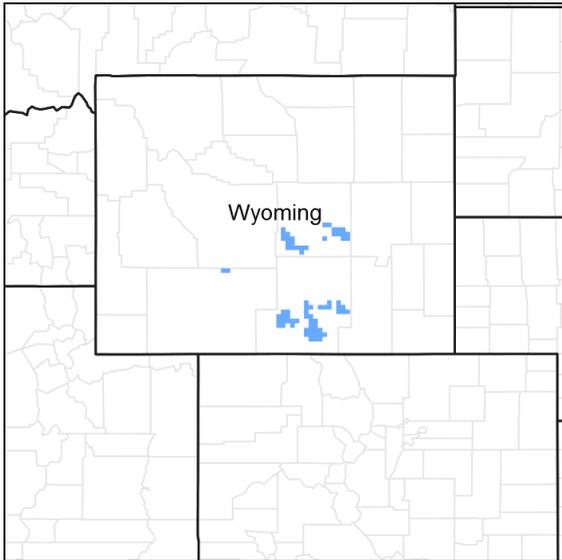


# Ecological site R034AY374WY Subirrigated High Plains Southeast (Sb)

Accessed: 04/19/2024

## 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.

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

This site will usually occur on level to nearly level land along perennial or intermittent streams near seeps, springs, and sloughs.

**Table 2. Representative physiographic features**

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	5,500–7,500 ft

Slope	1–10%
Ponding depth	0 in
Water table depth	12–40 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: C (Rosgen)

## Soil features

The soils of this site are deep and formed from alluvium. They have water tables below the surface for all of the growing season. The water table is non-saline and non-alkaline. They are loamy soils with a seasonal high water table depth of about 1 to 3 feet most years. Mottling or gleying usually occurs within 20 to 40 inches of the surface. These areas may have water over the surface from run-in, but only for short periods of time.

**Table 4. Representative soil features**

Surface texture	(1) Loam (2) Clay loam (3) Silt loam
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Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Moderately slow to moderate
Soil depth	20–60 in
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–5%
Available water capacity (0-40in)	2.5–5.5 in
Calcium carbonate equivalent (0-40in)	0–40%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–8.6
Subsurface fragment volume <=3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–15%

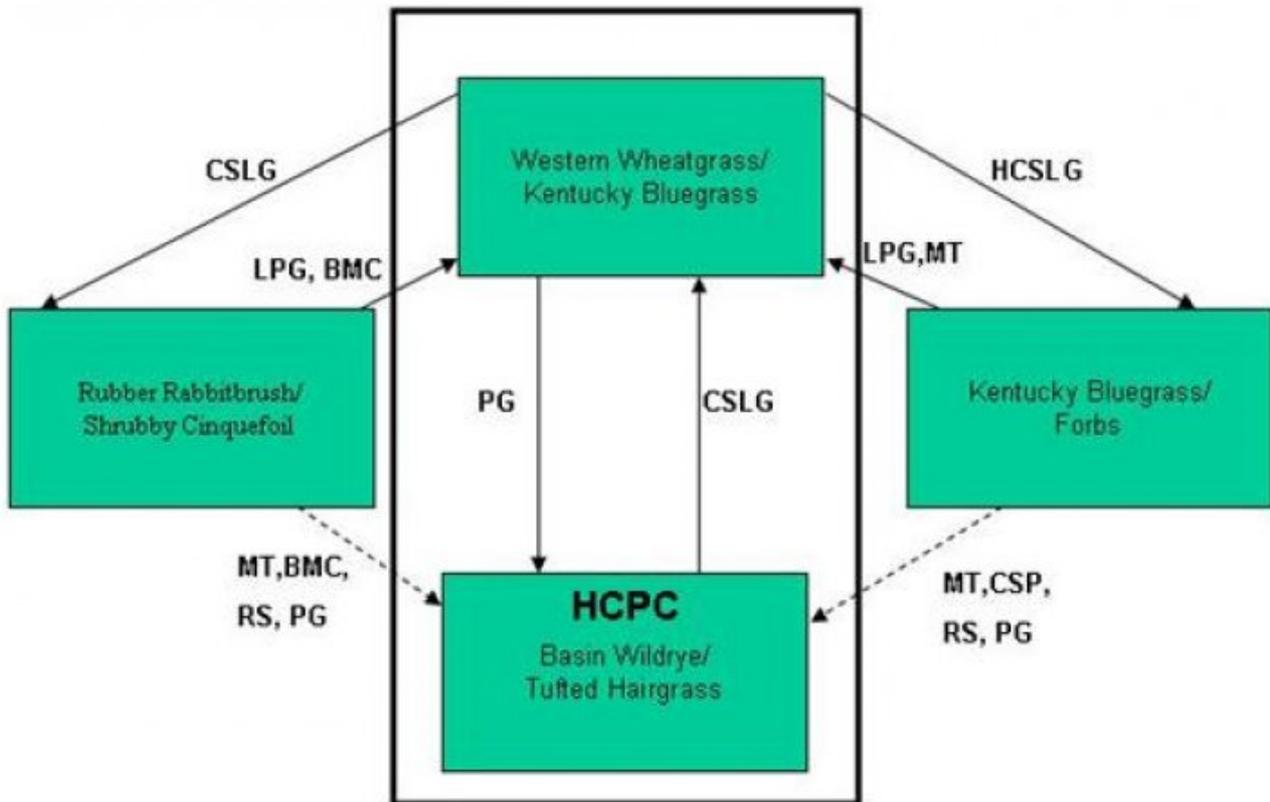
## Ecological dynamics

As this site deteriorates, species such as rubber rabbitbrush and shrubby cinquefoil increase. Grasses and grasslikes such as tufted hairgrass, Nebraska sedge, and basin wildrye will decrease in frequency and production. Willow stands will become decadent with a lack of diverse age classes as site declines. This site is vulnerable to noxious weed invasion by such species as Canada thistle.

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

### Basin Wildrye / Tufted Hairgrass Plant Community (HCPC)

#### Community 1.1

##### Basin Wildrye / Tufted Hairgrass Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is estimated at 80% grasses or grass-like plants, 10% forbs and 10% woody plants. The major grasses include basin wildrye, tufted hairgrass, and western wheatgrass. Woody species include willows, rubber rabbitbrush, and shrubby cinquefoil. A typical plant composition for this state consists of basin wildrye 35-50%, tufted hairgrass 15-25%, western wheatgrass 10-15%, perennial forbs 5-10%, and shrubs 5-10%. Ground cover, by ocular estimate, varies from 75-85%. The total annual production (air-dry weight) of this state is about 3700 pounds per acre, but it can range from about 3000 lbs./acre in unfavorable years to about 4300 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 Season-long Grazing will convert the plant community to the Western Wheatgrass / Kentucky Bluegrass Plant Community.

Figure 3. Plant community growth curve (percent production by month).  
WY0903, 10-14SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	0	0	0

## State 2

### Western Wheatgrass / Kentucky Bluegrass Plant Community

#### Community 2.1

##### Western Wheatgrass / Kentucky Bluegrass Plant Community

This plant community is the result of moderate continuous season long grazing of the HCPC. Western wheatgrass and Kentucky bluegrass dominate the site. A decrease in basin wildrye and tufted hairgrass provide the opportunity for species tolerant of grazing to increase and others to invade the site. Kentucky bluegrass, low growing sedges and forbs increase along with western wheatgrass. Some increase in shrubs may be noted. The soil resource is not protected by deep rooted perennial grasses which may lead to erosion. The biotic integrity is reduced due to low vegetative production. The hydrologic cycle is functioning but at risk. The total annual production (air-dry weight) of this state is about 2250 pounds per acre, but it can range from about 1500 lbs./acre in unfavorable years to about 3000 lbs./acre in above average years. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing or Long-term Prescribed Grazing will return this state to near Historic Climax Plant Community (Basin Wildrye / Tufted Hairgrass Plant Community). Kentucky Bluegrass will remain in this community. • Heavy Continuous Season-long Grazing will convert the plant community to the Kentucky Bluegrass / Forbs plant community • Continuous Season long Grazing will lead this state to the Rubber Rabbitbrush / Shrubby Cinquefoil Plant Community

Figure 4. Plant community growth curve (percent production by month).  
WY0903, 10-14SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	0	0	0

## State 3

### Kentucky Bluegrass / Forbs Plant Community

#### Community 3.1

##### Kentucky Bluegrass / Forbs Plant Community

This plant community is a result of heavy continuous season-long grazing. Severe hoof compaction typically occurs due to moisture regime and fine textures. Kentucky bluegrass becomes the dominant grass with low growing sedges common throughout. Perennial forbs such as yarrow, cinquefoil, geranium, black medic, horsetail and dandelion are common. Western wheatgrass is still part of the community but is reduced to 5- 10%. This state is unstable and vulnerable to erosion and noxious weed invasion. Biotic integrity is slight and hydrology is not functioning. The total annual production (air-dry weight) of this state is about 1900 pounds per acre, but it can range from about 1300 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. Transitional pathways leading to other plant communities are as follows: • Mechanical Treatment (Chiseling, etc.) followed by Prescribed Grazing or Long-term Prescribed Grazing may eventually return this state to Western Wheatgrass / Kentucky Bluegrass. • Mechanical Treatment (Chiseling, etc.) followed by Chemical Seedbed Preparation , Reseeding, and Prescribed Grazing or Long-term Prescribed Grazing may eventually return this state to near Historic Climax Plant Community (Basin Wildrye / Tufted Hairgrass).

**Figure 5. Plant community growth curve (percent production by month). WY0903, 10-14SE free water sites.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	0	0	0

## State 4

### Rubber Rabbitbrush / Shrubby Cinquefoil Plant Community

#### Community 4.1

### Rubber Rabbitbrush / Shrubby Cinquefoil Plant Community

This plant community is a result of continuous season-long grazing. Rubber rabbitbrush, shrubby cinquefoil, and willows are abundant in this state. Western wheatgrass and Kentucky bluegrass become the dominant grasses with low growing sedges common throughout. Undesirable perennial forbs are common in the understory. This state is unstable and vulnerable to surface erosion and noxious weed invasion. Biotic integrity is slight and hydrologic function is at risk. The total annual production (air-dry weight) of this state is about 2250 pounds per acre, but it can range from about 1500 lbs./acre in unfavorable years to about 3000 lbs./acre in above average years. Transitional pathways leading to other plant communities are as follows: • Brush Management (Chemical) followed by Prescribed Grazing or Long-term Prescribed Grazing may eventually return this state to Western Wheatgrass / Kentucky Bluegrass. • Mechanical Treatment (Chiseling, etc.), Brush Management (Chemical), Reseeding, and Prescribed Grazing or Long-term Prescribed Grazing may eventually return this state to near Historic Climax Plant Community (Basin Wildrye / Tufted Hairgrass). Remnants of Kentucky Bluegrass and other introduced perennial grasses will be present

**Figure 6. Plant community growth curve (percent production by month). WY0903, 10-14SE free water sites.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	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				1295–1850	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	1295–1850	–
2				555–925	
3				370–555	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	370–555	–
4				185–370	
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	185–370	–
5				185–555	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–185	–
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	0–185	–
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	0–185	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta ssp. inexpansa</i>	0–185	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–185	–
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	0–185	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	0–185	–
<b>Forb</b>					
6				185–370	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–185	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–185	–
	scouringrush horsetail	EQHY	<i>Equisetum hyemale</i>	0–185	–
	waterleaf	HYDRO4	<i>Hydrophyllum</i>	0–185	–
	iris	IRIS	<i>Iris</i>	0–185	–
	American bistort	POBI6	<i>Polygonum bistortoides</i>	0–185	–
	clover	TRIFO	<i>Trifolium</i>	0–185	–
	arrowgrass	TRIGL	<i>Triglochin</i>	0–185	–
	violet	VIOLA	<i>Viola</i>	0–185	–
<b>Shrub/Vine</b>					
7				185–370	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–185	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0–185	–
	Woods' rose	ROWOW	<i>Rosa woodsii var. woodsii</i>	0–185	–
	willow	SALIX	<i>Salix</i>	0–185	–

## Animal community

### Animal Community – Wildlife Interpretations

Basin Wildrye / Tufted Hairgrass Plant Community (HCPC): This plant community is very important for most wildlife in the area. Over 80% of all wildlife use this site to fulfill some part of their habitat needs. It provides forage and hiding cover for mule deer, elk, and antelope. It provides nesting habitat for shorebirds, songbirds, and waterfowl as well as ground nesting birds such as harriers. The lush herbaceous material produces insects for sage grouse brood rearing and foraging. Dense ground cover provides escape cover, forage, and breeding areas for small mammals which draws predators such as raptors, red fox and coyote. Other birds that would frequent this plant community include red-wing blackbirds, sandhill cranes, western meadowlarks, neotropical migrants, and golden eagles.

Western Wheatgrass / Kentucky Bluegrass Plant Community: This plant community functions similarly to the HCPC and is useful for the same large grazers. Forage is available for large animals and some nesting habitat remains for a variety of small birds. Structural diversity is reduced with thermal and hiding cover available for only small animals. It may provide some brood rearing and foraging opportunities for sage grouse.

Kentucky Bluegrass / Forb Plant Community: 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. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover.

Rubber Rabbitbrush / Shrubby Cinquefoil Plant Community: This plant community may be beneficial for some of the same wildlife that would use the Historic Climax Plant Community. However, the woody component is typically less productive and unable to support large browsers. As woody plants decrease, structural diversity is lost for neotropical migrants, cover decreased for deer, and nesting for shrub-nesting birds is impacted. It may provide some brood rearing and foraging opportunities for sage grouse when it occurs proximal to woody cover.

#### 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)

Basin Wildrye / Tufted Hairgrass (HCPC) 3000-4300 1.2

Western wheatgrass / Kentucky Bluegrass 1500-3000 0.7

Kentucky Bluegrass/ Forbs 1300-2500 0.6

Rubber Rabbitbrush / Shrubby Cinquefoil 1500-3000 0.7

\* - 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

Climate is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group C. Infiltration rate is slow when soils are thoroughly wet. These soils have a slow rate of water transmission due to moderately fine to fine textures and/or high water table conditions. However, high forage production on this site diminishes runoff potential as long as site is managed for maintaining adequate residual vegetation. (Refer to Part 630, NRCS National Engineering Handbook for detailed hydraulic information).

Rills and gullies should not typically be present. Water flow patterns may be present if associated with a perennial flowing stream. Litter typically falls in place, and signs of movement are not common unless associated with a perennial flowing stream. Chemical and physical crusts are rare to non-existent.

## Recreational uses

This site provides a variety of hunting opportunities as well as providing popular camping areas for recreationists. This site has a wide variety of forbs which bloom throughout spring and summer, providing esthetic values that appeal 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 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	05/01/2005
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
- 

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

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not**

**bare ground):** Bare ground is less than 5%

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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 95% 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 moderately rapid.

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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 and Mid stature Grasses/grasslikes >> Forbs = Shrubs > Short stature Grasses/Grasslikes

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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 50-55% with depths of 0.75 to 1.5 inches

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 3700 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:** Low growing sedges, Shrubby cinquefoil, Rubber rabbitbrush, Smooth Brome, Kentucky Bluegrass, 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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