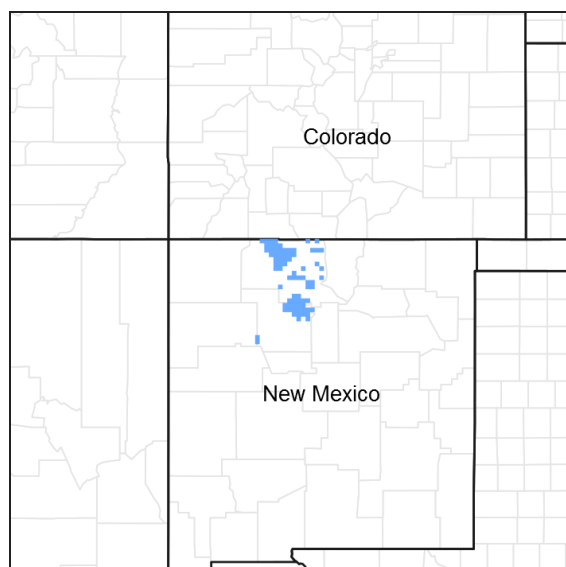


# **Ecological site R048AY012NM** **Mountain Loam Dry**

Last updated: 3/05/2024  
 Accessed: 05/12/2025

## **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 gently sloping to moderately rolling uplands below or ranging into the ponderosa pine-Douglas fir woodlands. It may occur on open parks within the true woodlands. Slopes range from 1 to 20 percent. Elevation ranges from 7,200 to 9,200 feet above sea level.

The soils are deep. Surface textures are loam or silt loam with subsoils varying from gravelly loam. very gravelly sandy clay loam, extremely cobbly clay loam. clay loam, or loam. Permeability is moderate slow to moderately rapid.

This ecological site used to have the ID number of R048BY004NM in RM-2 subresource area in 1982.

## Associated sites

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.
R048AY013NM	<b>Mountain Slopes</b> This site occurs on valley sides and hills ranging from relatively uniform, long slopes to short and choppy. Exposure is usually southern and/or western, which creates a relatively droughty site. Slopes range from 15 to 45 percent. Elevation ranges from 7,200 to 8,600 feet above sea level. The soils are generally moderately deep to deep over interbedded shale and sandstone parent materials. Surface textures is usually a loam. Subsoils range from sandy clay loam, clay loam to clay. This ecological site used to have the ID number of R048BY006NM in RM-2 subresource area in 1982.

F048AY908CO	<b>Mixed Conifer</b> This site is found mostly commonly on mountain slopes. Soils are moderately deep to very deep (20 to 60+ inches). Soil surface textures are loam, very gravelly sandy loam, very stony sandy loam, stony sandy loam, stony loam, very stony loam, very cobbly loam or gravelly fine sandy loam. Subsurface textures can be loamy-skeletal or sometimes fine-loamy. It is usually ustic udic or typic udic and cryic. It is a Mixed Conifer community with subalpine fir, white fir, and Douglas fir intermixed. The effective precipitation ranges from 20 to 40 inches.
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.

## Similar sites

R048AY004NM	<b>Mountain Loam</b> This site is on steep to moderately steep slopes on benches within the steeper slopes of the surrounding ponderosa pine tree zone. The slope is to the southwest; south and southeast, making the site directly exposed to the dry south and southwest winds and more intensive heat from the sun. Slopes vary from 5 to 70 percent. Elevation ranges from 6,900 to 9,000 feet above sea level. The soils on this site are moderately deep to deep and well drained. The surface texture is stony/cobbly silt loam or cobbly loam. The subsurface is stony loam or cobbly loam. They have a moderate permeability. The available water-holding capacity is low. Effective rooting depth is from 20 to 40 inches. There is cobble or stone throughout the profile and on the surface. Air-water-plant relationship is fair.
R048AY014NM	<b>Mountain Valley Dry</b> 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.

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Festuca arizonica</i> (2) <i>Poa fendleriana</i>

## Physiographic features

This site occurs on gently sloping to moderately rolling uplands below or ranging into the ponderosa pine-Douglas fir woodlands. It may occur on open parks within the true woodlands. Slopes range from 1 to 20 percent. Elevation ranges from 7,200 to 9,200 feet above sea level.

**Table 2. Representative physiographic features**

Landforms	(1) Mountain slope (2) Valley side (3) Valley floor
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	2,195–2,804 m
Slope	1–20%

Aspect	Aspect is not a significant factor
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### 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.

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)	406-762 mm
Frost-free period (actual range)	47-125 days
Freeze-free period (actual range)	82-157 days
Precipitation total (actual range)	406-762 mm
Frost-free period (average)	86 days
Freeze-free period (average)	120 days
Precipitation total (average)	584 mm

### Climate stations used

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

### Influencing water features

None.

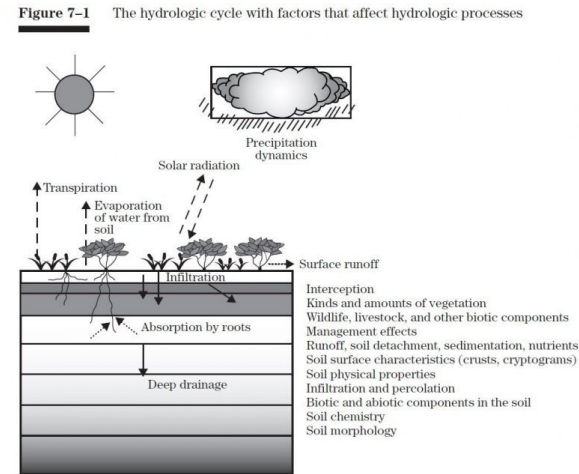


Figure 8.

## Soil features

The soils are deep. Surface textures are loam or silt loam with subsoils varying from gravelly loam. very gravelly sandy clay loam, extremely cobbly clay loam. clay loam, or loam. Permeability is moderate slow to moderately rapid.

Soils correlated to this site:

Cosey, Ohwiler, Pavo, and Suposo

**Table 4. Representative soil features**

Parent material	(1) Colluvium–rhyolite (2) Slope alluvium–rhyolite (3) Alluvium–sandstone and shale (4) Colluvium–tuff
Surface texture	(1) Loam (2) Silt loam
Family particle size	(1) Loamy (2) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	152–203 cm
Surface fragment cover ≤3"	0–5%
Surface fragment cover >3"	0–5%
Available water capacity (101.6cm)	10.16–17.78 cm
Calcium carbonate equivalent (Depth not specified)	0–10%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–1
Soil reaction (1:1 water) (Depth not specified)	6.1–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–40%

## Ecological dynamics

Deterioration of the potential plant community is indicated by a decrease in Arizona fescue, bluegrass, western wheatgrass, Columbia needlegrass and prairie junegrass. Species that increase include sleepygrass, sedges, bottlebrush squirreltail, forbs 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.

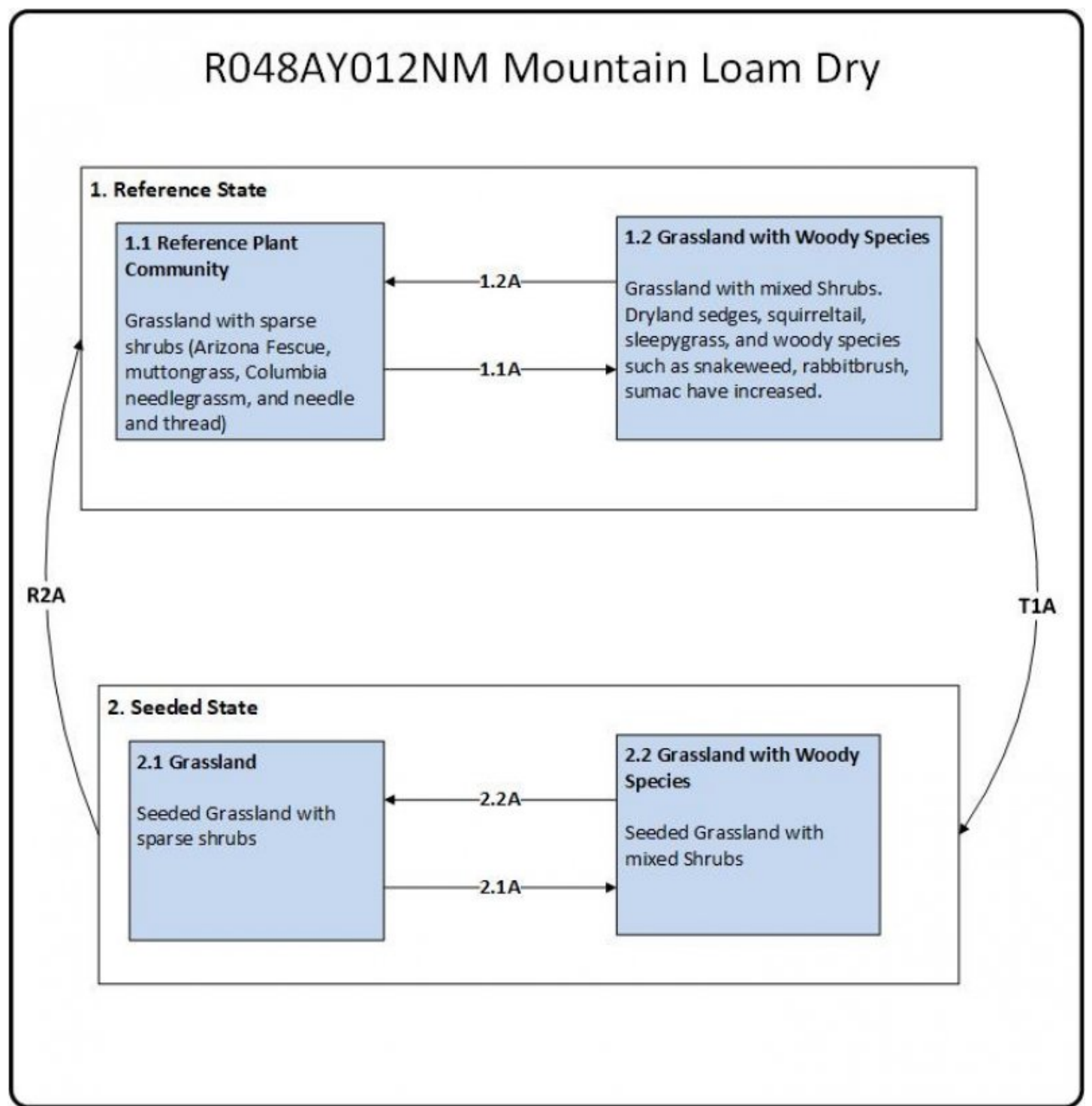
The major successional pathways within states, (“community pathways”) are indicated by arrows between phases. “Transitions” are indicated by arrows between states. The drivers of these changes are indicated in codes

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



## Legend

1.1A, 2.1A – lack of fire, lack of insect/pathogens, time without disturbance, drought and improper grazing

1.2A, 2.2A – fire, insect herbivory, pathogen presence, browsing of shrubs, and/or wetter climate cycles

T1A – Seeding

R2A – natives reestablished over extended time periods

### State 1

#### Reference State

This ecological 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, rest, and fire. The removal or alteration of these processes can cause a shift to an alternative ecological state.

### Community 1.1

#### Reference Plant Community

This is a grassland site with only scattered shrubs and few, if any trees. Cool-season grasses and sedges dominate. Forbs are a minor component but are usually detectable when in bloom. Shrubs and half-shrub canopy of this site averages 3 percent. Other species that could appear on this site include: blue grama, galleta, pine dropseed, threeawn, Indian paintbrush, gilia, pussytoes, thistle, rabbitbrush, broom snakeweed, big sagebrush, winterfat and fourwing saltbush.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	717	986	1255
Forb	90	123	157
Shrub/Vine	90	123	157
<b>Total</b>	<b>897</b>	<b>1232</b>	<b>1569</b>

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	1-5%
Grass/grasslike foliar cover	31-35%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	23-27%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%

Bare ground	30-34%
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**Figure 10. Plant community growth curve (percent production by month).**  
**NM3304, R048AY012NM Mountain Loam Dry HCPC. R048AY012NM Mountain Loam Dry HCPC Cool-season grassland with minor components of shrubs and forbs. .**

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

## Additional community tables

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

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				123–247	
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	123–247	–
2				99–148	
	bluegrass	POA	<i>Poa</i>	99–148	–
	muttongrass	POFE	<i>Poa fendleriana</i>	99–148	–
3				111–155	
	sedge	CAREX	<i>Carex</i>	111–148	–
4				99–148	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	99–148	–
5				62–99	
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	62–99	–
6				62–99	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	62–99	–
7				62–99	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	62–99	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	62–99	–
8				62–99	
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	62–99	–
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	62–99	–
9				62–99	
	sleepygrass	ACRO7	<i>Achnatherum robustum</i>	62–99	–
	oatgrass	DANTH	<i>Danthonia</i>	62–99	–
	Thurber's fescue	FETH	<i>Festuca thurberi</i>	62–99	–
	Grass, native	2GN	<i>Grass, native</i>	62–99	–
<b>Forb</b>					
10				39–91	
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	37–86	–
	Forb, native	2FN	<i>Forb, native</i>	37–86	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	37–86	–
	cinquefoil	POTEN	<i>Potentilla</i>	37–86	–
	golden Indian paintbrush	CALE27	<i>Castilleja levisecta</i>	37–86	–
	buckwheat	ERIOG	<i>Eriogonum</i>	37–86	–



	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	37–86	–
	beardtongue	PENST	<i>Penstemon</i>	37–86	–
<b>Shrub/Vine</b>					
11				12–37	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	12–37	–
12				0–37	
	common juniper	JUCO6	<i>Juniperus communis</i>	0–37	–
	oak	QUERC	<i>Quercus</i>	0–37	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–37	–
	currant	RIBES	<i>Ribes</i>	0–37	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–37	–

## 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 distribution need not be a problem as long as water and salt are adequately located. Salt can be moved periodically to improve grazing distribution. A planned grazing system with periodic grazing and rest is best to maintain the natural balance between plant species and to maintain high productivity. In addition to domestic livestock, this site is well suited to deer, elk, small mammals and birds.

### Habitat for Wildlife:

This site provides habitats which support a resident animal community characterized by black-tailed jackrabbit, badger, golden-mantled ground squirrel, Gummson's prairie dog, northern pocket gopher, chipping sparrow and mountain kingsnake. Mule deer, elk and turkey will 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

Cosey-----B

## Recreational uses

This site is well suited to picnicking, camping, horseback riding and hunting. The site alone is not noted for its beauty. However, when in association with adjacent woodlands and surrounding high mountains, this site presents a beautiful setting.

## Wood products

No significant wood products are produced on this site on a sustained yield basis.

## Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index-----Ac/AUM

100 - 76-----1.7 – 2.2

75 – 51-----2.1 – 3.3

50 – 26-----3.2 – 6.7

25 – 0-----6.7+

## 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	05/12/2025
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:**

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

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

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

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

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

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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:

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

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

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

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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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