

Ecological site R043BY270WY
Steep Stony
Foothills and Mountains West

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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.

Associated sites

R043BY262WY	Shallow Loamy Foothills and Mountains West Shallow Loamy
R043BY272WY	Stony Foothills and Mountains West Stony

Similar sites

R043BY208WY	Coarse Upland Foothills and Mountains West Coarse Upland (CU) 15-19W has higher production, larger coarse fragments (boulders), and different shrub species.
R043BY212WY	Gravelly Foothills and Mountains West Gravelly (Gr) 15-19W has lower production and different shrub species.
R043BY272WY	Stony Foothills and Mountains West Stony (St) 15-19W has lower production and different shrub species.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on gentle to steep mountain slopes, mesas, valley bottoms, and fans.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Alluvial fan (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,710 – 2,530 m
Slope	10 – 70 %
Ponding depth	0 cm

Climatic features

Annual precipitation ranges from 15-19 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Prevailing winds are from the southwest, and strong winds are less frequent than over other areas of Wyoming. Occasional storms, however, can bring brief periods of high winds with gusts exceeding 50 mph.

Growth of native cool season plants begins about May 15 and continues to about August 15.

The following information is from the “Jackson” climate station:

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days): 12 60 July 9 – August 12

Freeze-free period (days): 42 100 June 20 – August 26

Annual Precipitation (inches): <11.98 >19.69 (2 years in 10)

Mean annual precipitation: 17.00 inches

Mean annual air temperature: 38.9°F (23.3°F Avg. Min. to 54.5°F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=wy> website. Other climate stations representative of this precipitation zone include “Afton” in Lincoln County; and “Darwin Ranch” in Teton County.

Table 3 Representative climatic features

Frost-free period (average)	60 days
Freeze-free period (average)	100 days

Precipitation total (average)	480 mm
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Influencing water features

Soil features

The soils of this site are moderately deep to deep (greater than 20 inches), well-drained, dark colored, and stony and/or bouldery. They occur as steep mountain foot slopes with radiance usually greater than 30%. Coarse fragments are greater than 35 percent, by volume, within the first 20 inches of soil, usually increasing with depth. Roots penetrate the soil material readily, but are forced to detour around coarse fragments.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	50 – 150 cm
Surface fragment cover <=3"	0 – 20 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	5.08 – 10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified

Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	10 – 30 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

Ecological Dynamics of the Site:

As this site deteriorates, species such as rhizomatous (mainly thickspike) wheatgrass, Idaho fescue, mountain big sagebrush, snowberry, and rabbitbrush increase. Cheatgrass and annual forbs often invade. Mountain mahogany and serviceberry as well as cool season bunchgrasses such as bluebunch wheatgrass and spike fescue will decrease in frequency and production.

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				420-841	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	420-841	–
2				84-252	
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	84-252	–
3				84-168	
	spike fescue	LEK12	<i>Leucopoa kingii</i>	84-168	–
4				168-336	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-84	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0-84	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	0-84	–
	western needlegrass	ACOC3	<i>Achnatherum occidentale</i>	0-84	–
	mountain brome	BRMA4	<i>Bromus marginatus</i>	0-84	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0-84	–

	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0-84	–
	California oatgrass	DACA3	<i>Danthonia californica</i>	0-84	–
	timber oatgrass	DAIN	<i>Danthonia intermedia</i>	0-84	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-84	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	0-84	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0-84	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-84	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	0-84	–
	oniongrass	MEBU	<i>Melica bulbosa</i>	0-84	–
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	0-84	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0-84	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-84	–
	spike trisetum	TRSP2	<i>Trisetum spicatum</i>	0-84	–

Forb

5				84-168	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0-84	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0-84	–
	pussytoes	ANTEN	<i>Antennaria</i>	0-84	–
	sandwort	ARENA	<i>Arenaria</i>	0-84	–
	milkvetch	ASTRA	<i>Astragalus</i>	0-84	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	0-84	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0-84	–
	fireweed	CHAN9	<i>Chamerion angustifolium</i>	0-84	–
	thistle	CIRSI	<i>Cirsium</i>	0-84	–
	hawksbeard	CREPI	<i>Crepis</i>	0-84	–
	fleabane	ERIGE2	<i>Erigeron</i>	0-84	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0-84	–
	aster	EUCEP2	<i>Eucephalus</i>	0-84	–
	gilia	GILIA	<i>Gilia</i>	0-84	–
	little sunflower	HEPU3	<i>Helianthus pumilus</i>	0-84	–
	stoneseed	LITHO3	<i>Lithospermum</i>	0-84	–
	desertparsley	LOMAT	<i>Lomatium</i>	0-84	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	0-84	–
	bluebells	MERTE	<i>Mertensia</i>	0-84	–
	locoweed	OXYTR	<i>Oxytropis</i>	0-84	–
	ragwort	PACKE	<i>Packera</i>	0-84	–
	beardtongue	PENST	<i>Penstemon</i>	0-84	–
	phacelia	PHACE	<i>Phacelia</i>	0-84	–
	phlox	PHLOX	<i>Phlox</i>	0-84	–
	buttercup	RANUN	<i>Ranunculus</i>	0-84	–
	stonecrop	SEDUM	<i>Sedum</i>	0-84	–
	Townsend daisy	TOWNS	<i>Townsendia</i>	0-84	–
	clover	TRIFO	<i>Trifolium</i>	0-84	–
	stinging nettle	URDI	<i>Urtica dioica</i>	0-84	–
	valerian	VALER	<i>Valeriana</i>	0-84	–
	American vetch	VIAM	<i>Vicia americana</i>	0-84	–

	mule-ears	WYAM	<i>Wyethia amplexicaulis</i>	0-84	–
Shrub/Vine					
6				84-336	
	mountain mahogany	CERCO	<i>Cercocarpus</i>	84-336	–
7				17-168	
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	17-168	–
8				84-168	
	little sagebrush	ARAR8	<i>Artemisia arbuscula</i>	0-84	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0-84	–
	threetip sagebrush	ARTR4	<i>Artemisia tripartita</i>	0-84	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0-84	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0-84	–
	thimbleberry	RUPA	<i>Rubus parviflorus</i>	0-84	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0-84	–

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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Animal community

Animal Community – Wildlife Interpretations Bluebunch Wheatgrass/Mountain Mahogany Plant Community (HCPC): This plant community provides excellent thermal and escape cover for wintering mule deer and elk. Year-round habitat is provided for mule deer, elk, bobcat, mountain lion, cottontail rabbits, jackrabbits, and many birds such as the black-throated sparrow, lark sparrow, green-tailed towhee, and neo-tropical migrants. Mountain mahogany provides good thermal cover and nesting habitat for many bird species. Snowberry/Rhizomatous Wheatgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is much less diverse, and thus, less apt to meet the seasonal needs of these animals. Cheatgrass Plant Community: This plant community exhibits a low level of plant species diversity. In most cases it is not a desirable plant community to select as a wildlife habitat management objective. 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 Wheatgrass/Mountain Mahogany (HCPC) 1100-1900 .45 Snowberry/Rhizomatous Wheatgrass 400-1200 .25 Cheatgrass 200-800 .15 * - 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 yearlong 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

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from moderately slow to moderate. Runoff potential for this site varies from low to moderate depending on soil hydrologic group and ground cover (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information). Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. 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.

Wood products

No appreciable wood products are present on the site.

Inventory data references

Inventory Data References (narrative) 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: Bill Christensen, Range Management Specialist, NRCS; Karen Clause, Range Management Specialist, NRCS; and Everet Bainter, Range Management Specialist, NRCS. 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. Inventory Data References Data Source Number of Records Sample Period State County SCS-RANGE-417 58 1966-1986 WY Lincoln & others

Contributors

K. Clause

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	03/16/2007
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rare to nonexistent. Where present, short and widely spaced.

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

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

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 0-25%.

5. Number of gullies and erosion associated with gullies: Active gullies should not be present.

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 and large woody litter not expected to move.

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 3 (interspaces) to 6 (under plant canopy), but average values should be 4.0 or greater.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Described A-horizons vary from 7-10 inches (18-25 cm) with weak to strong granular or weak sub-angular blocky structure and color hues of 10YR or 7.5YR, values of 4-5, and a chroma of 2-3 (grayish brown to dark brown). Soil OM is typically 2 to 5%.

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. Evenly distributed plant canopy (60-85%) and litter plus moderate infiltration rates result in minimal runoff. Basal cover is typically 5-15% for this site and does affect runoff on this site. Surface rock fragments of 20-50% provide stability to the site, but reduce infiltration.

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:

Sub-dominant:

Other:

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

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.
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14. Average percent litter cover (%) and depth (in): Litter ranges from 5-30% of total canopy measurement with total litter (including beneath the plant canopy) from 50-80% expected. Herbaceous litter depth typically ranges from 3-10mm. Woody litter can be up to a couple inches (4-6 cm).
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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
English: 1100-1900 lb/ac (1500 lb/ac average); Metric 1232-2128 kg/ha (1680 kg/ha average).
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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: Bare ground greater than 40% is the most common indicator of a threshold being crossed. Rabbitbrush, Sandberg bluegrass, buckwheat, and phlox are common increasers. Annual weeds such as cheatgrass and mustards are common invasive species in disturbed sites.
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17. Perennial plant reproductive capability: All species are capable of reproducing, except in extreme drought years.
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