

Ecological site R043BY316WY
Igneous (Ig)
15-19" Foothills and Mountains East Precipitation Zone

Accessed: 09/30/2026

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.

Associated sites

R043BY304WY	Clayey (Cy) 15-19" Foothills and Mountains East Precipitation Zone Clayey
R043BY322WY	Loamy (Ly) 15-19" Foothills and Mountains East Precipitation Zone Loamy
R043BY360WY	Shallow Igneous (Swlg) 15-19" Foothills and Mountains East Precipitation Zone Shallow Igneous

Similar sites

R043BY116WY	Igneous High Mountains Igneous 20"+ High Mountains P.Z., 043BY116WY has higher production.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on steep slopes and ridge tops, but may occur on all slopes.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,830 – 2,740 m
Slope	0 – 80 %
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 15-19 inches per year. June is generally the wettest month. July, August, and September are somewhat less with daily amounts rarely exceeding one inch.

Snowfall is quite heavy in the area. Annual snowfall averages about 150 inches.

Because of the varied topography, the wind will vary considerably for different parts of the area. The wind is usually much lighter at the lower elevations and in the valleys as compared with the higher terrain. The average winter wind velocity is 8.5 mph while the summer wind velocity averages 7.5 mph. Winds during storms and on ridges may exceed 45 mph.

Growth of native cool-season plants begins about May 1 to May 15 and continues to about October 10.

The following information is from the “Crandall Creek” climate station, at the lower end of this precipitation zone:

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days): 16 80 July 8 – August 20

Freeze-free period (days): 37 120 June 17 – September 5

Mean Annual Precipitation (inches): 10.24 21.23

Mean annual precipitation: 14.90 inches

Mean annual air temperature: 38.16 F (21.88 F Avg. Min. to 54.66 F Avg. Max.)

For detailed information, visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. There are no other climate station(s) known to be representative of this precipitation zone.

Table 3 Representative climatic features

Frost-free period (average)	80 days
Freeze-free period (average)	120 days
Precipitation total (average)	480 mm

Influencing water features

Stream type: None

Soil features

The soils associated with this site were derived from granitic or volcanic bedrock. These soils are generally less than 10" in depth and virtually impermeable to plant roots. Pockets of deep soil may occur in this site and are moderately acidic. The bedrock will include all kinds including igneous, metamorphic and other volcanic material. The soil characteristics having the most influence on the plant community are the shallow depths and heavy textures.

Table 4. Representative soil features

Surface texture	(1) Loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	10 – 30 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-101.6cm)	5.59 – 16.76 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %

Ecological dynamics

Potential vegetation on this site is dominated by mid cool-season perennial grasses. Other significant vegetation includes black sagebrush, three-tip sagebrush, and a variety of forbs. The expected potential composition for this site is about 75% grasses, 15% forbs and 10% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates species such as bluegrasses, black sagebrush, and three-tip sagebrush will increase. Cool season grasses such as bluebunch wheatgrass, mountain muhly, spikefescue and Idaho fescue will decrease in frequency and production. As the site continues to deteriorate, annual forbs and grasses such as cheatgrass will invade.

Due to the heavy browsing, the antelope bitterbrush component may not be resilient once it has been removed or severely reduced if a vigorous stand of grass exists and is maintained. The exception to this is where the herbaceous component is severely degraded at the time of treatment, growing conditions are unfavorable after treatment, and/or recovery of herbaceous species are inadequate due to improper grazing management. Regeneration of antelope bitterbrush and black sagebrush may also be suppressed if three-tip sagebrush is established. This situation is more likely to develop in areas where fires have occurred in a relatively short cycle. Three-tip is a strong resprouter and will out compete other shrubs where a site is disturbed.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				67-168	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	67-168	–
2				0-67	
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	0-67	–
3				0-67	
	spike fescue	LEKI2	<i>Leucopoa kingii</i>	0-67	–
4				0-67	
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	0-67	–
5				0-67	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-67	–
6				0-67	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0-67	–
7				67-135	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-34	–
	timber oatgrass	DAIN	<i>Danthonia intermedia</i>	0-34	–
	onespike danthonia	DAUN	<i>Danthonia unispicata</i>	0-34	–
	Montana wheatgrass	ELAL7	<i>Elymus albicans</i>	0-34	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0-34	–
	spike trisetum	TRSP2	<i>Trisetum spicatum</i>	0-34	–
Forb					

8				34-101	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0-34	–
	yarrow	ACHIL	<i>Achillea</i>	0-34	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0-34	–
	sandwort	ARENA	<i>Arenaria</i>	0-34	–
	arnica	ARNIC	<i>Arnica</i>	0-34	–
	milkvetch	ASTRA	<i>Astragalus</i>	0-34	–
	balsamroot	BALSA	<i>Balsamorhiza</i>	0-34	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0-34	–
	fleabane	ERIGE2	<i>Erigeron</i>	0-34	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0-34	–
	aster	EUCEP2	<i>Eucephalus</i>	0-34	–
	lupine	LUPIN	<i>Lupinus</i>	0-34	–
	stonecrop	SEDUM	<i>Sedum</i>	0-34	–
	American vetch	VIAM	<i>Vicia americana</i>	0-34	–
Shrub/Vine					
9				0-67	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	0-67	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0-67	–
10				0-34	
	threetip sagebrush	ARTR4	<i>Artemisia tripartita</i>	0-34	–
11				0-34	
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	0-34	–
12				0-34	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0-34	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0-34	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 6.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 7.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

Animal Community – Wildlife Interpretations Bluebunch Wheatgrass/Mixed Sagebrush Plant Community (HCPC): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as deer, bison, elk, and antelope. Suitable thermal and escape

cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. Due to the location of these sites on the foot slopes of mountains they are valuable for elk and deer winter ranges. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous Hawks, and golden eagles. Many grassland obligate small mammals would occur here. Idaho Fescue/Mixed Sagebrush Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provides a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer, elk, and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous Hawks, and golden eagles. Mixed Shrub/Rhizomatous Wheatgrass Plant Community: The combination of an overstory of big sagebrush and an understory of grasses and forbs provides a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer, elk, and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous Hawks, and golden eagles. Mixed Shrub/Bluegrass Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time. This community provides escape and thermal cover for large ungulates, as well as nesting and brood rearing habitat for sage grouse. Due to the lack of herbaceous production and diversity of mid cool season grasses on this site, it is not as beneficial to grazers. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous Hawks, and golden eagles. Rhizomatous Wheatgrass/Three-tip Sagebrush Plant Community: The production of herbaceous species provided for good foraging to grazers. However, the lack of tall or mid growing shrubs does not benefit browsers nor provides cover for many wildlife species. As these site greens-up sooner in the spring, this site tends to provide early new growth for foraging large and small mammals. If located adjacent to shrub dominated sites, It provides good foraging habitat for sage grouse. Rhizomatous Wheatgrass/Bluegrass Plant Community: The production of herbaceous species provided for good foraging for grazers. However, the lack of tall or mid growing shrubs does not benefit browsers nor provides cover for many wildlife species. As these site greens-up sooner in the spring, this site tends to provide early new growth for foraging large and small mammals. If located adjacent to shrub dominated sites, It provides good foraging habitat for sage grouse. Bluegrass/Annual Plant Community: This community provides limited foraging for elk and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover. Generally, these are not target plant communities for wildlife habitat management. Animal Community – Grazing Interpretations The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor. Plant Community Production Carrying Capacity* (Lb./ac) (AUM/ac) Bluebunch WG/Mixed Sagebrush 400-800 .2 Idaho Fescue/Mixed Sagebrush 350-750 .15 Mixed Shrub/Rhizomatous WG 300-700 .12 Mixed Shrub/Bluegrass 200-550 .1 Rhizomatous WG/Three-tip Sagebrush 350-750 .15 Rhizomatous WG/Bluegrass 250-600 .1 Bluegrass/Annual 100-500 .05 * - Continuous, season-long grazing by cattle under average growing conditions. Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Hydrological functions

Climate is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D due to its shallow feature. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group and water table. Runoff will be high on this site since the soil saturate easy and due to its shallow characteristic and water holding capacity. (Refer to Part 630, NRCS National Engineering Handbook for detailed hydraulic information. Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors. Other recreational uses may include hiking, and mountain biking.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: Chris Krassin, Range Management Specialist, James Haverkamp, Range Management Specialist, Steven Gullion, Range Management Specialist, James Mischke, District Conservationist, and Everet Bainter, State Range Management Specialist. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Contributors

J. Haverkamp

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.

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Date	05/01/2008
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Some rills to be expected on this site.

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

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

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): Bare ground can range from 20-50%.

5. Number of gullies and erosion associated with gullies: Active gullies, where present, should be rare.

6. Extent of wind scoured, blowouts and/or depositional areas: Rare to nonexistent.

7. Amount of litter movement (describe size and distance expected to travel): Herbaceous litter expected to move in moderate amounts. Large woody debris will show only slight movement down slope.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Soil Stability Index ratings range from 1 (interspaces) to 6 (under plant canopy), but average values should be 3.0 or greater.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Currently no soil series are correlated to this ecological site. Soil Organic Matter of less than 3% is expected.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Plant community consists of 50-70% grasses, 10% forbs, and 20-40% shrubs. Sparse plant canopy (40-60%) and litter plus slow to moderate infiltration rates result in slight to moderate runoff. Basal cover is typically less than 10% and marginally affects runoff on this site. Surface rock outcrop of 10-30% provide stability to the site, but reduce infiltration. Runoff can be rapid on this site with a moderate to high erosion hazard associated with steep slopes.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None.

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: mid-size, cool season bunchgrasses>perennial shrubs>>perennial forbs=cool season rhizomatous grasses>short cool season bunchgrasses

Sub-dominant:

Other:

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
Minimal decadence, typically associated with shrub component.

14. Average percent litter cover (%) and depth (in): Litter ranges from 10-30% of total canopy measurement with total litter (including beneath the plant canopy) from 30-50% expected. Herbaceous litter depth typically ranges from 3-10mm. Woody litter can be up to several inches (>6 cm).

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
English: 400-800 lb/ac (600 lb/ac average); Metric 448-896 kg/ha (672 kg/ha average).

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: Bare ground greater than 75% is the most common indicator of a threshold being crossed. Bluegrasses, black sagebrush, and three-tip sagebrush are common increasers. Annual weeds such as cheatgrass and mustards are common invasive species in disturbed sites.

17. Perennial plant reproductive capability: All species are capable of reproducing, except in extreme drought years.
