USDA Natural Resources
Conservation Service

Ecological site DX032X01A158
Shallow Clayey (SwCy) Big Horn Basin Core

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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.

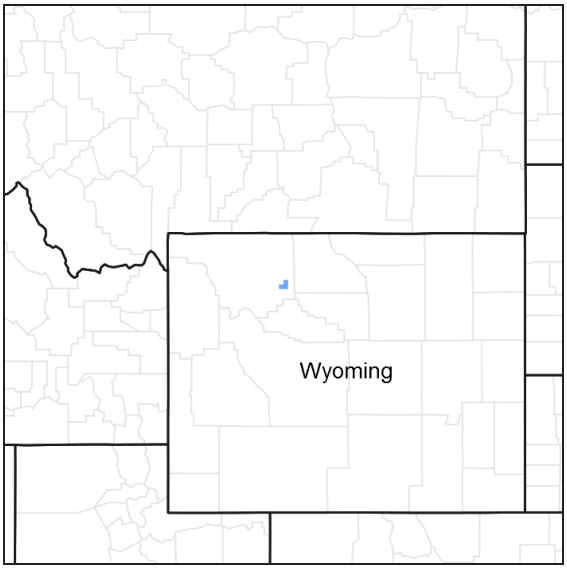


Figure 1. Mapped extent

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): 032X–Northern Intermountain Desertic Basins

Major land resource area (MLRA):

032X – Northern Intermountain Desertic Basins – This MLRA is comprised of two major Basins, the Big Horn and Wind River. These two basins are distinctly different and are split by LRU's to allow individual ESD descriptions. These warm basins are surrounded by uplifts and rimmed by mountains, creating a unique set of plant responses and communities. Unique characteristics of the geology and geomorphology single these two basins out.

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):

32X01A (WY): This LRU is the Big Horn Basin within MLRA 32. This LRU is lower in elevation, slightly warmer and

receives slightly less overall precipitation than the Wind River Basin (LRU 02). This LRU was originally divided into two LRU's - LRU A which was the core and LRU B which was the rim. With the most current standards, this LRU is divided into two Subsets. This subset is Subset A, referred to as the Core, which is warm, dry eroded basin floor. As the LRU shifts outer edges, aspect and relation to the major bodies of water and taller land forms create minor shifts in soil chemistry influencing the variety of ecological sites and plant interactions. 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, land form, and biological references. Older ESD's will refer to LRU A. LRU A and LRU 01 in MLRA 32X are synonymous.

Moisture Regime: Typic Aridic, prior to 2012, there are map units that cross over to ustic aridic or ustic aridic was correlated into this core area. As progressive mapping continues and when the ability to do update projects, these overlapping map units will be corrected.

Temperature Regime: Mesic
Dominant Cover: Rangeland, with Saltbush flats the dominant vegetative cover for this LRU/ESD.
Representative Value (RV) Effective Precipitation: 5-9 inches (127 – 229 mm)
RV Frost-Free Days: 110-150 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.g Big Horn Salt Desert Shrub Basin

Ecological site concept

• Site receives no additional water.
• Slope is < 60%
• Soils are:
o Textures range from loam to clay in top 4" (10 cm) of mineral soil surface
o Clay content is < 40% in top 4" (10 cm) of mineral soil surface
o All subsurface horizons have a weighted average of > 35% but < 60% clay.
o Shallow (10-20 in. (25-50 cm)
o < 10% stone and boulder cover and <25% cobble and gravel cover
o Not skeletal (<35% rock fragments) within 20" (50 cm) of mineral soil surface
o Non-saline, sodic, or saline-sodic; however, there is a potential for elevated soluble salts.

Associated sites

R032XY162WY	**Shallow Loamy (SwLy) 5-9" Big Horn Basin Precipitation Zone** Shallow Loamy occurs in a complex with shallow clayey along escarpments or outcroppings of inter-bedded sedimentary parent material.

R032XY104WY	**Clayey (Cy) 5-9” Big Horn Basin Precipitation Zone** Clayey sites are commonly associated with Shallow Clayey sites on escarpments or along shale outcroppings. The clayey site is lower on the hillslope or further from the bedrock outcropping with shallow residing at the site of the outcropping.
R032XY112WY	**Gravelly (Gr) 5-9” Big Horn Basin Precipitation Zone** Gravelly sites will occur along the shoulder of a ridge or escarpment, with shallow clayey falling on the scarp face or down slope.

Similar sites

R032XY358WY	**Shallow Clayey (SwCy) 10-14" East Precipitation Zone** Shallow Clayey 10-14” Foothills and Basins East P.Z., 032XY358WY has higher production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. wyomingensis*
Herbaceous	(1) *Pascopyrum smithii* (2) *Achnatherum hymenoides*

Legacy ID

R032XA158WY

Physiographic features

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

Table 2. Representative physiographic features

Landforms	(1) Intermontane basin > Hill (2) Intermontane basin > Ridge (3) Intermontane basin > Escarpment
Runoff class	Negligible to very high
Elevation	3,700–6,000 ft
Slope	0–60%
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 5 to 9 inches (127 – 229 mm). The normal precipitation pattern shows peaks in May and June and a secondary peak in September. The noted peaks account for approximately 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 approximately on April 1st and continues through to July 1st. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late

October. For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/. “Basin”, "Emblem", "Greybull", “Lovell”, "Worland FAA AP" and “Worland” are the representative weather stations for LRU A. 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)	110-115 days
Freeze-free period (characteristic range)	131-142 days
Precipitation total (characteristic range)	7-8 in
Frost-free period (actual range)	105-119 days
Freeze-free period (actual range)	130-150 days
Precipitation total (actual range)	6-8 in
Frost-free period (average)	112 days
Freeze-free period (average)	138 days
Precipitation total (average)	7 in

Climate stations used

- (1) WORLAND [USW00024062], Worland, WY
- (2) WORLAND [USC00489770], Worland, WY
- (3) BASIN [USC00480540], Basin, WY
- (4) GREYBULL [USC00484080], Greybull, WY
- (5) EMBLEM [USC00483031], Burlington, WY
- (6) LOVELL [USC00485770], Lovell, WY

Influencing water features

Soil features

The soils of this site are shallow (10”-20” to bedrock) well-drained soils formed in alluvium or residuum. These soils have moderately slow to very slow permeability and may occur on all aspects. The bedrock is clay shale which is virtually impenetrable to plant roots. Thin ineffectual layers of other soil textures are disregarded. The soil characteristics having the most influence on the plant community are the shallow depths, heavy textures, and the potential for elevated quantities of soluble salts.

Major Soil Series correlated to this site includes: Persayo

Table 4. Representative soil features

Parent material	(1) Alluvium–interbedded sedimentary rock (2) Residuum–shale
Surface texture	(1) Clay loam (2) Clay (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Very slow to moderately slow
Depth to restrictive layer	10–20 in
Soil depth	10–20 in

Surface fragment cover <=3"	0–25%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	1.4–4.2 in
Calcium carbonate equivalent (0-40in)	0–14%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	5–15%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

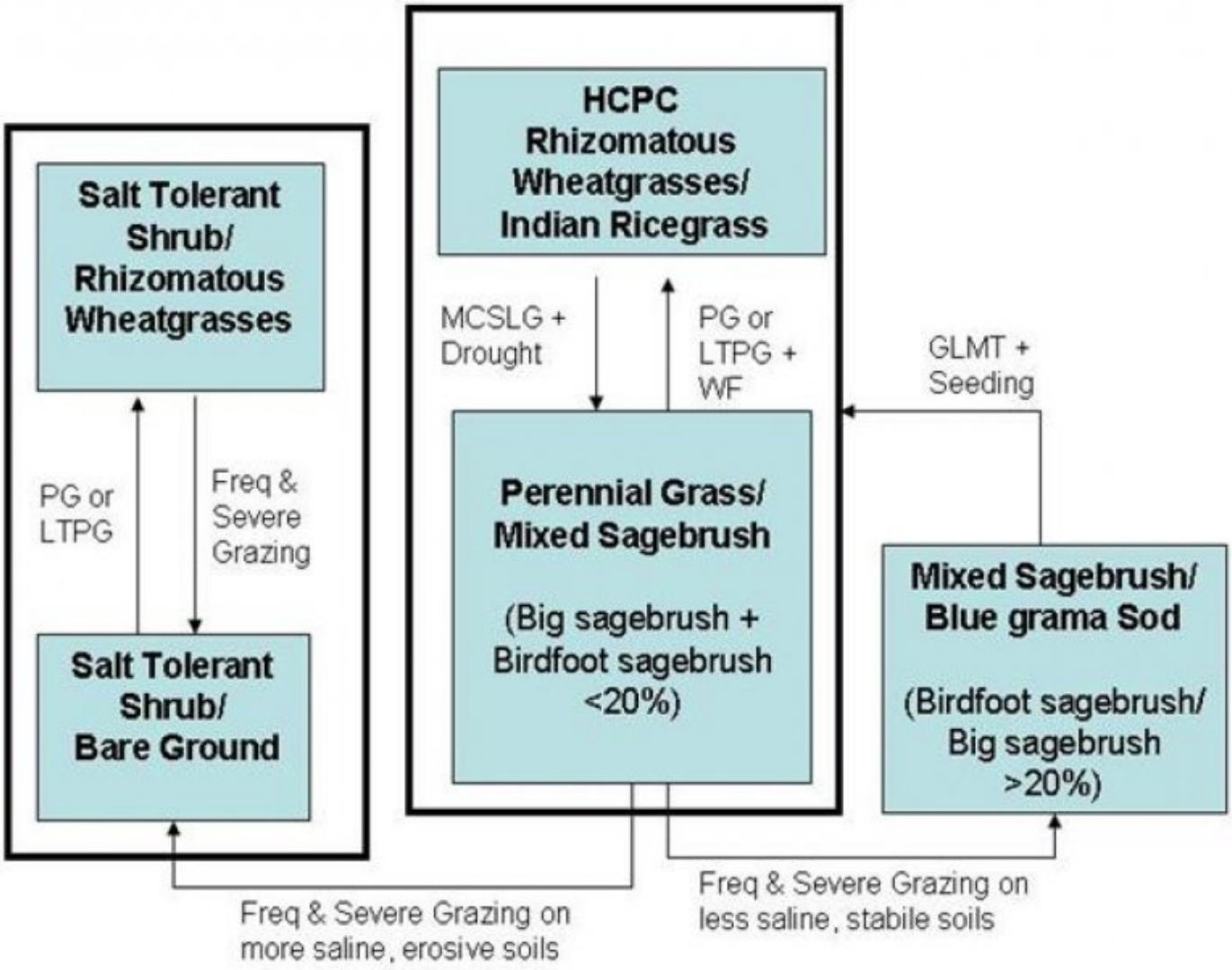
Potential vegetation on this site is dominated by mid cool-season perennial grasses. Other significant vegetation includes Gardner saltbush, birdfoot sagebrush, and a variety of forbs. The expected potential composition for this site is about 70% grasses, 10% forbs and 20% woody plants. The composition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

As this site deteriorates, species such as blue grama, birdfoot sagebrush and big sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool season grasses such as rhizomatous wheatgrasses, bottlebrush squirreltail, and Indian ricegrass 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.

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
Rhizomatous Wheatgrasses/Indian Ricegrass Plant Community

Community 1.1
Rhizomatous Wheatgrasses/Indian Ricegrass Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores, soil less than 15 inches, and periodic fires. The cyclical nature of the fire regime in this community and the shallow soils prevented big sagebrush from being the dominant landscape. This state is comprised of mostly cool season mid-grasses and a variety of forbs and woody species. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs, and 20% woody plants. The major grasses include rhizomatous wheatgrasses, Indian ricegrass, bottlebrush squirreltail, and bluebunch wheatgrass. Other grasses occurring on the state may include Sandberg bluegrass, blue grama, and prairie junegrass. Big sagebrush, Gardner's saltbush, and birdfoot sagebrush are conspicuous elements of this state, and make up 20% of the annual production. Big sagebrush may become dominant on some areas with absence of fire. 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 300 pounds per acre, but it can range from about 150 lbs. /acre in unfavorable years to about 375 lbs. /acre in above average years. The state is extremely 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 Sagebrush Plant Community. Prolonged drought will exacerbate this transition.

Figure 9. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			15	50	20	5		10			

State 2
Perennial Grass/Mixed Sagebrush Plant Community

Community 2.1
Perennial Grass/Mixed Sagebrush Plant Community

Historically, this plant community evolved under grazing 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. 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 is now a conspicuous part of the overall production. Dominant grasses include western wheatgrass, and bottlebrush squirreltail. Grasses and grass-like species of secondary importance include blue grama, Sandberg bluegrass and threadleaf sedge. Forbs commonly found in this plant community include scarlet globemallow, wild onion, smooth woodyaster, leafy wildparsley, and Hood's phlox. Big sagebrush, birdfoot sagebrush and Gardner's saltbush dominate the overstory. Big sagebrush and birdfoot sagebrush can make up to 20% of the annual production. Plains pricklypear cactus can also occur. When compared to the Historic Climax Plant Community, big sagebrush and blue grama have increased. Plains pricklypear cactus will also have increased, but occurs only in small patches. Indian ricegrass has decreased and may occur in only trace amounts under the sagebrush canopy or within the patches of pricklypear. In addition, 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 200 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 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 on more saline soils will convert the plant community to the Salt Tolerant Shrub/*Bare Ground* Plant Community. • Frequent and severe grazing (yearlong grazing) on less saline soils, will convert the plant community to the Mixed Sagebrush/Blue Grama Sod Plant Community.

Figure 10. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			15	50	20	5		10			

State 3
Mixed Sagebrush/Blue Grama Sod Plant Community

Community 3.1
Mixed Sagebrush/Blue Grama Sod Plant Community

This plant community is the result of frequent and severe yearlong grazing. Soils on these sites are usually less saline. It is dominated by a dense sod of blue grama and includes a mosaic shrub overstory. Big sagebrush may be present but usually birdfoot sagebrush is the most important shrub in this plant community. Pricklypear cactus can become dense in areas so that livestock cannot graze forage growing within the cactus clumps. When the historic climax plant community is replaced by warm season grasses total annual production is reduced and the ability of perennial cool season grasses is not able to remain as part of the plant composition. The total annual production (air-dry weight) of this state is about 75 pounds per acre, but it can range from about 50 lbs. /acre in unfavorable years to about 150 lbs. /acre in above average years. This state is relatively stable and protected from excessive erosion where the sod cover is excessive. The sod formed by these grasses is resistant to water infiltration. While the soil is protected by this sod, excessive runoff may occur off-site and on-site where sod is patchier. As a result, rills or other more severe erosion can occur on unprotected areas. The watershed may or may not be functioning, as runoff may affect adjoining sites. The biotic integrity of this plant community is not intact. Plant diversity is extremely low. Transitional pathways leading to other plant communities are as follows: • Grazing land mechanical treatment (chiseling, etc.) followed by prescribed grazing and, if necessary, seeding, will return this plant community to near Historic Climax Plant Community.

Figure 11. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			15	50	20	5		10			

State 4
Salt Tolerant Shrub/Bare Ground Plant Community

Community 4.1
Salt Tolerant Shrub/Bare Ground Plant Community

This plant community can occur on sites subjected to continuous yearlong grazing and where soils are influenced by elevated amounts of soluble salts. Salt tolerant shrubs are a significant component of the plant community and the preferred cool season grasses have been eliminated or greatly reduced. Wyoming big sagebrush makes up a minor component of the plant community. This site is dominated by an overstory of salt tolerant shrubs, such as greasewood, birdfoot sagebrush and saltbushes, but can vary widely in their composition and production. This variation results from the varying quantity of soluble salts present in the soils and the availability of shrubs to occupy the site. Big sagebrush and rubber rabbitbrush are present but are mostly in small patches. Perennial cool season

mid-grasses have been removed leaving mostly patches of blue grama and annuals. Cheatgrass and weedy annual forbs such as halogeton, Russian thistle, and kochia, will occupy the site if a seed source is available. Noxious weeds such as Russian knapweed may also invade this state. Plant diversity is moderate to poor. When compared to the HCPC, grass production has diminished but is compensated by the increase in shrub production. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. Surface salts have increased, especially on sites dominated by greasewood and saltbushes. The leaves of these plants contain high amounts of sodium and other salts, and when shed these soluble salts are transferred to the soils underneath the plants. Consequently, the soil can exhibit wide variations in soluble salts, which can explain the variation in shrub composition. The total annual production (air-dry weight) of this state is about 150 pounds per acre, but it can range from about 75 lbs. /acre in unfavorable years to about 200 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 has 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 moderate to poor. The biotic integrity of this state is mostly dysfunctional because of the predominant salt tolerant shrub overstory and absence of perennial cool season grasses. 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: • Prescribed grazing or possibly long-term prescribed grazing, will convert this plant community to the Salt Tolerant Shrub/Rhizomatous Wheatgrass Plant Community. Recovery to near Historic Climax Plant Community condition is difficult to impossible due to the resistance of these shrubs to herbicides and other brush management techniques. In addition, the increase in surface salts has had accumulated effects on the soil so most of the herbaceous plants associated with the HCPC are no longer suitable for this site. The most notable exception is the rhizomatous wheatgrasses and bottlebrush squirreltail. Soil remediation to reduce the surface salts is not recommended, as this is mostly ineffective and extremely costly. Seeding more salt-tolerant native grasses and forbs will improve the productivity of site and plant cover.

Figure 12. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			15	50	20	5		10			

State 5
Salt Tolerant Shrub/Rhizomatous Wheatgrasses Plant Community

Community 5.1
Salt Tolerant Shrub/Rhizomatous Wheatgrasses Plant Community

This plant community can occur where the Salt Tolerant Shrub/*Bare Ground* Plant Community is rested and a prescribed grazing management practice is implemented. Salt tolerant shrubs remain a significant component of the plant community, but preferred cool season grasses have reestablished. This site is dominated by an overstory of salt tolerant shrubs, such as birdfoot sagebrush, saltbushes, and greasewood, but can exhibit a wide variety of shrub composition and production. Some perennial cool season mid-grasses have once again reestablished such as rhizomatous wheatgrasses and bottlebrush squirreltail. Other important grasses include Sandberg bluegrass and blue grama. Patches of annuals such as cheatgrass and other weedy annual forbs such as halogeton, Russian thistle, and kochia, will persist on this site. Noxious weeds such as Russian knapweed may also remain if not treated. The interspaces between plants will have diminished in size. The total annual production (air-dry weight) of this state is about 200 pounds per acre, but it can range from about 125 lbs. /acre in unfavorable years to about 300 lbs. /acre in above average years. This plant community is mostly resistant to change, but species composition can be altered through long-term overgrazing. The herbaceous component is stable and plant vigor and replacement capabilities are sufficient. The watershed may or may not be functioning and the biotic community is not intact because of the predominant salt tolerant shrub overstory. Plant diversity is moderate Soils are mostly stable and recent soil loss is minimal. This should not be confused with evidence of remnant erosion. Water flow patterns and litter movement is stable but is still occurring on steeper slopes. Incidence of pedestalling is improving. Transitions or pathways leading to other plant communities are as follows: • Frequent and severe grazing will convert the plant community to the Salt Tolerant Shrub/*Bare Ground* Plant Community. • Recovery to near Historic Climax Plant

Community condition is difficult to impossible due to the resistance of these shrubs to herbicides and other brush management techniques. In addition, the increase in surface salts has had accumulated effects on the soil so most of the herbaceous plants associated with the HCPC are no longer suitable for this site. The most notable exception is the rhizomatous wheatgrasses and bottlebrush squirreltail. Soil remediation to reduce the surface salts is not recommended, as this is mostly ineffective and extremely costly. Seeding more salt-tolerant grasses and forbs will improve the productivity and plant cover of the site, but will not improve the biotic integrity.

Figure 13. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			15	50	20	5		10			

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				60–90	
	western wheatgrass	PASM	*Pascopyrum smithii*	60–90	–
2				30–60	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	30–60	–
3				15–30	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	15–30	–
4				15–30	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	15–30	–
5				0–45	
	Grass, perennial	2GP	*Grass, perennial*	0–15	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–15	–
	sedge	CAREX	*Carex*	0–15	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–15	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–15	–
Forb					
6				0–30	
	Forb, perennial	2FP	*Forb, perennial*	0–15	–
	textile onion	ALTE	*Allium textile*	0–15	–
	desertparsley	LOMAT	*Lomatium*	0–15	–
	phlox	PHLOX	*Phlox*	0–15	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–15	–
Shrub/Vine					
7				0–30	
	bud sagebrush	PICRO	*Picrothamnus*	0–30	–
8				0–30	
	Gardner's saltbush	ATGA	*Atriplex gardneri*	0–30	–
9				0–30	
	birdfoot sagebrush	ARPE6	*Artemisia pedatifida*	0–30	–
10				0–15	
	big sagebrush	ARTR2	*Artemisia tridentata*	0–15	–
11				0–15	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–15	–
12				0–15	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–15	–

Animal community

Animal Community – Wildlife Interpretations
Rhizomatous Wheatgrasses/Indian Ricegrass (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 Sagebrush 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.

Mixed Sagebrush/Blue Grama Sod 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 Mixed Shrub/Perennial Grass Plant Community is limiting. Generally, these are not target plant communities for wildlife habitat management.

Salt Tolerant Shrub/*Bare Ground* Plant Community: This plant community exhibits a low level of plant species diversity due to the accumulation of salts near the soil surface. It may provide some thermal and escape cover for deer and antelope if no other woody community is nearby, but in most cases, it is not a desirable plant community to select as a wildlife habitat management objective.

Salt Tolerant Shrub/Rhizomatous Wheatgrass 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.

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 150-375 .10
Perennial Grass/Mixed Sagebrush 100-300 .08
Mixed Sagebrush/Blue Grama Sod 50-150 .03
Salt Tolerant Shrub/*Bare Ground* 75-200 .03
Salt Tolerant Shrub/Rhizomatous Wheatgrasses 125-300 .05

* - 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 C and D. Infiltration ranges from very slow to moderately slow. Runoff potential for this site varies from moderate to high 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 will vary from none on sites with slopes of < 9% to common on slopes of > 25%. Active gullies are restricted to concentrated water flow patterns. Water flow patterns will vary from barely observable on sites with slopes of < 9% and from broken and irregular in appearance to continuous on slopes of > 25%. Pedestals are only slightly present in association with bunchgrasses such as bluebunch wheatgrass. Little to no plant litter movement occurs on slopes < 9%. Litter movement does occur on slopes > 25%. 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 here has been derived from NRCS inventory data. Field observations from range trained personnel were also used. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References
Data Source Number of Records Sample Period State County
SCS-RANGE-417 19 1965-1986 WY Park & others

Approval

Scott Woodall, 9/05/2019

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	Marji Patz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Due to the wide slope range associated with this site, the number and extent of rills will vary from none on sites with slopes of < 9% to common on slopes > 25%.

2. **Presence of water flow patterns:** Due to the wide slope range associated with this site, water flow patterns will vary from barely observable on sites with slopes of < 9% from broken and irregular in appearance to continuous on slopes > 25%.

3. **Number and height of erosional pedestals or terracettes:** Not evident on slopes < 9%. Erosional pedestals will be present with terracettes present at debris dams on slopes >9%.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 35 to 45%.

5. **Number of gullies and erosion associated with gullies:** Active gullies restricted to concentrated water flow patterns.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement occurs on slopes < 9%. Litter movement does occur on slopes > 25%.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 50% or greater of soil surface and maintains soil surface integrity. Stability class anticipated to be 5 or greater.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil series description for depth and color of A-horizon.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant canopy (50% maximum), very slow to slow infiltration rates, the amount of bare ground, and steepness of slopes results in a naturally high runoff rate on slopes > 25%, even in HCPC.

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 would be expected except for the naturally occurring rooting restriction (bedrock or decomposing shale) at 10 to 20 inches.

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-stature grasses shrubs

Sub-dominant: forbs

Other: short grasses/grasslikes

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very low.

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14. **Average percent litter cover (%) and depth (in):** Average litter cover is 15-25% with depths of 0.1 to 0.2 inches. Litter cover is in contact with soil surface with little evidence of biological activity.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 250 lbs/acre

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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:** Blue grama, Birdfoot sagebrush, Big sagebrush, Annuals, Exotics, and Species found on Noxious Weed List.

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17. **Perennial plant reproductive capability:** No limitations.
