

Ecological site R049XY036CO Overflow

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General information

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

MLRA notes

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

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

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

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

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

The dominant soil orders in this MLRA are Mollisols, Alfisols, Inceptisols, and Entisols. The soils in the Colorado and New Mexico portions of the MLRA dominantly have a frigid or mesic soil temperature regime. Those in the Wyoming portion have a frigid or cryic soil temperature regime. A few of the higher peaks and some north aspects have a cryic soil temperature regime. Most of the soils in the area have an ustic soil moisture regime, but those on the higher peaks and on some north aspects have a udic soil moisture regime. The soils in the area dominantly have smectitic or mixed mineralogy. They are very shallow to very deep and are dominantly well drained. The texture is dominantly loamy in soils that formed in material weathered from igneous and metamorphic rocks and is dominantly loamy or clayey in soils that formed in material weathered from sedimentary rocks. Some of the most extensive and representative great groups are Haplustolls (Baller series), Argiustolls (Nederland, Nunn, Santa Fe, and Enmedio series), Haplustalfs (Fort Collins, Stoneham, and Dargol series), Haplustepts (Stout series), Ustorthents (Lorencito and Saruche series), and Paleustolls (Flatirons series). (USDA-NRCS, 2006)

Classification relationships

NRCS:

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

USFS:

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

M331Fb – Wet Mountains; M331Fc – Wet Mountain Valley; M331Ff – Raton Basin; M331Fg – Sangre de Cristo Mountains Woodland; and M331Fh – Sangre de Cristo Mountains Coniferous Forest M331F – Southern Parks and Rocky Mountain Range M331I – Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

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

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

EPA:

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

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

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

Ecological site concept

R049XY036CO Overflow occurs on flood plains, terraces, valley floor and stream terraces. Slopes is between 0 to 9 percent. Soils are greater than 60 inches in depth. Soils are derived from slopes alluvium from sandstone and shale. Soil surface texture is loam or fine sandy loam. Family particle size is fine-loamy. It is a Western Wheatgrass– Green Needlegrass community. It has an aridic ustic moisture regime. The effective precipitation ranges from 11 to 18 inches.

Associated sites

R049XB208CO	Clayey Foothill This site occurs on undulating hills to gently sloping uplands. Slopes is between 0 to 15%. Soils are moderately deep to deep (20 to 60 inches). Soils are derived from alluvium from basalt, and/or calcareous shale; or residuum from clayey shale, sandstone, calcareous shale and/or shale. Soil surface texture is clay loam or silty clay loam and it may or may not have cobbles, stone, or gravels (up to 15%). Family particle size is fine. It is a Western Wheatgrass – Green Needlegrass community. It has an aridic ustic moisture regime. The effective precipitation ranges from 12 to 17 inches.
R049XB210CO	Sandy Foothill This site occurs on gently sloping to rolling hills and uplands. Slopes is between 0 to 10%. Soils are greater than 40 inches. Soils are derived from alluvium, eolian deposits, eolian sands, and residuum primarily from arkosic sedimentary rock and sandstone. Soil surface texture is loamy sand, sandy loam or fine sandy loam. Family particle size is coarse-loamy or sandy. It is a Big Bluestem– Prairie Sandreed community. It has an aridic ustic moisture regime. The effective precipitation ranges from 12 to 16 inches.
R049XY031CO	Sandy Bottomland This site occurs on flood plains and stream terraces. Slopes is between 0 to 4%. Soils are greater than 60 inches in depth. Soils are derived from alluvium from arkose. Soil surface texture is loamy coarse sand. Family particle size is sandy. It is a Switchgrass– Sand Bluestem community. It has an typic ustic moisture regime. The effective precipitation ranges from 14 to 19 inches.

Similar sites

R049XY031CO	Sandy Bottomland This site occurs on flood plains and stream terraces. Slopes is between 0 to 4%. Soils are greater than 60 inches in depth. Soils are derived from alluvium from arkose. Soil surface texture is loamy coarse sand. Family particle size is sandy. It is a Switchgrass– Sand Bluestem community. It has an typic ustic moisture regime. The effective precipitation ranges from 14 to 19 inches.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Nassella viridula</i>

Physiographic features

Draws, swales, valleys and streamides are typical landscape characteristics of this site. The site's position is one that benefits from natural surface "irrigation" from water moving onto or over it. The site occurs on nearly level to gently sloping land. Elevation ranges from 5,500 to 7,500 ft (1463 to 2134 m).

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Terrace (3) Fan (4) Valley floor (5) Stream terrace
Runoff class	Very low to low
Flooding duration	Brief (2 to 7 days)

Flooding frequency	None to occasional
Ponding frequency	None
Elevation	5,500–7,500 ft
Slope	0–9%
Aspect	Aspect is not a significant factor

Climatic features

The climate is semi-arid with precipitation averaging 11 to 18 inches (28 to 46 centimeters). Total yearly snowfall varies from 21 to 82 inches (53 to 208 cm). The average monthly precipitation for the three Land Resource Areas that this site occurs in is as follows:

The average growing seasons for the Land Resource Areas are as follows: For resource area 49 the last killing frost varies from about May 9 to May 26 and the first killing frost in the fall occurs between September 17 and October 8. This allows 107 to 152 days for the growing season. There is usually sufficient moisture at the beginning of the growing season to initiate growth in such cool-season grasses as Canada wildrye, green needlegrass, slender wheatgrass, and western wheatgrass. Their optimum growth is early April through June. The warm season grasses have their optimum growing season from May to July, if adequate moisture is available. About 70 percent of the annual precipitation falls in the form of rain during the frost-free season. About 90 percent of the annual precipitation benefits cool-season plants, 79 percent benefits warm season plants and the rest falls during the season of plant dormancy.

The average annual temperature is 49 degrees F (9.4 degrees C) with 8 - 64 days higher than 90 degrees F (32 degrees C) and 124-192 days lower than 32 degrees F (0 degrees C). Temperatures fall below the freezing mark much of the time in December through February.

Winters are generally cold and dry. High intensity winds in the fall and winter months are common in LRA 49. Wind velocities for the area average 1.8 to 5 miles (1.1 - 3.1 km) per hour and are prevailing from the north during the winter and south westerly during the spring and summer. Generally, February through April and November through December are the windiest months. Strong winds during the spring cause rapid drying of the soil surface. Relative humidity is low. The sun shines approximately 75% of the time during the year.

Table 3. Representative climatic features

Frost-free period (characteristic range)	91-118 days
Freeze-free period (characteristic range)	118-146 days
Precipitation total (characteristic range)	15-17 in
Frost-free period (actual range)	71-124 days
Freeze-free period (actual range)	107-152 days
Precipitation total (actual range)	11-18 in
Frost-free period (average)	104 days
Freeze-free period (average)	131 days
Precipitation total (average)	16 in

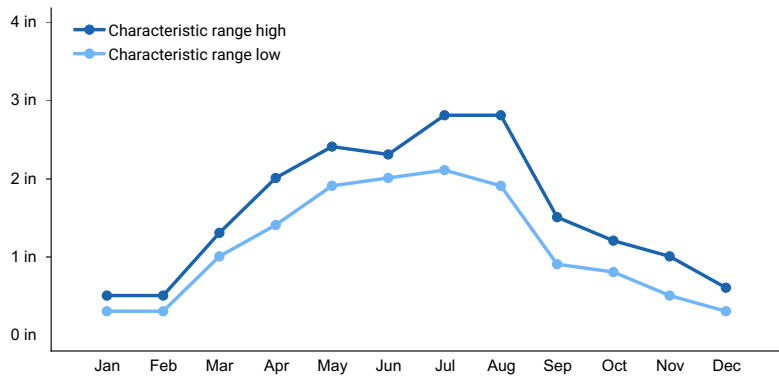


Figure 1. Monthly precipitation range

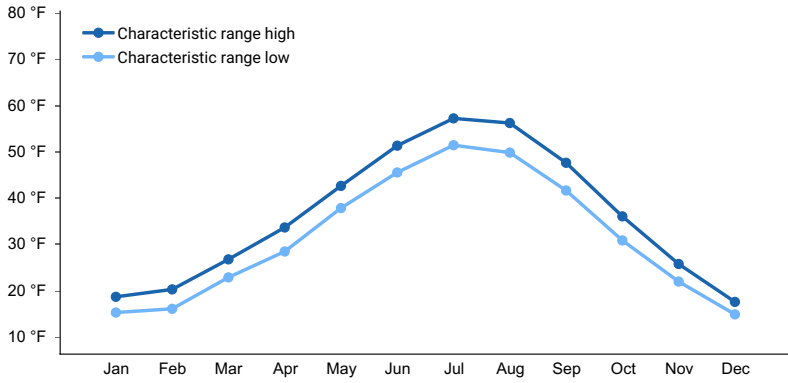


Figure 2. Monthly minimum temperature range

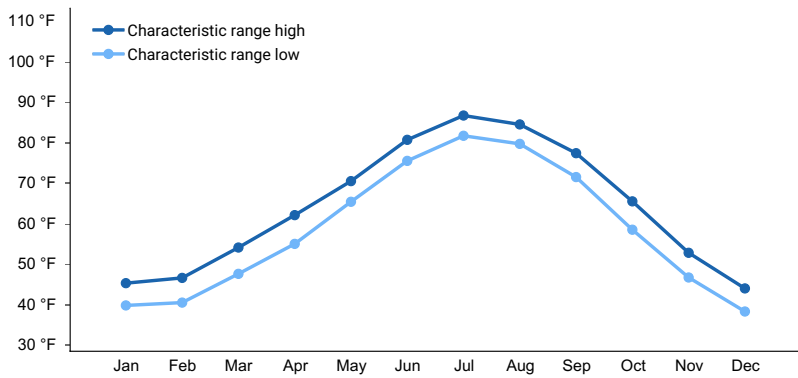


Figure 3. Monthly maximum temperature range

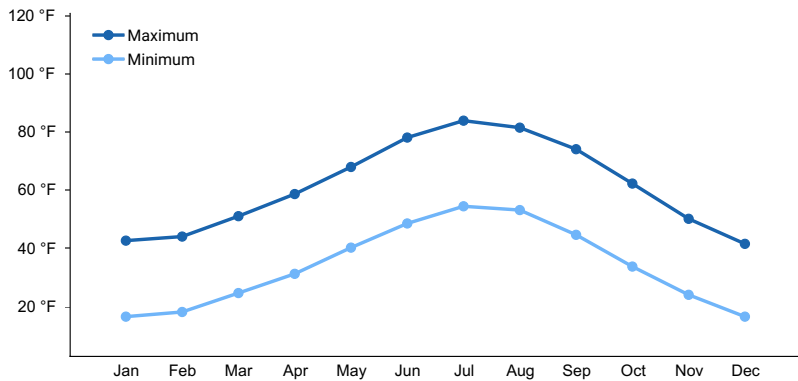


Figure 4. Monthly average minimum and maximum temperature

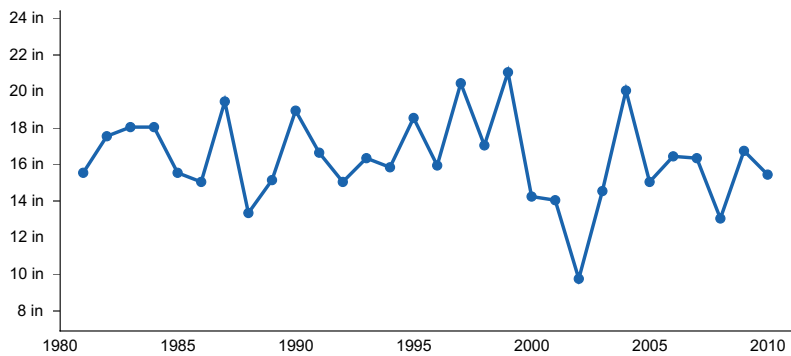


Figure 5. Annual precipitation pattern

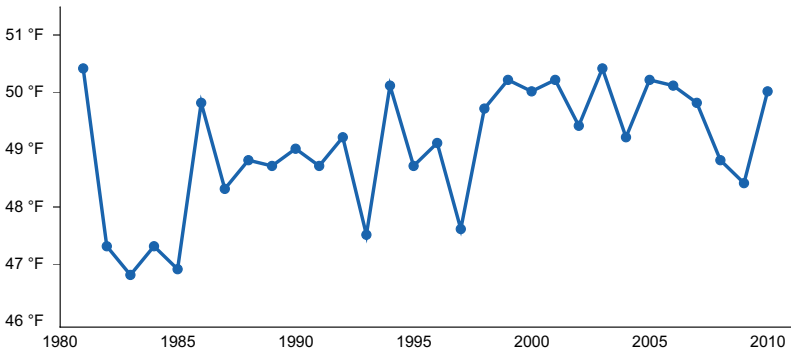


Figure 6. Annual average temperature pattern

Climate stations used

- (1) VIRGINIA DALE 7 ENE [USC00058690], Livermore, CO
- (2) WATERDALE [USC00058839], Loveland, CO
- (3) DENVER CENTENNIAL AP [USW00093067], Englewood, CO
- (4) PARKER 6 E [USC00056326], Parker, CO
- (5) RUSH 1N [USC00057287], Rush, CO
- (6) COLORADO SPRINGS MUNI AP [USW00093037], Colorado Springs, CO
- (7) RED WING 1 WSW [USC00056977], Gardner, CO
- (8) TRINIDAD LAKE [USC00058436], Trinidad, CO

Influencing water features

This site is in a run-in position and receives extra water from the surrounding uplands.

Soil features

The soils of this site are deep, well drained and found on terraces and floodplains. The soil texture ranges from a loam to a fine sandy loam.

Major soils associated with this site are:

Barnum loam, Garrett loam, Haverson loam, Manzano fine sandy loam, Mauricanyon loam, and Table Mountain loam

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and shale (2) Alluvium
Surface texture	(1) Loam (2) Fine sandy loam

Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	60–100 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–2%
Available water capacity (Depth not specified)	4.2–7.6 in
Calcium carbonate equivalent (Depth not specified)	0–5%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–25%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

If ecological retrogression is cattle-induced, desirable grasses will decrease. However, if retrogression is sheep-induced, desirable forbs and shrubs may be reduced. Deterioration of this site caused by overgrazing of cattle will decrease the percentage of grasses such as switchgrass, yellow Indiangrass, western wheatgrass, big bluestem, and green needlegrass. Four-wing saltbush will decrease especially if used heavily through the growing season. Winterfat will decrease with heavy spring use. With the decrease of above mentioned plants blue grama, sand dropseed will increase initially. Forbs will increase such as curlycup gumweed and shrubs such as rubber rabbitbrush, and plains pricklypear will also increase. Plant species likely to invade or increase in density will be red threeawn, curly dock, devil beggarticks, Canada thistle, musk bristlethistle, pepperweed whitetop, and annuals such as tumbling Russian thistle, kochia, six weeks fescue, cheatgrass, cocklebur, field pennycress, flixweed tansymustard, pinnate tansymustard, redroot pigweed.

Annual Production:

Favorable years 2800 lbs/ac 3138 kg/ha

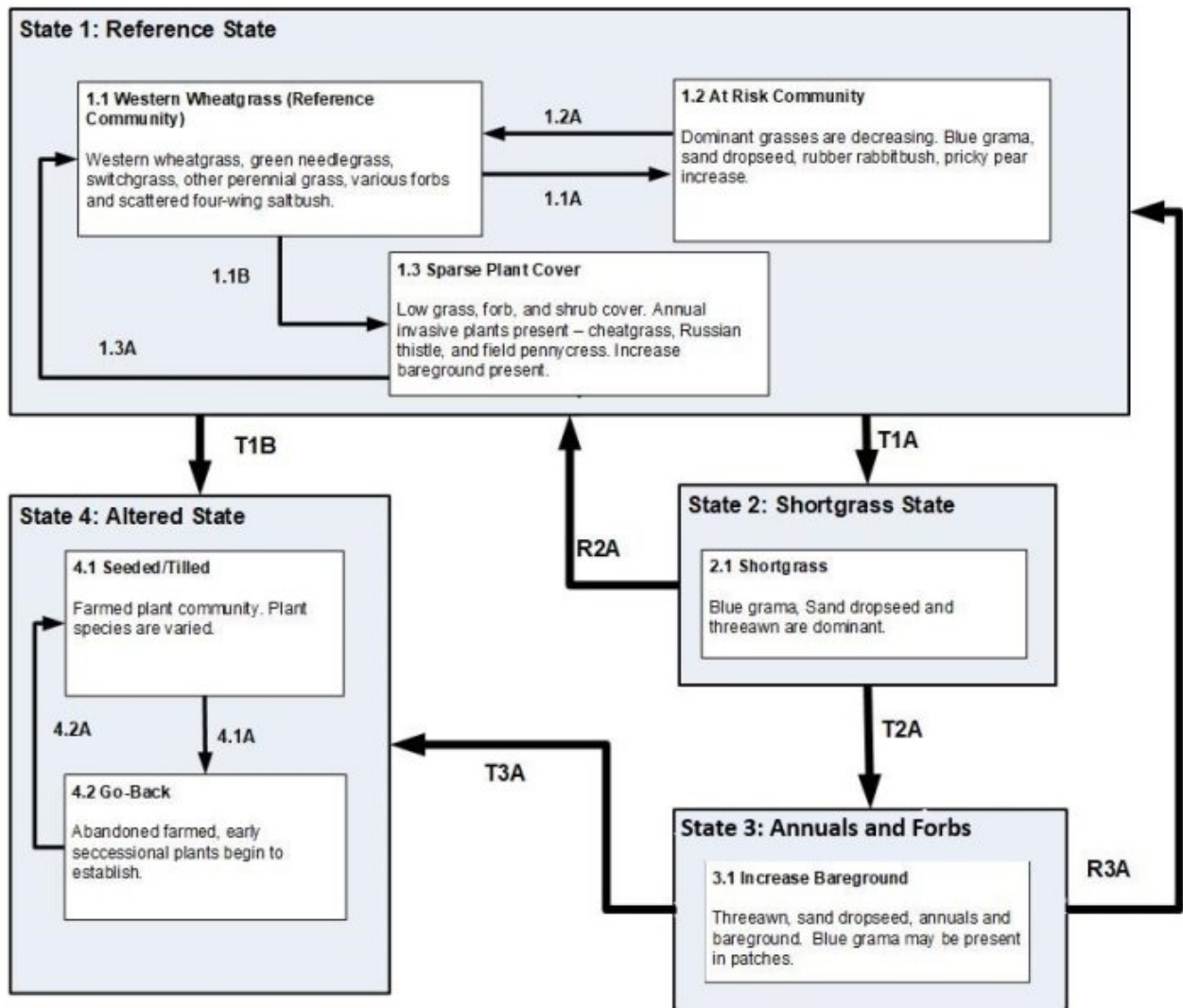
Normal years 2000 lbs/ac 2241 kg/ha

Unfavorable years 1200 lbs/ac 1344 kg/ha

Of this production 10 to 20 percent will likely be unpalatable or out of reach to grazing animals.

State and transition model

R049XY036CO – Overflow



Legend

- 1.1A – Moderate to heavy continuous grazing without adequate recovery, extended drought, lack of fire
- 1.2A, 1.3A – proper grazing with proper stocking rates, wetter climatic cycles, fire
- 1.1B – non-use, lack of fire, extended drought
- 4.1A – stoppage of tillage, seeding perennial plants, time without disturbance
- T1A – continuous grazing and/or high stocking rates without adequate recovery time
- T1B, T3A, 4.2A – tillage and planting
- T2A – long term heavy continuous grazing without adequate recovery time
- R2A, R3A – long-term prescribed grazing and proper stocking rates over lengthy time frame, wetter climatic cycles

State 1 Reference State

The plant community is about 75-90% grasses, 5-10% forbs, and 5-15% shrubs air-dry weight. The production is predominantly made up of grasses; however, scattered shrubs such as fourwing saltbush, winterfat and green plume rabbitbrush give this site a mottled look. The dominant grasses are western wheatgrass, switchgrass and green needlegrass. Less abundant grasses are blue grama, big bluestem, sideoats grama, yellow Indiangrass, and

lesser amounts of Canada wildrye and buffalograss. Forbs that make up the plant community are Missouri goldenrod, rag sumpweed, upright prairie coneflower with lesser amounts of curlycup gumweed, prairie groundsel, Louisiana sagebrush, Missouri milkvetch, plains larkspur, scarlet globemallow and slimflower scurfpea. The dominant shrubs that occur on this site are fourwing saltbush, with lesser amounts of fringed sagebrush, green plume rabbitbrush, plains pricklypear, rubber rabbitbrush and winterfat.

Community 1.1
Reference Plant Community

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	960	1600	2240
Forb	120	200	280
Shrub/Vine	120	200	280
Total	1200	2000	2800

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Grasses and Grasslike Plants			900–2520	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	700–800	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	300–500	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	200–400	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	100–200	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	100–200	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	100–200	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	20–140	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–100	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	0–60	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–60	–
	Grass, native	2GN	<i>Grass, native</i>	0–60	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–20	–
	squirreldtail	ELEL5	<i>Elymus elymoides</i>	0–20	–
Forb					
2	Forbs			60–280	
	Forb, native	2FN	<i>Forb, native</i>	0–120	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–40	–
	slimflower scurfpea	PSTE5	<i>Psoralidium tenuiflorum</i>	0–20	–
	Missouri milkvetch	ASMI10	<i>Astragalus missouriensis</i>	0–20	–
	narrowleaf milkvetch	ASPE5	<i>Astragalus pectinatus</i>	0–20	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	0–20	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–20	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0–10	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–10	–
Shrub/Vine					
3	Shrubs			60–420	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	100–300	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	20–60	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	1–60	–
	rubber rabbitbrush	ERNAG	<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>glabrata</i>	0–20	–
	rubber rabbitbrush	ERNAN5	<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>nauseosa</i>	0–10	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–10	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–10	–

Animal community

Grazing:

This site provides excellent forage for cattle and horses throughout the year. It provides good forage for sheep, antelope, deer and small animals.

The animal forage preference changes as the growing season progresses. Western wheatgrass and green needlegrass are palatable during the spring, switchgrass, big bluestem and yellow Indiangrass are palatable during the spring and summer. Fourwing saltbush and winterfat are especially valuable forage in the winter. It is important that a proper stocking rate and planned deferment are carried out so these plants are not grazed out and replaced by less desirable plants.

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

Habitat for Wildlife:

This site provides habitats which support a resident animal community that is characterized by a good population of antelope, jackrabbit, coyote and numerous small mammals and birds.

Endangered Plants and Animals:

The greater prairie chicken in Northern Colorado and the lesser prairie chicken in Southern Colorado are present in isolated flocks. The black footed ferret has been associated with sites near prairie dog towns.

Major Poisonous Plants to Livestock that May Cause Poisoning:

Common Name - Scientific Name - Season Dangerous - Animals Affected

plains larkspur - *Delphinium virescens* - early growth is most toxic but all parts of plant are poisonous and can poison after seeds start to mature - cattle, rarely horses and sheep unless subjected to sudden physical activity.

Effects and symptoms - Nervousness, weakness and staggering gait, animal may fall suddenly. Muscular twitching, nausea and vomiting, bloating, frequent swallowing, salivation and rapid pulse. Animal may die suddenly especially if excited which intensifies and symptoms, retardation of heat action and paralysis of the respiratory centers.

narrowleaf poisonvetch - *Astragalus pectinatus* - early in spring when forage is scarce - cattle

Effects and symptoms - Poisoning is associated with selenium poisoning. When plants are crushed in the hand, a sulfurous odor is given off. Poisoning is cumulative. Poisoning can cause alkali disease (the chronic disease) which develops from eating small amounts of selenium-bearing vegetation over an extensive period of time or poisoning can cause blind staggers (the acute disease) which results from feeding on relatively large amounts of selenium in a short time. In acute cases of selenium poisoning, animals walk aimlessly into objects. "Blind staggers" or alkali disease are names given for the disease. Hoofs grow abnormally with the formation of deep rings. The hair falls out- especially the mane and tail of horses. Recovery of animals affected may take several months or years, even after being placed on good forage.

Hydrological functions

Soils in this site are grouped into "B" and "C" hydrologic group, as outlined in the "Soils of Colorado Loss Factors and Erodibility Hydrologic Groupings 1979" handbook. Field investigations are needed to determine hydrological cover conditions and hydrologic curve numbers. The hydrologic curve number for Group "B" soil is about 61 and Group "C" the hydrologic curve number is 74 when hydrologic conditions are good, as shown in "Peak Flows in Colorado" handbook.

Refer to NRCS "National Engineering Handbook", Section 4, to determine runoff quantities from the curves.

Recreational uses

This site has a high aesthetic appeal and natural beauty when in excellent condition but declines rapidly as condition declines. The lush growth is a pleasant break from the droughty areas that surround this site.

Inventory data references

Field Offices:

Byers, Franktown Colorado Springs, Fort Collins, Greeley, Kiowa, Longmont, and Simla

Other references

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Contributors

Ben Berlinger
Suzanne Mayne-Kinney

Approval

Kirt Walstad, 9/07/2023

Acknowledgments

Project Staff:

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

Program Support:

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

--Site Development and Testing Plan--:

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

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

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

Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	05/03/2024
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant:
- Sub-dominant:
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-
14. **Average percent litter cover (%) and depth (in):**
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
-
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**
-
17. **Perennial plant reproductive capability:**
-