

Ecological site R034AY328WY  
Lowland High Plains Southeast (LL)

Accessed: 05/19/2024

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.

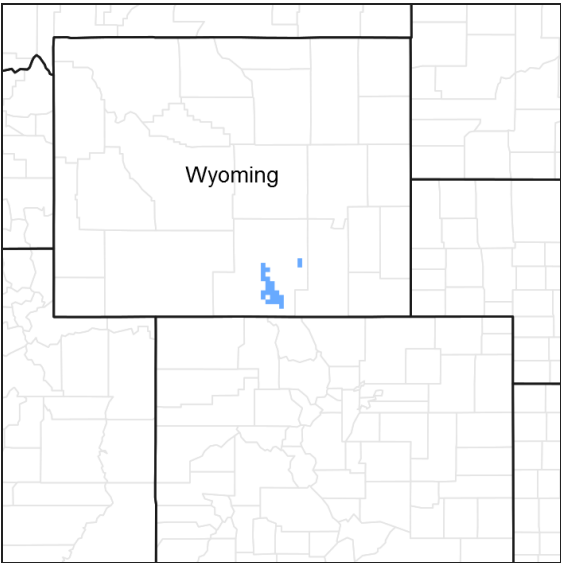


Figure 1. Mapped extent

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 occurs on gently sloping land along perennial or intermittent streams. It is found on all exposures. Slopes are mostly from 0 to 3%.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Drainageway (3) Stream terrace
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	1,676–2,286 m

Slope	0–10%
Ponding depth	0 cm
Water table depth	30–152 cm
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)	356 mm

## Influencing water features

Stream type: C (Rosgen)

## Soil features

These soils are mostly deep, moderately well-drained soils on second bottoms near perennial streams and were formed in alluvium. A fluctuating water table occurs in these areas and ranges from 1 to 5 feet, but is usually deeper than 3 feet.

**Table 4. Representative soil features**

Surface texture	(1) Loam (2) Clay loam (3) Silty clay loam
Family particle size	(1) Clayey

Drainage class	Poorly drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–5%

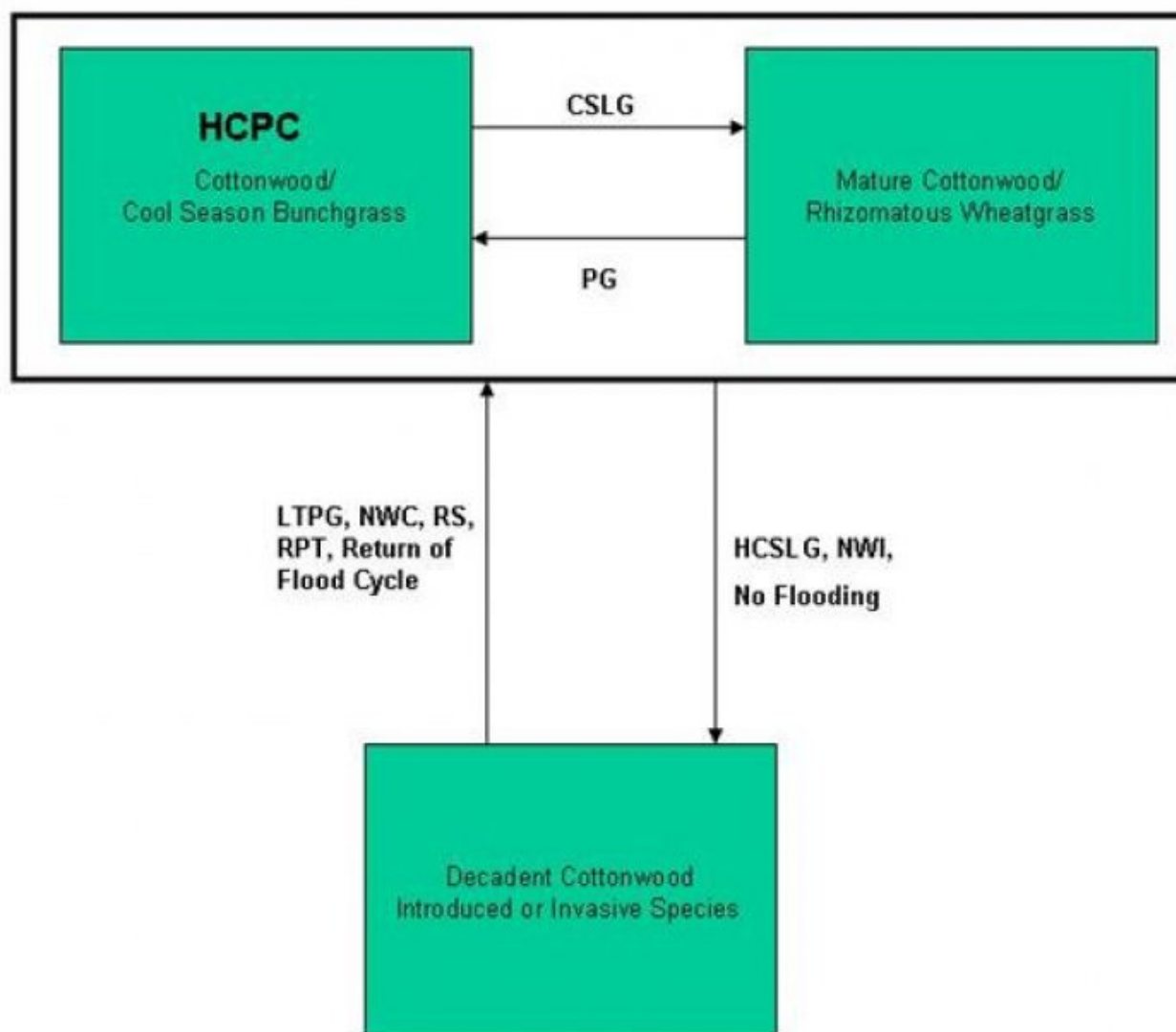
## Ecological dynamics

As this site deteriorates from improper grazing management, species such as Silver sagebrush and rubber rabbitbrush will increase, and species such as thistles and Kentucky bluegrass invade the site. Grasses such as basin wildrye and needleandthread will decrease in frequency and production. Cottonwood will lose younger age classes.

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**  
**Cottonwood / Cool Season Bunchgrass Plant Community (HCPC)**

**Community 1.1**  
**Cottonwood / Cool Season Bunchgrass Plant Community (HCPC)**

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is estimated at 60% grasses or grass-like plants, 10% forbs and 30% woody plants. The major grasses include basin wildrye, needle and thread, western wheatgrass, green needlegrass, and, Indian ricegrass. Narrowleaf cottonwood is the major woody plant. Other woody plants that may occur include silver sagebrush, chokecherry, rubber rabbitbrush, buffaloberry, and snowberry. A typical plant composition for this state consists of basin wildrye 10-20%, needle and thread 10-20%, western wheatgrass 10-20%, perennial forbs 5-10%, cottonwood 5-10%, silver sagebrush 5-10%. Ground cover, by ocular estimate, varies from 45-55%. The total annual production (air-dry weight) of this state is about 2300 pounds per acre, but it can range from about 1600 lbs./acre in unfavorable years to about 3000 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 Mature Cottonwood/Rhizomatous Wheatgrass • Heavy Continuous Season-long Grazing with Noxious weed invasion and flood control will convert the plant community to the Decadent Cottonwood/Introduced or Invasive Species

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 2**  
**Mature Cottonwood / Rhizomatous Wheatgrass Plant Community**

**Community 2.1**  
**Mature Cottonwood / Rhizomatous Wheatgrass Plant Community**

This plant community is the result of continuous season long grazing of the HCPC. Desirable bunchgrasses such as basin wildrye and needle and thread have been greatly reduced. Young cottonwoods have been browsed and replaced with silver sagebrush, rubber rabbitbrush and snowberry. The total annual production (air-dry weight) of this state is about 1800 pounds per acre, but it can range from about 1100 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. The soils of this state are moderately protected. The loss of deep rooted perennial bunchgrasses have affected biotic integrity may be reduced due to low vegetative production. The watershed is functioning ,but is at risk of rapidly degrading with improper management.. 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 –Cottonwood/Cool Season Bunchgrass. • Heavy Continuous Season-long Grazing with Noxious weed invasion and flood control will convert the plant community to the Decadent Cottonwood/Introduced or Invasive Species

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 3**  
**Decadent Cottonwood / Introduced or Invasive Species Plant Community**

**Community 3.1**  
**Decadent Cottonwood / Introduced or Invasive Species Plant Community**

This plant community is a result of heavy continuous season-long grazing, noxious weed invasion, and flood control. The plant community is primarily composed of smooth brome, Kentucky bluegrass and non native forbs such as burdock, Canada thistle, and leafy spurge. Woody species that remain are tolerant of heavy grazing disturbance and include silver sagebrush, rubber rabbitbrush, and snow berry. Cottonwoods have low vigor and recruitment. The total annual production (air-dry weight) of this state is about 1800 pounds per acre, but it can range from about 1100 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. This state is unstable and vulnerable to excessive erosion. The biotic integrity of this plant community is at risk or non-functioning. The watershed is usually at risk or non-functioning as bare ground increases. Transitional pathways leading to other plant communities are as follows: • Long Term Prescribed Grazing, Noxious Weed Control, Return of Flood Water, Reseeding, and Replanting Trees may eventually return this state to near Historic Climax Plant Community-Cottonwood/Cool Season Bunchgrass. Remnants of Introduced species will still be present and returning to HCPC may not be economically feasible. • Long Term Prescribed Grazing, Noxious Weed Control, Return of Flood Water will return this site to a plant community similar to Mature Cottonwood / Rhizomatous Wheatgrass.

**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 (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				258–516	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	258–516	–
2				258–516	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	258–516	–
3				258–516	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	258–516	–
4				129–258	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	129–258	–
5				129–258	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	129–258	–
6				129–516	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–129	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–129	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–129	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–129	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–129	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–129	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–129	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–129	–
<b>Forb</b>					
7				129–387	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–129	–
	yarrow	ACHIL	<i>Achillea</i>	0–129	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–129	–

	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–129	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–129	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–129	–
	aster	EUCEP2	<i>Eucephalus</i>	0–129	–
	beardtongue	PENST	<i>Penstemon</i>	0–129	–
	phlox	PHLOX	<i>Phlox</i>	0–129	–
	scurfpea	PSORA2	<i>Psoralea</i>	0–129	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–129	–
	violet	VIOLA	<i>Viola</i>	0–129	–
<b>Shrub/Vine</b>					
8				129–258	
	narrowleaf cottonwood	POAN3	<i>Populus angustifolia</i>	129–258	–
	plains cottonwood	PODEM	<i>Populus deltoides ssp. monilifera</i>	129–258	–
9				129–258	
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	129–258	–
10				129–387	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–129	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–129	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–129	–
	dogwood	CORNU	<i>Cornus</i>	0–129	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0–129	–
	chokecherry	PRVIV	<i>Prunus virginiana var. virginiana</i>	0–129	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–129	–
	currant	RIBES	<i>Ribes</i>	0–129	–
	Woods' rose	ROWOW	<i>Rosa woodsii var. woodsii</i>	0–129	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–129	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–129	–

## Animal community

### Animal Community – Wildlife Interpretations

Cottonwood / Cool Season Bunchgrass Plant Community (HCPC): The high degree of plant species and structural diversity, proximity to areas with water at or near the soil surface, and woody plants in this community favors a large variety of wildlife. Trees and shrubs provide suitable thermal and escape cover for mule deer, elk, and occasional whitetail deer as well as valuable nesting habitat for all primary and secondary tree-nesting birds. This community provides habitat for a wide array of small mammals such as jackrabbits, cottontail rabbits, mice, and voles so diverse prey populations are available for badgers, fox, coyotes, and raptors such as red-tail and Swainson's hawks. Birds such as western kingbird, western meadowlark, lark bunting, and grasshopper sparrow will utilize this community for nesting and foraging. The overstory of large cottonwoods provides habitat for a variety of birds ranging from golden eagles to neotropical migrants.

Mature Cottonwood / Rhizomatous Wheatgrass Plant Community: This plant community still has a moderate level of diversity and will benefit the same species found within the HCPC. Cover and structure found within this state may limit opportunities for small mammals and birds. Fawns and nesting sites may see increased depredation due to changes in plant community.

Decadent Cottonwood / Introduced or Invasive Species Plant Community: This plant community is less diverse, and thus, less able to meet the habitat needs of many wildlife species. Herbaceous forage and cover is not as dense and will aid in successful predation of nesting birds, therefore improving habitat for predators such as raptors, red fox, and coyote. It may provide some brood rearing and foraging opportunities for sage grouse when it occurs

proximal to shrub 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)

Cottonwood/Cool Season Bunchgrass (HCPC) 1600-3000 .6

Mature Cottonwood/ Rhizomatous Wheatgrass 1100-2500 .5

Decadent Cottonwood/ Introduced or Invasive 1100-2500 .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 herbaceous forage production on this site. This site is dominated by soils in hydrologic groups B and C, with localized areas in hydrologic group D. Infiltration ranges from moderately slow to rapid. 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. 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.

### Recreational uses

This site provides a variety of hunting opportunities as well 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

Limited value for firewood.

### 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

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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
- 
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 moderate.
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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: Mid stature Grasses >> Shrubs > Forbs > Short Grasses/grasslikes > Trees
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Some decadence and mortality among tree species
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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):** 2300 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:** Kentucky bluegrass, Smooth Brome, 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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