USDA Natural Resources Conservation Service

Ecological site EX043B23A112
Gravelly (Gr) Absaroka Lower Foothills

Last updated: 10/04/2019
Accessed: 05/14/2025

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

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434 – Central Rocky Mountains and Foothills – In 2016, a revision to Agricultural Handbook 296 was drafted, changing the MLRA naming convention. In response to these noted changes, Region 4 proactively drafted changes to MLRA 43A, 43B, and 43C. In these changes, 43B has been divided into subsequent MLRA's, LRU's and Subsets. The Central Rocky Mountains within Wyoming (southern extent of 43B) was divided into MLRA 434.

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) 43403A: 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 03. Further division of this LRU is necessary due to the gradient moving from the foothills to the summit, as well as aspect shifts (east face versus 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 <50%
• Soils are:
o Textures range from loamy sand to very fine sandy loam in top 4” (10 cm) of mineral soil surface
o Clay content is or = 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% 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 (generally around 60%)
o Skeletal (≥35% rock fragments) within 20” (50 cm) of mineral soil surface
o Non-saline, sodic, or saline-sodic

Associated sites

R032XY366WY	**Shallow Sandy (SwSy) 10-14" East Precipitation Zone** Shallow Sandy sites occur with Gravelly sites where gravelly alluvial deposits are inter-bedded/inter-mixed with sandstone outcrops.
R032XY350WY	**Sandy (Sy) 10-14" East Precipitation Zone** Sandy sites are found lower in the landscape or in depositional areas where the gravel beds have not been exposed, or have been buried with finer sediments.
R032XY362WY	**Shallow Loamy (SwLy) 10-14" East Precipitation Zone** Shallow Loamy sites occur with Gravelly sites where gravelly alluvial deposits are inter-mixed with inter-bedded shale and sandstone outcrops.
R032XY322WY	**Loamy (Ly) 10-14" East Precipitation Zone** Loamy sites are found interior to wind swept edges of the landscape or in depositional areas where the gravel beds have not been exposed, or have been buried with finer sediments.

Similar sites

R032XY112WY	**Gravelly (Gr) 5-9” Big Horn Basin Precipitation Zone** Gravelly 5-9" Big Horn Basin Precipitation Zone has lower production than the this site.
R032XY212WY	**Gravelly (Gr) 5-9” Wind River Basin Precipitation Zone** Gravelly 5-9" Wind River Basin Precipitation Zone has lower production than the this site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia frigida* (2) *Krascheninnikovia lanata*
Herbaceous	(1) *Pseudoroegneria spicata* (2) *Achnatherum hymenoides*

Legacy ID

R043BX512WY

Physiographic features

This site occurs on nearly level to 50% slopes. Commonly occurring on wind swept shoulders of relict stream terraces or eroded fan remnants.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Eroded fan remnant (2) Foothills > Stream terrace (3) Foothills > Pediment
Elevation	1,646–2,286 m
Slope	0–50%
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)	279-305 mm
Frost-free period (actual range)	46-118 days
Freeze-free period (actual range)	88-147 days
Precipitation total (actual range)	254-330 mm
Frost-free period (average)	80 days
Freeze-free period (average)	117 days
Precipitation total (average)	305 mm

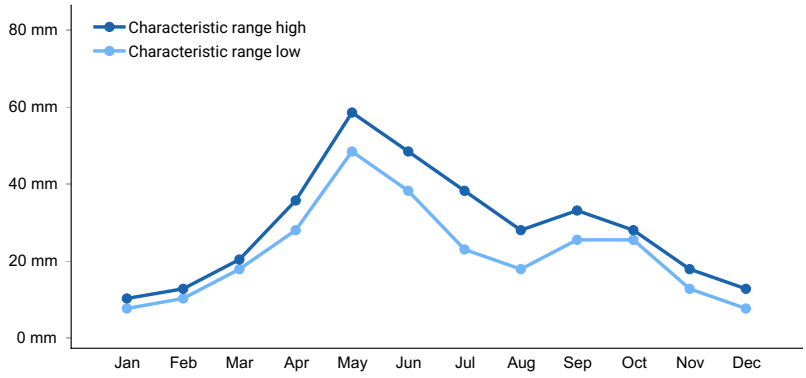


Figure 1. Monthly precipitation range

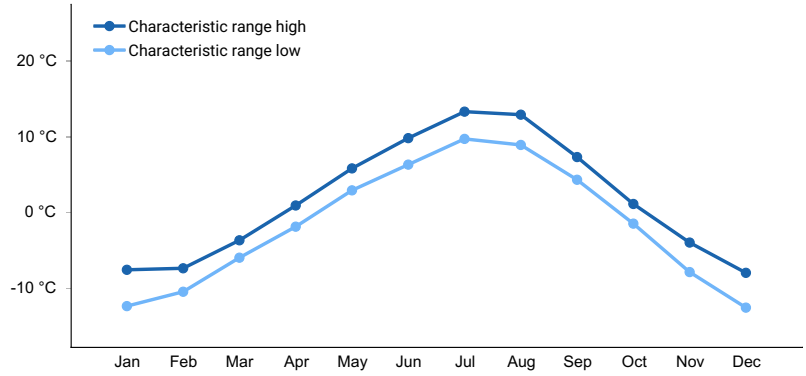


Figure 2. Monthly minimum temperature range

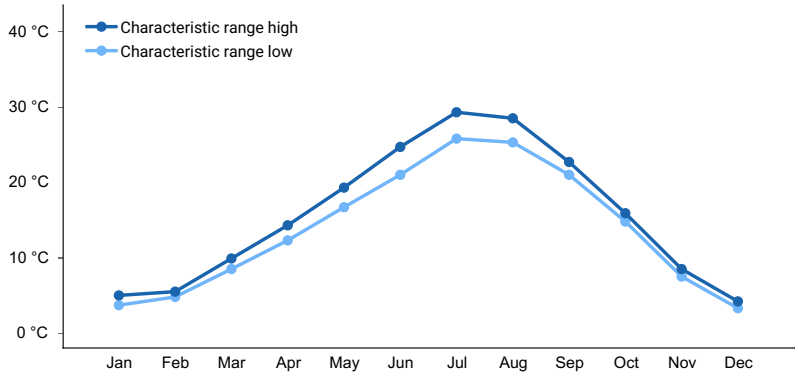


Figure 3. Monthly maximum temperature range

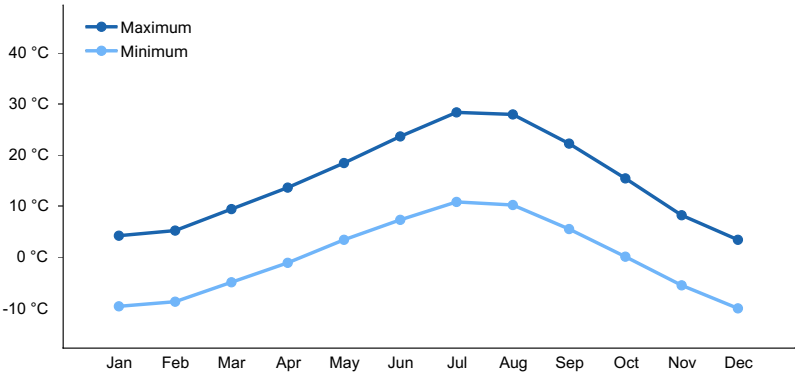


Figure 4. Monthly average minimum and maximum temperature

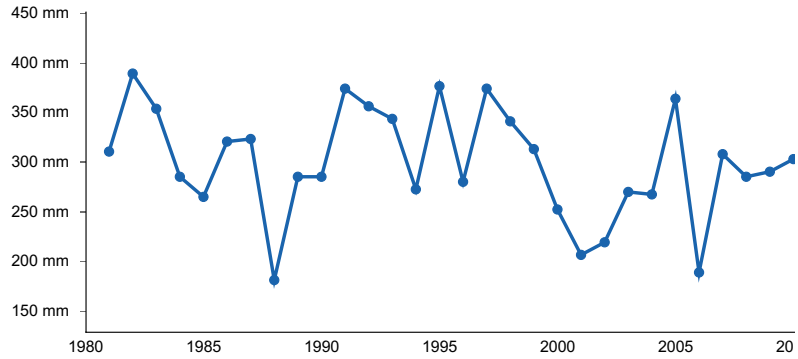


Figure 5. Annual precipitation pattern

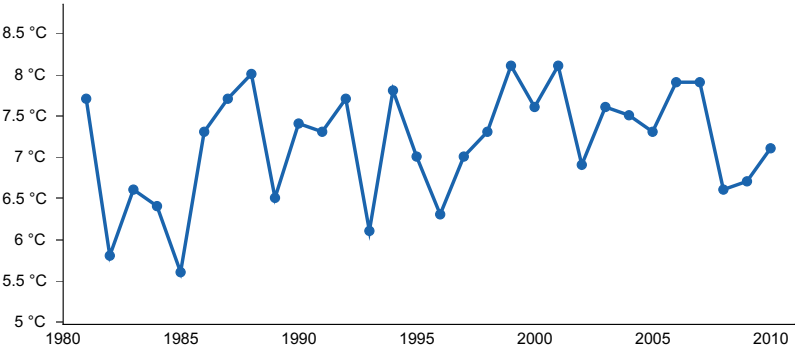


Figure 6. Annual average temperature pattern

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. The coarse soil textures and high volume of rock fragments reduce water holding capacity significantly, creating a dry soil, limiting the ability for shrubs and grasses to persist.

Soil features

The soils of this site are moderately deep (greater than 20” to bedrock) to very deep, well to excessively well-drained soils that formed in alluvium or alluvium over residuum. These soils have moderately rapid or rapid permeability. The surface soil will vary from 3 to 6 inches deep. The coarser topsoil’s may be included if underlain by finer textured subsoil. The soil characteristic most influential to the plant community is the high volume of coarse fragments on the surface and in the profile, which reduces plant density and available moisture.

Major Soil Series correlated to this site include: Mcfadden, Pesmore

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock
Surface texture	(1) Very gravelly fine sandy loam (2) Extremely gravelly sandy loam (3) Loam
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	15–50%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	3.56–12.19 cm
Calcium carbonate equivalent (0-101.6cm)	0–30%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–35%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Potential vegetation on this site is dominated by mid cool-season perennial grasses. Other significant vegetation includes winterfat, black and big sagebrush, rubber rabbitbrush, juniper, 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, blue grama, big and/or black sagebrush, and juniper will increase. Plains pricklypear and weedy annuals will invade. Mid cool season grasses such as Griffiths and bluebunch wheatgrass, Indian ricegrass, needleandthread, and rhizomatous wheatgrasses will decrease in frequency and production.

A mixture of shrubs 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 shrub 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.

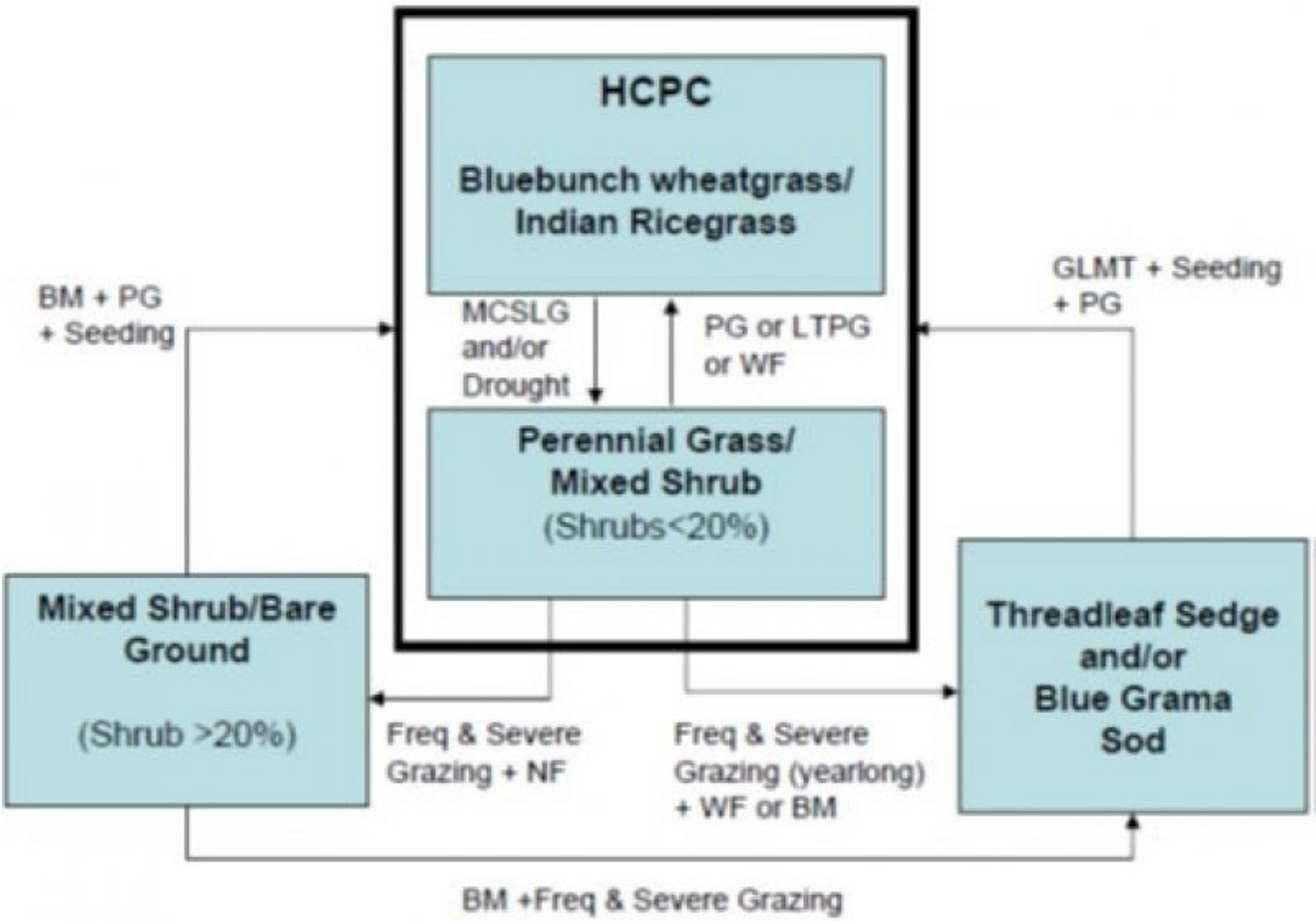
The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical 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.

Plant Community Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC’s) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

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

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and periodic fires. Potential vegetation is about 75% grasses or grass-like plants, 10% forbs, and 15% woody plants. Cool season mid-grasses dominate this state. The major grasses include Griffiths and bluebunch wheatgrass, Indian ricegrass needleandthread, and rhizomatous wheatgrass. Other grasses occurring in the state include prairie junegrass, Sandberg bluegrass, bottlebrush squirreltail, red threeawn, blue grama, and threadleaf sedge. Winterfat, and black sagebrush are conspicuous components of this site but other shrubs occur including big sagebrush, juniper, and rubber rabbitbrush. Antelope bitterbrush will occur on sites associated with the upper limits of this precipitation zone. A variety of forbs also occurs in this state and plant diversity is high (see Plant Composition Table). 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 600 lbs./acre in above average years. The state is stable and well adapted to the Northern Intermountain Desertic Basins climatic conditions. 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: • Moderate, Continuous Season-Long grazing will convert the plant community to the Perennial Grass/Mixed Shrub Plant Community.

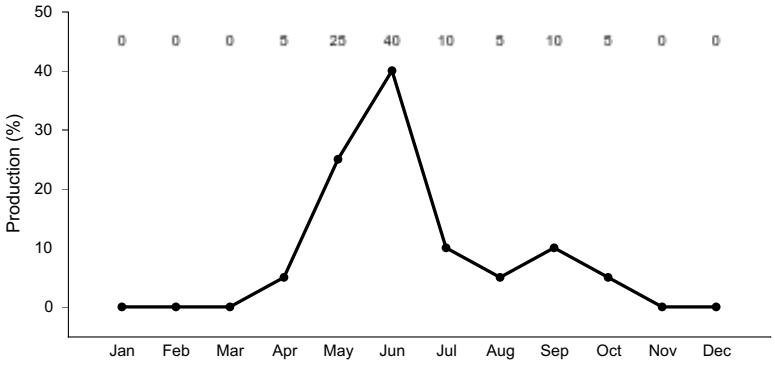


Figure 8. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

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. Shrubs and forbs make up an increasingly significant portion of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses. The dominant grasses include Griffiths and bluebunch wheatgrass, needleandthread, rhizomatous wheatgrasses, Sandberg bluegrass, red threeawn, threadleaf sedge, and blue grama. Forbs commonly found in this plant community include scarlet globemallow, Hood’s phlox, sulfur flower buckwheat, and lemon scurfpea. Black and big sagebrushes, rubber rabbitbrush and juniper can make up to 25% of the total annual production. Plains pricklypear will also occur. When compared to the Historic Climax Plant Community, Griffiths and bluebunch wheatgrass and Indian ricegrass have decreased. Shrubs and warm season grasses/grass-likes such as threadleaf sedge, blue grama, and red threeawn have increased. The total annual production (air-dry weight) of this state is about 320 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 450 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 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 Mixed 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 brush management, will convert the plant community to a Threadleaf Sedge and/or 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.

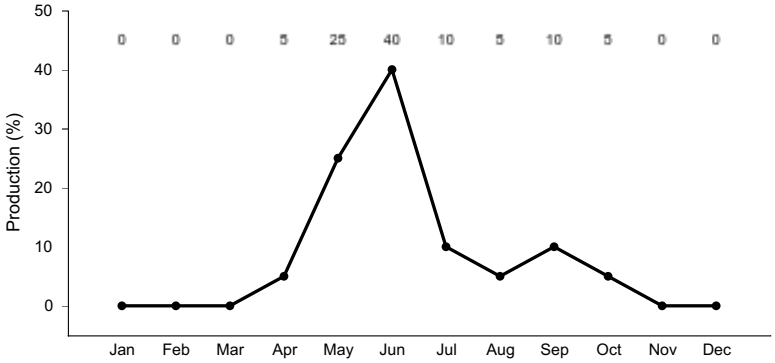


Figure 9. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

State 3
Mixed Shrub/ Bare Ground

Community 3.1
Mixed Shrub/ Bare Ground

This plant community is the result of frequent and severe grazing and protection from fire. Black and big sagebrushes, rubber rabbitbrush, and juniper dominate this plant community as the annual production of shrubs exceeds 25%. Shrubs, forbs, and warm season grasses comprise the significant components of the plant community and the preferred cool season grasses have been greatly reduced. The dominant grasses are prairie junegrass, Sandberg bluegrass, red threeawn, threadleaf sedge, and blue grama. Fringed sagewort, stemless goldenweed, basin rayless daisy, and sulfur flower buckwheat are some of the dominant forbs. Weedy annual species such cheatgrass, kochia, Russian thistle, halogeton and a variety of mustards may occupy the site. Cactus has increased. Plant diversity is moderate to poor. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. When compared with the HCPC, the annual production is less as the perennial mid cool season grasses have been reduced, but the shrub production compensates for some of the decline in the herbaceous production. The total annual production (air-dry weight) of this state is about 275 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 350 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 is recommended. • Brush management, followed by frequent and severe grazing, will convert the plant community to a Threadleaf Sedge and/or 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.

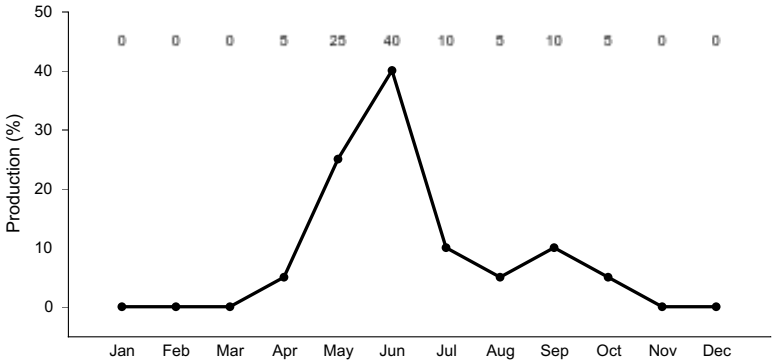


Figure 10. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

State 4
Threadleaf Sedge and/ or Blue Grama Sod

Community 4.1
Threadleaf Sedge and/ or Blue Grama Sod

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 Mixed 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 can form extensive sod patches. Rubber rabbitbrush may or may not be present on the site as this species may quickly re-establish the site after a fire. However, heavy browsing by large ungulates will significantly reduce or remove this shrub. Shadscale saltbush can also be found on this site and become more prominent. Compared to the HCPC, weedy annual species are widespread and may include cheatgrass, kochia, Russian thistle, halogeton and a variety of mustards. Cactus and sageworts have invaded significantly. Noxious weeds such as Russian knapweed, leafy spurge, 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 patches of rubber rabbitbrush and black sagebrush. Plant diversity is low. The total annual production (air-dry weight) of this state is about 80 pounds per acre, but it can range from about 35 lbs./acre in unfavorable years to about 120 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 gravels and cobbles 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.

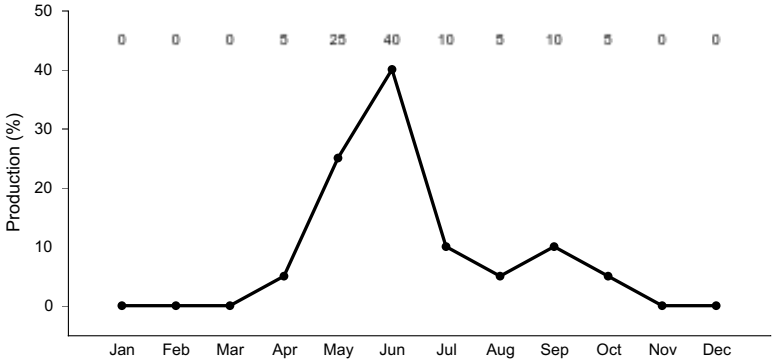


Figure 11. Plant community growth curve (percent production by month). WY0701, 10-14E upland sites.

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				112–179	
	Montana wheatgrass	ELAL7	*Elymus albicans*	112–179	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	112–179	–
2				22–67	
	needle and thread	HECO26	*Hesperostipa comata*	22–67	–
3				45–90	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	45–90	–
4				0–45	
	western wheatgrass	PASM	*Pascopyrum smithii*	0–45	–
5				0–45	
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–37	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–22	–
	sedge	CAREX	*Carex*	0–22	–
	squirreltail	ELEL5	*Elymus elymoides*	0–22	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–22	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–22	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–22	–
	Grass, perennial	2GP	*Grass, perennial*	0–22	–
Forb					
6				0–45	
	Forb, perennial	2FP	*Forb, perennial*	0–22	–
	Franklin's sandwort	ARFR	*Arenaria franklinii*	0–22	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–22	–
	woollypod milkvetch	ASPU9	*Astragalus purshii*	0–22	–
	wavyleaf Indian paintbrush	CAAPM	*Castilleja applegatei ssp. martinii*	0–22	–
	miner's candle	CRVI4	*Cryptantha virgata*	0–22	–
	larkspur	DELPH	*Delphinium*	0–22	–
	cutleaf daisy	ERCO4	*Erigeron compositus*	0–22	–

	fleabane	ERIGE2	*Erigeron*	0–22	–
	sulphur-flower buckwheat	ERUM	*Eriogonum umbellatum*	0–22	–
	nailwort	PARON	*Paronychia*	0–22	–
	fuzzytongue penstemon	PEER	*Penstemon eriantherus*	0–22	–
	waxleaf penstemon	PENI3	*Penstemon nitidus*	0–22	–
	phlox	PHLOX	*Phlox*	0–22	–
	lemon scurfpea	PSLA3	*Psoralidium lanceolatum*	0–22	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–22	–
	thrift mock goldenweed	STARA	*Stenotus armerioides var. armerioides*	0–22	–
Shrub/Vine					
7				22–45	
	black sagebrush	ARNO4	*Artemisia nova*	22–45	–
8				0–45	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–22	–
	big sagebrush	ARTR2	*Artemisia tridentata*	0–22	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	0–22	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–22	–
	Rocky Mountain juniper	JUSC2	*Juniperus scopulorum*	0–22	–
	winterfat	KRASC	*Krascheninnikovia*	0–22	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–22	–

Animal community

Animal Community – Wildlife Interpretations

Historic Climax Plant Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. 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: These communities provide foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover.

Mixed 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 excellent escape and thermal cover for large ungulates, as well as nesting and brood rearing habitat for sage grouse.

Threadleaf sedge and/or Blue Grama Sod/ *Bare Ground*: These communities provide limited grazing for antelope and other herbivores due to low production. They may be used as a foraging site by sage grouse if 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)
Historic Climax Plant Community 250-600 .15
Perennial Grass/Mixed Shrub 200-450 .12
Mixed Shrub/*Bare Ground* 100-350 .05
Threadleaf Sedge &/or B. Grama Sod/ B.G. 35-120 .03

* - 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, with localized areas in hydrologic group C. Infiltration potential for this site varies from moderately rapid to rapid depending on soil hydrologic group and ground cover. Runoff varies from low to moderate. 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:** Some 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 25-50%.

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:** Minimal to nonexistent.

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move in moderate amounts. Large woody debris will show only slight movement down slope.

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 2 (interspaces) to 5 (under plant canopy), but average values should be 2.5 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 .5 to 1%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 70-85% grasses, 15% forbs, and 0-15% shrubs. Minimal plant canopy (15-50%) and litter plus slow to moderately rapid infiltration rates result in slight to moderate runoff. Basal cover is typically less than 5% and does very little to effect runoff on this site. Surface rock fragments of 20-50% provide site stability from erosion, but decrease infiltration.

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 exists, but large amounts of subsurface coarse fragments may be mistaken for a compaction layer.

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 perennial forbs = perennial shrubs

    Sub-dominant: cool season rhizomatous grasses

    Other: 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.

14. **Average percent litter cover (%) and depth (in):** Litter ranges from 5-25% of total canopy measurement with total litter (including beneath the plant canopy) from 15-50% expected. Herbaceous litter depth is typically shallow, ranging from 2-8mm. Woody litter can be up to a couple inches (4-6 cm).

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 250-600 lb/ac (425 lb/ac average); Metric: 280-672 kg/ha (476 kg/ha average).

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:** Threadleaf sedge, blue grama, big and/or black sagebrush and juniper are common increasers. Annual weeds such as cheatgrass, mustards, kochia, and Russian thistle are common invasive species in disturbed sites.

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