USDA Natural Resources Conservation Service

Ecological site R048AY006NM
Mountain Meadow

Last updated: 3/01/2024
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.

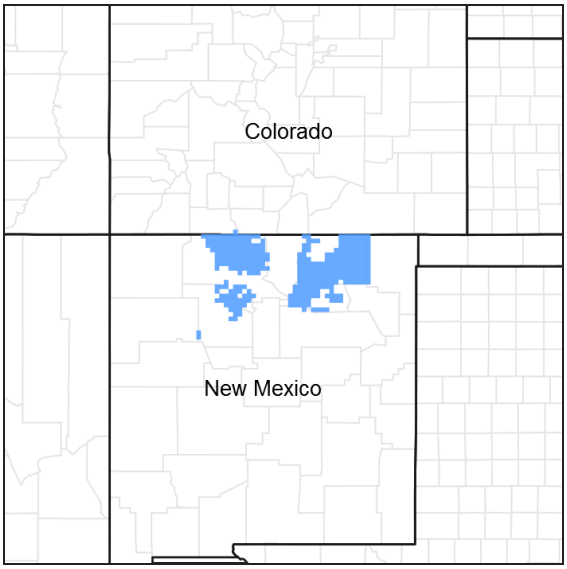


Figure 1. Mapped extent

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-1 sub-resource area. This site is found on the east side of Sangre de Cristo 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

The site occurs as lower lying drainageways, flood plains, swales or other depressional areas where extra moisture accumulates as a result of runoff from surrounding higher sites. A high water table is characteristic of this site particularly in the spring and a portion of the area may have open water during this season. Springs or seeps bring the water table to the subsoil or even to the surface, in which instance the site may colloquially be called a “cienaga”. Slopes vary from flat to gently sloping, not to exceed 5 percent. The exposure varies and is not significant. Elevation ranges from 7,000 to 9,500 feet above sea level.

These soils consist of deep to very deep soils and poorly to very poorly drained. The surface texture ranges from a very fine sandy loam to a mucky silty clay and clay surface layers. They have an active water table, which varies from the surface to 3 feet below the surface.
They are normally non-saline and have high organic content. These soils have moderate to moderately slow permeability. Available water-holding capacity is moderate. The effective rooting depth is 20 inches to more than 60 inches.

Characteristic Soils Are:
Ceboya, Chamita, Frolic, and Saladon

Associated sites

R048AY003NM	**Mountain Valley** This site is in mountain valleys in the ponderosa pine zone. It has gentle to moderate slopes and receives occasional light overflow from the stream course or adjacent side slopes. The alluvial slopes immediately adjacent to the 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.

R048AY002NM	**Mountain Grassland** This site is found on the north and northeast-facing slopes at lower elevations and can be found on all exposures at the higher elevations. The site is located on open benchlands, outwash fans or exposed ridges between parks and valleys and higher mountain slopes. High mountain rims and mountain valleys are included in this site. The Mountain Grassland often occurs on benches or depressed areas within the steeper surrounding slopes of the ponderosa pine. The slopes ranges from 0 to 15 percent. Elevation ranges from 7,000 to 9,000 feet above sea level. These soils are well drained, deep to very deep. The surface layer is loam, silt loam or sandy loam. Gravel or stones are often present on the soil surface and throughout the profile but is not skeletal. These soils have a moderate permeability. Available water-holding capacity is moderate to high. Effective rooting depth is 40 inches to more than 60 inches.
R048AY004NM	**Mountain Loam** 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.

Similar sites

R048AY241CO	**Mountain Meadow** This site occurs flood plains, stream terraces, drainageways, ephemeral streams, flood-plain step and depressions. This site has natural sub-irrigation. Slopes is between 0 to 12%. Soils are moderately deep to very deep (20 to 60+ inches). Soils are derived from alluvium from sandstone and shale, sedimentary rock, igneous, metamorphic and sedimentary rock, or shale. Soil surface texture is loam, silty clay loam, clay loam, clay, sandy clay loam or sandy loam with fine-loamy or fine textured subsurface. It has a typic aquic or oxyaquic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY016NM	**Mountain Meadows** 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	(1) *Dasiphora fruticosa* (2) *Salix*
Herbaceous	(1) *Deschampsia caespitosa* (2) *Carex*

Physiographic features

The site occurs as lower lying drainageways, flood plains, swales or other depressional areas where extra moisture accumulates as a result of runoff from surrounding higher sites. Open parks or park-like areas having a relatively high water table are included within this site. Also included are the broader, flat, mountain valley areas immediately adjacent to a permanent stream. A high water table is characteristic of this site particularly in the spring and a portion of the area may have open water during this season. Springs or seeps bring the water table to the subsoil or even to the surface, in which instance the site may colloquially be called a “cienaga”.

Slopes vary from flat to gently sloping, not to exceed 5 percent. The exposure varies and is not significant. Elevation ranges from 7,000 to 9,500 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Flood plain (3) Swale (4) Depression (5) Valley
Runoff class	High to very high
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Very long (more than 30 days)
Ponding frequency	None to frequent
Elevation	7,000–9,500 ft
Slope	0–5%
Ponding depth	0–4 in
Water table depth	0–36 in
Aspect	Aspect is not a significant factor

Climatic features

Climate is typical of Rocky Mountain areas encountered at elevations extending between the pinyon/juniper type and the high mountain sites where spruce and fir become an important part of the aspect. The average annual precipitation varies from 15 to 25 inches and varies considerable from year to year. It also varies from low elevations to high elevations. Half or more of the precipitation comes in the form of snow; however, the key to existence of this site is the natural sub-irrigation and cool mountain climate rather than total amount of precipitation. A feature of the climate of this site is the usual winter snowfall that is received during the period from November through March. Snowfall accumulations during this period are irregular as indicated by the fluctuation of the annual precipitation. This site is an important site from the standpoint of water yield in the overall watershed conservation program. During some years, accumulations of several feet of snow are found on this site in the early spring. Summer precipitation is received during the period from June through September, although the total amount of this season is 50 percent of the total. Summer storms are violent thunderstorm type of short duration and high intensity.

Air temperatures vary from a monthly mean of 19 degrees F in January to 57 degrees F in July at the higher elevations. At the lower elevations, the mean monthly temperature in January is approximately 22 degrees F and in July it is 68 degrees F. Winter low temperatures fall well below 0 degrees F during much of the winter. Dates of the last killing frost may vary from May 6th to June 15th. The first killing frost from September 9th to October 11th.

The frost-free season ranges from 79 days at the higher elevations to 140 days at the lower elevations. The growing season varies elevationally from three months at the higher elevations to approximately five months at the lower elevations.

Table 3. Representative climatic features

Frost-free period (characteristic range)	36-65 days
Freeze-free period (characteristic range)	86-98 days
Precipitation total (characteristic range)	15-25 in
Frost-free period (actual range)	33-77 days
Freeze-free period (actual range)	86-104 days
Precipitation total (actual range)	15-25 in
Frost-free period (average)	52 days
Freeze-free period (average)	93 days

Precipitation total (average)	20 in

Climate stations used

- (1) EAGLE NEST [USC00292700], Eagle Nest, NM
- (2) ANGEL FIRE 1S [USC00290407], Cimarron, NM
- (3) GASCON [USC00293488], Mora, NM

Influencing water features

This site has an active water table, which varies from the surface to 3 feet below the surface.

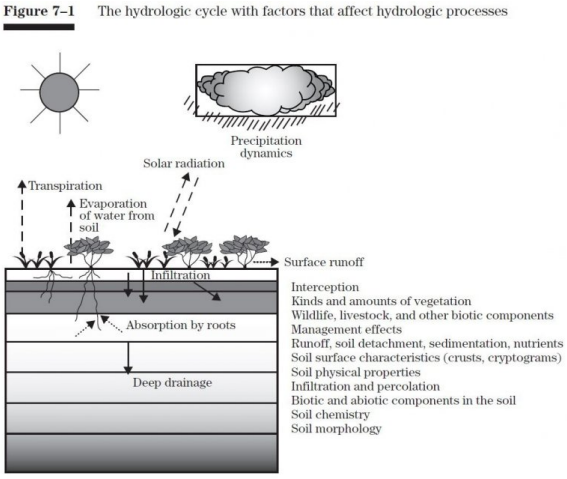


Figure 8.

Soil features

These soils consist of deep to very deep soils and poorly to very poorly drained. The surface texture ranges from a very fine sandy loam to a mucky silty clay and clay surface layers. They have an active water table, which varies from the surface to 3 feet below the surface.
They are normally non-saline and have high organic content. These soils have moderate to moderately slow permeability. Available water-holding capacity is moderate. The effective rooting depth is 20 inches to more than 60 inches.

Characteristic Soils Are:
Ceboya, Chamita, Frolic, and Saladon

Table 4. Representative soil features

Parent material	(1) Alluvium–basalt (2) Alluvium–igneous, metamorphic and sedimentary rock (3) Alluvium–volcanic rock (4) Ash flow–sandstone and shale
Surface texture	(1) Silty clay loam (2) Loam (3) Mucky silty clay (4) Mucky silty clay loam (5) Clay loam (6) Very fine sandy loam
Family particle size	(1) Fine-loamy (2) Fine
Drainage class	Very poorly drained to poorly drained
Permeability class	Moderately slow to moderate

Soil depth	60–100 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	5.8–8.4 in
Calcium carbonate equivalent (Depth not specified)	0–1%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Tufted hairgrass dominates this site. On soils having a mesic soil temperature regime, , baltic rush and Nebraska sedge are subordinate to tufted hairgrass and are aggregated in colonies only in wetter depressions. If the condition of this site deteriorates as a result of overgrazing, tufted hairgrass decreases and becomes co-dominant with other grasses, sedges and forbs. Baltic rush, sedges or reedgrass become more dominant. On the drier precipitation range of this site, prairie junegrass and oatgrass along with yarrow, and aster increase. With lowering of the water table Kentucky bluegrass can become naturalized and become co-dominant with mat muhly. Foxtail barley, dock and thistle are likely to invade

Abusive grazing for multiple years can result in the loss of grazing-sensitive herbaceous species. Periodic rest is essential to plant recovery and vigor. With the reduction or elimination of fine fuels and fire, woody species may increase across most sites. As the structure and composition of the vegetation changes, the hydrology, energy flow, and production potential of the site changes. Often, this results in the transition to an alternative ecological state that may or may not be reversible.

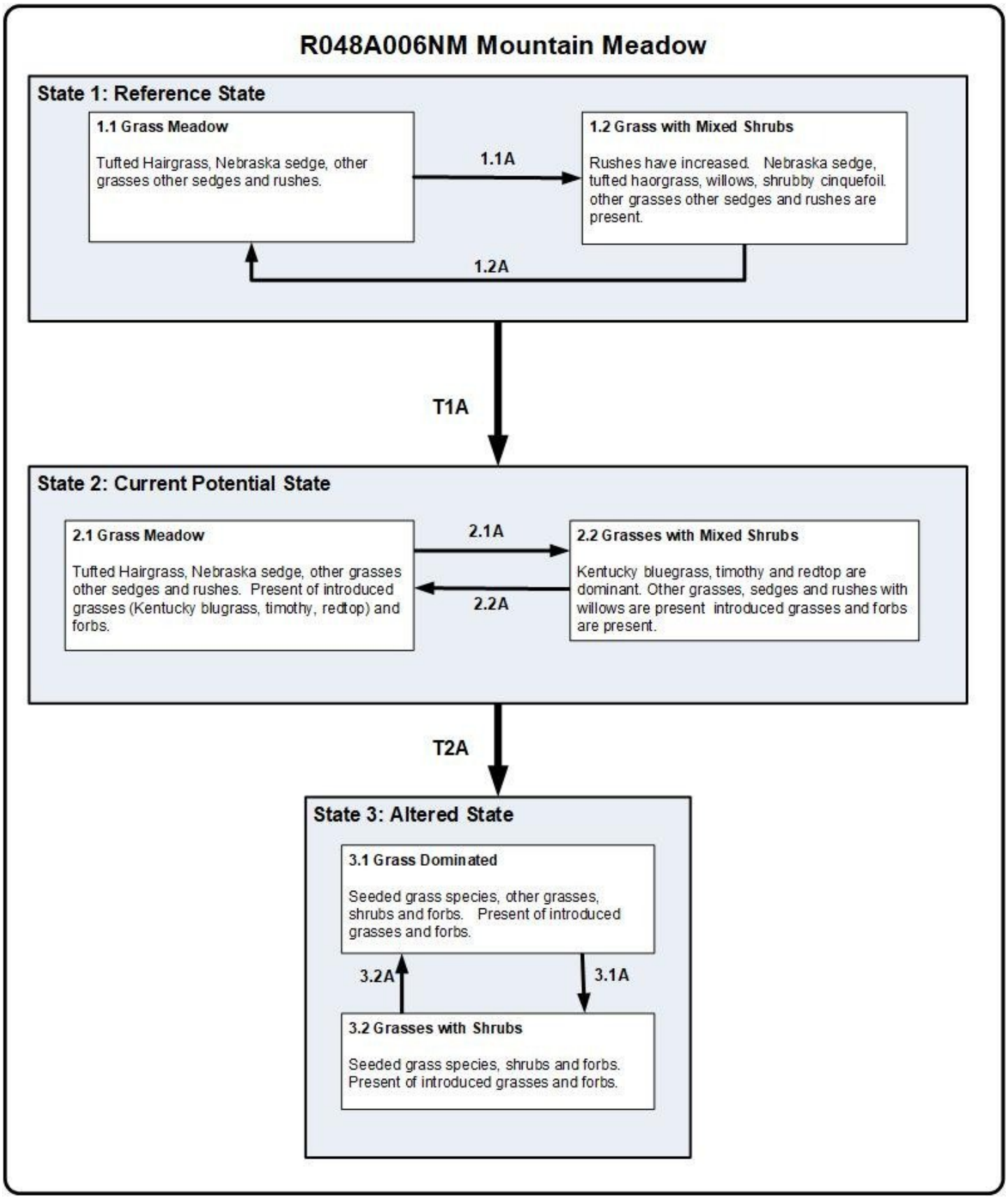
Periodic wet and dry cycles also have an impact on the vegetation. Variability in precipitation patterns from year to year can have a profound impact on annual production. Long term drought can lead to noticeable changes in composition and structure and require specific management to allow for recovery of desired species.

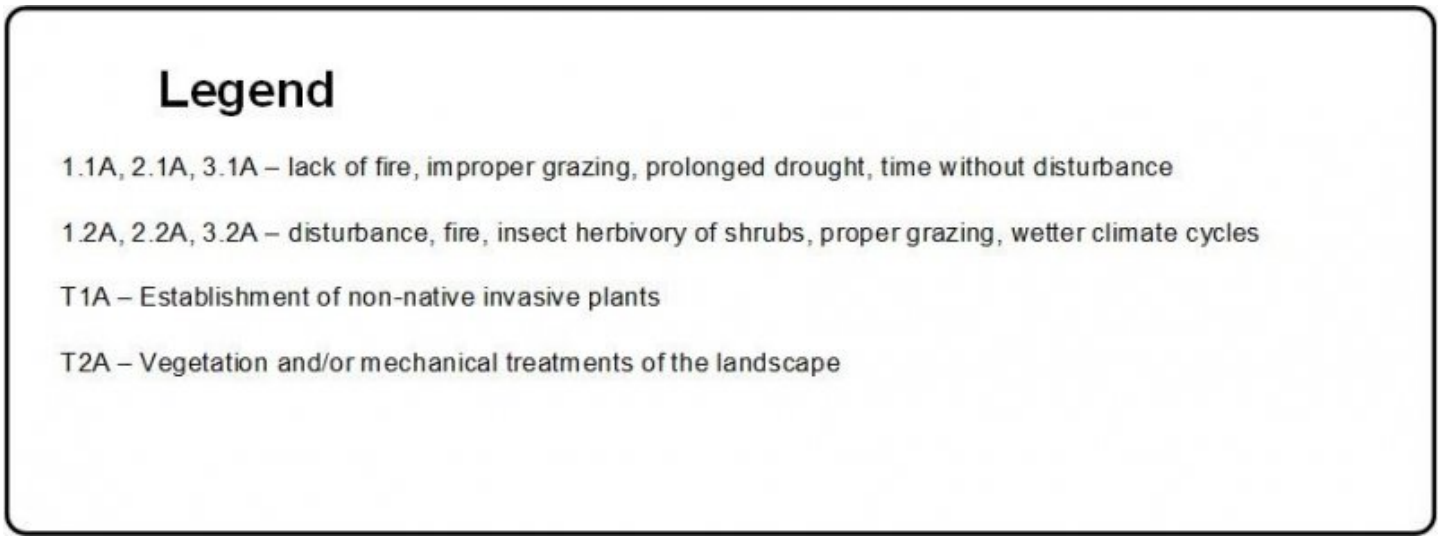
Below is a State and Transition Model diagram to illustrate the “phases” (common plant communities), and “states” (aggregations of those plant communities) that can occur on the site. Differences between phases and states depend primarily upon observations of a range of disturbance histories in areas 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.

State and transition model





State 1
Reference State

Continuous grazing throughout the entire season will cause species such as tufted hairgrass, mountain brome, red fescue and oatgrass to decline. Species most likely to invade the site are dandelions and introduced forage grasses, especially timothy, redtop and Kentucky bluegrass. Canadian thistle is a troublesome invader in some spots. As the ecological conditions decline, some of the above plants usually become predominant. Several plants, in smaller amounts, natural to the site also increase at the expense of most of the desirable grasses. Typical plants in this category are Baltic rush (mountain rush), iris, common yarrow and cinquefoil. Shrubby cinquefoil or iris often gives the dominant aspect to many deteriorated spots. Sedges on predominantly wet spots retain their position mush longer than plants on slightly drier spots because of the reluctance of livestock to graze in water. Gullies can lower the water table greatly, changing the moisture relationship on sloping ground.

Community 1.1
Grass Meadow

This site is dominated by cool-season bunchgrasses and sedges to give it its characteristic appearance. Approximately 15 percent of the total plant composition are made up of sedges. Perennial and annual forbs constitute less than 10 percent of the plant community. Herbaceous half-shrubs are present only in trace amounts. Since principally shallow ground water and high water tables supply moisture for plant growth, the annual precipitation received is not as critical as the drier sites adjoining it. Sedges and rushes become conspicuous only in the wetter or swampier portions of the site. Forage yield is comparable to domestic tame pastures; top condition, this site presents the appearance of a hay field. There are no trees associated with this site. Other species that could be present include: Timothy, prairie junegrass, subalpine needlegrass, shortawn foxtail, blue grama, redtop, and slender wheatgrass.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	2040	2380	2975
Forb	240	280	350
Shrub/Vine	120	140	175
Total	**2400**	**2800**	**3500**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	55-65%

Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	5-15%

Table 7. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	0%
Forb basal cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-7%

Figure 10. Plant community growth curve (percent production by month). NM3106, R048AY006NM Mountain Meadow HCPC. R048AY006NM Mountain Meadow HCPC Cool-season bunch grass grassland with traces of shrubs and forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				560–700	
	tufted hairgrass	DECE	*Deschampsia cespitosa*	560–700	–
2				336–420	
	brown sedge	CASU6	*Carex subfusca*	336–420	–
	Nebraska sedge	CANE2	*Carex nebrascensis*	336–420	–
	sedge	CAREX	*Carex*	336–420	–
3				196–280	
	mountain brome	BRMA4	*Bromus marginatus*	196–280	–
4				196–280	

	western wheatgrass	PASM	*Pascopyrum smithii*	196–280	–
5				196–280	
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	196–280	–
	poverty rush	JUTE	*Juncus tenuis*	196–280	–
	bulrush	SCIRP	*Scirpus*	196–280	–
6				196–280	
	red fescue	FERUR2	*Festuca rubra ssp. rubra*	196–280	–
7				196–280	
	bluejoint	CACA4	*Calamagrostis canadensis*	196–280	–
	reedgrass	CALAM	*Calamagrostis*	196–280	–
8				84–140	
	mountain muhly	MUMO	*Muhlenbergia montana*	84–140	–
9				84–140	
	oatgrass	DANTH	*Danthonia*	84–140	–
	meadow barley	HOBR2	*Hordeum brachyantherum*	84–140	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	84–140	–
	marsh muhly	MURA	*Muhlenbergia racemosa*	84–140	–
10				84–140	
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–140	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–140	–
	shortawn foxtail	ALAE	*Alopecurus aequalis*	0–140	–
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	0–140	–
	Grass, perennial	2GP	*Grass, perennial*	0–140	–
Forb					
11				84–140	
	clover	TRIFO	*Trifolium*	84–140	–
12				84–140	
	common yarrow	ACMI2	*Achillea millefolium*	84–140	–
	aster	ASTER	*Aster*	84–140	–
	geranium	GERAN	*Geranium*	84–140	–
	iris	IRIS	*Iris*	84–140	–
	vetch	VICIA	*Vicia*	84–140	–
13				84–140	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	84–140	–
Shrub/Vine					
14				84–140	
	willow	SALIX	*Salix*	84–140	–
	shrubby cinquefoil	DAFR6	*Dasiphora fruticosa*	84–140	–

Animal community

Grazing:
This site is adapted for late spring, summer and early fall grazing. The grazing season varies elevationally from three to five months. Livestock use on this site ordinarily starts in mid-May or early June and extends through fall.

This site can be used by all classes of livestock regardless of age during this season; however, cattle and horses are better suited to this site because of the coarse forage that is produced by tufted hairgrass as it matures. Although tufted hairgrass withstands fairly close grazing and is usually relished by all classes of livestock, new plants are established entirely from seed, and sufficient seed should be permitted to mature in order to provide the necessary replacements.

To maintain or to improve on a healthy, well-balanced plant community, grazing needs to be delayed until the plants have had the opportunity to make good growth in the spring. Rapid growth of plants in the spring may temporarily deplete food reserves. Delay grazing until the plants have had the opportunity to restore this food supply is advisable.

A system if deferred grazing, which varies the time of grazing and rest in the pastures during successive years, will result in a healthy, well-balanced plant community. Deferment is needed for seed production and forage production. Approximately 95 percent of the annual yield is from species that furnish forage for grazing animals. Maximum forage production on this site can be achieved by using it for hay.

Habitat for Wildlife:
This site provides habitats which support a resident animal community that is characterized by elk, bridled weasel, raccoon, water shrew, meadow vole, western jumping mouse, leopard frog and western territorial garter snake. The brewer's blackbird, savanah sparrow and white crowned sparrow nest in these sites. Mule deer use the 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
Frolic----------C
Saladon----------D

Recreational uses

This site provides limited recreation potential due to the dense vegetation when it is in its top ecological condition. Small mountain streams provide trout fishing. The natural beauty is enhanced by the change from wooded areas and grassland areas to the green meadows.

Wood products

None.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM
100 - 76----------0.5 – 0.9
75 – 51----------0.8 – 2.1
50 – 26----------1.4 – 3.2
25 – 0----------3.2+

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 surveys: Colfax, Taos, Mora, Santa Fe National Forest (Pecos-Las Vegas Ranger District), and San Miguel.

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

Approval

Kirt Walstad, 3/01/2024

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:**

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

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):**

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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):**

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:**