USDA Natural Resources
Conservation Service

Ecological site R049XA126WY
Loamy Overflow (Foothills and Mountains Southeast)

Accessed: 05/13/2025

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.

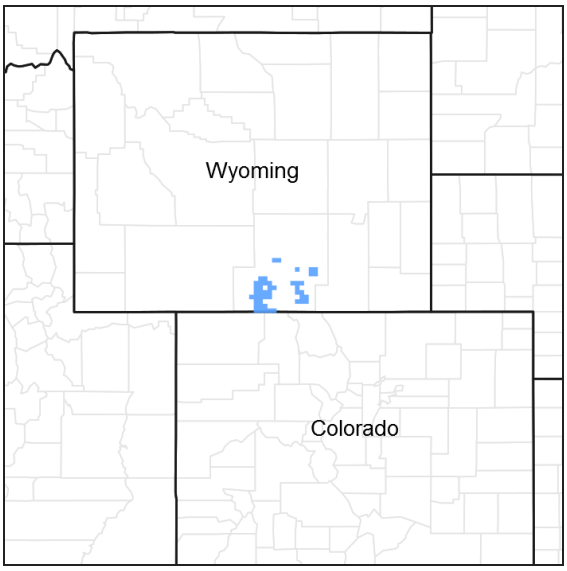


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R049XA122WY	**Loamy (Foothills and Mountains Southeast)** Loamy
R049XA174WY	**Subirrigated (Foothills and Mountains Southeast)** Subirrigated

Similar sites

R049XA122WY	**Loamy (Foothills and Mountains Southeast)** Loamy, 049XA122WY has less basin wildrye and lower production

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on areas that receive additional water from overflow of intermittent streams or runoff from adjacent

slopes.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Frequent
Ponding frequency	None
Elevation	1,981–2,591 m
Slope	0–6%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

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 1 and continues to about August 1.

The following information is from the “Hecla 1E” climate station:

Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 93 151 May 20 – September 14
Freeze-free period (days): 106 184 May 9 – September 26
Annual Precipitation (inches): 9.56 24.23

Mean annual precipitation: 16.04 inches
Mean annual air temperature: 44.7F (32.1F Avg. Min. to 57.2F Avg. Max.)
For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/ website. Other climate station(s) representative of this precipitation zone include ”Glenrock 14 SSE”, “Foxpark” and “Horse Creek 2 NW”.

Table 3. Representative climatic features

Frost-free period (average)	151 days
Freeze-free period (average)	184 days
Precipitation total (average)	2,311 mm

Influencing water features

Soil features

The soils of this site are deep to very deep well-drained soils formed in mixed alluvium. Layers of the soil most

influential to the plant community varies from 3 to 6 inches thick. These soils have moderate to rapid permeability. The surface soil is highly variable and will vary from 2 to 8 inches in thickness and will be one or more of the following textures: very fine sandy loam, fine sandy loam, sandy loam, loam, silt loam, clay loam, and silty clay loam. These areas receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

Major Soil Series correlated to this site include:

Other Soil Series correlated to this site include:

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Clay
Family particle size	(1) Loamy
Drainage class	Moderately well drained to excessively drained
Permeability class	Moderate to rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–15.75 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–10
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

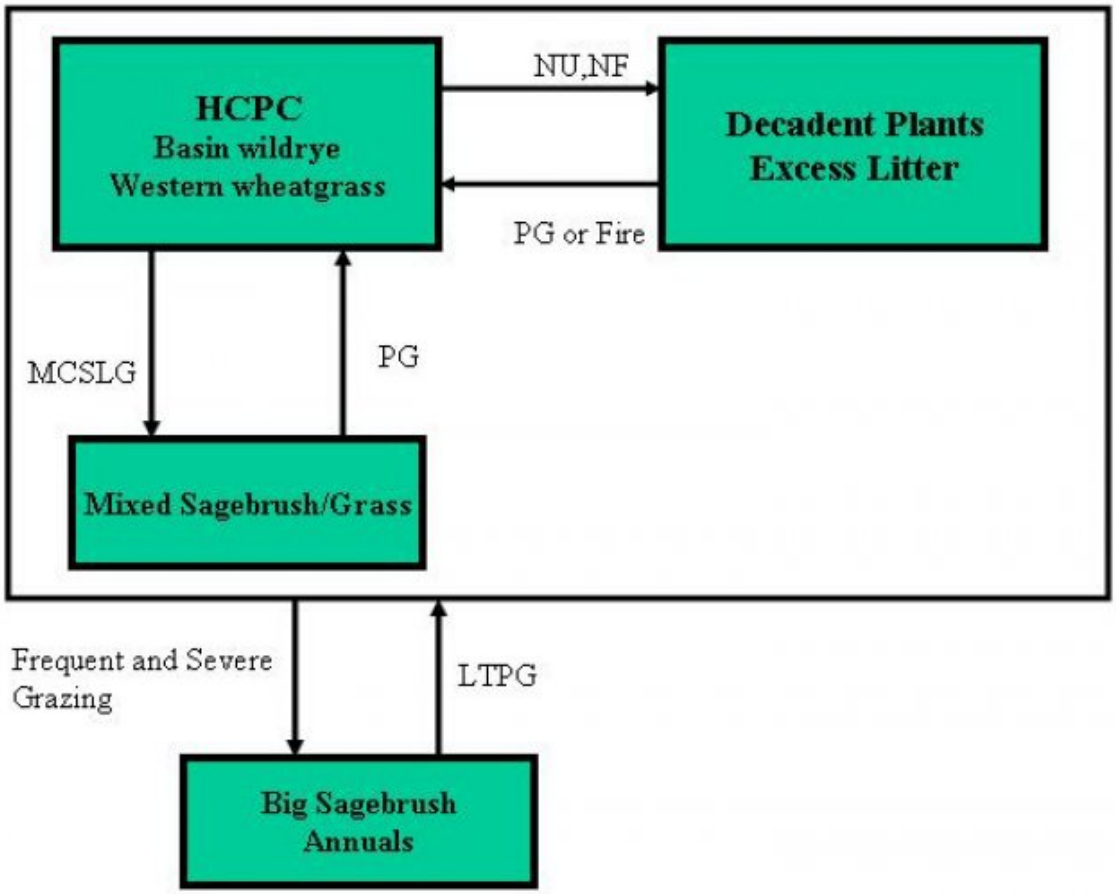
Ecological Dynamics of the Site:

As this site deteriorates, species such as Sandberg bluegrass and big sagebrush will increase. Cool season grasses such as basin wildrye and big bluegrass 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



Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season
MCSLG - Moderate, Continuous Season-long Grazing
NU, NF - No Use and No Fire
PG - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)
LTPG – Long Term Prescribed Grazing (may take generations)

State 1
Basin wildrye, Western wheatgrass Plant Community

Community 1.1
Basin wildrye, Western wheatgrass Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is about 75% grasses or grass-like plants, 15% forbs and 10% woody plants. The major grasses include basin wildrye and rhizomatous wheatgrasses. Other grasses occurring on the state include Canby and Sandberg bluegrass, Columbia needlegrass, threadleaf sedge, mountain muhly, and prairie junegrass. Forbs commonly found in this plant community include western yarrow, penstemons and biscuitroots. Woody plants include big sagebrush, winterfat and snowberry. The total annual production (air-dry weight) of this state is about 2000 pounds per acre, but it can range from about 1500 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 5 10 35 30 15 5 0 0 0 (Monthly percentages of total annual growth) This plant community is extremely stable and well adapted to the climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Moderate, Continuous Season-Long grazing will convert the plant community to the Mixed sagebrush/Grass Vegetation State. • No Use and No Fire will convert this plant community to the Decadent Plants/Excess Litter Vegetation State.

Figure 4. Plant community growth curve (percent production by month). WY1002, 15-19SE extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	15	5	0	0	0

State 2
Mixed Sagebrush/Grass Plant Community

Community 2.1
Mixed Sagebrush/Grass Plant Community

This plant community evolved under moderate grazing by domestic livestock. Cool-season grasses make up the majority of the understory with the balance made up of annual cool-season grass, and miscellaneous forbs. Dominant grasses include rhizomatous wheatgrasses, Kentucky bluegrass, and Sandberg bluegrass,. Grasses of secondary importance include mat muhly and prairie junegrass. Annuals have invaded this state. Big sagebrush has increased, with canopy cover up to 20%. Forbs commonly found in this plant community include Louisiana sagewort (cudweed), western yarrow, and Hoods phlox. When compared to the Historical Climax Plant Community, rhizomatous wheatgrasses have increased. Basin wildrye and big bluegrass have decreased, often occurring only where protected from grazing by the big sagebrush canopy. Production of cool-season grasses has also been reduced. Annuals and Kentucky bluegrass have invaded. The overstory of big sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope. The total annual production (air-dry weight) of this state is about 1400 pounds per acre, but it can range from about 1000 lbs./acre in unfavorable years to about 1800 lbs./acre in above average years. The following is the growth curve expected during a normal year: Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 5 10 35 30 15 5 0 0 0 (Monthly percentages of total annual growth) The state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. However, it can be at risk depending on how far a shift has occurred in plant composition toward big sagebrush, and/or annuals. The watershed is usually functioning. However, it can become at risk when canopy cover of big sagebrush, annuals, and/or bare ground increases. Transitional pathways leading to other plant communities are as follows: • Prescribed grazing will result in a plant community very similar to the Historic Climax Plant Community except that the big sagebrush will persist. • Frequent and Severe grazing will result in the Big sagebrush/Annuals Vegetation State.

Figure 5. Plant community growth curve (percent production by month). WY1002, 15-19SE extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	15	5	0	0	0

State 3
Big sagebrush/Annuals Plant Community

Community 3.1
Big sagebrush/Annuals Plant Community

This plant community is the result of long-term improper grazing use. Big sagebrush, rhizomatous wheatgrasses, annuals, and Sandberg bluegrass dominate this state. Noxious weeds may have invaded. Hoods phlox, cudweed sagewort, and western yarrow have increased. The total annual production (air-dry weight) of this state is about 900 pounds per acre, but it can range from about 600 lbs./acre in unfavorable years to about 1400 lbs./acre in above average years. The following is the growth curve expected during an average year. Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 5 10 35 30 15 5 0 0 0 (Monthly percentages of total annual growth) The biotic integrity is threatened by the invasion of noxious weeds. The soil of this state is protected. The watershed is functioning but may produce excessive runoff. Transitional pathways leading to other plant communities are as follows: • Prescribed grazing over the long-term will move this state towards the Mixed Sagebrush/Grass plant community.

Figure 6. Plant community growth curve (percent production by month). WY1002, 15-19SE extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	15	5	0	0	0

State 4
Decadent Plants, Excess Litter Plant Community

Community 4.1
Decadent Plants, Excess Litter Plant Community

This plant community occurs after an extended period of non-use, and where fire has been eliminated. The dominant plants tend to be similar to those found in the Historic Climax Plant Community, however in advanced stages, frequency and production can be lower. Litter amounts have increased causing plants to become decadent. Much of the plant nutrients are tied up in excessive litter. Organic matter oxidizes in the air rather than being incorporated into the soil due to the absence of animal impact. Typically, bunchgrasses (basin wildrye) develop dead centers and rhizomatous grasses (western wheatgrass) form small colonies because of a lack of tiller stimulation. Total annual production (air-dry weight) is about 1,800 pounds per acre during an average year, but it can range from about 1,400 pounds per acre in unfavorable years to about 2,000 pounds per acre in above average years. The following is the growth curve of this plant community expected during an average year: Growth curve number: Growth curve name: Growth curve description: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 5 5 35 35 15 5 0 0 0 (monthly percentages of total annual growth) This plant community is not resistant to change. Grazing or fire can easily move it toward the HCPC. Soil erosion is not a concern due to increased litter levels and landscape position. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing or fire will shift this plant community towards the Basin wildrye, Western wheatgrass Plant Community (HCPC).

Figure 7. Plant community growth curve (percent production by month). WY1002, 15-19SE extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	35	30	15	5	0	0	0

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				560–1233	
	basin wildrye	LECI4	*Leymus cinereus*	448–785	–
	western wheatgrass	PASM	*Pascopyrum smithii*	112–448	–
2				448–673	
	Grass, perennial	2GP	*Grass, perennial*	0–112	–
	mountain brome	BRMA4	*Bromus marginatus*	0–112	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–112	–
	Idaho fescue	FEID	*Festuca idahoensis*	0–112	–
	needle and thread	HECO26	*Hesperostipa comata*	0–112	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–112	–
	mountain muhly	MUMO	*Muhlenbergia montana*	0–112	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–112	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–112	–
Forb					
3				112–336	
	Forb, perennial	2FP	*Forb, perennial*	0–112	–
	yarrow	ACHIL	*Achillea*	0–112	–
	textile onion	ALTE	*Allium textile*	0–112	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–112	–
	Indian paintbrush	CASTI2	*Castilleja*	0–112	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–112	–
	desertparsley	LOMAT	*Lomatium*	0–112	–
	beardtongue	PENST	*Penstemon*	0–112	–
	spiny phlox	PHHO	*Phlox hoodii*	0–112	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–112	–
	clover	TRIFO	*Trifolium*	0–112	–
Shrub/Vine					
4				224–448	
	silver sagebrush	ARCA13	*Artemisia cana*	0–112	–
	big sagebrush	ARTR2	*Artemisia tridentata*	0–112	–
	snowbrush ceanothus	CEVE	*Ceanothus velutinus*	0–112	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–112	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–112	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0–112	–

Animal community

Animal Community – Wildlife Interpretations
Historic Climax Plant Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as 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. Birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland

obligate small mammals would occur here.

Mixed Sagebrush/Grass: The combination of an overstory of sagebrush and an understory of grasses and forbs provide 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. Brewer's sparrows' nest in big sagebrush plants, and hosts of other nesting birds utilize stands in the 20-30% cover range.

Big sagebrush/annuals: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

Decadent Plants, Excessive Litter 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.

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 (lb./ac)	Carrying Capacity* (AUM/ac)
Historic Climax Plant Community	2000	.6
Mixed Sagebrush/Grass	1400	.5
Big sagebrush/annuals	900	.3
Decadent Plants/Excess Litter	1800	.5

* - 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. Infiltration ranges from moderate to rapid. Runoff potential for this site varies from moderate to high 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 variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

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 was also used.

Inventory Data References
Data Source Number of Records Sample Period State County
SCS-RANGE-417 24 1963 -1987 WY Albany & others

Other references

Other sources used as references include: High Plains Regional Climate Center, USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	03/01/2005
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills should not be present

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

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3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 15-25% occurring in small areas throughout site

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None

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7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

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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):** Plant cover and litter is at 75% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 5 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration is Moderately Slow to Slow.

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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 or soil surface crusting should be present.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional: Tall Cool Season Bunch Grasses >Mid stature Cool Season Rhizomatous and Bunch Grasses > Shrubs> Forbs > Short stature Grasses/Grasslike

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very Low

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14. **Average percent litter cover (%) and depth (in):** Average litter cover is 30-40% with depths of 0.25 to 1.0 inches

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 2000 lbs/ac

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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:** Big Sagebrush, Rabbitbrush, Snowberry, Sandberg Bluegrass, and Species found on Noxious Weed List

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17. **Perennial plant reproductive capability:** All species are capable of reproducing

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