USDA Natural Resources Conservation Service

Ecological site R048BY227CO
Dry Loamy Slopes

Last updated: 9/07/2023
Accessed: 05/14/2025

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): 048B–Southern Rocky Mountain Parks and Valleys

This area is in Colorado (96 percent) and Wyoming (4 percent). It makes up about 2,325 square miles (6,020 square kilometers). The town of Walden, in the northern part of this MLRA, is in a wide valley locally known as North Park. The town of Kremmling is in a valley locally known as Middle Park. The town of Hartsel, in the center of the southern part of the MLRA, is in a broad intermontane basin locally known as South Park. The northern part is bordered by the Medicine Bow, Routt, and Arapaho National Forests, and the southern part is bordered by the San Isabel and Pike National Forests. The Arapaho National Wildlife Refuge is directly south of the town of Walden.

This area is within the Southern Rocky Mountains Province of the Rocky Mountain System. It consists of nearly level to rolling mountain parks and valleys and a few narrow mountain ridges. It occurs as two separate parts in the center of the Southern Rockies. The southern half of the northern part is on the west side of the Continental Divide, and the rest of the MLRA is on the east side of the divide. Elevation ranges from 7,850 to 10,850 feet (2,395 to 3,310 meters). The head waters of North Platte River leaves Colorado and enters Wyoming in the northern half of the northern part of the MLRA (North Park). The headwaters of Colorado River is in the southern half of the northern part of the MLRA (Middle Park). The headwaters of South Platte River is in the southern part of the MLRA (South Park).

The mountain valleys and parks that are characteristic of this MLRA are surrounded by high mountain peaks of the adjacent Southern Rocky Mountains MLRA (48A). Steep slopes give rise to steep-gradient streams that can move cobbles and gravel from the mountain slopes down into the valleys. The coarse textured sediments on the surface of this area were deposited by either glacial meltwater or present-day rivers. Buried deep beneath the sediments is a complex of sedimentary and igneous rocks. Residuum from sedimentary rocks is on the steeper slopes that were not covered by alluvium and glacial outwash.

The average annual precipitation is mainly 10 to 16 inches (255 to 405 millimeters), but it is as high as 28 inches (710 millimeters) at the higher elevations that border the Southern Rocky Mountains MLRA. Precipitation generally increases with elevation. Rainfall occurs as high-intensity, convective thunderstorms during the growing season. About half of the annual precipitation falls as snow. Soil moisture is unevenly distributed within short distances because of snowdrifts. The amount of precipitation is highly influenced by rain shadows. The surrounding peaks receive most of the precipitation as storm systems traverse the area. The average annual temperature is 35 to 42 degrees F (1 to 6 degrees C). The freeze-free period averages 95 days and ranges from 70 to 120 days, decreasing in length with elevation.

The dominant soil order in this MLRA is Mollisols. Alfisols are of lesser extent. The soils are very shallow to deep, generally well drained, and loamy or clayey and have mixed or smectitic mineralogy. The soil temperature regime is dominantly cryic, but it is frigid in some small areas, primarily on south- or west-facing slopes. The soil moisture regime is mainly ustic, but a marginal aridic regime has been identified in areas where the average annual precipitation is less than about 12 inches (305 millimeters). The most extensive great group is Argicryolls (Hodden, Lucky, Parlin, Tiagos, and Cabin series), which commonly formed in outwash and slope alluvium on outwash

terraces, fan remnants, hills, and mountain slopes. Haplocryolls (Redcloud and Tealson series) formed in outwash and slope alluvium on outwash terraces, valley side slopes, hills, and ridges. Haplocryalfs (Gebson and Harsha series) formed in slope alluvium and outwash on outwash terraces, fan remnants, hills, ridges, and mountain slopes. Cryaquolls (Dobrow and Randman series) formed in alluvium on stream terraces and flood plains.

Classification relationships

NRCS:
Major Land Resource Area 48B, Southern Rocky Mountain Parks (United States Department of Agriculture, Natural Resources Conservation Service, 2006).

USFS:
M331I – North Parks and Ranges Section Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

EPA:
21i – Sagebrush Parks and 21j – Grassland Parks < 21 Southern Rockies < 6.2 Western Cordillera < 6 Northwestern Forested Mountains North American Deserts (Griffith, 2006).

USGS: Southern Rocky Mountain Province

Ecological site concept

R048BY227CO Dry Loamy Slopes occurs on fan remnants, pediments, fills, outwash terrace and fan terraces. Slopes is between 30 to 60 percent. Soils are deep to very deep (40 to 80 inches). Soils are derived from alluvium; slope alluvium from tuff, limestone, sandstone and/or shale; colluvium from tuff; residuum from tuff; or outwash from granite and gneiss or sedimentary rock. Soil surface texture is usually gravelly loam, very cobbly loam or very cobbly sandy loam or sandy loam with fine-loamy or loamy-skeletal textured subsurface. It is a mountain muhly – Arizona fescue community. It has an aridic ustic moisture regime. The effective precipitation ranges from 10 to 16 inches.

Associated sites

R048BY225CO	**Mountain Loam 10-16 PZ South Park** R048BY225CO Mountain Loam 10-16” South Park occurs fan remnants, pediments and hills. Slopes is between 1 to 25%. Soils are deep to very deep (40 to 80 inches). Soils are derived from alluvium; slope alluvium from volcanic breccia, limestone, sandstone, and/or shale; and outwash from sedimentary rock or granite and gneiss. Soil surface texture is usually loam, sandy loam, gravelly loam or very gravelly sandy loam with either a fine-loamy or loamy-skeletal textured subsurface. It is an Arizona fescue – western wheatgrass community.
R048BY232CO	**Dry Shallow Loam** R048BY232CO Dry Shallow Loam occurs on hills, pediments, ridges and knobs. Slopes is between 1 to 30%. Soils are shallow to moderately deep (10 to 40 inches). Soils are derived from slope alluvium from volcanic breccia, limestone, sandstone, shale, gneiss, granodiorite, and/or schist; colluvium from limestone; or residuum from limestone and sandstone. Soil surface texture is usually loam, channery loam, very gravelly loam, sandy loam or gravelly sandy loam with loamy or loamy-skeletal textured subsurface. It is a Arizona fescue – Indian ricegrass community.
R048BY280CO	**Dry Mountain Swale** R048BY280CO Dry Mountain Swale occurs on alluvial flat, stream terraces, drainageways, flood plains and flood-plain steps. Slopes is between 0 to 5%. Soils are very deep (60+ inches). Soils are derived from alluvium. Soil surface texture is usually loam, sandy loam or clay loam with fine-loamy, fine-silty or fine textured subsurface. This site receives extra moisture from surrounding uplands that drain into the area. It is a western wheatgrass – slender wheatgrass community.

Similar sites

R048BY225CO	**Mountain Loam 10-16 PZ South Park** R048BY225CO Mountain Loam 10-16” South Park occurs fan remnants, pediments and hills. Slopes is between 1 to 25%. Soils are deep to very deep (40 to 80 inches). Soils are derived from alluvium; slope alluvium from volcanic breccia, limestone, sandstone, and/or shale; and outwash from sedimentary rock or granite and gneiss. Soil surface texture is usually loam, sandy loam, gravelly loam or very gravelly sandy loam with either a fine-loamy or loamy-skeletal textured subsurface. It is an Arizona Fescue – Western Wheatgrass community. It has an aridic ustic moisture regime. The effective precipitation ranges from 10 to 16 inches.
R048BY222CO	**Loamy Park** R048BY222CO Loamy Park occurs on flood plains, flood-plain steps, hills, fans and stream terrace. Slopes is between 0 to 15%. Soils are very deep (60+ inches). Soils are derived from alluvium or colluvium. Soil surface texture is usually loam or sandy loam with fine-loamy textured subsurface. It is an Arizona Fescue – Mountain Muhly community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048BY231CO	**Dry Mountain Loam** R048BY231CO Dry Mountain Loam occurs on alluvial fans, valley sides, mountainsides, fans, terraces, and outwash plains. Slopes is between 0 to 30%. Soils are moderately deep to very deep (20 to 60 inches). Soils are derived from alluvium from sedimentary rock; colluvium from basalt or sandstone; or outwash. Soil surface texture is usually loam or with fine-loamy textured subsurface. It is a Wyoming big sagebrush – needlegrass – bluebunch wheatgrass community.
R048AY303CO	**Loamy Slopes** R048AY303CO Loamy Slopes occurs on alluvial fans, terraces, hills mountains and mountainsides. Slopes is between 25 to 65%. Soils are moderately deep to deep (20 to 60+ inches). Soils are derived from alluvium from sandstone and siltstone or sandstone; residuum or colluvium from sandstone or outwash from basalt. Soil surface texture is cobbly sandy loam or cobbly, very flaggy or channery loam with loamy-skeletal textured subsurface. It is a mountain mahogany – Indian ricegrass community.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Muhlenbergia montana* (2) *Festuca arizonica*

Physiographic features

This site occurs on the sides of drainages which dissect broad outwash terraces and fan terraces of the high inter-mountain parks. Elevation ranges from 8800 to 10100 feet. Slope are 30 to 60 percent with the site occurring primarily on the southerly aspects. It is associated with the Mountain Loam 10 to 16 inch precipitation site and the Skeletal Loam site.

Figure 1. Dry Loamy Slopes in Distance, General Physiographi

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Pediment (3) Hill (4) Outwash terrace (5) Fan terrace
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	2,682–3,078 m
Slope	30–60%
Aspect	Aspect is not a significant factor

Climatic features

The climate is semi-arid with precipitation averaging 10 to 16 inches. Total yearly snowfall is 47 to 111 inches.

The growing season averages approximately 55 to 85 days from June to September; however, can be as short as 20 days and in some years can reach 96 days in length. In average years, there is sufficient snow melt moisture at the beginning of the growing season to initiate growth in such cool-season grasses as western wheatgrass, mountain muhly, needle and thread, and Arizona fescue. Their optimum growth is early June through July. Blue grama, a warm-season grass, responds well to the July and August rains on the steeper south facing slopes. About 50 percent of the annual precipitation falls in the form of rain during the frost free season.

The average annual temperature is 38 to 44 degrees F. Temperatures fall below the freezing mark much of the time in September through May. Frosts can occur from September 1 through June 15.

Wind patterns redistribute snow each winter causing small areas immediately at the top of the north and east facing slopes to receive additional moisture. Western aspects, consequently receive less spring moisture from snow melt.

Steep south facing slopes are warmer and drier than surrounding range sites, causing a distinct shift toward warmer season vegetation.

Table 3. Representative climatic features

Frost-free period (characteristic range)	28-62 days
Freeze-free period (characteristic range)	67-90 days
Precipitation total (characteristic range)	305-356 mm
Frost-free period (actual range)	20-70 days
Freeze-free period (actual range)	61-96 days
Precipitation total (actual range)	254-406 mm
Frost-free period (average)	45 days
Freeze-free period (average)	79 days
Precipitation total (average)	330 mm

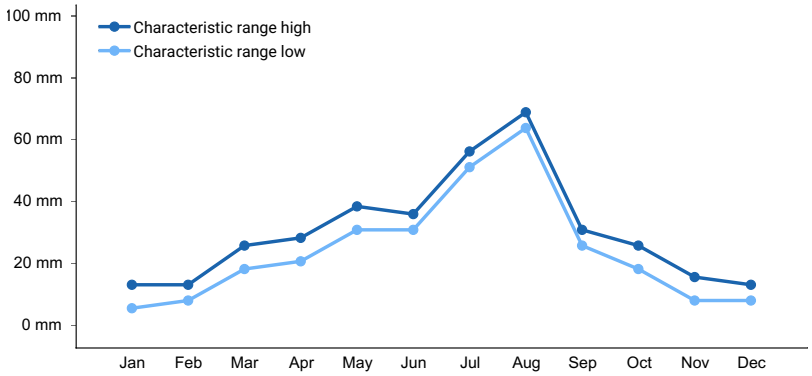


Figure 2. Monthly precipitation range

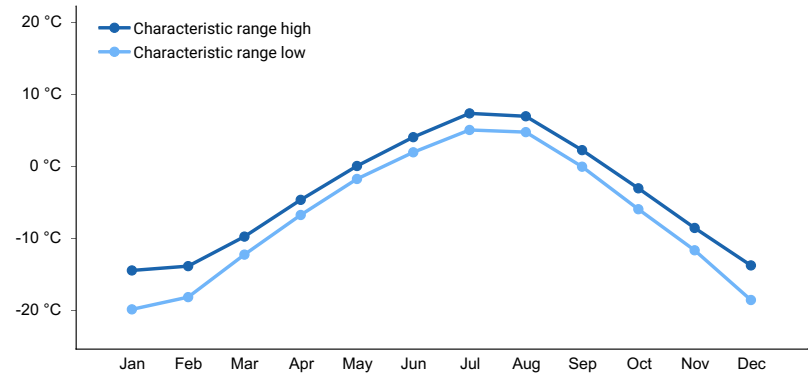


Figure 3. Monthly minimum temperature range

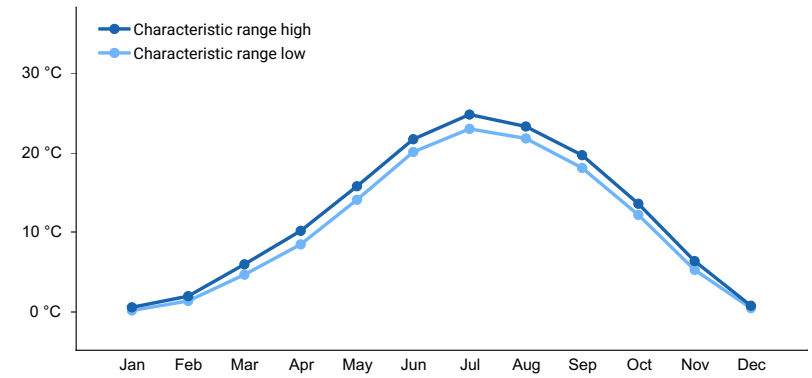


Figure 4. Monthly maximum temperature range

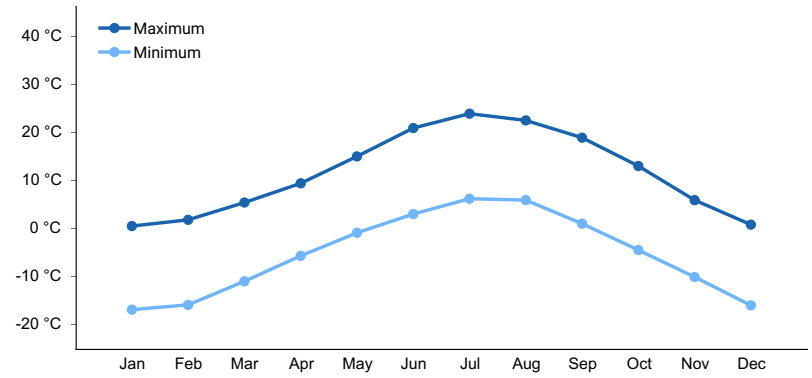


Figure 5. Monthly average minimum and maximum temperature

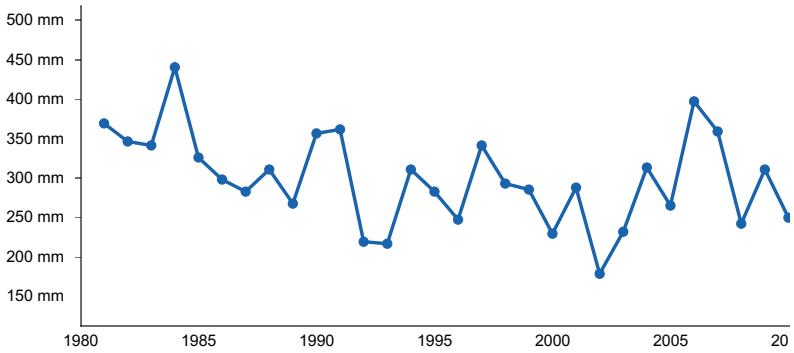


Figure 6. Annual precipitation pattern

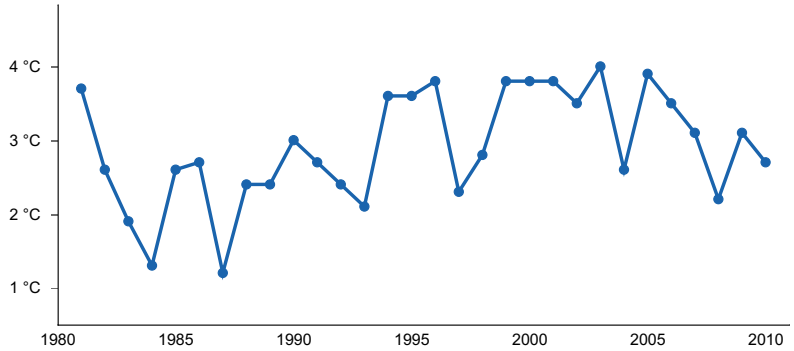


Figure 7. Annual average temperature pattern

Climate stations used

- (1) FAIRPLAY S PARK RD [USC00052816], Fairplay, CO
- (2) LAKE GEORGE 8 SW [USC00054742], Lake George, CO
- (3) ANTERO RSVR [USC00050263], Fairplay, CO

Influencing water features

None

Wetland description

N/A

Soil features

Composite Description: This site is located on soils that are deep and well drained and have formed on the steep sideslopes of fan terraces of glacial outwash or alluvium. Typically the surface layer is a gravelly or cobbly loam about three inches thick. The subsoil is a gravelly clay loam about 10 inches thick and overlies extremely gravelly, sandy loam high in calcium carbonate. The soil is moderately permeable but runoff hazard is high due to extreme slope. Available waterholding capacity is low.

Major Soils associated with this site:
Loamy Skeletal Soils: Hodden and Sawfork

Fine-Loamy Soils: Gebson and Glentivar

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Slope alluvium (3) Outwash–granite and gneiss (4) Outwash–sedimentary rock (5) Slope alluvium–limestone, sandstone, and shale (6) Slope alluvium–tuff (7) Colluvium–tuff (8) Residuum–tuff
Surface texture	(1) Gravelly, very cobbly loam (2) Very cobbly sandy loam (3) Sandy loam
Family particle size	(1) Fine-loamy (2) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	102–254 cm
Surface fragment cover <=3"	5–40%
Surface fragment cover >3"	0–25%
Available water capacity (Depth not specified)	5.08–12.7 cm
Calcium carbonate equivalent (Depth not specified)	0–25%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Soil reaction (1:1 water) (Depth not specified)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	10–45%
Subsurface fragment volume >3" (Depth not specified)	0–30%

Ecological dynamics

The plant community is about 80 to 90 percent grasses, 5 to 10 percent forbs, and 10 to 15 percent shrubs air-dry weight.

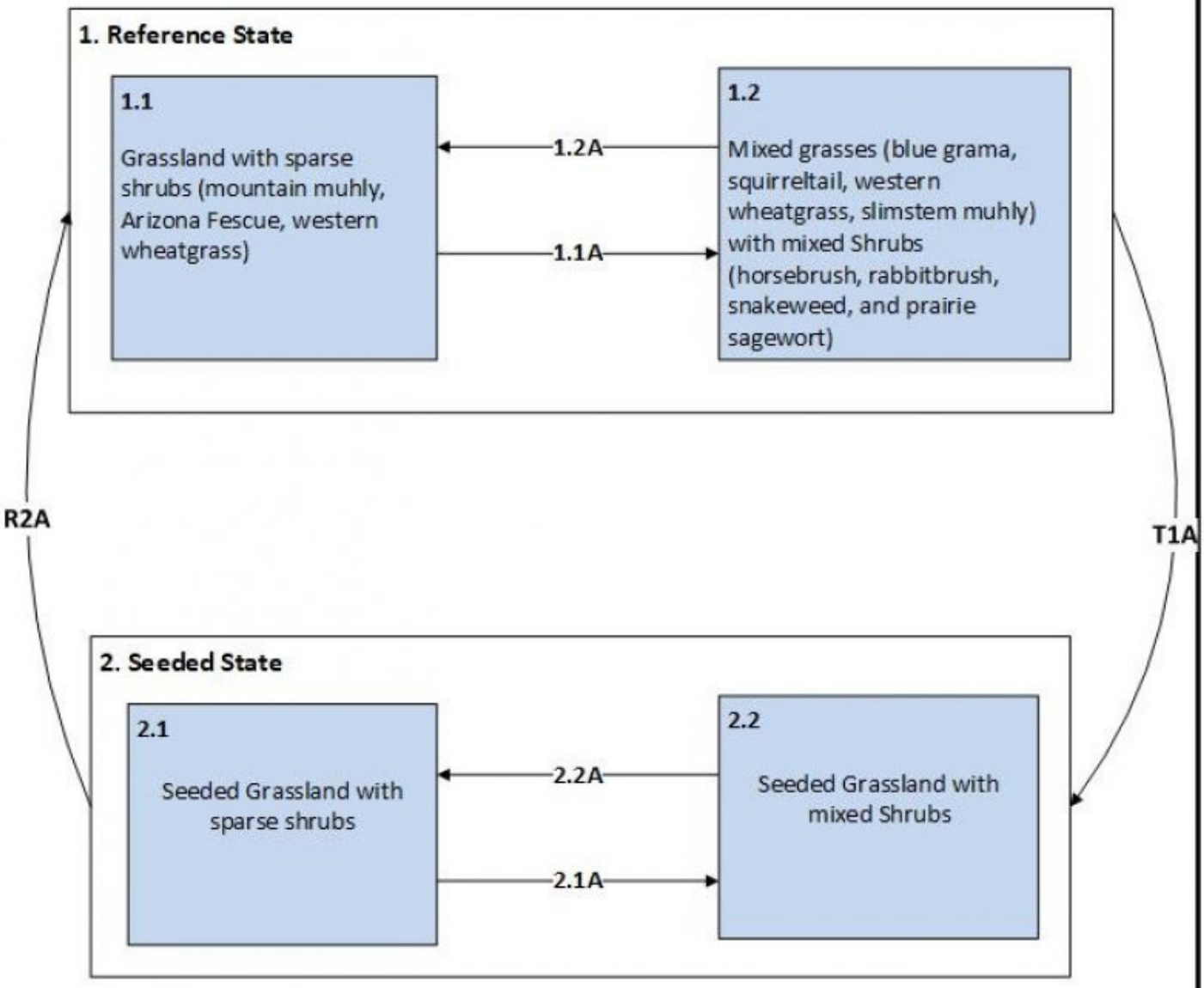
The steeper south facing slopes are co-dominated by mountain muhly and blue grama with lesser amounts of Arizona fescue, western wheatgrass, and needle and thread grass. The more gentle sloping southeastern aspects are dominated by mountain muhly and Arizona fescue and are more productive.

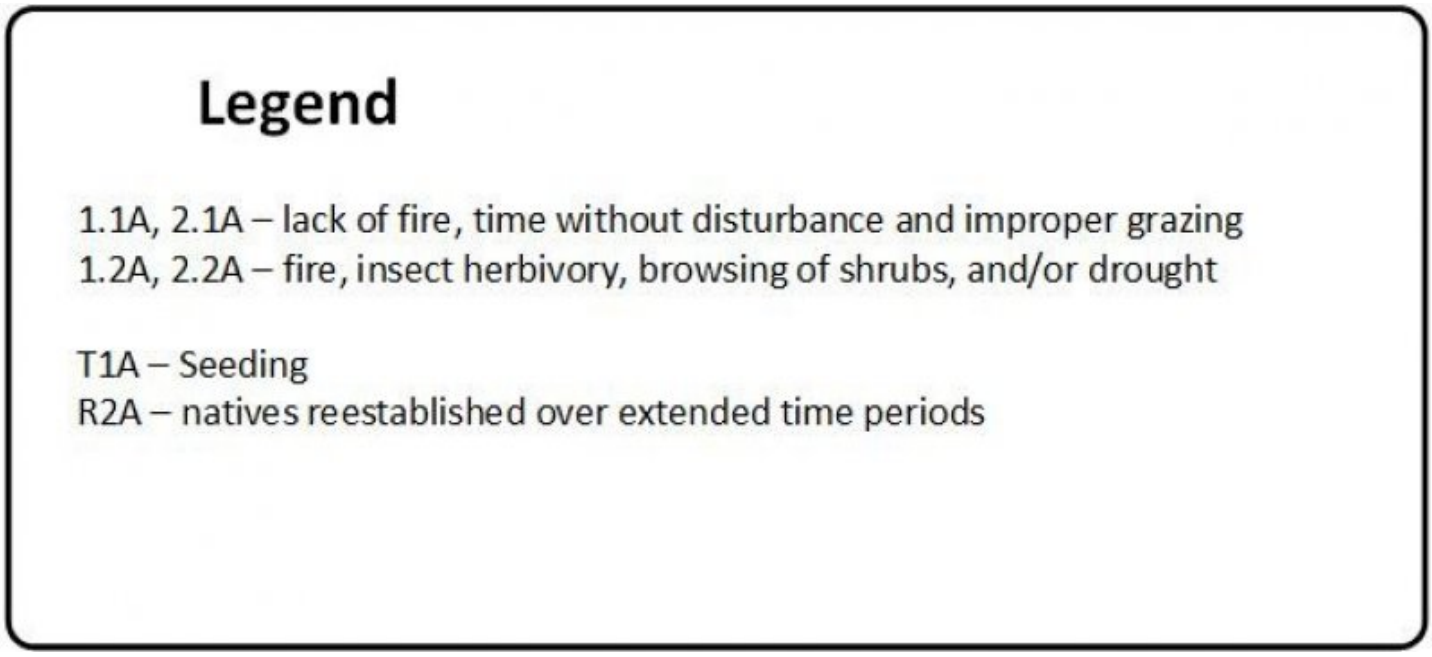
Forbs that make up the plant community are yellow eriogonum, northwest cinquefoil, Parry geranium, Pacific aster, granite gillia, desert Indian paintbrush, and pingue hymenoxys.

Shrubs that occur on this site are small rabbitbrush, Parry's (Howard's) rabbitbrush, gray horsebrush, broom snakeweed, fringed sagewort, prickly pear and snowball cactus, and small soapweed.

State and transition model

Dry Loamy Slopes
R048BY227CO





State 1
Reference State

If ecological retrogression is cattle induced, desirable grasses and grasslike plants will decrease. Parry oatgrass elk sedge, Arizona fescue, western wheatgrass, and mountain muhly are early decreasers under continuous season long grazing, and will be the first to disappear from the site. With the reduction of more palatable species, blue grama, bottlebrush squirreltail, and slimstem muhly will increase along with fringed sage, pingue hymenoxys, northwest cinquefoil, gray horsebrush, small (yellow) rabbitbrush, yellow eriogonum, plains prickly pear, and small soapweed. Annual production If the range is in excellent condition, the approximate total annual production (air-dry) is: Favorable years 950 pounds/Ac Normal years 800 pounds/Ac Unfavorable years 600 pounds/Ac Of this production, 15 to 20 percent will likely be unpalatable or out of reach of grazing animals.

Community 1.1
Reference State

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	549	717	829
Shrub/Vine	84	112	140
Forb	39	67	95
Total	**672**	**896**	**1064**

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**			673–762	
	mountain muhly	MUMO	*Muhlenbergia montana*	224–448	–
	Arizona fescue	FEAR2	*Festuca arizonica*	90–179	–
	blue grama	BOGR2	*Bouteloua gracilis*	90–135	–
	needle and thread	HECO26	*Hesperostipa comata*	17–45	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	17–45	–
	western wheatgrass	PASM	*Pascopyrum smithii*	17–45	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–17	–
	Scribner needlegrass	ACSC11	*Achnatherum scribneri*	11–17	–
	slimstem muhly	MUFI	*Muhlenbergia filiculmis*	11–17	–
	Geyer's sedge	CAGE2	*Carex geyeri*	11–17	–
	Parry's oatgrass	DAPA2	*Danthonia parryi*	0–17	–
	squirreltail	ELEL5	*Elymus elymoides*	11–17	–
Forb					
2	**Forbs**			45–90	
	James' buckwheat	ERJAX	*Eriogonum jamesii var. xanthum*	11–17	–
	slender cinquefoil	POGR9	*Potentilla gracilis*	11–17	–
	Pacific aster	SYCH4	*Symphyotrichum chilense*	0–11	–
	Rocky Mountain milkvetch	ASSC7	*Astragalus scopulorum*	0–11	–
	Indian paintbrush	CASTI2	*Castilleja*	0–11	–
	sidebells penstemon	PESE11	*Penstemon secundiflorus*	0–11	–
	pingue rubberweed	HYRI	*Hymenoxys richardsonii*	0–11	–
	winged buckwheat	ERAL4	*Eriogonum alatum*	0–11	–
	aspen fleabane	ERSP4	*Erigeron speciosus*	0–11	–
	Parry's geranium	GECAP2	*Geranium caespitosum var. parryi*	0–11	–
Shrub/Vine					
3	**Shrubs**			90–135	
	yellow rabbitbrush	CHVIS5	*Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus*	17–45	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	17–45	–
	Parry's rabbitbrush	ERPAH	*Ericameria parryi var. howardii*	11–17	–
	prairie sagewort	ARFR4	*Artemisia frigida*	11–17	–
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	0–17	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–11	–
	mountain ball cactus	PESI	*Pediocactus simpsonii*	0–11	–
	wax currant	RICE	*Ribes cereum*	0–11	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–11	–
	soapweed yucca	YUGL	*Yucca glauca*	0–11	–

Animal community

INTERPRETATIONS FOR GRAZING ANIMALS:
This site provides good grazing value for livestock where slopes are less than 20 percent. Grazing is severely restricted on steeper slopes. Continuous, season long grazing by cattle causes more palatable grasses to be replaced by less desirable grasses like slimstem muhly and bottlebrush squirreltail. A system of grazing which encourages short periods of grazing followed by adequate periods of rest is needed to prevent retrogression and loss of productivity. Deferments occurring in the spring benefit cool-season plants, especially western wheatgrass and Arizona fescue. Summer deferment will benefit all grasses especially blue grama.

INTERPRETATIONS FOR WILDLIFE:
This site provides habitat for a resident animal community that is characterized by antelope, small mammals, and birds. Southern slopes which stay relatively clear of snow throughout the year make this site especially valuable for winter use by antelope and elk.

Habitat values for small mammals do not significantly change as ecological condition changes. With retrogression induced by cattle grazing, value for elk will decline. The increase of forbs and shrubs would increase habitat value for wildlife initially. Retrogression to poor condition will result in massive erosion on steeper slopes, and habitat values will decline severely for all species.

Hydrological functions

Soils in this site are grouped into “B” hydrologic group, as outlined in the Soils of Colorado Loss Factors and Erodibility Hydrologic Grouping handbook. Field investigations are needed to determine hydrologic cover conditions and hydrologic curve numbers. The hydrologic curve number for Group soil is about 61, 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

Very little recreational use is made of this range site. Limited antelope and elk hunting may occur at times. Individuals looking for ecological variation in plant communities due to aspect and moisture patterns would find this site very interesting.

Wood products

No potential production on this site.

Other information

MAJOR POISONOUS PLANTS TO LIVESTOCK:3/
Plant Livestock Type of Season
Common Name Affected Poisoning Serious
Gray Horsebrush sheep cumulative early spring
Rocky Mt Milkvetch all cumulative spring, summer
Pingue hymenoxys sheep cumulative spring, summer

3/ For additional information regarding poisoning by specific plants, see Colorado Range Technical Note.

ENDANGERED PLANTS AND ANIMALS:
No threatened or endangered species of plants or animals have been identified at this time. Species names to be included as reliable information becomes available.

COUNTIES IN WHICH THIS RANGE SITE OCCURS:
Fremont
Park

Inventory data references

This site is mapped in Park, Teller, and Fremont Counties.

Type locality

Location 1: Park County, CO	
General legal description	A typical example of this site occurs two miles east of Badger Creek in Park County on the southfacing slope of the Rye Slough drainage.

Other references

Chapman, S.S., G.E. Griffith, J.M. Omernik, A.B. Price, J. Freeouf, and D.L. Schrupp. 2006. Ecoregions of Colorado. (2-sided color poster with map, descriptive text, summary tables, and photographs). U.S. Geological Survey, Reston, VA. Scale 1:1,200,000.

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored.

Soil Conservation Service (SCS). November 1987. Range Site Description for Dry Loamy Slopes #227. : USDA, Denver Colorado.

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Western Regional Climate Center. Retrieved from http://www.wrcc.dri.edu/summary/Climsmco.html on December 10, 2018

Contributors

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

Program Support:
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

Those involved in developing earlier versions of this site description include: Bob Rayer, retired NRCS Soil Scientist; Herman Garcia, retired CO State RMS and NRCS MLRA Ecological Site Specialist-QA Phoenix, AZ.

--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 is required to refine the Plant Production and Annual Production tables for this ecological site. The extent of MLRA 48A 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)	Ben Berlinger (2-27-2014)
Contact for lead author	ben.berlinger@co.usda.gov
Date	02/27/2014
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None to slight.

---

2. **Presence of water flow patterns:** None to slight. Short and disconnected on slopes > 20%.

---

3. **Number and height of erosional pedestals or terracettes:** Not significant.

---

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:** None in the reference condition.

---

6. **Extent of wind scoured, blowouts and/or depositional areas:** No wind scoured and/or depositional areas.

---

7. **Amount of litter movement (describe size and distance expected to travel):** None to slight on slopes less than or equal to 20%. On steeper slopes expect fine hervaceous litter expected to move 0.5 to 1.0 feet and confined within water flow paths.

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Estimated to be in the range of 4-5 for the soil stability rating.

---

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:** Due to diverse plant composition and structure infiltration is good.

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Soil profile features are not present that could be mistaken for compaction.

---

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: warm season bunch grasses

    Sub-dominant: cool season bunch grasses > shrubs > forbs

    Other: cool season rhizomatous grass > sedge

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** None to slight. Expect an increase in the decadence of the warm & cool season bunchgrasses on slopes that exceed 30%.

---

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):** Total annual production (air-dry):
    unfavorable years = 600 pounds per acre
    normal years = 800 pounds per acre
    favorable years = 950 pounds per acre

---

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:** Degraded states will show a dominance of "low-growth" blue grama and slimstem muhly. Shrubs & forbs that will characterize ecological degradation are fringed sagebrush, gray horsebrush, rabbitbrush species,

pingue, and yellow eriogonum.

---

17. **Perennial plant reproductive capability:** None. Only weather related events can detract from the reproductive capability of the perennial plants in the reference condition.
