USDA Natural Resources Conservation Service

Ecological site R049XB212CO
Shaly Foothill

Last updated: 9/07/2023
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.

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 M331 - 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 M331 - 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).

USGS:
Southern Rocky Mountain Province, Colorado Piedmont and Raton

Ecological site concept

R049XB212CO Shaly Foothill occurs on break areas with short steep slopes that expose the raw shale parent material. Slopes is between 3 to 35%. Soils are shallow with depths of 6 to 20 inches. Soils are derived from slopes alluvium, and/or residuum primarily from shale or clayey shale. Soil surface texture is clay, clay loam, silt loam or gravelly clay loam. Family particle size is clayey or loamy. It is a Western Wheatgrass– Green Needlegrass-Winterfat community. It has an aridic ustic moisture regime. The effective precipitation ranges from 13 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.
R049XY214CO	**Gravelly Foothill** This site occurs on gently rolling and sloping uplands. Slopes is between 0 to 35%. Soils are deep and greater than 60 inches in depth. Soils are derived from slopes alluvium, alluvium and colluvium from arkose or igneous and metamorphic rocks. Soil surface texture is gravelly, sandy loam, cobbly sandy loam, gravelly loam or very gravelly loam. Family particle size is sandy-skeletal, loamy-skeletal or fine-loamy over sandy-skeletal. It is a Little Bluestem – Needle-and-Thread community. It has an aridic ustic moisture regime. The effective precipitation ranges from 12 to 16 inches.

Similar sites

R049XB204CO	**Shallow Foothill** This site occurs on ridges, hog-backs, and steep slopes. Slopes is between 0 to 35%. Soils are shallow (< 20 inches). Soils are derived from residuum from basalt, sandstone, shale, granite, gneiss and/or limestone; slope alluvium from basalt, sandstone and/or limestone. Soil surface texture is loam or sandy loam and it may have cobbles, stone, gravels or channers in it. It is a Mountain Mahogany – Big Bluestem – Little Bluestem community. It has an aridic ustic moisture regime. The effective precipitation ranges from 13 to 17 inches.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Krascheninnikovia lanata*
Herbaceous	(1) *Pascopyrum smithii* (2) *Nassella viridula*

Physiographic features

This site is on break areas with short steep slopes that expose the raw shale parent material. Exposures are chiefly easterly with short steep slopes dipping to the west. Slope ranges up to 35%. Elevations from 5,500 to 7,000 ft.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Fan remnant (4) Pediment (5) Valley side
Runoff class	High to very high
Flooding frequency	None
Ponding frequency	None

Elevation	1,676–2,134 m
Slope	3–35%
Aspect	W, E

Climatic features

The climate is semi-arid with precipitation averaging 13 to 18 inches (33 to 45.7 cm). Total yearly snowfall is 63 inches (160 cm). The average monthly precipitation is as follows:

The mean growing season averages approximately 155 to 165 days from May 5 to October 11, and, in average years, there is sufficient moisture at the beginning of the growing season to initiate growth in such cool-season grasses as western wheatgrass and green needlegrass. Their optimum growth is early April through May. The warm season grasses have their optimum growing season through July and August, if adequate moisture is available. About 70 percent of the 15.25 inches (38.7 cm) of annual precipitation falls in the form of rain during the frost-free season. There are 39 days per year that the precipitation equals or exceeds .1 inches (.25 cm), 8 days that meet, equal or exceed .5 inches 91.3 cm), and 2 days that equal or exceed 1 inch (2.54 cm).

The average annual temperature is 52.8 degrees F (11.6 degrees C) with 32 days higher than 90 degrees F (32.2 degrees C) and 6 days lower than 0 degrees F (17.8 degrees C). Temperatures fall below the freezing mark much of the time in January.

High intensity thunderstorms are common from June through August. Wind velocities for the area average 1.2 to 2.9 miles (1.9 to 4.7 km) per hour and are prevailing from the north and northwest. Generally, March is the windiest month. Strong winds during the spring cause rapid drying of the soil surface. The sun shines approximately 72 percent of the time during the year.

Table 3. Representative climatic features

Frost-free period (characteristic range)	89-117 days
Freeze-free period (characteristic range)	118-146 days
Precipitation total (characteristic range)	356-432 mm
Frost-free period (actual range)	71-155 days
Freeze-free period (actual range)	106-165 days
Precipitation total (actual range)	330-457 mm
Frost-free period (average)	103 days
Freeze-free period (average)	130 days
Precipitation total (average)	406 mm

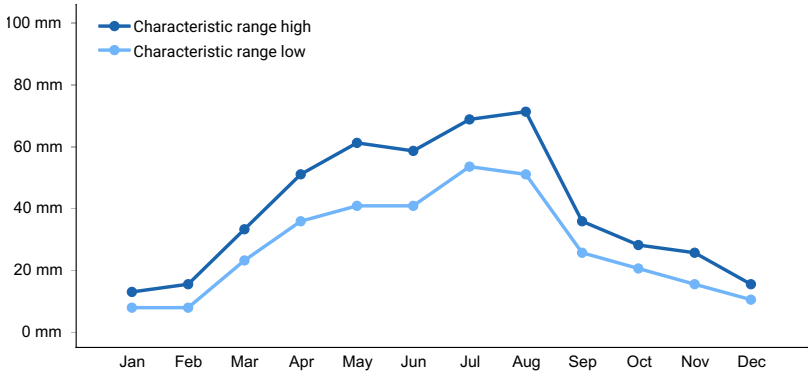


Figure 1. Monthly precipitation range

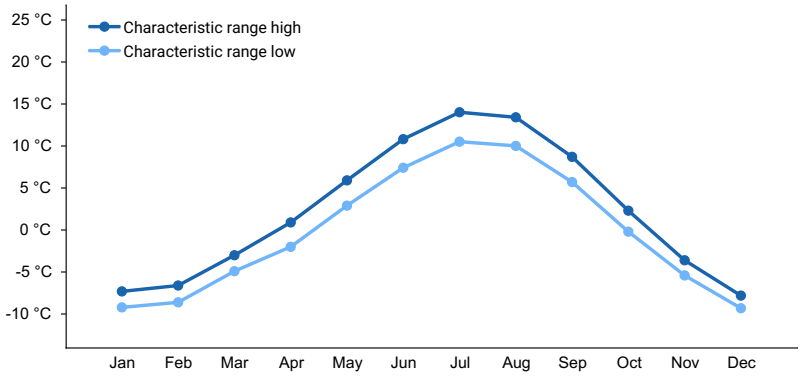


Figure 2. Monthly minimum temperature range

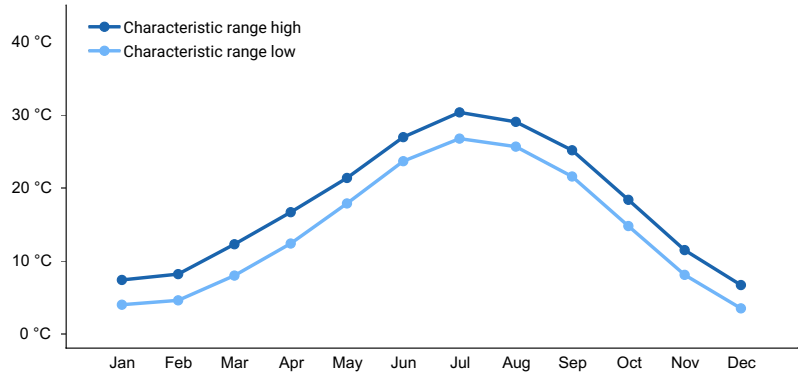


Figure 3. Monthly maximum temperature range

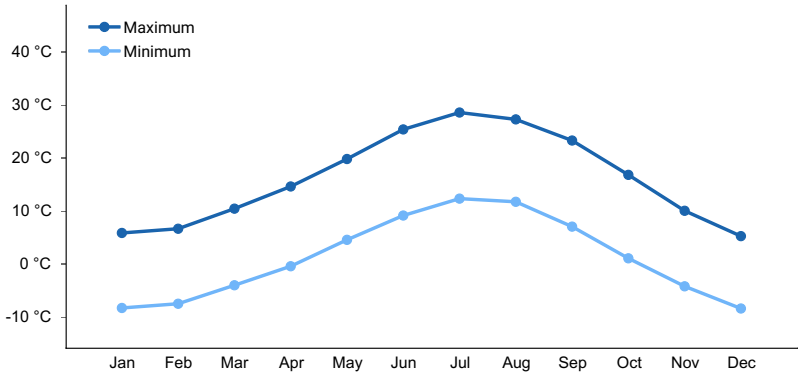


Figure 4. Monthly average minimum and maximum temperature

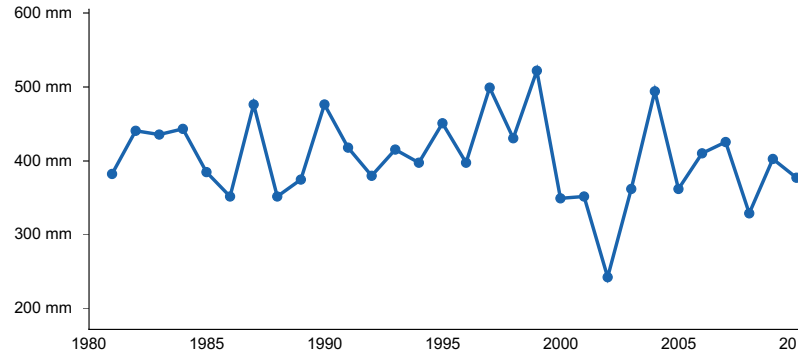


Figure 5. Annual precipitation pattern

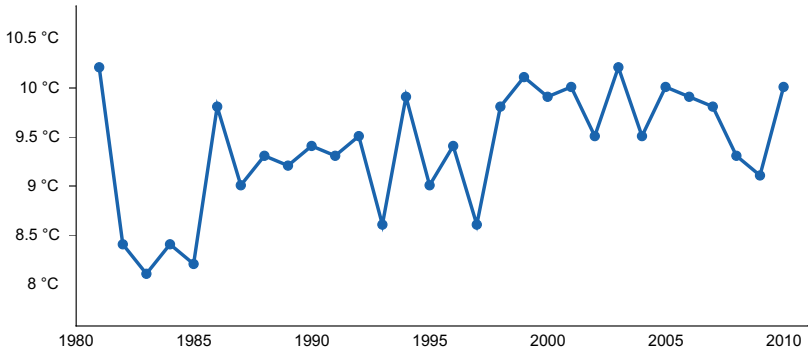


Figure 6. Annual average temperature pattern

Climate stations used

- (1) VIRGINIA DALE 7 ENE [USC00058690], Livermore, CO
- (2) WATERDALE [USC00058839], Loveland, CO
- (3) PARKER 6 E [USC00056326], Parker, CO
- (4) DENVER CENTENNIAL AP [USW00093067], Englewood, CO
- (5) COLORADO SPRINGS MUNI AP [USW00093037], Colorado Springs, CO
- (6) RUSH 1N [USC00057287], Rush, CO
- (7) RED WING 1 WSW [USC00056977], Gardner, CO
- (8) SHEEP MTN [USC00057572], Gardner, CO
- (9) TRINIDAD LAKE [USC00058436], Trinidad, CO

Influencing water features

None

Soil features

The soils on this site are shallow and well drained. They occur on upland ridges, escarpments, and hillsides. The parent material source is residual and the parent rock is calcareous and non-calcareous shale. The surface textures vary from clay loam, silt loam, clay or gravelly clay. The surface layers vary in reaction from a pH of 6.1 to 8.4.

Permeability is slow and the available water capacity is low. The surface runoff is medium to rapid and the hazard of erosion is moderate to severe.

Soil Unit & Percent Slope:
Lorencito Gravelly Clay Loam 10-35% slopes
Louviers Clay 8-25% slopes
Midway Clay Loam 5-25% slopes
Midway Clay Loam 15-35% slopes
Mion Silt Loam 10-25% slopes
Samsil Clay 5-25% slopes
Shingle Clay Loam 3-20% slopes

Table 4. Representative soil features

Parent material	(1) Residuum–shale (2) Slope alluvium–shale (3) Residuum–clayey shale (4) Residuum–sandstone and shale
Surface texture	(1) Clay (2) Clay loam (3) Silt loam (4) Gravelly clay loam

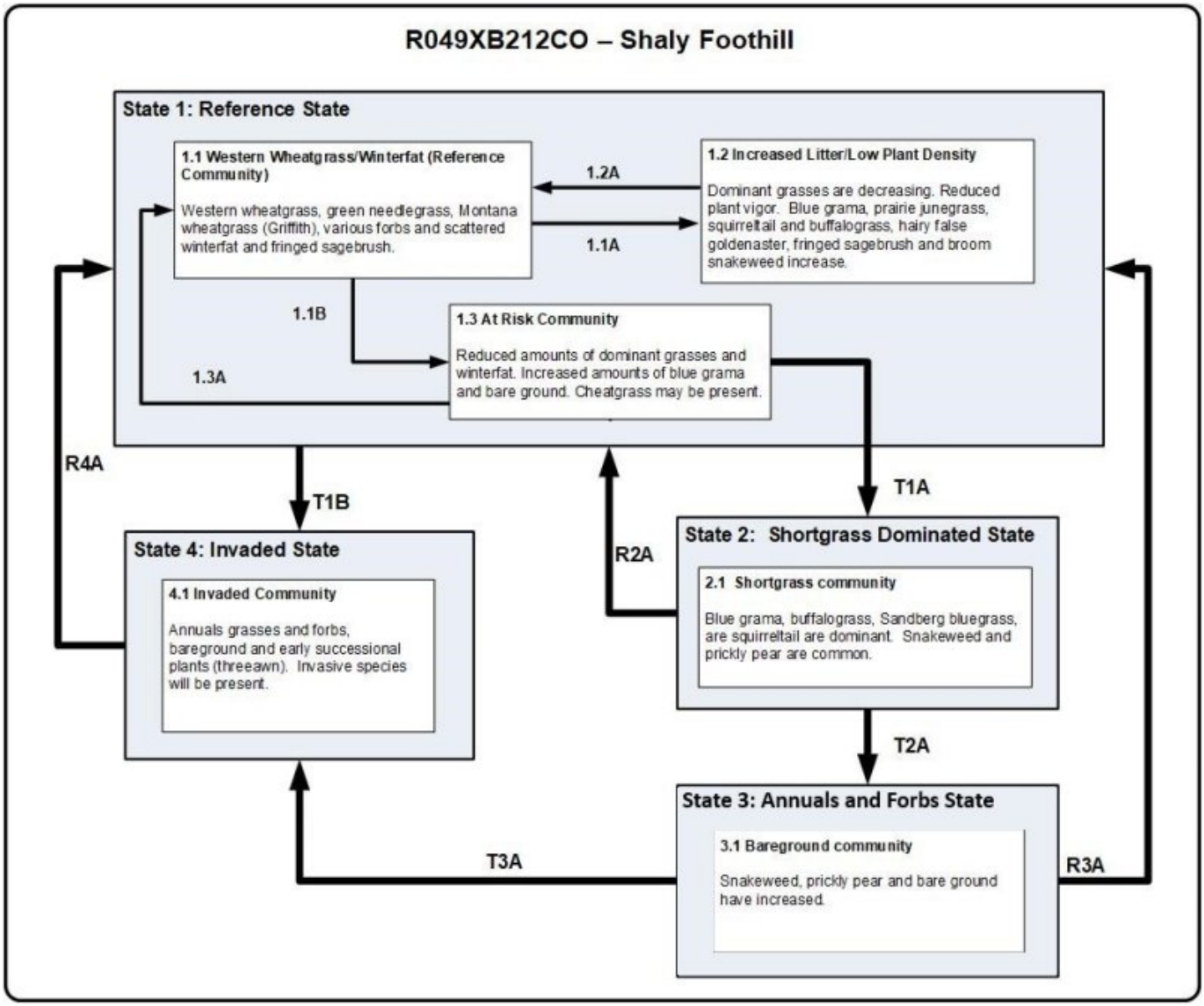
Family particle size	(1) Clayey (2) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	15–51 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	3.56–8.38 cm
Calcium carbonate equivalent (Depth not specified)	0–10%
Electrical conductivity (Depth not specified)	0–4 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–5
Soil reaction (1:1 water) (Depth not specified)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Drought and insects/disease cycles historically have had a major impact on the vegetation composition. The species composition changes according to the duration and severity of the drought cycle. It is believed that fire did not play a major role in the ecology of the Shaly Foothill site due to the inherent low annual production resulting in lack of fuels available for ignition.

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 green needlegrass, Montana (Griffith) wheatgrass, needle and thread, sideoats grama, little bluestem, western wheatgrass, Indian ricegrass, and big bluestem. With the decrease of above mentioned plants blue grama, prairie junegrass, bottlebrush squirreltail, and buffalograss will increase initially. Forbs will increase such as hairy false goldenaster and wormwood; and shrubs such as fringed sagebrush and broom snakeweed will also increase. With continued ecological destruction, plants such as sleepygrass, ring muhly, Texas tumblegrass, cheatgrass, Kochia, and Russian thistle will increase and/or invade the site.

State and transition model



Legend

1.1A – lack of grazing, time without disturbance
1.2A – drought, proper grazing
1.3A – proper grazing, wetter climatic periods
1.1B – repeated herbivory without recovery time, drought
T1A – continuous grazing and/or high stocking rates, extended drought
R2A, R3A – long-term prescribed grazing and proper stocking rates over lengthy time frame, wetter climatic cycles
T2A – long term heavy continuous grazing
T3A – mechanical disturbance, long term heavy continuous grazing
T1B – heavy continuous grazing
R4A – insect/disease, vegetation manipulation (invasive species management, seeding), long-term prescribed grazing,

State 1
Reference State

The plant community is about 90% grasses, 5% forbs and 5% shrubs air dry weight. The production is predominantly made up of grasses, which give this site a distinctive mid-grass aspect. The dominant grasses are western wheatgrass, green needlegrass, Montana (Griffith) wheatgrass, needle and thread, sideoats grama, and little bluestem. Less abundant grasses are blue grama, prairie junegrass, bottlebrush squirreltail, big bluestem, and

Indian ricegrass. Forbs that make up the plant community are foothill arnica, purple prairieclover, scarlet globemallow, and slimflower scurfpea. Shrubs that are most noticeable on this site are winterfat, fourwing saltbush, alderleaf mountain mahogany, and green plume rabbitbrush.

Community 1.1
Reference Plant Community

This is the interpretive plant community and is considered to be the reference community. This plant community evolved with grazing by large herbivores, drought and insects/disease. It is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for adequate recovery periods following each grazing event. The plant community is about 90% grasses, 5% forbs and 5% shrubs air dry weight. The major grasses include western wheatgrass, green needlegrass, Montana (Griffith) wheatgrass sideoats grama and blue grama. Dominant shrubs are winterfat and fourwing saltbush. Secondary plants include little bluestem, needle and thread, big bluestem, prairie junegrass, sun sedge, purple prairie clover, scarlet globemallow and foothill arnica. The annual production ranges from 350 to 700 pounds of air-dry vegetation per acre and will average 450 pounds. Of this production 10% will likely be unpalatable or out of reach to grazing animals. These production figures are the fluctuations expected during favorable, normal and unfavorable years due to the timing and amount of precipitation and temperature. Total annual production should not be confused with species productivity, which is annual production and variability by species throughout the extent of the community phase.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	303	448	706
Forb	17	28	39
Shrub/Vine	17	28	39
Total	**337**	**504**	**784**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses and Grasslike Plants**			303–706	
	western wheatgrass	PASM	*Pascopyrum smithii*	76–151	–
	green needlegrass	NAVI4	*Nassella viridula*	76–101	–
	needle and thread	HECO26	*Hesperostipa comata*	50–76	–
	little bluestem	SCSC	*Schizachyrium scoparium*	50–76	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	50–76	–
	blue grama	BOGR2	*Bouteloua gracilis*	26–50	–
	big bluestem	ANGE	*Andropogon gerardii*	0–36	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	10–26	–
	squirreltail	ELEL5	*Elymus elymoides*	6–20	–
	muttongrass	POFE	*Poa fendleriana*	0–16	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–16	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–16	–
	sun sedge	CAINH2	*Carex inops ssp. heliophila*	6–16	–
	Fendler's threeawn	ARPUF	*Aristida purpurea var. fendleriana*	0–16	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–16	–

	Grass, perennial	2GP	*Grass, perennial*	0–16	–
	buffalograss	BODA2	*Bouteloua dactyloides*	0–16	–
Forb					
2	**Forbs**			17–39	
	foothill arnica	ARFU3	*Arnica fulgens*	1–16	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	1–16	–
	purple prairie clover	DAPU5	*Dalea purpurea*	1–10	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	1–10	–
	Drummond's milkvetch	ASDR3	*Astragalus drummondii*	0–10	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	0–6	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	0–6	–
	Forb, native	2FN	*Forb, native*	0–6	–
	dotted blazing star	LIPU	*Liatris punctata*	0–6	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–6	–
	threadleaf ragwort	SEFLF	*Senecio flaccidus var. flaccidus*	0–3	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–3	–
Shrub/Vine					
3	**Shrubs and Half-Shrubs**			17–39	
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–20	–
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	6–16	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	10–16	–
	prairie sagewort	ARFR4	*Artemisia frigida*	6–16	–
	rubber rabbitbrush	ERNAG	*Ericameria nauseosa ssp. nauseosa var. glabrata*	6–11	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–11	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–10	–
	tree cholla	CYIMI	*Cylindropuntia imbricata var. imbricata*	0–6	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–6	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–3	–

Animal community

Grazing:
The site produces fair forage for cattle and horses during years of average precipitation. It provides fair to good forage for sheep, pronghorn, and deer. Care should be exercised so that this site is not overgrazed because of the hazard of severe water erosion on steep slopes.

The animal forage preference changes as the growing season progresses. Continuous year-long grazing or grazing from April to October by cattle cause green needlegrass, needle and thread, sideoats grama, and little bluestem to be replaced by blue grama, buffalograss, and Fendler threeawn. A system of deferred grazing, which varies the season of grazing use in pastures during successive years, is needed to maintain a healthy well-balanced plant community. Rest during different season of the year benefits plants such as sideoats grama and little bluestem. Spring rest (April-June) benefits cool-season plants such as green needlegrass, Montana (Griffith) wheatgrass, and needle and thread. Deferment during late winter and spring reduces competition between grazing animals for palatable shrubs and forbs.

Habitat for Wildlife:
This site provides habitats which support a resident animal community that is characterized by pronghorn, mule deer, cottontail, jackrabbit, and coyote. There is seasonal use by upland game birds and various raptors.

Major Poisonous Plants to Livestock That May Cause Poisoning:

Common Name - Scientific Name - Season Dangerous - Animals Affected

Drummond milkvetch - Astragalus drummondii - Drummond milkvetch has not been confirmed as being poisonous to livestock. However, it is listed as being suspected of toxicity - Potentially cattle, horses and sheep.

Broom snakeweed - Gutierrezia sarothrae - when forage is scarce - cattle-sheep

Effect and symptoms - Poisoning is not common but will occur on overgrazed ranges. Causes abortion in cattle or may produce weak underweight calves. Losses are sporadic and will occur when 10 to 20% of the body weight of green material is consumed in 1/2 to 20 weeks.

Threadleaf groundsel - Senecio longilobus - early spring when forage is short or on overgrazed ranges - cattle & horses. Normally will not affect sheep if a supplement is fed on dry range during the spring.

Effect and symptoms - Signs may not appear until 6 months or more after plant is eaten. The best prevention is proper range use. Symptoms are progressive and effects are cumulative. Losses are sporadic. Degeneration of the liver results. Depression, weakness, diarrhea, darkly stained urine may be observed. Animals may die quickly or wander aimlessly.

Hydrological functions

Soils in this site are grouped in "D" 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 D soils is about 80 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 medium value regarding recreational uses and natural beauty. During favorable rainfall years, numerous flowering plants give this site an aesthetically pleasing appearance.

Wood products

Not applicable to this site.

Inventory data references

Location of Typical Examples of the Site:
a. Four miles north and three miles east of Calhan, El Paso County.
b. Along Skyline Drive just outside of Canon City, Fremont County

Field Offices this site occurs in:
Canon City, Colorado Springs, Fort Collins, Franktown, Longmont, Pueblo, Simla, and Trinidad

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	05/12/2025
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:**

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:**

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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):**

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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:**
