USDA Natural Resources
Conservation Service

Ecological site EX043B23A109
Cobbly Upland (CoU) Absaroka Lower Foothills

Last updated: 10/04/2019
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.

MLRA notes

Major Land Resource Area (MLRA): 043B–Central Rocky Mountains

Major Land Resource Unit (MLRA) 43B: Central Rocky Mountains

43B – Central Rocky Mountains – The Central Rocky Mountains extends from northern Montana to southern extent of Wyoming and from Idaho to central Wyoming. The southern extent of 43B is comprised of a combination of metamorphic, igneous, and sedimentary mountains and foothills. Climatic changes across this extent are broad and create several unique breaks in the landscape.

Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.
Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

LRU notes

Land Resource Unit (LRU) 43B23A: Absaroka Lower Foothills

Based on the shifts in geology, precipitation patterns and other climatic factors, as well as elevations and vegetation, the Absaroka Range was divided into LRU 23. Further division of this LRU is necessary due to the gradient moving from the foothills to the summit, as well as aspect shifts (north/east face versus south/west face). Subset A is set for the lower elevations within the foothills with 10 to 14 inches of precipitation. To verify or identify the LRU A (the referenced LRU for this ecological site), refer to the Wyoming LRU matrix key contained within the Ecological Site Key. This particular LRU occurs along the eastern lower foothills of the Absaroka Range. This LRU starts north of Clark, WY and runs to the Thermopolis, WY area. Once the foothills cross into the Northern Beartooth Range, the climatic patterns and elevational changes shifts the plant community and allows for a break in LRU's near the Montana state line. As the LRU follows to the south and tracks east with the intersection of the Absaroka and Owl Creek Ranges, the face changes aspect and geology creating a shift in plant dynamics and a break in the LRU. The extent of soils currently correlated to this ecological site does not fit within the digitized boundary. Many of the noted soils are provisional and will be reviewed and corrected in mapping update projects. Other map units are correlated as small inclusions within other MLRA’s/LRU’s based on elevation, landform, and biological references.

Moisture Regime: Aridic Ustic or Ustic Aridic – Progressive Initial mapping has shown that soil correlations completed prior to 2014 were identified as ustic aridic, after further evaluation of climatic and soil taxonomy information the proper moisture regime is aridic ustic. Both are recorded here until an update project is completed to correct the previous correlations.

Temperature Regime: Frigid

Dominant Cover: Rangeland – Sagebrush Steppe (major species is Wyoming Big Sagebrush)
Representative Value (RV) Effective Precipitation: 10-14 inches (254 – 355 mm)
RV Frost-Free Days: 80-110 days

Classification relationships

Relationship to Other Established Classification Systems:

National Vegetation Classification System (NVC):
3 Xeromorphic Woodland, Scrub & Herb Vegetation Class
3.B Cool Semi-Desert Scrub & Grassland Subclass
3.B.1 Cool Semi-Desert Scrub & Grassland formation
3.B.1.NE Western North American Cool Semi-Desert Scrub & Grassland Division
M169 Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe Macrogroup
G302 Artemisia Tridentata - Artemisia tripartita - Purshia tridentata Big Sagebrush Steppe Group
CEGL001535 - Artemisia tridentata ssp. wyomingensis/Pseudoroegneria spicata Herbaceous Vegetation or
CEGL001009 - Artemisia tridentata ssp. wyomingensis/Pseudoroegneria spicata Shrubland

Ecoregions (EPA):
Level I: 10 North American Deserts Level II: 10.1 Cold Deserts
Level III: 10.1.18 Wyoming Basin
Level IV: 10.1.18.b Big Horn Basin and
10.1.18.d Foothills and Low Mountains

Ecological site concept

• Site receives no additional water.
• Slope is <30%
• Soils are:
o Textures range from fine sandy loam to clay loam in top 4” (10 cm) of mineral soil surface
o Clay content is ≥18% in top 4” (10 cm) of mineral soil surface
o All subsurface horizons in the particle size control section have a weighted average of ≥18% but < 35% clay. (The particle size control section is the segment of the profile from either the start of an argillic horizon for 50 cm’s or from 25-100 cm’s).
o Moderately deep to very deep (20-80+ in. (50-200+ cm)
o <3% stone and boulder cover and >35% cobble and gravel cover
o Skeletal (≥35% rock fragments) starting within 8-20” (20-50 cm) of mineral soil surface (may have up to but not exceeding 35% rock fragments above 8")
o Non-saline, sodic, or saline-sodic

Associated sites

R032XY366WY	**Shallow Sandy (SwSy) 10-14" East Precipitation Zone**
R032XY350WY	**Sandy (Sy) 10-14" East Precipitation Zone**
R032XY358WY	**Shallow Clayey (SwCy) 10-14" East Precipitation Zone**
R032XY312WY	**Gravelly (Gr) 10-14" East Precipitation Zone**
R032XY328WY	**Lowland (LL) 10-14" East Precipitation Zone**

Similar sites

R032XY108WY	**Coarse Upland (CU) 5-9” Big Horn Basin Precipitation Zone** Coarse Upland 5-9” Wind River Basin, lower production than Coarse Upland 10-14” E
R032XY208WY	**Coarse Upland (CU) 5-9” Wind River Basin Precipitation Zone** Coarse Upland 5-9” Big Horn Basin, lower production than Coarse Upland 10-14” E

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. wyomingensis* (2) *Artemisia frigida*
Herbaceous	(1) *Pseudoroegneria spicata* (2) *Hesperostipa comata*

Legacy ID

R043BX509WY

Physiographic features

This site occurs on undulating rolling land.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Hillslope (2) Foothills > Eroded fan remnant (3) Foothills > Landslide
Runoff class	Negligible to high
Flooding frequency	None
Elevation	5,700–7,500 ft
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 10 to 14 inches (254 – 355 mm). The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall is about 20 inches annually. 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, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. High winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm. Growth of native cool-season plants begins about April 15th and continues until about July 1st. Cool weather and moisture in September may produce some green up of cool season plants that will continue through late October.

Review of a 30 year trend of data for Average Temperature as well as Average Precipitation, there has been a warming trend, but as the last 12 years graphed, the temperatures have swayed high and low, but overall it has maintained a steady trajectory, neither increasing nor decreasing. Where on the moisture side, the trajectory in trend has been a slow decline. The swings of when spring warm up and first frost hit with the decline in average precipitation have produced a drought effect where the moisture is not being received when the plants and ground is able to utilize the moisture. And in some cases, the late precipitation has encouraged the warm season or mat forming species over the cool season bunchgrasses that are the drivers of the natural system. Early frosts, with dry open winters has created a more arid or desert effect on plants resulting in high rates of winter kill, loss of vigor or overall damage to the plant.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at

http://www.wcc.nrcs.usda.gov/. “Buffalo Bill Dam", "Cody 21SW", "Thermopolis", "Thermopolis 25WNW" and "Wapiti 1NE" are the representative weather stations within LRU D. The following graphs and charts are a collective sample representing the averaged normals and 30 year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3. Representative climatic features

Frost-free period (characteristic range)	64-106 days
Freeze-free period (characteristic range)	101-144 days
Precipitation total (characteristic range)	11-12 in
Frost-free period (actual range)	46-118 days
Freeze-free period (actual range)	88-147 days
Precipitation total (actual range)	10-13 in
Frost-free period (average)	80 days
Freeze-free period (average)	117 days
Precipitation total (average)	12 in

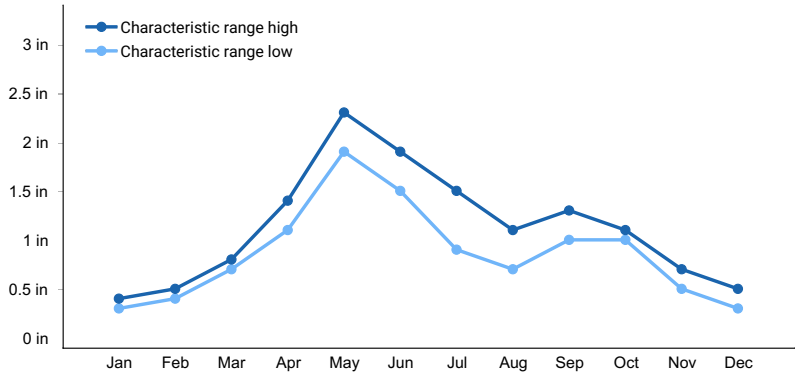


Figure 1. Monthly precipitation range

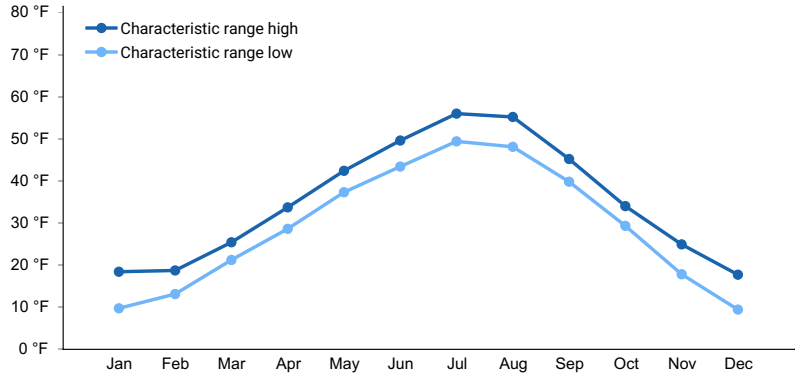


Figure 2. Monthly minimum temperature range

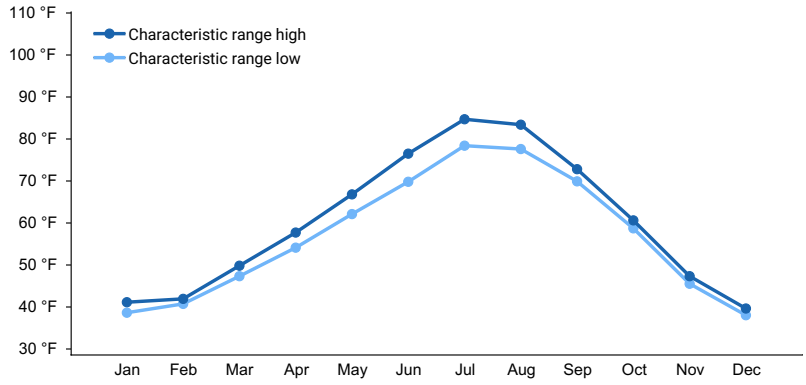


Figure 3. Monthly maximum temperature range

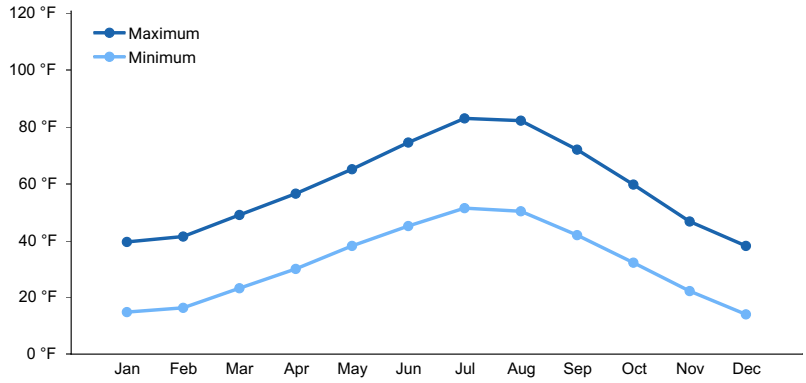


Figure 4. Monthly average minimum and maximum temperature

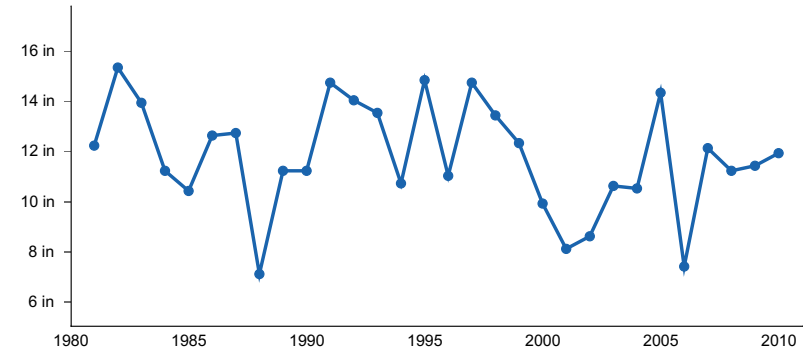


Figure 5. Annual precipitation pattern

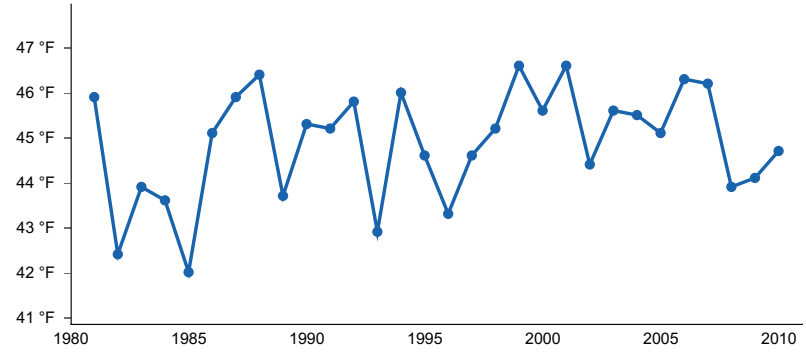


Figure 6. Annual average temperature pattern

Climate stations used

- (1) BUFFALO BILL DAM [USC00481175], Cody, WY
- (2) WAPITI 1NE [USC00489467], Cody, WY
- (3) CODY 21 SW [USC00481855], Cody, WY

- (4) SUNSHINE 3NE [USC00488758], Meeteetse, WY
- (5) THERMOPOLIS 25WNW [USC00488888], Thermopolis, WY
- (6) THERMOPOLIS [USC00488875], Thermopolis, WY

Influencing water features

The characteristics of these upland soils have no influence from ground water (water table below 60 inches (150 cm)) and have minimal influence from surface water/overland flow. There may be isolated features that are affected by snow pack that persists longer than surrounding areas due to position on the landform (shaded/protected pockets). Generally, the soils will appear dry (droughty) compared to surrounding non-skeletal sites.

Soil features

The soils of this site are deep to moderately deep (greater than 20" to bedrock), moderately well to somewhat excessively well-drained & moderately slow to moderately rapid permeable. This site consists of bouldery to cobbly coarse fragment soils. The soil surface can be covered extensively with these coarse fragments and as such, plant density can be reduced. The soil characteristics having most influential to the plant community are volume of coarse fragments in the profile that reduces the available moisture and the extensive cover of these coarse fragments, which can reduce the plant density.

Major Soil Series correlated to this site includes: Brownsto

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and shale (2) Colluvium–igneous, metamorphic and sedimentary rock (3) Slide deposits (4) Slope alluvium
Surface texture	(1) Cobbly loam (2) Very cobbly silt loam (3) Very fine sandy loam
Family particle size	(1) Fine-loamy (2) Loamy-skeletal (3) Fine-loamy over sandy or sandy-skeletal
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	20–60 in
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	2.8–6 in
Calcium carbonate equivalent (0-40in)	0–30%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–25%
Subsurface fragment volume >3" (Depth not specified)	0–35%

Ecological dynamics

Potential vegetation on this site is dominated by mid cool-season perennial grasses. Other significant vegetation includes big sagebrush and a variety of forbs. The expected potential composition for this site is about 75% grasses, 10% forbs and 15% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates species such as threadleaf sedge, Sandberg bluegrass, blue grama, and big sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool-season grasses such as Griffiths and bluebunch wheatgrass, rhizomatous wheatgrasses, and needleandthread will decrease in frequency and production.

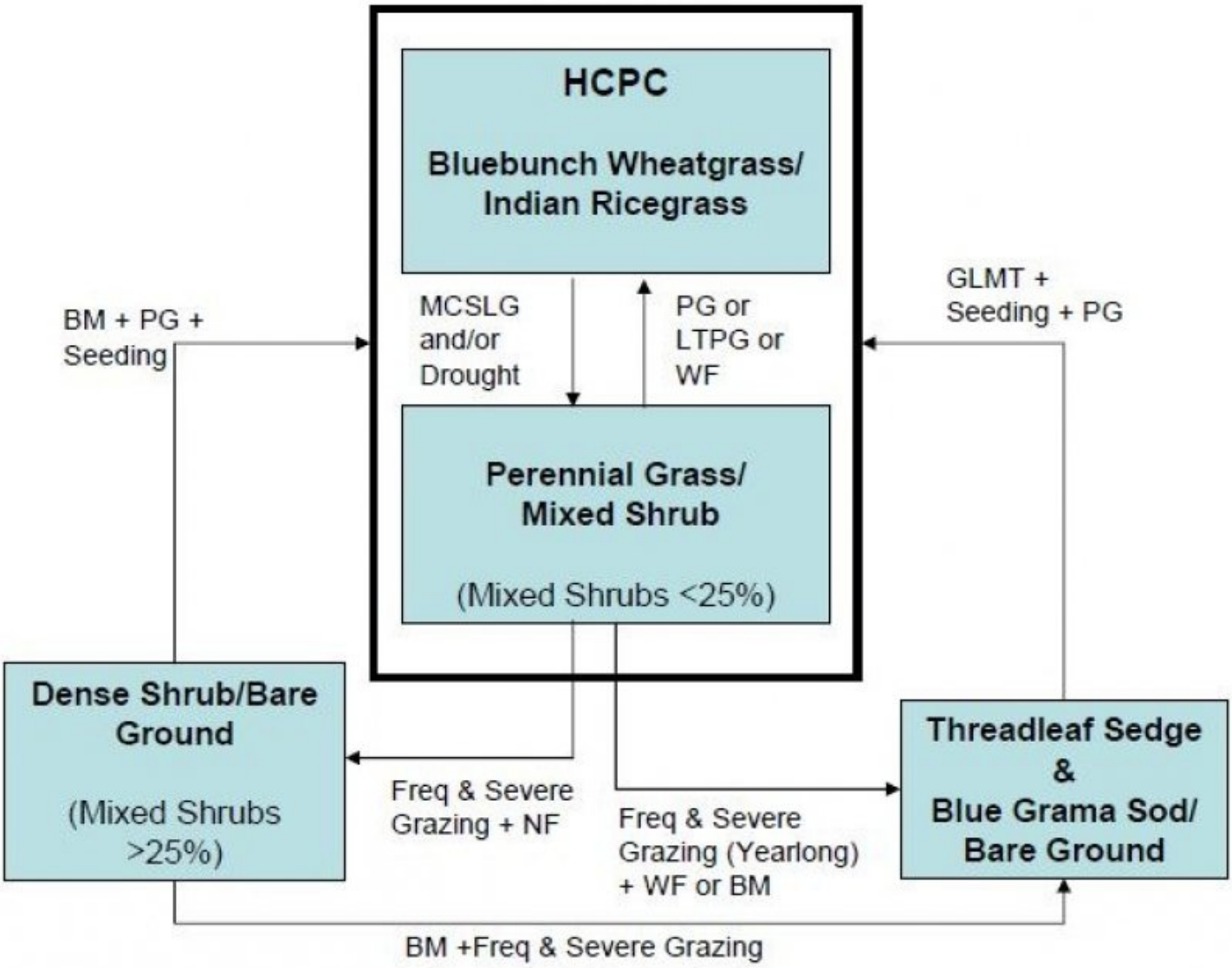
Big sagebrush may become dominant on some areas with an absence of fire. Wildfires are actively controlled in recent times so chemical control using herbicides has replaced the historic role of fire on this site. Recently, prescribed burning has regained some popularity.

Due to the amount and pattern of the precipitation, the big sagebrush component typically is not resilient once it has been removed if a healthy and vigorous stand of grass exists and is maintained. The exception to this is where the herbaceous component is severely degraded at the time of treatment, growing conditions are unfavorable after treatment, and/or recovery periods are inadequate.

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



BM - Brush Management (fire, chemical, mechanical)
Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season
GLMT - Grazing Land Mechanical Treatment
LTPG - Long-term Prescribed Grazing
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)
VLTPG - Very Long-term Prescribed Grazing (could possibly take generations)
WF - Wildfire (Natural or Human Caused)

State 1

Bluebunch Wheatgrass/ Indian Ricegrass

Community 1.1
Bluebunch Wheatgrass/ Indian Ricegrass

This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This state evolved with grazing by large herbivores and periodic fires. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and on areas receiving occasional short periods of rest. The potential vegetation is about 75% grasses or grass-like plants, 10% forbs, and 15% woody plants. This state is dominated by cool season mid-grasses. The major grasses include bluebunch wheatgrass, Indian ricegrass, rhizomatous wheatgrasses, spikefescue, and needleandthread. Other grasses occurring in this state include blue grama and Sandberg's bluegrass. A variety of forbs occurs on this site, as shown in the preceding table. Big sagebrush, black sagebrush, and rubber rabbitbrush are conspicuous species in this plant community. Antelope bitterbrush will occur on sites associated with the upper limits of this precipitation zone. These shrubs occur in a mosaic pattern, and make up 15% of the annual production. Plant diversity is high (see Plant Composition Table). The total annual production (air-dry weight) of this state is about 650 lbs./acre, but it can range from about 400 lbs./acre in unfavorable years to about 900 lbs./acre in above average years. This plant community is extremely stable and well adapted to the Northern Intermountain Desertic Basins 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 Perennial Grass/Mixed Shrub Plant Community. Prolonged drought will exacerbate this transition.

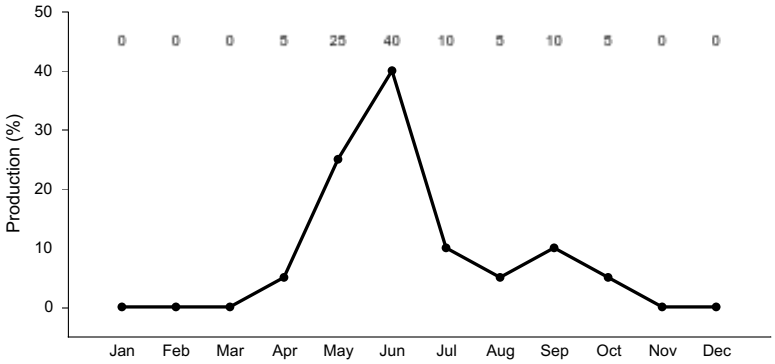


Figure 8. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

State 2
Perennial Grass/ Mixed Shrub

Community 2.1
Perennial Grass/ Mixed Shrub

Historically, this plant community evolved under grazing by large ungulates and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock, and will be exacerbated by prolonged drought conditions. In addition, the fire regime for this site has been modified and extended periods without fire is now common. Big sagebrush and rubber rabbitbrush are significant components of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs. Dominant grasses include bluebunch wheatgrass, needleandthread, and western wheatgrass. Grasses of secondary importance include threadleaf sedge, blue grama, Sandberg bluegrass, and red threeawn. Forbs commonly found in this plant community include scarlet globemallow, Hood's phlox, sulfur flower buckwheat, and penstemon spp. Shrubs can make up to 25% of the total annual production. Plains pricklypear can also occur. When compared to the Historic Climax Plant Community, sagebrush, rubber rabbitbrush, juniper, blue grama, and threadleaf sedge have increased. Production of cool-season grasses, particularly bluebunch wheatgrass and Indian ricegrass, has been reduced. Some weedy species may have invaded the site but are in small patches such as cheatgrass, kochia, and Russian thistle. The total annual production (air-dry weight) of this state is about 500 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 700 lbs./acre in above average years. This plant community is resistant to change. The herbaceous species present are

well adapted to grazing; however, species composition can be altered through long-term overgrazing. The herbaceous component is mostly intact and plant vigor and replacement capabilities are sufficient. Water flow patterns and litter movement may be occurring but only on steeper slopes. Incidence of pedestalling is minimal. Soils are mostly stable and the surface shows minimum soil loss. The watershed is functioning and the biotic community is intact. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing or possibly long-term prescribed grazing will convert this plant community to the HCPC. The probability of this occurring is high especially if rotational grazing along with short deferred grazing is implemented as part of a prescribed method of use. In addition, the removal of fire suppression will allow a somewhat natural fire regime to reoccur to more easily transition between this plant community and the HCPC. A prescribed fire treatment can be useful to hasten this transition if desired. • Frequent and severe grazing plus no fires will convert the plant community to the Dense Shrub/ *Bare Ground* Plant community. The probability of this occurring is high. This is especially evident on areas where drought or heavy browsing does not adversely impact the shrub stand. • Frequent and severe grazing (yearlong) plus wildfire or brush management, will convert the plant community to a Threadleaf Sedge and Blue Grama Sod/*Bare Ground* Plant Community. The probability for is high especially on areas were the shrubs have been heavily browsed or removed by natural or human causes. Drought can also exasperate this transition.

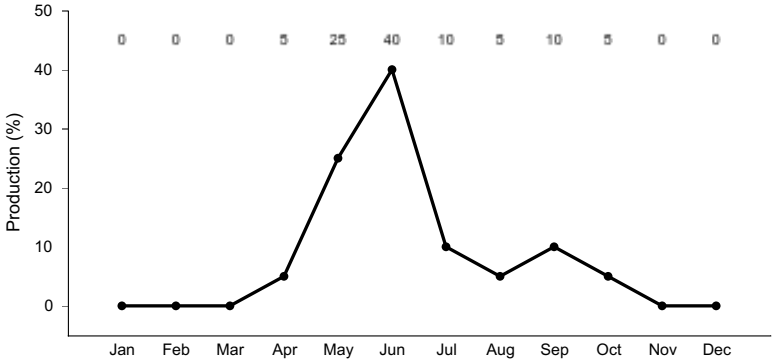


Figure 9. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

State 3
Dense Shrub/ Bare Ground

Community 3.1
Dense Shrub/ Bare Ground

This plant community is the result of frequent and severe grazing and protection from fire. Sagebrush and rubber rabbitbrush dominate this plant community as the annual production of shrubs exceeds 25%. Shrubs comprise the significant component of the plant community and the preferred cool season grasses have been eliminated or greatly reduced. The dominant grasses are Sandberg bluegrass, threadleaf sedge, and blue grama. Weedy annual species such cheatgrass, kochia, Russian thistle, halogeton and a variety of mustards may occupy the site. Cactus has significantly increased. Noxious weeds such as Russian knapweed, leafy spurge, or Canada thistle may invade the site if a seed source is available. Plant diversity is moderate to poor. Cool-season grasses still exist, but are usually under the shrub canopy or in the cactus patches. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. When compared with the HCPC or the Perennial Grass/ Mixed Shrub Plant Communities, the annual production is less, as the cool season grasses are reduced, but the shrub production compensates for the decline in some of the herbaceous production. The total annual production (air-dry weight) of this state is about 400 pounds per acre, but it can range from about 250 lbs./acre in unfavorable years to about 650 lbs./acre in above average years. This plant community is resistant to change as the stand becomes more decadent. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the shrubs is increased. The herbaceous component is not as diverse and plant vigor and species regeneration capabilities of cool-season perennials are deficient. The removal of grazing does not seem to affect the plant composition or structure of the plant community. Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope. Transitions or pathways leading to other plant communities are as follows: • Brush management, followed by prescribed grazing and seeding, will return this plant community to at or near the HCPC. If prescribed fire is used as

a means to reduce or remove the shrubs, sufficient fine fuels will need to be present. This may require deferment from grazing prior to treatment. Post management is critical to ensure success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. In the case of an intense wildfire that occurs when desirable plants are not completely dormant, the length of time required to reach the HCPC may be increased and seeding of natives are recommended. • Brush management, followed by frequent and severe grazing, will convert the plant community to a Threadleaf Sedge and Blue Grama Sod/*Bare Ground* Plant community. The probability of this occurring is high, because of the amount of bare ground exposed to weedy annuals and sod formers as the competition for space, has been removed.

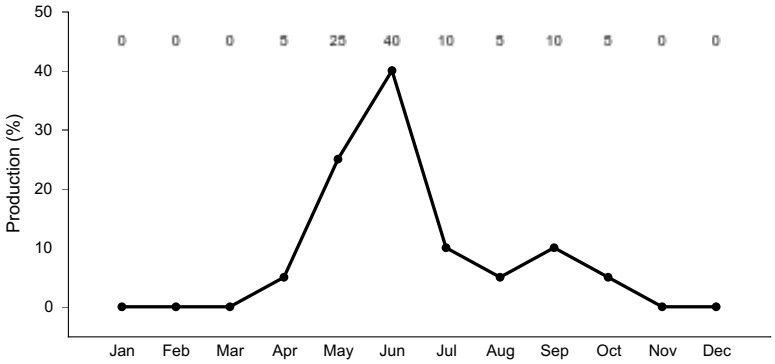


Figure 10. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

State 4
Threadleaf sedge & Blue Grama Sod/ Bare Ground

Community 4.1
Threadleaf sedge & Blue Grama Sod/ Bare Ground

This plant community is created when the Perennial Grass/Mixed Shrub Plant Community is subjected to severe heavy yearlong grazing and the shrub component has been removed by heavy browsing, wildfire or human means. Additionally, this plant community can occur as a result of the Dense Shrub/*Bare Ground* Plant Community being subjected to fire or brush management and not followed by prescribed grazing. Weedy annuals, threadleaf sedge, and/or blue grama are the most dominant plants. Weedy annuals occupy any open bare ground areas, while threadleaf sedge and/or blue grama form patches of sod in between the exposed boulders or cobbles. Rubber rabbitbrush may or may not be present on this site as this species may quickly re-establish after a fire. However, heavy browsing by large ungulates will significantly reduce or remove this shrub. Compared to the HCPC, weedy annual species are widespread and may include cheatgrass, kochia, Russian thistle, halogeton and a variety of mustards. Cactus has increase significantly. Noxious weeds such as Russian knapweed or Canada thistle may invade the site if a seed source is available. Virtually all other cool-season mid-grasses are absent or severely decreased. Blue grama and threadleaf sedge have significantly increased from what is found in the HCPC. Shrubs have been removed with the exception of small patches of mostly rubber rabbitbrush. The total annual production (air-dry weight) of this state is about 150 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 300 lbs./acre in above average years. This plant community is relatively stable and resistant to overgrazing. Annuals and sod forming grasses are effectively competing against the establishment of perennial cool-season grasses. Plant diversity is greatly altered and the herbaceous component is not intact. Recruitment of perennial grasses is not occurring and the replacement potential is absent. The biotic integrity is missing. On areas with a well established sod plant community, water infiltration will be significantly affected. While this sod protects the area itself, adjacent on-site and off-site areas are impacted by excessive runoff that can cause rill channels and gully erosion. Water flow patterns and pedestalling are obvious. The watershed may or may not be functional. Transitions or pathways leading to other plant communities are as follows: • Grazing land mechanical treatment (chiseling, etc.) and pricklypear cactus control (if needed), followed by prescribed grazing, will return this plant community to near Historic Climax Plant Community condition. The sod areas are extremely resistant to change and will require grazing land mechanical treatments, such as chiseling to revert to a more preferred state. This may not be possible given the presence of cobbles or boulders on the soil surface, which can also exclude reseeding the area. If applicable, mechanical treatments and reseeding native plant species are recommended. This should be followed by proper grazing management to accelerate recovery where few desirable plants remain.

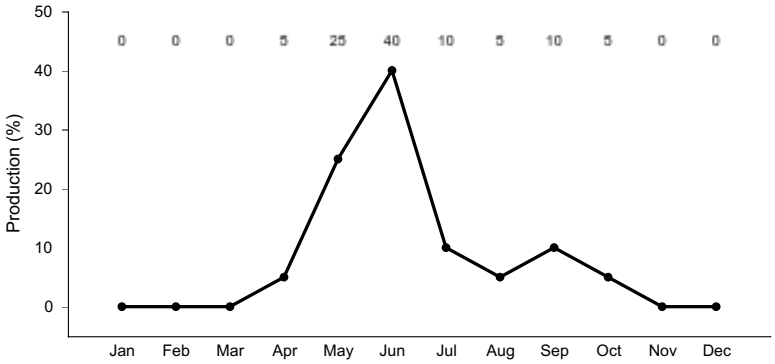


Figure 11. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				163–228	
	Montana wheatgrass	ELAL7	*Elymus albicans*	163–228	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	163–228	–
2				98–163	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	98–163	–
3				33–98	
	western wheatgrass	PASM	*Pascopyrum smithii*	33–98	–
4				0–65	
	spike fescue	LEKI2	*Leucopoa kingii*	0–65	–
5				0–65	
	needle and thread	HECO26	*Hesperostipa comata*	0–65	–
6				0–65	
	Grass, perennial	2GP	*Grass, perennial*	0–33	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–33	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–33	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–33	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–33	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–33	–
Forb					
7				0–65	
	Forb, perennial	2FP	*Forb, perennial*	0–33	–
	yarrow	ACHIL	*Achillea*	0–33	–
	rosy pussytoes	ANRO2	*Antennaria rosea*	0–33	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–33	–
	corn gromwell	BUAR3	*Buglossoides arvensis*	0–33	–
	wavyleaf Indian paintbrush	CAAPM	*Castilleja applegatei ssp. martinii*	0–33	–
	Indian paintbrush	CASTI2	*Castilleja*	0–33	–
	miner's candle	CRVI4	*Cryptantha virgata*	0–33	–
	larkspur	DELPH	*Delphinium*	0–33	–

	larkspur	DELPH	*Delphinium*	0–33	
	sulphur-flower buckwheat	ERUM	*Eriogonum umbellatum*	0–33	–
	aster	EUCEP2	*Eucephalus*	0–33	–
	beardtongue	PENST	*Penstemon*	0–33	–
	phlox	PHLOX	*Phlox*	0–33	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–33	–
Shrub/Vine					
8				33–98	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–33	–
	black sagebrush	ARNO4	*Artemisia nova*	0–33	–
	big sagebrush	ARTR2	*Artemisia tridentata*	0–33	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–33	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–33	–
	Utah juniper	JUOS	*Juniperus osteosperma*	0–33	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–33	–

Animal community

Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass/Indian Ricegrass Plant Community (HCPC): 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. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here.

Perennial Grass/Mixed Shrub Plant Community: 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. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer’s sparrows’ nest in big sagebrush plants, and hosts of other nesting birds utilize stands in the 20-30% cover range.

Dense Shrub/*Bare Ground* Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time. This community provides escape and thermal cover for large ungulates, as well as nesting and brood rearing habitat for sage grouse.

Threadleaf Sedge and Blue Grama Sod/*Bare Ground* Plant Community: These communities provide limited foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover and if the Historic Climax Plant Community or the Perennial Grass/Mixed Shrub Plant Community is limiting. Generally, these are not target plant communities for wildlife habitat management.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing 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)
Bluebunch Wheatgrass/Indian Ricegrass 400-900 .3
Perennial Grass/Mixed Shrub 300-700 .25
Dense Shrub/*Bare Ground* 250-650 .15
Threadleaf Sedge & Blue Grama Sod/*B. Ground* 100-300 .07

* - 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, with localized areas in hydrologic group D. Infiltration ranges from moderately slow to moderate. Runoff potential for this site varies from low to moderate depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Information presented in the original site description was derived from NRCS inventory data. Field observations from range trained personnel were also used. Those involved in developing the original site include: Chris Krassin, Range Management Specialist, NRCS and Everet Bainter, Range Management Specialist. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, USDI and USDA Interpreting Indicators of Rangeland Health Version 3, and USDA NRCS Soil Surveys from various counties.

Information presented here has been derived from NRCS inventory data, Field observations from range trained personnel, and the existing range site descriptions. Those involved in developing the Loamy range site include: Chris Krassin, Range Management Specialist, NRCS and Everet Bainter, Range Management Specialist.

Those involved in the development of the new concept for Loamy and Loamy Calcareous Ecological site include: Ray Gullion, Area Range Management Specialist, NRCS; Jim Wolf, Resource Manager, USDI-BLM; Jack Mononi,

Range Management Specialist, USDI-BLM; Daniel Wood, MLRA Soil Survey Leader, NRCS; Jane Karinen, Soil Data Quality Specialist, NRCS; and Marji Patz, Ecological Site Specialist, NRCS.

Inventory Data References:
Ocular field estimations observed by trained personnel were completed at each site. Then sites were selected where a 100 foot tape was stretched and the following sample procedures were completed by inventory staff. For full sampling protocol and guidelines with forms please refer to the Wyoming ESI Operating Procedures, compiled in 2012 for the Powell and Rock Springs Soil Survey Office, USDA-NRCS.
• Double Sampling Production Data (9.6 hoop used to estimate 10 points, clipped a minimum of 3 of these estimated points, with two 21 foot X 21 foot square extended shrub plots).
• Line Point Intercept (over story and understory captured with soil cover). Height of herbaceous and woody cover is collected every three feet along established transect.)
• Continuous Line Intercept (Woody Canopy Cover, with minimum gap of 0.2 of a foot for all woody species and succulents. Intercept height collected at each measurement.),
• Gap Intercept (Basal Gap measured with a minimum gap requirement of 0.7 foot.),
• Sample Point (10 – 1 meter square point photographs taken at set distances on transect. Red using the sample point computer program established by the High Plains Agricultural Research Center, WY).
• Soil Stability (Slake Test – surface and subsurface samples collected and processed according to the soil stability guidelines provided by the Jornada Research Center, NM.)

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Approval

Scott Woodall, 10/04/2019

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)	Ray Gullion, E. Bainter
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Date	05/01/2008
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rare to nonexistent. Where present, short and widely spaced.

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

3. **Number and height of erosional pedestals or terracettes:** Rare to nonexistent.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground can range from 10-30%.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** Rare to nonexistent.

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move only in small amounts (to leeward side of shrubs). Large woody debris from sagebrush will show no movement.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Stability Index ratings range from 1 (interspaces) to 6 (under plant canopy), but average values should be 3.0 or greater.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil data is limited for this site. Described A-horizons vary from 2-11 inches (5-28 cm) with OM of 1 to 2%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 60-80% grasses, 10% forbs, and 10-30% shrubs. Evenly distributed plant canopy (55-80%) and litter plus moderate to moderately rapid infiltration rates result in minimal runoff. Basal cover is typically less than 5% for this site and does very little to effect runoff on this site.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None

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: Mid-size, cool season bunchgrasses>>

    Sub-dominant: perennial shrubs>>

    Other: perennial forbs>cool season rhizomatous grasses=short cool season bunchgrasses

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub component.

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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 5-30% of total canopy measurement with total litter (including beneath the plant canopy) from 30-70% expected. Herbaceous litter depth typically ranges from 3-10mm. Woody litter can be up to a couple inches (4-6 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 400-900 lb/ac (650 lb/ac average); Metric 448-1008 kg/ha (728 kg/ha average).

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Bare ground greater than 50% is the most common indicator of a threshold being crossed. Threadleaf sedge, Blue grama, big sagebrush, Sandberg bluegrass, buckwheat, and phlox are common increasers. Annual weeds such as cheatgrass, mustards, kochia, lambsquarter, and Russian thistle are common invasive species in disturbed sites.

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