USDA Natural Resources Conservation Service

Ecological site R049XY214CO
Gravelly Foothill

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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 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

R049XB214CO Gravelly Foothill occurs on gently rolling and sloping uplands. Slopes are between 0 to 35 percent. Soils are deep and greater than 60 inches in depth. Soils are derived from slope 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 – Sideoats Grama – Blue Grama - Needle and thread community. It has an aridic ustic moisture regime. The effective precipitation ranges from 12 to 16 inches.

Associated 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.
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.
R049XB212CO	**Shaly Foothill** This site 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 community. It has an aridic ustic moisture regime. The effective precipitation ranges from 13 to 18 inches.

Similar sites

R049XB212CO	**Shaly Foothill** This site 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 community. It has an aridic ustic moisture regime. The effective precipitation ranges from 13 to 18 inches.
R049XY213CO	**Cobbly Foothill** This site occurs on fans, terraces, stream terraces, fan terraces, mesas and cuestas. Slopes is between 5 to 25%. Soils are moderately deep to very deep with depths of greater than 20 inches. Soils are derived from alluvium, colluvium and/or residuum primarily from sandstone and//or sedimentary rock. Soil surface texture is extremely cobbly sandy loam, stony sandy loam, cobbly sandy loam or extremely cobbly loam. Family particle size is loamy-skeletal or clayey skeletal. It is a Mountain Muhly – Big Bluestem community. It has a typic ustic moisture regime. The effective precipitation ranges from 15 to 18 inches.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium* (2) *Bouteloua curtipendula*

Physiographic features

This site is on gently rolling and sloping uplands. Slopes range from 0 to 35%. Elevations range from 5,500 to 7500 ft.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Fan (3) Fan terrace (4) Hillslope (5) Hill (6) Terrace (7) Fan remnant
Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None
Elevation	5,500–7,500 ft
Slope	0–35%
Aspect	Aspect is not a significant factor

Climatic features

The climate is semi-arid with precipitation averaging 12 to 16 inches (31 to 41 centimeters). Total yearly snowfall is 38 to 44 inches (97 to 112 centimeters). The average monthly precipitation is as follows:

The mean growing season averages approximately 130 to 140 days from May 16 to September 28, and, in average years, there is sufficient moisture at the beginning of the growing season to initiate growth in such cool-season grasses as needle-and-thread and western wheatgrass. Their optimum growth is early April through June. The warm season grasses have their optimum growing season through July and August, if adequate moisture is available. About 60 percent of the 14.75 inches (37.5 cm) of annual precipitation falls in the form of rain during the frost-free season. There are 35 days per year that the precipitation equals or exceeds .1 inches (.25 cm), 7 days that meet, equal or exceed .5 inches (1.3 cm), and 2 days that equal or exceed 1 inch (2.5 cm).

The average annual temperature is 48 degrees F (8.9 degrees C) with 18 days higher than 90 degrees F (32.2 degrees C) and 10 days lower than 0 degrees F (17.8 degrees C). Temperatures fall below the freezing mark much of the time in December through February.

High intensity thunderstorms are common from June through August. Wind velocities for the area average 1.2 to 2.9 miles (1.9 km 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 71 percent of the time during the year.

Table 3. Representative climatic features

Frost-free period (characteristic range)	99-127 days
Freeze-free period (characteristic range)	125-147 days
Precipitation total (characteristic range)	14-16 in
Frost-free period (actual range)	74-130 days
Freeze-free period (actual range)	115-148 days
Precipitation total (actual range)	12-16 in
Frost-free period (average)	111 days
Freeze-free period (average)	140 days
Precipitation total (average)	16 in

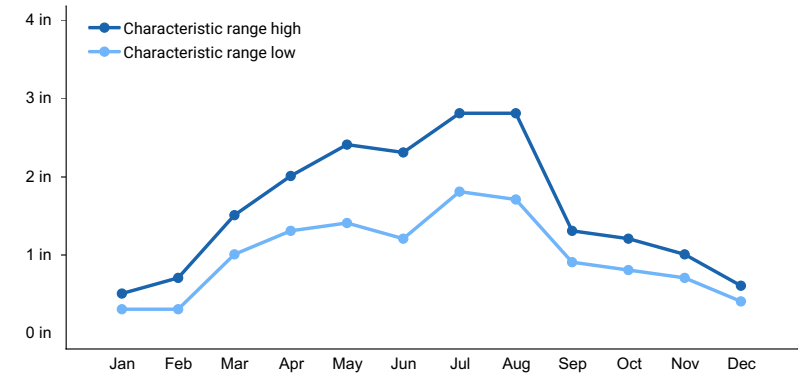


Figure 1. Monthly precipitation range

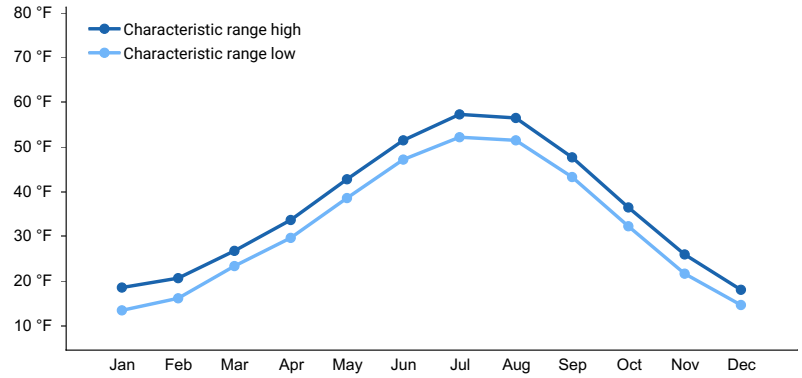


Figure 2. Monthly minimum temperature range

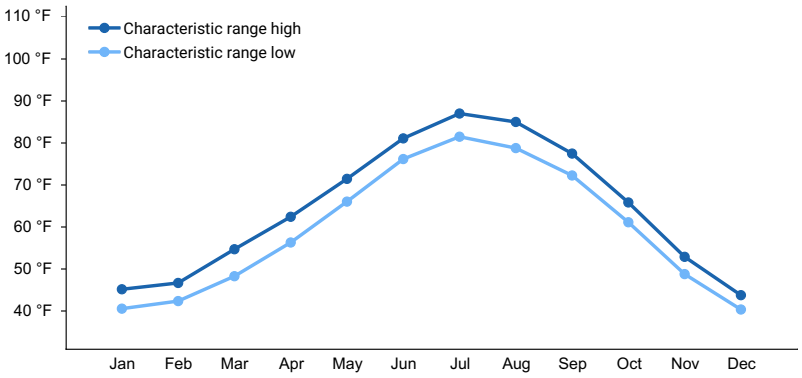


Figure 3. Monthly maximum temperature range

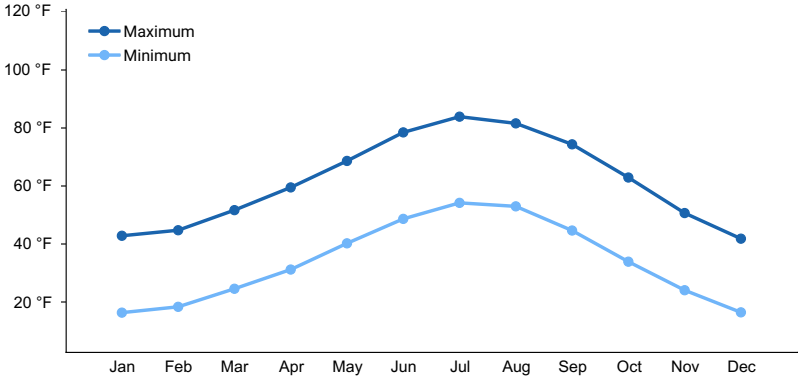


Figure 4. Monthly average minimum and maximum temperature

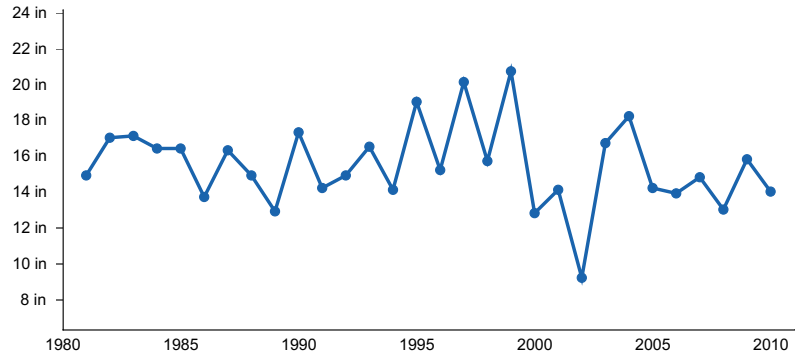


Figure 5. Annual precipitation pattern

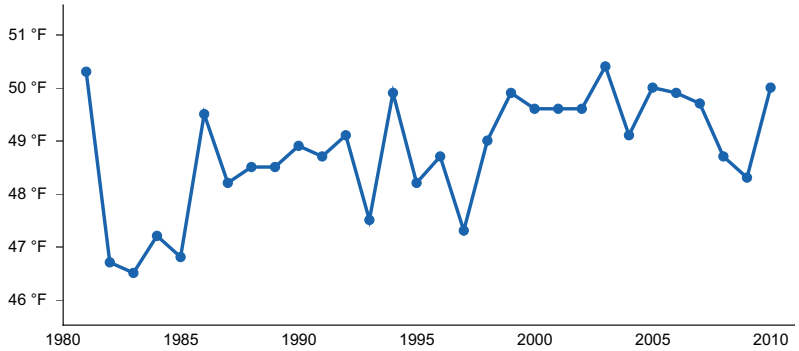


Figure 6. Annual average temperature pattern

Climate stations used

- (1) PARKER 6 E [USC00056326], Parker, CO
- (2) COLORADO SPRINGS MUNI AP [USW00093037], Colorado Springs, CO
- (3) FT COLLINS [USC00053005], Fort Collins, CO
- (4) LOVELAND 2N [USC00055236], Loveland, CO
- (5) RED WING 1 WSW [USC00056977], Gardner, CO
- (6) SHEEP MTN [USC00057572], Gardner, CO
- (7) TRINIDAD LAKE [USC00058436], Trinidad, CO

Influencing water features

None

Soil features

The soils on this site are deep and somewhat excessively to well drained. They occur on hills, fans and terraces. The parent material source is alluvium and reworked alluvium derived from arkosic deposits. The surface textures are gravelly sandy loam and gravelly loam.

Permeability is moderate to rapid, the Columbine soil has very rapid permeability. Available water capacity is low to medium. The surface runoff is slow to medium and the erosion hazard is slight to moderate. The steeper slopes associated with the Chaseville, Larim, and Redridge soils have medium to rapid surface runoff and moderate to severe erosion hazard.

Soil Unit:
Bronell very gravelly loam
Chaseville gravelly sandy loam
Columbine gravelly sandy loam
Larim gravelly sandy loam
Nederland cobbly sandy loam
Newlin gravelly sandy loam

Redridge gravelly sandy loam
Sedillo cobbly sandy loam
Sedillo very gravelly loam
Yoder gravelly sandy loam

Table 4. Representative soil features

Parent material	(1) Alluvium–arkose (2) Alluvium (3) Slope alluvium (4) Alluvium–igneous and metamorphic rock (5) Colluvium
Surface texture	(1) Gravelly, cobbly sandy loam (2) Very gravelly, gravelly loam
Family particle size	(1) Sandy-skeletal (2) Loamy-skeletal (3) Fine-loamy over sandy or sandy-skeletal
Drainage class	Somewhat excessively drained to well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	60–100 in
Surface fragment cover <=3"	15–40%
Surface fragment cover >3"	0–15%
Available water capacity (Depth not specified)	1.8–3.9 in
Calcium carbonate equivalent (Depth not specified)	0–10%
Electrical conductivity (Depth not specified)	0 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)	15–50%
Subsurface fragment volume >3" (Depth not specified)	2–10%

Ecological dynamics

This site developed with occasional fires being part of the ecological processes. It is believed that the fires were historically infrequent, randomly distributed, and started by lightning at various times throughout the growing season. Early human inhabitants were also likely to start fires for various reasons (deliberately or accidentally). Both types of fire events likely impacted the site by leaving mosaic vegetation patterns. The impact of fire over the past 50 years has been relatively insignificant due to wildfire suppression and the lack of acceptance of prescribed fire as a management tool.

Drought and insects/disease cycles historically have had a major impact upon the vegetation. The species composition changes according to the duration and severity of the drought cycle. This site is extremely dynamic and variable due to variations in climate (precipitation and temperature), aspect, elevation, parent material, soils, fire frequency/intensity, past timber harvest, and grazing (wildlife and domestic). Typical vegetation patterns are a mosaic of grasses, shrubs, and trees.

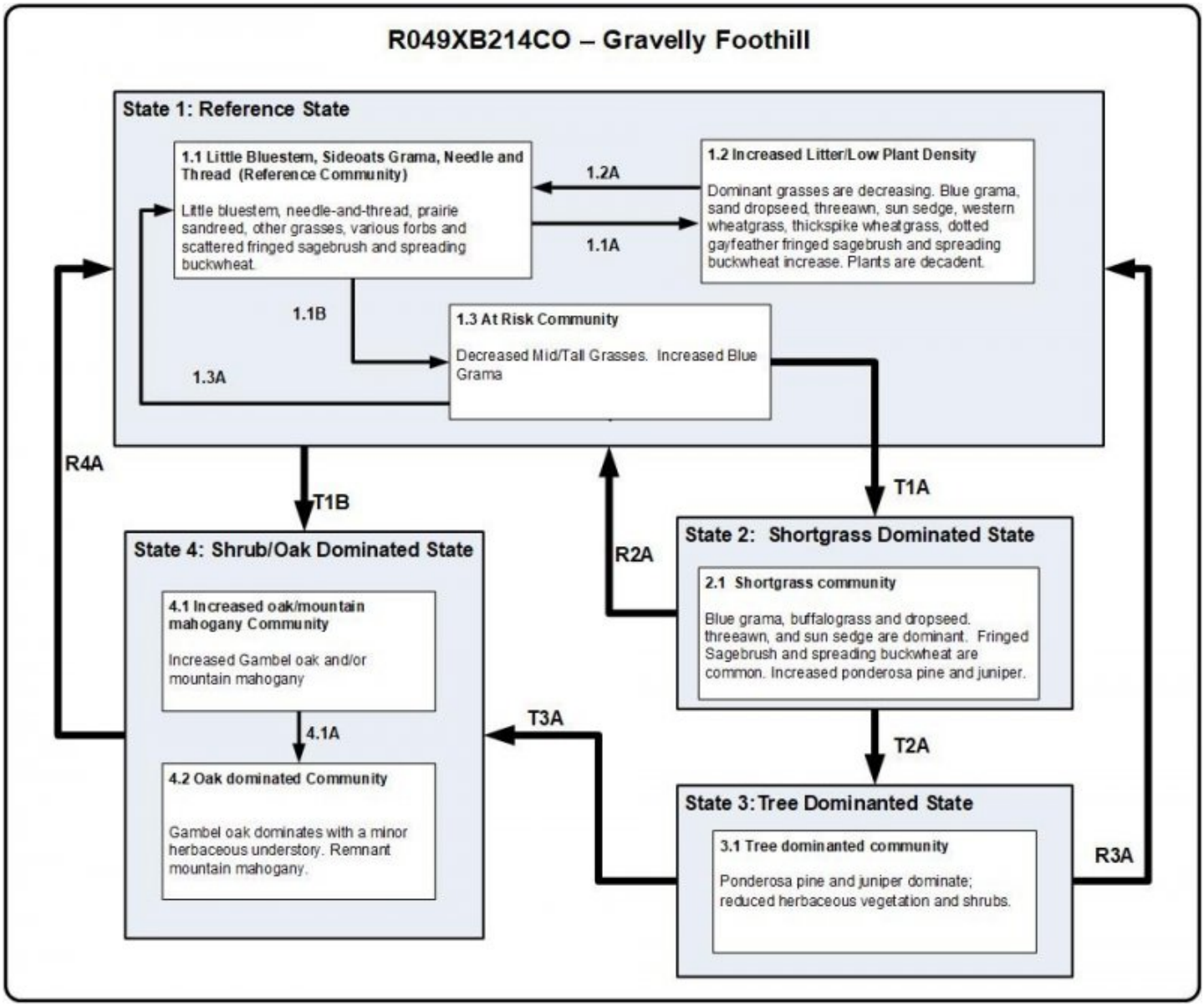
Timber harvest for fuel and lumber has significantly influenced the appearance of the site today. Drought and/or early killing frost cycles have historically had a major impact upon the vegetation. Species composition changes

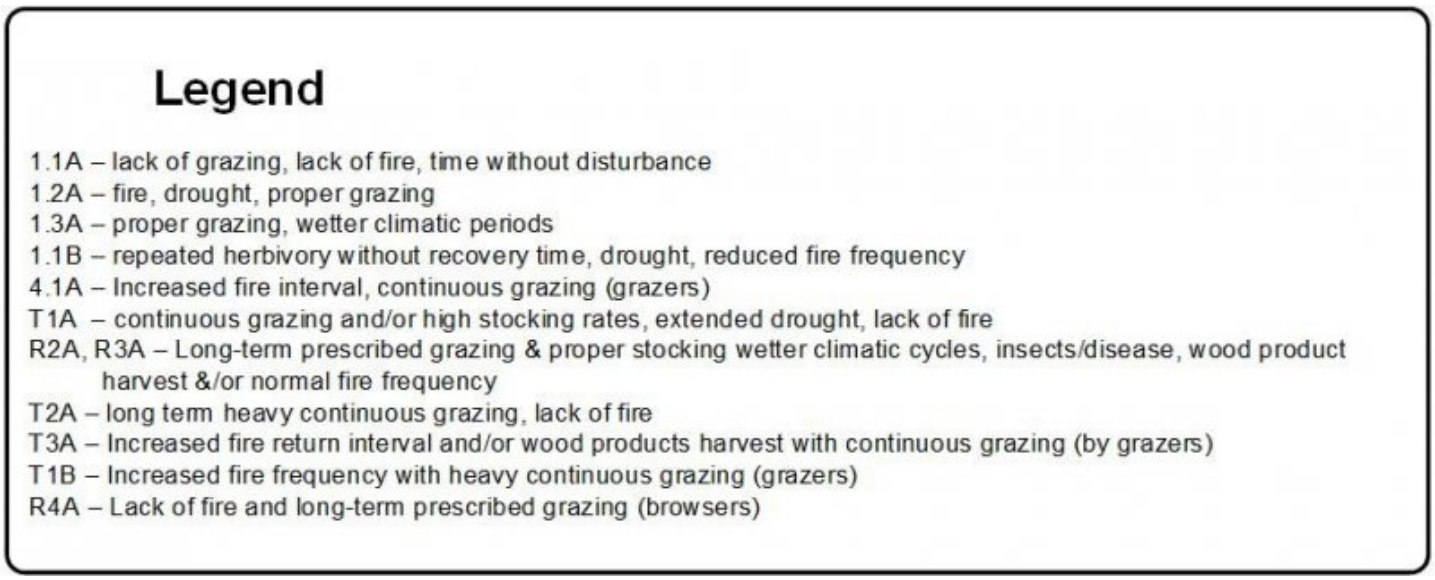
according to the duration and severity of the drought and/or frost cycle.

Today, much of this site is urban/suburban residence and small acreage development. The natural variation and beauty of the site creates a desirable setting for homes. High value homes and real estate lead to fire suppression.

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 prairie sandreed, little bluestem, needle and thread, sideoats grama, mountain muhly, plains muhly. With the decrease of above mentioned plants blue grama, sand dropseed, Fendler threeawn, sun sedge, western wheatgrass and thickspike wheatgrass will increase initially. Forbs will increase such as dotted blazing star and wormwood; and shrubs such as prairie sagewort (fringed sagebrush) and spreading eriogonum will also increase. With continued ecological destruction, plants such as sleepygrass, ring muhly, cheatgrass, kochia, and Russian thistle will invade the site.

State and transition model





State 1
Reference State

The Reference State is characterized by three distinct plant community phases. The Reference Plant Community, Increased litter Low Plant Density and the At Risk Plant Community represent the state. Warm & cool-season mid/tall grasses with scatted distributions of woody plants give the site rolling grassland/shrubland appearance on the landscape. The plant communities, and the various successional states between them, represent the natural range of variability due to the disturbance regimes applicable to the site.

Community 1.1
Reference Plant Community

The plant community is about 84% grasses, 10% forbs, 5% shrubs and 1% trees air dry weight. The production is predominantly made up of grasses; however, the numerous forbs add a distinctive appearance to the landscape. The dominant grasses are little bluestem, needle and thread, sideoats grama and prairie sandreed. Less abundant grasses are blue grama, thickspike wheatgrass, western wheatgrass and mountain muhly. Forbs that make up the plant community are dotted blazing star, Drummond milkvetch, Geyer larkspur, and slimflower scurfpea. Shrubs that are most noticeable on this site are mountain mahogany, Gambel oak, prairie sagewort (fringed sagebrush) and spreading buckwheat. Trees that can occur are ponderosa pine and juniper. The Reference Plant Community (and the associated successional stages) is diverse, stable, and productive. Litter is properly distributed with very little movement off-site and natural plant mortality is low. On steeper slopes, some litter movement may occur. It is well suited to carbon sequestration, water yield, wildlife use by many species, livestock use and is aesthetically pleasing. The biotic community, nutrient cycle, water cycle and energy flow are functioning properly. This community is resistant to many disturbances except continuous grazing, over stocking, long term non-use, tillage and/or development into urban or other uses. Total annual production ranges from 600 to 1,000 pounds of air-dry vegetation per acre and will average 850 pounds. Of this production, 10-15% will likely be unpalatable out of reach of 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. Resilience management. Grazing management that provides for proper stocking and adequate recovery opportunity, and fire, will maintain this plant community and provide sustainable ecosystem goods and services from the plant community.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	505	715	835
Forb	60	85	100
Shrub/Vine	30	40	50
Tree	5	10	15
Total	**600**	**850**	**1000**

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**			510–850	
	little bluestem	SCSC	*Schizachyrium scoparium*	170–213	–
	blue grama	BOGR2	*Bouteloua gracilis*	85–170	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	85–128	–
	needle and thread	HECO26	*Hesperostipa comata*	60–102	–
	thickspike wheatgrass	ELLA3	*Elymus lanceolatus*	42–85	–
	mountain muhly	MUMO	*Muhlenbergia montana*	0–85	–
	western wheatgrass	PASM	*Pascopyrum smithii*	42–60	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	17–60	–
	Grass, native	2GN	*Grass, native*	0–50	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	25–42	–
	prairie sandreed	CALO	*Calamovilfa longifolia*	26–42	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–34	–
	muttongrass	POFE	*Poa fendleriana*	0–25	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–25	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–17	–
Forb					
2	**Forbs**			60–100	
	Geyer's larkspur	DEGE2	*Delphinium geyeri*	1–25	–
	Forb, native	2FN	*Forb, native*	0–25	–
	purple prairie clover	DAPU5	*Dalea purpurea*	9–20	–
	dotted blazing star	LIPU	*Liatris punctata*	1–17	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	1–10	–
	Drummond's milkvetch	ASDR3	*Astragalus drummondii*	1–10	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–10	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–10	–
	stiff greenthread	THFI	*Thelesperma filifolium*	1–10	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	0–9	–
	foothill deathcamas	ZIPA2	*Zigadenus paniculatus*	0–5	–
	Wyoming Indian paintbrush	CALI4	*Castilleja linariifolia*	0–5	–
	stemless four-nerve daisy	TEACA2	*Tetraneuris acaulis var.*	0–5	–

			acaulis		
Shrub/Vine					
3	**Shrubs and Half-Shrubs**			30–50	
	Gambel oak	QUGA	*Quercus gambelii*	26–60	–
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	9–27	–
	skunkbush sumac	RHTR	*Rhus trilobata*	9–27	–
	prairie sagewort	ARFR4	*Artemisia frigida*	1–17	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–15	–
	spreading buckwheat	EREF	*Eriogonum effusum*	1–10	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–10	–
	soapweed yucca	YUGL	*Yucca glauca*	0–10	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–5	–
Tree					
4	**Trees**			0–25	
	ponderosa pine	PIPO	*Pinus ponderosa*	0–30	–
	oneseed juniper	JUMO	*Juniperus monosperma*	0–10	–
	Rocky Mountain juniper	JUSC2	*Juniperus scopulorum*	0–10	–

Animal community

Grazing:
This site produces excellent 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 possibility 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 little bluestem, needle-and-thread, prairie sandreed, and sideoats grama to be replaced by blue grama, red threeawn, and sand dropseed. A system of deferred grazing, which maintain a healthy well-balanced plant community. Rest during different seasons of the year benefits different plants. Summer rest (June-August) benefits warm season plants such as little bluestem, sideoats grama, and prairie sandreed. Spring rest (April-June) benefits cool-season plants such as needle-and-thread, western wheatgrass, muttongrass, and prairie junegrass. 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, deer, cottontail, jackrabbit, coyote, and various raptors. There is seasonal use by upland game birds.

Major Poisonous Plants to Livestock That May Cause Poisoning:

Common Name - Scientific Name - Season Dangerous - Animals Affected

broom snakeweed - Xanthocephalum sarothrae - when forage is scarce - cattle-sheep

Effects 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 10-20% of the body weight of green material is consumed in 1/2 to 20 weeks.

foothills deathcamas - Zigadenus paniculatus - spring and early summer when fresh leaves, stems, flowers and other green forage is not available. Most toxic at maturity - usually sheep but can affect cattle & horses.

Effects and symptoms - poisoning is cumulative. One-half lb will poison sheep. Symptoms are salivation, nausea,

vomitting, lowered temperature, weakness shown by staggering or complete prostration, rapid breathing, and sometimes coma followed by death. Animals may lie for hours or even days followed by death.

Geyer larkspur - Delphinium geyeri - spring and early summer when other green foliage is not available - cattle are most susceptible; horses and sheep are occasionally affected.

Effects and symptoms - Poisoning is cumulative. Symptoms include loss of appetite, general uneasiness, excessive salivation, frequent swallowing, twitching muscles, rapid irregular heart beat, respiratory paralysis and staggering gait. In advanced cases, the animal falls and lies with feet extended more or less rigidly. Poisoned animals are constipated and severe cases are nauseated and some are also bloated.

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

Guide to Initial Stocking Rates Stocking rates recommendations from range site concept circa 1983 and based on estimated plant community succession):

The stocking rate calculations are based on the total annual forage production in a normal year multiplied by 25% harvest efficiency divided by 912.5 pounds of ingested air-dry vegetation for an animal unit per month.

Plant Community (PC); Production (lbs./acre); Stocking Rate (AUM/acre)
Reference PC 850 0.23
Increased Litter/Decadence PC 500 0.14
At Risk PC 650 0.18
Shortgrass Dominated PC 450 0.12
Tree Dominated PC * *
Increased Oak PC * *
Oak Dominated PC * *
* Highly variable; stocking rate needs to be determined on site.

Hydrological functions

Soils in this site are grouped into "B" 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 for all the soils except Chaseville and Columbine series which are Group A with a hydrologic curve number of 39 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. Pronghorn hunting provides fair to good recreation on the site. The numerous forbs that bloom from spring through mid-summer give this site an aesthetically pleasing appearance.

Wood products

Not applicable to this site.

Other information

Endangered Plants and Animals:
Gaura neomexicana coloradensis or Colorado butterfly weed has been reported as endangered in Douglas County. However, its occurence on this ecological site has not been documented.

(Species names to be added as reliable information becomes available).

Inventory data references

Location of Typical Examples of the Site:
a. One mile north of Falco, El Paso County
b. Soapstone Grazing Association, Larimer County

Counties in which this ecological site occurs:
Arapahoe, Boulder, Douglas, Elbert, El Paso, Fremont, Huerfano, Jefferson, Larimer, and Las Animas.

Other references

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Approval

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--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	05/05/2024
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:**

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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):**

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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:**
