Ecological site EX043B23B106
Clayey Overflow (CyO)
Absaroka
Upper Foothills

Last updated: 3/06/2025
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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): 043B–Central Rocky Mountains

43B – Central Rocky Mountains – The Central Rocky Mountains extends from northern Montana to southern extent of Wyoming and from Idaho to central Wyoming. The southern extent of 43B is comprised of a combination of metamorphic, igneous, and sedimentary mountains and foothills. Climatic changes across this extent are broad and create several unique breaks in the landscape. Further information regarding MLRAs, refer to: 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. Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

LRU notes

Land Resource Unit (LRU) 43B23B: Absaroka Upper Foothills Based on the shifts in geology, precipitation patterns and other climatic factors, as well as elevations and vegetation, the Absaroka Range was divided into LRU 23. Further division of this LRU is necessary due to the gradient moving from the foothills to the summit, as well as aspect shifts (north/east face versus south/west face). Subset B is set for the higher elevations within the foothills, with 15 to 19 inches of precipitation. To verify or identify Subset B (the referenced subset for this ecological site), refer to the Wyoming LRU matrix key contained within the Ecological Site Key. This particular LRU/Subset occurs along the eastern foothills of the Absaroka Range. This LRU starts north of Clark, WY and runs to the Thermopolis, WY area. Once the foothills cross into the Northern Beartooth Range, the climatic patterns and elevational changes shifts the plant community and allows for a break in LRU's near the Montana state line. As the LRU follows to the south and then tracks east to the intersection of the Absaroka Range and the Owl Creek Range, the face changes aspect and geology creating a shift in plant dynamics and a break in the LRU. The extent of soils currently correlated to this ecological site does not fit within the digitized boundary. Many of the noted soils are provisional and will be reviewed and corrected in mapping update projects. Other map units are correlated as small inclusions within other MLRA’s/LRU’s based on elevation, landform, and biological references. Moisture Regime: Typic Ustic Temperature Regime: Frigid Dominant Cover: Rangeland – Sagebrush Steppe (major species is Mountain Big Sagebrush) Representative Value (RV) Effective Precipitation: 15-19 inches (381 – 483 mm) RV Frost-Free Days: 37 - 80 days

Classification relationships

Relationship to Other Established Classification Systems: National Vegetation Classification System (NVC): 2 Shrub & Herb Vegetation Class 2.B Temperate & Boreal Grassland & Shrubland Subclass 2.B.2 Temperate Grassland & Shrubland Formation 2.B.2.Na Western North American Grassland & Shrubland Division Division M048 Central Rocky Mountain Montane-Foothill Grassland & Shrubland Macrogroup G273 Central Rocky Mountain Lower Montane, Foothill & Valley Grassland Group Ecoregions (EPA): Level I: 10 North American Deserts Level II: 10.1 Cold Deserts Level III: 10.1.18 Wyoming Basin Level IV: 10.1.18.b Big Horn Basin and 10.1.18.d Foothills and Low Mountains

Ecological site concept

• Site receives significant additional effective moisture as overland flow. • Slope is less than or equal to 30 percent • Soils are: o Moderately deep to very deep (20-80+ in. (50-200+ cm) o Less than 3 percent stone and boulder cover and occasionally up to 10 percent cobble and gravel cover o Not skeletal (less than 35% rock fragments) within 20 inches (50 cm) of mineral soil surface o None to Slightly effervescent throughout top 20 inches (50 cm) of mineral soil surface o Non-saline, sodic, or saline-sodic o Textures range from fine sandy loam to clay in top 4 inches (10 cm) of mineral soil surface o Clay content is greater than or equal to 18 percent in top 4 inches (10

cm) of mineral soil surface o All subsurface horizons in the particle size control section have a weighted average of greater than 35 percent clay. (The particle size control section is the segment of the profile from either the start of an argillic horizon for 50 cms or from 25-100 cms).

Associated sites

EX043B23B109	**Cobbly Upland (CoU) Absaroka Upper Foothills** Cobbly Upland sites will contain inclusions of Clayey Overflow in concave positions of a slope.
EX043B23B104	**Clayey (Cy) Absaroka Upper Foothills** Clayey sites will contain inclusions of Clayey Overflow in concave positions of a slope.
EX043B23B128	**Lowland (LL) Absaroka Upper Foothills** Depositional areas or areas that do not receive influence from the water table within the Lowland site may contain clayey overflow.
EX043B23B175	**Skeletal (Sk) Absaroka Upper Foothills** Skeletal sites will contain inclusions of Clayey Overflow in concave positions of a slope.

Similar sites

EX043B23B130	**Overflow (Ov) Absaroka Upper Foothills** Overflow has a higher diversity of plant species and is more productive than the clayey overflow site. The heavy/fine soil texture limits the clayey overflow.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. vaseyana* (2) *Symphoricarpos occidentalis*
Herbaceous	(1) *Leymus cinereus* (2) *Elymus trachycaulus*

Legacy ID

R043BX606WY

Physiographic features

The Clayey Overflow ecological site is located on nearly level to rolling lands with 30 percent or less slope; either adjacent to streams that run water at least during the major part of the growing season or on alluvial fans adjacent to toe slopes or foothills.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Alluvial fan (2) Foothills > Drainageway (3) Foothills > Stream terrace
Runoff class	Low to high
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Elevation	1,830 – 2,740 m
Slope	0 – 30 %
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 15 to 19 inches (381 – 483 mm). The normal precipitation pattern shows peaks in June tapering into September. This amounts to about 50 percent of the mean annual precipitation. Average snowfall is about 150 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.
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.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. High winds are generally blocked by high mountains but occur in conjunction with thunderstorms, which are common in late summer. Growth of native cool-season plants begins about May 1 to May 15 and continues until about October 15.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/. Historically, Crandall Creek was the
representative weather stations within this subset. However, Sunshine 3NE, Yellowstone Park Mammoth, and Tower Falls are the only available weather stations within a close proximity in location and characteristics for this subset. The following graphs and charts are a collective sample representing the averaged normals and 30-year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3 Representative climatic features

Frost-free period (characteristic range)	20-60 days
Freeze-free period (characteristic range)	40-100 days
Precipitation total (characteristic range)	360-410 mm

Frost-free period (actual range)	10-70 days
Freeze-free period (actual range)	20-110 days
Precipitation total (actual range)	360-410 mm
Frost-free period (average)	40 days
Freeze-free period (average)	70 days
Precipitation total (average)	380 mm

- (1) SUNSHINE 3NE [USC00488758], Meeteetse, WY
- (2) YELLOWSTONE PK MAMMOTH [USC00489905], Yellowstone National Park, WY
- (3) TOWER FALLS [USC00489025], Yellowstone National Park, WY

Influencing water features

The characteristics of these upland soils have no influence from ground water (water table below 60 inches (150 cm)). This site is characterized by the influence from surface water/overland flow from adjacent slopes, that has created a long-term shift in vegetation. The hydrology reflects more of a lowland position, lacking the ground water influence. These soils are prone to drought effects due to the hydrologic relationship to precipitation rather than to ground water. Isolated features that are affected by snow pack may connect and will persists longer than surrounding areas due to position on the landform (shaded/protected pockets).

Soil features

The soils of this site are very deep to moderately deep (greater than 20" to bedrock), moderately well to well-drained that formed in alluvium or alluvium over residuum. These soils have slow to moderate permeability. The surface soil will vary from 2 to 5 inches deep. These soils may develop severe cracks. The soil characteristics having the most influence on plants are the heavy texture and the additional available moisture. These areas receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

Table 4. Representative soil features

Parent material	(1) Slope alluvium – igneous, metamorphic and sedimentary rock (2) Residuum – shale and siltstone
Surface texture	(1) Cobbly, gravelly clay loam (2) Clay (3) Silty clay loam (4) Sandy clay loam
Drainage class	Moderately well drained to somewhat poorly drained

Permeability class	Very slow to moderate
Soil depth	50 cm
Surface fragment cover <=3"	0 – 20 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (Depth not specified)	5.08 – 15.75 cm
Calcium carbonate equivalent (Depth not specified)	0 – 10 %
Clay content (10.2-50.8cm)	40 – 60 %
Electrical conductivity (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	6.4 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

Potential vegetation on this site is dominated by tall and mid cool-season perennial grasses. Other significant vegetation includes mountain big sagebrush, silver sagebrush, rubber rabbitbrush, and a variety of forbs. The expected potential composition for this site is about 75 percent grasses, 15 percent forbs and 10 percent 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 rhizomatous wheatgrasses, bluegrasses, and mountain big sagebrush will increase. Weedy annuals will invade. Cool-season grasses such as, basin wildrye, Columbia needlegrass, and slender wheatgrass will decrease in frequency and production.

In some instances, mountain big sagebrush may become dominant on areas with an absence of fire and sufficient amount of overflow. If treatment of a stand is necessary, thinning is usually preferred instead of total removal. This can be accomplished by chemical, mechanical or closely monitored burning.

The upper foothills landscape holds snowpack longer, especilly in depressional areas, north aspects and along the edge of timbered areas. These locations can have a significant influence from the slower melt off of the snowpack and will have a dominant community of shrubby cinquefoil and tufted hairgrass. Although many of these locations will key to Clayey Overflow, but this may not be the most appropriate correlation. Consider looking at a Wet Meadow or Lowland ecological site.

The Reference Community Phase (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	**Tall-stature, Cool-season Grasses**			308-1121	
	basin wildrye	LECI4	*Leymus cinereus*	280-560	10-25
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	84-336	5-15
	mountain brome	BRMA4	*Bromus marginatus*	0-224	0-10
	nodding brome	BRAN	*Bromus anomalus*	0-84	0-5
2	**Mid-stature, Cool-season Bunchgrasses**			56-280	
	Idaho fescue	FEID	*Festuca idahoensis*	0-196	0-10
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0-84	0-5
	Cusick's bluegrass	POCU3	*Poa cusickii*	0-56	0-5
3	**Rhizomatous, Cool-season Grasses**			224-560	
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	224-504	10-25
	Montana wheatgrass	ELAL7	*Elymus albicans*	0-196	0-10
	western wheatgrass	PASM	*Pascopyrum smithii*	0-196	0-10
4	**Miscellaneous Grasses/Grass-likes**			0-196	
	muttongrass	POFE	*Poa fendleriana*	0-84	0-5
	Sandberg bluegrass	POSE	*Poa secunda*	0-84	0-5
	squirreltail	ELEL5	*Elymus elymoides*	0-84	0-5
	spike trisetum	TRSP2	*Trisetum spicatum*	0-84	0-5
	timber oatgrass	DAIN	*Danthonia intermedia*	0-84	0-5
	Grass, perennial	2GP	*Grass, perennial*	0-84	0-5
Forb					
5	**Perennial Forbs**			56-224	
	lupine	LUPIN	*Lupinus*	0-84	0-5
	buttercup	RANUN	*Ranunculus*	0-84	0-5
	fleabane	ERIGE2	*Erigeron*	0-84	0-5
	phlox	PHLOX	*Phlox*	0-84	0-5
	beardtongue	PENST	*Penstemon*	0-84	0-5
	goldenrod	SOLID	*Solidago*	0-84	0-5

	groundsel	TEPHR3	*Tephroseris*	0-84	0-5
	Forb, perennial	2FP	*Forb, perennial*	0-84	0-5
Shrub/Vine					
6	**Dominant Shrubs**			280-560	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	112-336	5-15
	silver sagebrush	ARCA13	*Artemisia cana*	0-112	0-5
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0-112	0-5
7	**Miscellaneous Shrubs**			0-280	
	chokecherry	PRVI	*Prunus virginiana*	0-84	0-5
	Saskatoon serviceberry	AMAL2	*Amelanchier alnifolia*	0-84	0-5
	Woods' rose	ROWO	*Rosa woodsii*	0-84	0-5
	currant	RIBES	*Ribes*	0-84	0-5
	snowbrush ceanothus	CEVE	*Ceanothus velutinus*	0-84	0-5
	Shrub, other	2S	*Shrub, other*	0-84	0-5

Table 6. Community 1.2 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 3.1 plant community composition

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

Table 9. Community 3.2 plant community composition

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

Table 10. Community 4.1 plant community composition

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

Animal community

Animal Community – Wildlife Interpretations Rhizomatous Wheatgrass/Green Needlegrass (Refernce): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, deer, 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. 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 meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here. Perennial Grasses/Big Sagebrush Plant Community: The combination of an overstory of shrubs and an understory of grasses and forbs plus it proximity to water 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 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. Big Sagebrush/Rhizomatous Wheatgrass Plant Community: The combination of an overstory of shrubs and an understory of grasses and forbs plus it proximity 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 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. Dense Shrub/Bare Ground 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 excellent escape and thermal cover for large ungulates, as well as nesting habitat for upland game birds including sage grouse. Weedy Annuals/Short Grass Plant Community: These communities provide limited foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover and if the Historic Climax Plant Community or the Perennial Grasses/ Big Sagebrush Plant Community is limiting. 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 with 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* The Carrying capacity is calculated as the production (normal year) X .25 efficiency factor / 912.5 # / AUM to calculate the AUM's/Acre. Plant Community Description/Title Lbs./Acre AUM/Acre* Acre/AUM Below Ave. Normal Above Ave. Slender Wheatgrass/Wildrye/Needlegrass 1250-2000-2500 0.55 1.83 Perennial Grass/Big Sagebrush 1250-1750-2750 0.48 2.09 Big Sagebrush/Rhizomatous Wheatgrasses ** ** Introduced Species/Big Sagebrush ** ** Invasive Species/Big Sagebrush ** ** Altered ** ** * - Carrying Capacity is figured for continuous, season-long grazing by cattle under average growing conditions. ** - Sufficient data for invaded and reclaimed communities has not be collected or evaluated, at this time, so no projection of a stocking rate recommendation or production range will be established at this time. 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. Distance to water, shrub density, and slope can affect carrying capacity (grazing capacity) within a management unit. Adjustments should be made for the area that is considered necessary for reduction of animal numbers. For example, 30% of a management unit may have 25% slopes and distances of greater than one mile from water; therefore, the adjustment is only calculated for 30% of the unit (i.e. 50% reduction on 30% of the management unit). Fencing, slope length, management, access, terrain, kind and class of livestock, and breeds are all factors that can increase or decrease the percent of graze-able acres within a management unit. Adjustments should be made that incorporate these factors when calculating stocking rates.

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. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (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. The wide varieties of plants which bloom from spring until fall have an aesthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

The Clayey Overflow ecological site is generally small in nature; however, the area will support fruit-bearing shrubs that are harvested for using for seeping (teas/herbal drinks) and baked goods (jams, jellies, etc.).

Inventory data references

Information presented here has been derived from NRCS inventory data, Field observations from range trained personnel, and the existing range site descriptions. Those involved in developing the Loamy range site include: Chris Krassin, Range Management Specialist, NRCS and Everet Bainter, Range Management Specialist. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, USDI and USDA Interpreting Indicators of Rangeland Health Version IV, and USDA NRCS Soil Surveys from various counties. Those involved in the development of the new concept for Loamy and Loamy Calcareous Ecological site include: Blaise Allen, Area Range Management Specialist, NRCS; Jim Wolf, Resource Manager, USDI-BLM; Patricia Hatle, Range Management Specialist, USDI-BLM; Daniel Wood, MLRA Soil Survey Leader, NRCS; Jane Karinen, Soil Data Quality Specialist, NRCS; and Marji Patz, Ecological Site Specialist, NRCS. Inventory Data References: Ocular field estimations observed by trained personnel were completed at each site. Then sites were selected where a 100 foot tape was stretched and the following sample procedures were completed by inventory staff. For full sampling protocol and guidelines with forms please refer to the Wyoming ESI Operating Procedures, compiled in 2012 for the Powell and Rock Springs Soil Survey Office, USDA-NRCS. • Double Sampling Production Data (9.6 hoop used to estimate 10 points, clipped a minimum of 3 of these estimated points, with two 21 foot X 21 foot square extended shrub plots). • Line Point Intercept (over story and understory captured with soil cover). Height of herbaceous and woody cover is collected every three feet along established transect.) • Continuous Line Intercept (Woody Canopy Cover, with minimum

gap of 0.2 of a foot for all woody species and succulents. Intercept height collected at each measurement.), • Gap Intercept (Basal Gap measured with a minimum gap requirement of 0.7 foot.), • Sample Point (10 – 1 meter square point photographs taken at set distances on transect. Red using the sample point computer program established by the High Plains Agricultural Research Center, WY). • Soil Stability (Slake Test – surface and subsurface samples collected and processed according to the soil stability guidelines provided by the Jornada Research Center, NM.)

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Contributors

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Approval

Kirt Walstad, 3/06/2025

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	04/06/2020
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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **Rare to nonexistent.**

2. **Presence of water flow patterns:** **Water flow patterns sometimes evident in ephemeral floodplain zone where this site occurs.**

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 5-15%.**

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:** Minimal to nonexistent.

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move in water flow patterns.

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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):** Soil Stability Index ratings range from 2 (interspaces) to 6 (under plant canopy), but average values should be 2.5 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil data is limited for this site. Described A-horizons vary from 2 to 8 inches (5-20 cm). Organic matter is typically 1 to 2%.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 60-75% grasses, 20% forbs, and 5-20% shrubs. Moderate plant canopy (50-70%) and litter plus slow to moderately slow infiltration rates result in slight to moderate runoff. Basal cover is typically around 2-3% for this site and does not effectively reduce runoff on this site.

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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):** No compaction layer exists.

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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: Rhizomatous, Cool-season Grasses < Tall-stature, Cool-season Grasses

    Sub-dominant: Mid-stature, Cool-season Grasses < Perennial Shrubs

    Other: Perennial Forbs << Short-stature, Cool-season Bunchgrasses

    Additional:

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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 20-40% of total canopy measurement with total litter (including beneath the plant canopy) from 75-90% expected. Herbaceous litter depth typically ranges from 10-25 mm. Woody litter can be up to several inches (>8 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** **Estimated production is 1250-2500 lb/ac (1401 - 2802 kg/ha) with an average of 2000 lb/ac (2242 kg/ha). This is based on few ocular estimations, more data is needed.**

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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% or noxious weed invasion are the most common indicators of a threshold being crossed. Rhizomatous wheatgrasses, Sandberg bluegrass, and mountain big sagebrush are common increasers. Annual weeds such as mustard and Canada thistle are common invasive species on disturbed sites.**

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