

Ecological site R034AY306WY

Clayey Overflow High Plains Southeast (CyO)

Accessed: 05/11/2025

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.

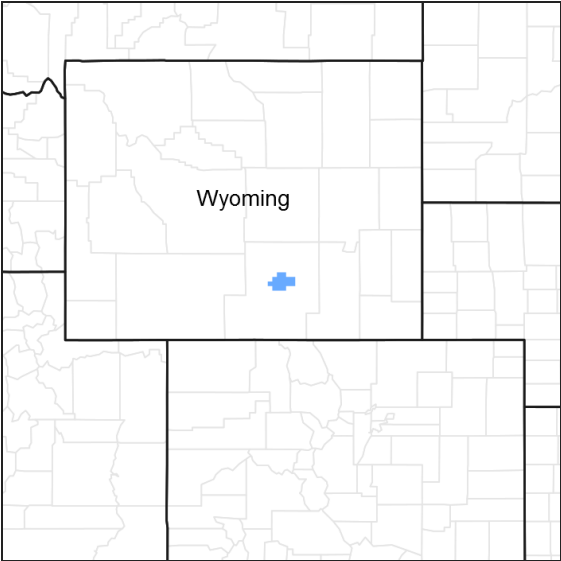


Figure 1. Mapped extent

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

R034AY304WY	<b>Clayey High Plains Southeast (Cy)</b> Clayey
R034AY326WY	<b>Loamy Overflow High Plains Southeast (LyO)</b> Loamy Overflow
R034AY328WY	<b>Lowland High Plains Southeast (LL)</b> Lowland

Similar sites

R034AY326WY	<b>Loamy Overflow High Plains Southeast (LyO)</b> Loamy Overflow (LyO), 10-14SE has coarser soil textures.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

This site occurs on gently sloping to moderately sloping flood plains, canyons, and small valley bottoms along intermittent streams. This site is found on all exposures .

**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	5,500–7,500 ft
Slope	0–10%
Ponding depth	0 in
Aspect	Aspect is not a significant factor

## Climatic features

Annual precipitation ranges from 10-14 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.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about June 15. Some green up of cool season plants usually occurs in September.

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

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days): 57 149 June 1 – September 16

Freeze-free period (days): 94 183 May 15 – September 28

Annual Precipitation (inches): 5.8 17.34

Mean annual precipitation: 11.53 inches

Mean annual air temperature: 42.2 F (30.4 F Avg. Min. to 53.9 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. Other climate station(s) representative of this precipitation zone include “Dixon ” and “Medicine Bow”.

**Table 3. Representative climatic features**

Frost-free period (average)	149 days
Freeze-free period (average)	183 days
Precipitation total (average)	14 in

## Influencing water features

Stream type: None

## Soil features

The soils of this site are moderately deep (greater than 20" to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. Layers of the soil most influential to the plant community varies from 3 to 6 inches thick. These soils have slow permeability. The surface soil will vary from 2 to 5 inches deep and have one of the following textures: silty clay, sandy clay, clay, and the finer portions of silty clay loam, clay loam, and sandy clay loam. These soils may develop severe cracks. These areas receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

**Table 4. Representative soil features**

Surface texture	(1) Clay loam (2) Clay (3) Sandy clay loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to slow
Soil depth	20–60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2.8–5.7 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–10
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

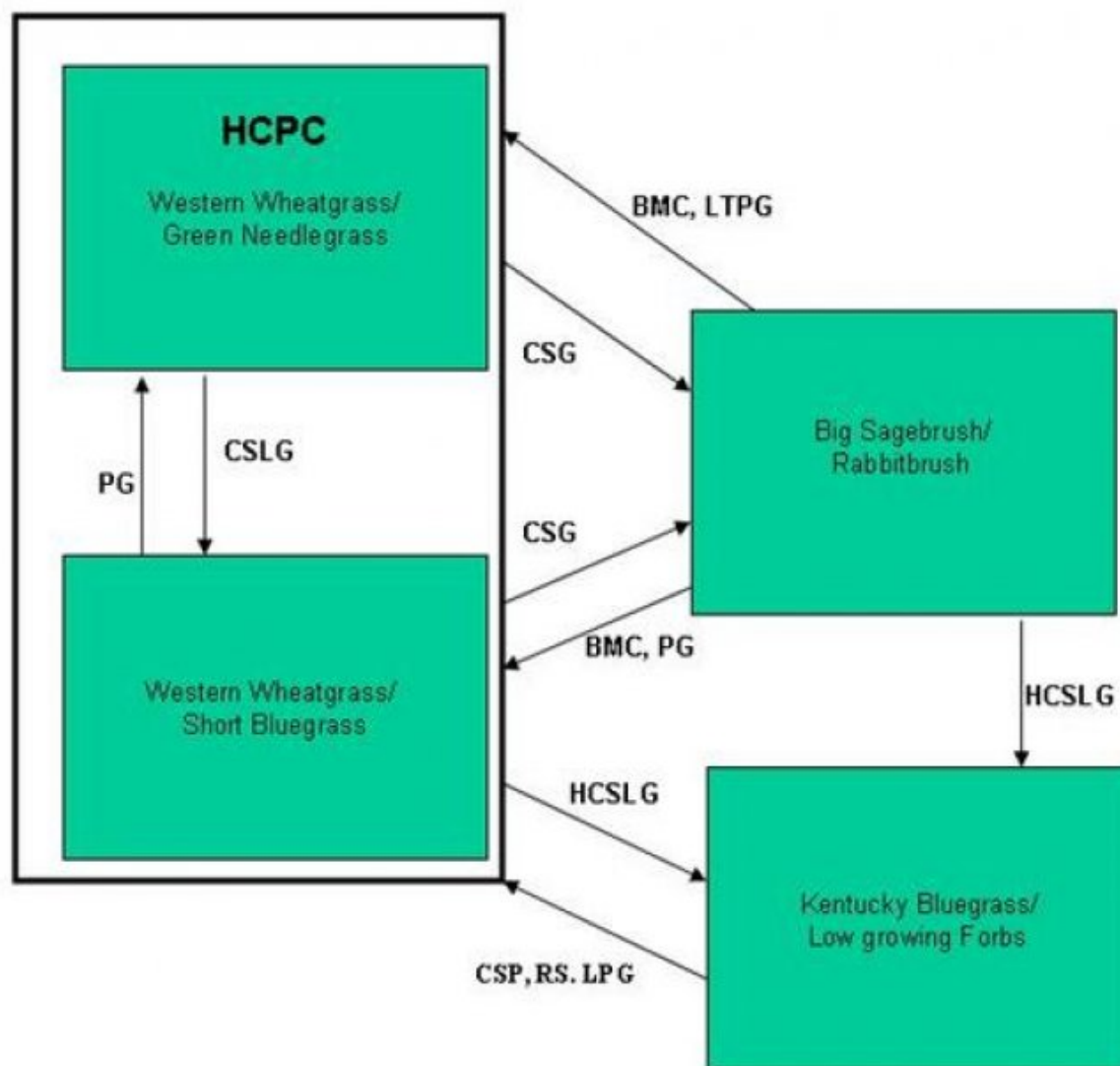
## Ecological dynamics

As this site deteriorates woody species such as big sagebrush and rabbitbrush will increase. As improper grazing continues Kentucky bluegrass and low growing forbs become dominant.

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



BMA – Brush Management (all methods)  
BMC – Brush Management (chemical)  
BMF – Brush Management (fire)  
BMM – Brush Management (mechanical)  
CSP – Chemical Seedbed Preparation  
CSLG – Continuous Season-long Grazing  
DR – Drainage  
CSG – Continuous Spring Grazing  
HB – Heavy Browse  
HCSLG – Heavy Continuous Season-long Grazing  
HI – Heavy Inundation  
LPG – Long-term Prescribed Grazing  
MT – Mechanical Treatment (chiseling, ripping, pitting)  
MCSLG – Moderate Continuous Season Long Grazing

NF – No Fire  
NS – Natural Succession  
NWC – Noxious Weed Control  
NWI – Noxious Weed Invasion  
NU – Nonuse  
P&C – Plow & Crop (including hay)  
PG – Prescribed Grazing  
RPT – Re-plant Trees  
RS – Re-seed  
SGD – Severe Ground Disturbance  
SHC – Severe Hoof Compaction  
WD – Wildlife Damage (Beaver)  
WF – Wildfire

State 1  
Western Wheatgrass / Green Needlegrass Plant Community (HCPC)

Community 1.1  
Western Wheatgrass / Green Needlegrass Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is estimated at 70% grasses or grass-like plants, 10% forbs and 20% woody plants. The major grasses include western wheatgrass, slender wheatgrass, basin wildrye, and green needlegrass. Silver sagebrush is the major woody plant. Other woody plants that may occur include rabbitbrush and snowberry. A typical plant composition for this state consists of western wheatgrass 30-45%, slender wheatgrass 10-20%, green needlegrass 10-20%, others grass species 5-10%. Perennial forbs 5-10% and woody plants 5-10%. Ground cover, by ocular estimate, varies from 40-50%. The total annual production (air-dry weight) of this state is about 1800 pounds per acre, but it can range from about 1200 lbs./acre in unfavorable years to about 2200 lbs./acre in above average years. This state is extremely stable and well adapted to the Cool Central Desertic Basins and Plateaus climate. The diversity in plant species allows for high drought resistance. 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: • Continuous Spring Grazing will convert the plant community to the Big Sagebrush / Rabbitbrush plant community. • Continuous Season-long Grazing will convert the plant community to the Western Wheatgrass/ Short Bluegrass Plant Community.

Figure 3. Plant community growth curve (percent production by month).  
WY0902, 10-14SE extra water sites.

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

State 2  
Big Sagebrush / Rabbitbrush Plant Community

Community 2.1  
Big Sagebrush / Rabbitbrush Plant Community

This plant community is the result of continuous spring grazing of the HCPC. Woody species become dominant and mid bunch grasses have decreased in production. Big sagebrush may exceed 40% of annual production. The total annual production (air-dry weight) of this state is about 1000 pounds per acre, but it can range from about 400 lbs./acre in unfavorable years to about 1400 lbs./acre in above average years. The state is moderately stable and somewhat vulnerable to 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 silver sagebrush. The watershed is usually functioning. However, it can become at risk due to increase in canopy cover of woody species and bare ground. Transitional pathways leading to other plant communities are as follows: • Brush Management (chemical) with Long-term Prescribed Grazing will return this state to near Historic Climax Plant Community- Western Wheatgrass/ Green Needlegrass Plant Community • Brush Management (chemical) with Prescribed Grazing will convert the plant community to the Western Wheatgrass/ Short Bluegrass Plant Community. • Heavy Continuous Season Long Grazing following Brush Management will lead the community towards the Kentucky Bluegrass/ Low Growing Forb Plant Community.

Figure 4. Plant community growth curve (percent production by month).  
WY0902, 10-14SE extra water sites.

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

State 3  
Western Wheatgrass / Short Bluegrass Plant Community

Community 3.1

**Western Wheatgrass / Short Bluegrass Plant Community**

This plant community is a result of heavy continuous season-long grazing. Mid bunchgrasses such as basin wildrye and green needlegrass are replaced by low growing Sandberg, Canby and mutton bluegrasses. This site becomes susceptible to change caused by grazing practices and fire. The total annual production (air-dry weight) of this state is about 1500 pounds per acre, but it can range from about 1000 lbs./acre in unfavorable years to about 2000 lbs./acre in above average years. This state is moderately stable but may be vulnerable to excessive erosion. The biotic integrity of this community is still intact for the most part lacking structural diversity. The watershed is usually functioning but may be at risk if bare soil increases. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing will return this state to near Historic Climax Plant Community- Western Wheatgrass/ Green Needlegrass Plant Community • Heavy Continuous Season Long Grazing following Brush Management will lead the community towards the Kentucky Bluegrass/ Low Growing Forb Plant Community.

Figure 5. Plant community growth curve (percent production by month).  
WY0902, 10-14SE extra water sites.

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

**State 4**  
**Kentucky Bluegrass/ Low Growing Forb Plant Community**

**Community 4.1**  
**Kentucky Bluegrass/ Low Growing Forb Plant Community**

This plant community is a result of heavy continuous season-long grazing alone or in combination with brush management practices. The total annual production (air-dry weight) of this state is about 1500 pounds per acre, but it can range from about 1000 lbs./acre in unfavorable years to about 2000 lbs./acre in above average years. This state is somewhat stable but is vulnerable to excessive erosion and noxious weed invasion. The biotic integrity of this community is at risk. The watershed is usually functioning at risk but trending toward non functioning. Transitional pathways leading to other plant communities are as follows: • Chemical Seedbed Preparation, Reseeding, and Long Term Prescribed Grazing will return this state to near Historic Climax Plant Community- Western Wheatgrass/ Green Needlegrass Plant Community. Some Remnants of Introduced species will remain.

Figure 6. Plant community growth curve (percent production by month).  
WY0902, 10-14SE extra water sites.

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

**Additional community tables**

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				540–810	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	540–810	–
2				180–360	
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	180–360	–
3				180–360	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	180–360	–
4				90–180	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	90–180	–
5				90–360	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–90	–
		ACBL	<i>Achnatherum ×bloomeri</i>	0–90	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–90	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–90	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–90	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–90	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–90	–
<b>Forb</b>					
6				90–270	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–90	–
	yarrow	ACHIL	<i>Achillea</i>	0–90	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0–90	–
	beardtongue	PENST	<i>Penstemon</i>	0–90	–
	phlox	PHLOX	<i>Phlox</i>	0–90	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–90	–
<b>Shrub/Vine</b>					
7				90–270	
	birdfoot sagebrush	ARPE6	<i>Artemisia pedatifida</i>	0–90	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–90	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–90	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–90	–

## Animal community

### Animal Community – Wildlife Interpretations

Western Wheatgrass/ Green Needlegrass Plant Community (HCPC): The predominance of grasses in this community favors foraging animals such as Elk, Antelope, and other small herbivores. Suitable thermal and escape cover for mule deer may be limited due to the low availability of woody species. When found adjacent to sagebrush dominated sites, this plant community may provide suitable brood rearing / foraging areas for sage grouse. Other birds that frequent this site include meadow larks, horned larks, and raptors. Many small grassland obligates will also be seen here.

Big Sagebrush/ Rabbitbrush Plant Community: This plant community is beneficial for the same wildlife species found with in the HCPC. The additional increase in Woody Species provides thermal and escape cover for deer, small mammals, and birds.

Western Wheatgrass/ Short Bluegrass Plant Community: This plant community may be beneficial for the same wildlife 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.

Kentucky Bluegrass/ Low Growing Forb Plant Community: This plant community may be beneficial for the same wildlife 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.

#### 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)

Western Wheatgrass/ Green Needlegrass (HCPC) 1200-2200 0.6

Big Sagebrush/ Rabbitbrush 400-1400 0.33

Western Wheatgrass/ Short Bluegrass 1000-2000 0.5

Kentucky Bluegrass/ Low Growing Forbs 1000-2000 0.5

\* - 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. 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. Cryptogammic 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 esthetic values that appeal to visitors.

### Wood products

No appreciable wood products are present on the site.

### 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. 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 69 1967-1988 WY Carbon  
& others

## Contributors

B. Brazee

## 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	05/05/2005
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.
- 
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
- 
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.
- 
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 stature Cool Season Bunch Grasses > Mid stature Cool Season Rhizomatous Grasses > Short stature Grasses/Grasslike > Forbs = Shrubs
- 
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):** 1800 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:** Bluegrasses, Bromes, Annuals, 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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