USDA Natural Resources
Conservation Service

Ecological site EX043B23A176
Very Shallow (VS) Absaroka Lower Foothills

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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.

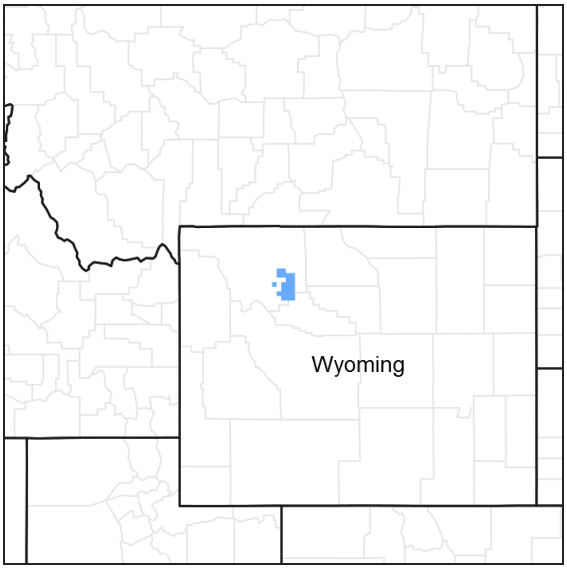


Figure 1. Mapped extent

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.

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 < 60%
• Soils are:
o Textures range from loamy sand to clay loam in top 4" (10 cm) of mineral soil surface
o Clay content is ≤ 35% in top 4" (10 cm) of mineral soil surface
o All subsurface horizons have a weighted average of < 35% clay.
o very shallow (< 10 in. (25 cm))
o <3% stone and boulder cover and < 15% cobble and gravel cover
o Generally not skeletal (< 35% rock fragments) but occasionally will have up to 75% gravels and cobbles.

Associated sites

R032XY362WY	**Shallow Loamy (SwLy) 10-14" East Precipitation Zone** Shallow Loamy is commonly located in a complex with very shallow sites on the scarp face or on eroded dip slopes of escarpments and hillslopes (ridges) and is associated with inter-bedded sedimentary parent material.
R032XY366WY	**Shallow Sandy (SwSy) 10-14" East Precipitation Zone** Shallow Sandy is commonly located in a complex with very shallow sites on the scarp face or on eroded dip slopes of escarpments and hillslopes (ridges) and is associated with sandstone parent material.

Similar sites

R032XY276WY	**Very Shallow (VS) 5-9” Wind River Basin Precipitation Zone** Very Shallow 5-9
R032XY176WY	**Very Shallow (VS) 5-9” Big Horn Basin Precipitation Zone** Very Shallow 5-9

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Pseudoroegneria spicata* (2) *Achnatherum hymenoides*

Legacy ID

R043BX576WY

Physiographic features

This site occurs on steep slopes and ridge tops, but may occur on all slopes.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Hill (2) Foothills > Ridge (3) Foothills > Escarpment
Runoff class	Low to high
Elevation	1,646–2,286 m
Slope	0–60%
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

Climate stations used

- (1) THERMOPOLIS [USC00488875], Thermopolis, WY
- (2) THERMOPOLIS 25WNW [USC00488888], Thermopolis, WY
- (3) SUNSHINE 3NE [USC00488758], Meeteetse, WY
- (4) CODY 21 SW [USC00481855], Cody, WY
- (5) WAPITI 1NE [USC00489467], Cody, WY
- (6) BUFFALO BILL DAM [USC00481175], Cody, 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).

Soil features

The soils of this site are very shallow (less than 10” to bedrock) well-drained soils formed in residuum. These soils have rapid to slow permeability and can be of any texture. This site usually occurs on steep slopes, but may be on any slope. The bedrock will include all kinds except soft clay shales, igneous and some volcanic. The soil characteristic having the most influence on the plant community is the very shallow depth to bedrock, which

drastically limits the available moisture.

Major Soil Series correlated to this site include: Rentsac

Table 4. Representative soil features

Parent material	(1) Residuum–sandstone (2) Colluvium–sandstone and shale (3) Slope alluvium–igneous, metamorphic and sedimentary rock
Surface texture	(1) Channery loam (2) Fine sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Slow to moderately rapid
Depth to restrictive layer	3–25 cm
Soil depth	3–25 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–20%
Available water capacity (0-25.4cm)	0.76–4.32 cm
Calcium carbonate equivalent (0-25.4cm)	0–5%
Electrical conductivity (0-25.4cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-25.4cm)	0–5
Soil reaction (1:1 water) (0-25.4cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

Potential vegetation on this site is dominated by a variety of mid cool-season perennial grasses. Other significant vegetation includes winterfat and a variety of forbs and shrubs. The expected potential composition for this site is about 70% grasses, 10% forbs and 20% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

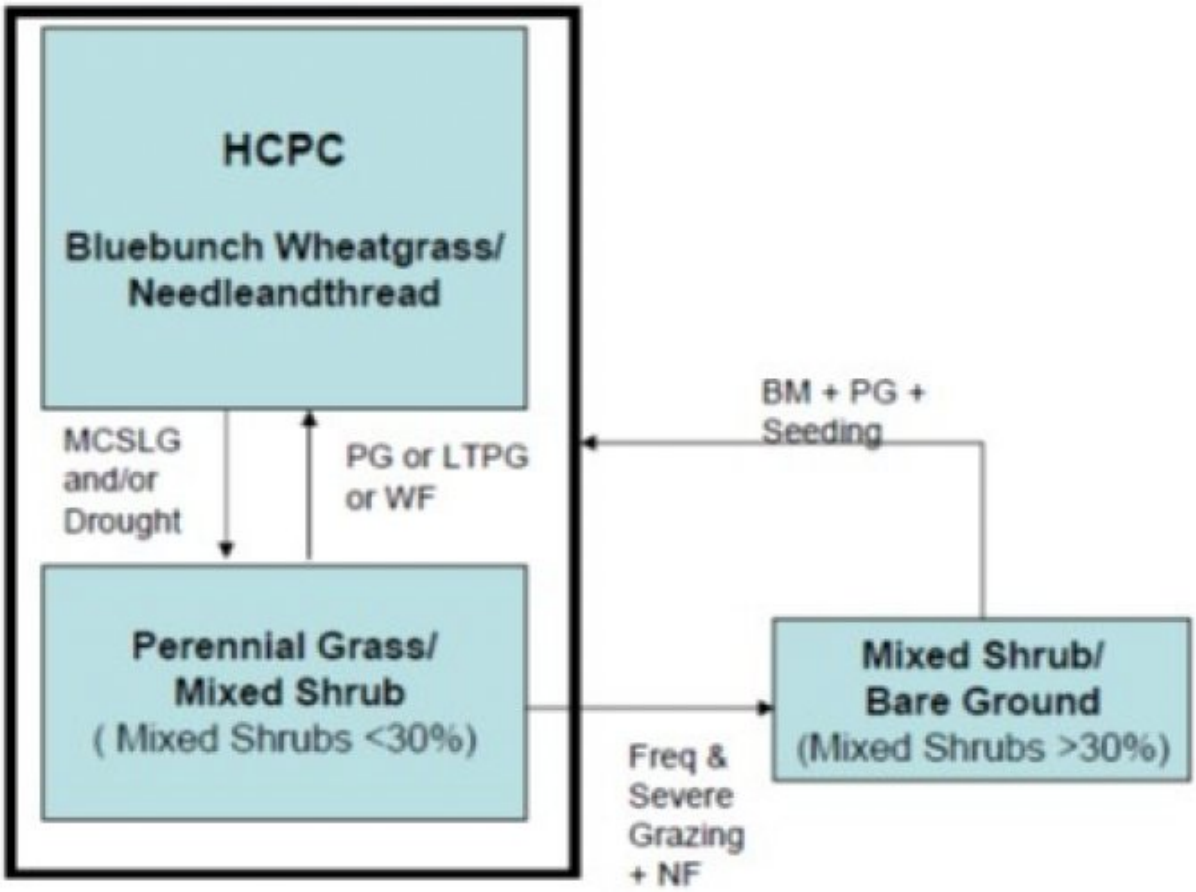
As this site deteriorates, species such as short warm-season grasses, juniper, and shrubs will increase. Plains pricklypear and weedy annuals will invade. Cool season grasses such as bluebunch wheatgrass will decrease in frequency and production.

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.

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

State 1
Bluebunch Wheatgrass/ Needleandthreead

Community 1.1
Bluebunch Wheatgrass/ Needleandthreead

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and droughty soils due to the limited water holding capacity. Fire, although rare due to the sparseness of the vegetation is a component of this plant community. This plant community can be found on areas that are properly managed with grazing and on areas receiving occasional short periods of rest. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs, and 20% woody plants. Cool season mid-grasses dominate the state. The major grasses include bluebunch and/or Griffith's wheatgrasses, prairie junegrass, Indian ricegrass, and needleandthread. Other grasses and grasslikes occurring on the site include rhizomatous wheatgrasses, bottlebrush squirreltail, Sandberg bluegrass, Fendler threeawn, blue grama, and threadleaf sedge. Shrubs most commonly found are black and Wyoming big sagebrush, green and rubber rabbitbrush, winterfat, and juniper. Curl-leaf mountainmahogany is also a major shrub along the western slopes of the Bighorn mountains but does not occur in the Wind River Basin or along the slopes of the Owl Creek and Absaroka mountain ranges. Antelope bitterbrush and limber pine are very common on sites in the upper precipitation range of this zone. A variety of forbs can be present and plant diversity is high (see Plant Composition Table). The total annual production (air-dry weight) of this state is about 350 pounds per acre, but it can range from about 250 lbs./acre in unfavorable years to about 500 lbs./acre in above average years. The state is stable and well adapted to the Northern Intermountain Desertic Basins 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: • Moderate Continuous Season-Long Grazing will convert this plant community to the Perennial Grass/Mixed Shrub Plant Community. Prolonged drought will exacerbate this transition.

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	25	40	10	5	10	5		

State 2
Perennial Grass/Mixed Shrub

Community 2.1
Perennial Grass/Mixed Shrub

Historically, this plant community evolved under grazing and a rare fire event. Currently, it is found under moderate, season-long grazing by livestock and is exacerbated by prolonged drought conditions. A fire regime for this site is basically non-existent. This plant community is still dominated by cool-season grasses, while short warm-season grasses and miscellaneous forbs account for the balance of the understory. A variety of shrubs makes up the overstory. The dominant grasses include bluebunch wheatgrass, needleandthread, and rhizomatous wheatgrasses. Grasses and grasslikes of secondary importance include Sandberg bluegrass, blue grama, Fendler threeawn, and threadleaf sedge. Forbs commonly found in this plant community include tufted evening primrose, stemless mock goldenweed, Hood's phlox, sulfur flower buckwheat, and scarlet globemallow. Shrubs most commonly found are black and Wyoming big sagebrush, green and rubber rabbitbrush, and juniper. Curl-leaf mountainmahogany is also a major shrub along the western slopes of the Bighorn mountains but does not occur in the Wind River Basin or along the slopes of the Owl Creek and Absaroka mountain ranges. Antelope bitterbrush and limber pine are very common on sites in the upper precipitation range of this zone. These shrubs account for 20% to 30% of the total production. When compared to the Historical Climax Plant Community, shrubs such as sagebrush and juniper have increased. Indian ricegrass and bluebunch and/or Griffiths wheatgrasses have decreased. Indian ricegrass may occur in only trace amounts under the sagebrush canopy or within patches of pricklypear. Blue grama and threadleaf sedge have increased. Plains pricklypear cactus will also have invaded, but occurs only in small patches. In addition, the amount of winterfat may or may not have changed depending on the season of use. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from about 225 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. Transitional 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 the 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. The wide gaps between plants, however, may create a problem in carrying a fire. • Frequent and severe grazing over the long-term will convert this plant community to the Mixed Shrub/*Bare Ground* Plant Community.

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	25	40	10	5	10	5		

State 3
Mixed Shrub/ Bare Ground

Community 3.1
Mixed Shrub/ Bare Ground

This state currently is found under heavy, season-long grazing by livestock and the absence of fire. Shrubs are significant components of this plant community and account for greater than 30% of the total production. Cool-season grasses have been reduced. Bare ground, warm season grasses, and annual plants dominate the understory. The dominant grasses/grasslikes are threadleaf sedge and blue grama. Black and Wyoming big sagebrush, green rabbitbrush, and juniper are the common shrubs found on this site. Typically these sites are dominated by either black sagebrush or juniper. Concurrently, curl-leaf mountainmahogany can also dominate sites along the western slopes of the Bighorn mountains especially where fire suppression has persisted. Antelope bitterbrush, if not removed by over browsing, may still be present in the upper precipitation range of this zone, but these plants usually exhibit a gnarled hedged appearance as a result of heavy use. Limber pine may have increased on sites in the upper precipitation range of this zone, but will not exceed 10% of the total annual production. Weedy annual species such as cheatgrass and Russian thistle may occupy the site if a seed source is available. Cactus and sageworts often invade. Noxious weeds such as Russian knapweed may invade the site if a seed source is available. The interspaces between plants have expanded significantly, leaving the amount of bare ground more prevalent. As compared with the HCPC, there is a reduction in the annual production, but the increase in juniper and sagebrush off sets some of the decline in the herbaceous production. The total annual production (air-dry weight) of this state is about 150 pounds per acre, but it can range from about 50 lbs./acre in unfavorable years to about 250 lbs./acre in above average years. This plant community is resistant to change. These areas are actually more resistant to fire as less fine fuels are available and the bare ground between the shrubs is increased. Continued frequent and severe grazing or the removal of grazing does not seem to affect the composition or structure of the plant community. Plant diversity is poor. The plant vigor is diminished and replacement capabilities are limited due to the reduced number of cool-season grasses. Plant litter is noticeably less when compared to the HCPC. 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. Transitional pathways leading to other plant communities are as follows: • Brush management (fire) and prescribed grazing will return this state to near Historic Climax Plant Community. Seeding native perennials is usually necessary to hasten establishment of these species.

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	25	40	10	5	10	5		

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				118–177	
	Montana wheatgrass	ELAL7	*Elymus albicans*	118–177	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	118–177	–
2				4–39	
	needle and thread	HECO26	*Hesperostipa comata*	4–39	–
3				4–39	
	prairie Junegrass	KOMA	*Koeleria macrantha*	4–39	–
4				4–39	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	4–39	–
5				20–78	
	Grass, perennial	2GP	*Grass, perennial*	0–20	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–20	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–20	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–20	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–20	–
	squirreltail	ELEL5	*Elymus elymoides*	0–20	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–20	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–20	–
Forb					
6				4–39	
	Forb, perennial	2FP	*Forb, perennial*	0–20	–
	small-leaf pussytoes	ANPA4	*Antennaria parvifolia*	0–20	–
	Franklin's sandwort	ARFR	*Arenaria franklinii*	0–20	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–20	–
	cutleaf daisy	ERCO4	*Erigeron compositus*	0–20	–
	fleabane	ERIGE2	*Erigeron*	0–20	–
	sulphur-flower buckwheat	ERUM	*Eriogonum umbellatum*	0–20	–
	tufted evening primrose	OECA10	*Oenothera caespitosa*	0–20	–
	woolly groundsel	PACA15	*Packera cana*	0–20	–
	nailwort	PARON	*Paronychia*	0–20	–
	phlox	PHLOX	*Phlox*	0–20	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–20	–
	stemless four-nerve daisy	TEACA2	*Tetraneuris acaulis var. acaulis*	0–20	–
	prairie thermopsis	THRH	*Thermopsis rhombifolia*	0–20	–
Shrub/Vine					
7				0–39	
	black sagebrush	ARNO4	*Artemisia nova*	0–39	–
8				0–39	
	curl-leaf mountain mahogany	CELE3	*Cercocarpus ledifolius*	0–39	–

9				20–39	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–20	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	0–20	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	0–20	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–20	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–20	–
	Utah juniper	JUOS	*Juniperus osteosperma*	0–20	–
	winterfat	KRASC	*Krascheninnikovia*	0–20	–
	limber pine	PIFL2	*Pinus flexilis*	0–20	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–20	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–20	–

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: The combination of a shrub overstory and an understory of grasses and forbs provide a very diverse plant community for wildlife. This diversity provides important winter ranges for mule deer and antelope as they may use this state for winter foraging. Cottontail and jack rabbits will use this area for both forage and cover year-round. It may provide winter, nesting, brood-rearing, and foraging habitat for upland game birds including sage grouse. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize juniper stands as well.

Mixed Shrub/*Bare Ground*: This plant community can provide winter foraging for mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time.
Due to the sparseness of the vegetation, this community does not provide escape and thermal cover for large ungulates or for nesting habitat for sage grouse. An exception is if large shrubs such as juniper or sometimes mountainmahogany dominate a site. In these cases, sufficient thermal and escape cover will meet the needs of many wildlife species.

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 250-500 .15
Perennial Grass/Mixed Shrub 225-450 .12
Mixed Shrub/*Bare Ground* 50-250 .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 highly variable and is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from slow to very rapid. Runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope 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 may be present, but should be small. Water flow patterns should be barely distinguishable. Pedestals are only slightly present in association with bunchgrasses such as bluebunch wheatgrass. 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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Contributors

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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.

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Date	05/02/2008
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Some rills to be expected on this site. Depending on slope, rills range from .5-2 inches (1-5 cm) wide and are found every 3-6 feet (1-2 m).

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

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3. **Number and height of erosional pedestals or terracettes:** Slight pedestalling evident.

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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 can range from 30-60%.

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5. **Number of gullies and erosion associated with gullies:** Active gullies, where present, should be rare.

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

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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.

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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):** Soil Stability Index ratings range from 1 (interspaces) to 6 (under plant canopy), but average values should be 2.5 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Currently no soil series are correlated to this ecological site. Soil OM of less than 1% is expected.

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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, 15% forbs, and 5-25% shrubs. Sparse plant canopy (20-60%) and litter, steep slopes, plus slow to moderate 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. Bedrock outcropping provides stability to the site, but reduces infiltration.

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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 exists, but shallow depth to and exposed bedrock may be mistaken for a compaction layer.

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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: mid-size, cool season bunchgrasses

    Sub-dominant: perennial shrubs/trees perennial forbs

    Other: cool season rhizomatous grasses short, cool season bunchgrasses

    Additional:

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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 5-20% of total canopy measurement with total litter (including beneath the plant canopy) from 15-50% expected. Herbaceous litter depth is typically shallow, ranging from 2-8 mm. Woody litter can be up to several inches (>8 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 250-500 lb/ac (375 lb/ac average); Metric: 280 - 560 kg/ha (420 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 75% and the presence of cheatgrass are the most common indicators of a threshold being crossed. Short warm season grasses, juniper, shrubs, Sandberg bluegrass, and phlox are common increasers. Annual weeds such as cheatgrass, mustards, kochia, 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.
