Ecological site DX032X01A110
Dense Clay (DC) Big Horn Basin Core

Last updated: 9/05/2019
Accessed: 04/26/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

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 precipitaiton 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 landforms 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, landform, 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

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 <30%
• Soils are:
o Textures range from fine sandy clay loam to clay 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 in the particle size control section have a weighted average of ≥ 35% clay. (The particle size control section is the segment of the profile from either the start of an argillic horizon for 50 cm’s or from 25-100 cm’s).
o Moderately deep to very deep (20-80+ in. (50-200+ cm)
o Not skeletal (<35% rock fragments) within 20” (50 cm) of mineral soil surface
o None to Slightly effervescent throughout top 20” (50 cm) of mineral soil surface
o Non-saline, sodic, or saline-sodic

Site drafted from historic range site: R032XY118WY. Based heavy clay soils that develop large cracks at the surface when dry. Site has a thin cap of coarser soils on the surface. This community is dominated by birdfoot sagebrush and generally lacks Wyoming big sagebrush.

Associated sites

R032XY144WY	**Saline Upland (SU) 5-9” Big Horn Basin Precipitation Zone** Saline upland site will occur in close proximity with the dense clay site appearing higher on the landscape with lower affect by salt accumulations. Site is both associated and similar.
R032XY104WY	**Clayey (Cy) 5-9” Big Horn Basin Precipitation Zone** Dense clay will occur in small swales or side slopes with the clayey site. Site is both associated and similar.
R032XY138WY	**Saline Lowland (SL) 5-9” Big Horn Basin Precipitation Zone** Site is found in connection to dense clay, with the dense clay occurring on higher nobs above influence of runoff or a water table, and saline lowland occurring on a step below or in small depressions along a drainage system.

Similar sites

R032XY344WY	**Saline Upland (SU) 10-14" East Precipitation Zone** Saline Upland may be similar in production with a shift in species. Saline Upland is Gardner's saltbush dominated (significant salts - sodic, saline, gypsic, saline-sodic) while Dense Clay is birdfoot sagebrush dominated (minimal to no salt accumulations).
R032XY304WY	**Clayey (Cy) 10-14" East Precipitation Zone** Site is similar to Dense clay but is lacking the coarser surface textures and supports Wyoming big sagebrush and mixed mid-stature grasses for overall greater production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia pedatifida*
Herbaceous	(1) *Pascopyrum smithii* (2) *Elymus elymoides*

Legacy ID

R032XA110WY

Physiographic features

This site occurs on nearly level up to 30% slopes.

Table 2. Representative physiographic features

Landforms	(1) Intermontane basin > Hill (2) Intermontane basin > Ridge (3) Intermontane basin > Escarpment
Elevation	3,700–6,000 ft
Slope	0–30%
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

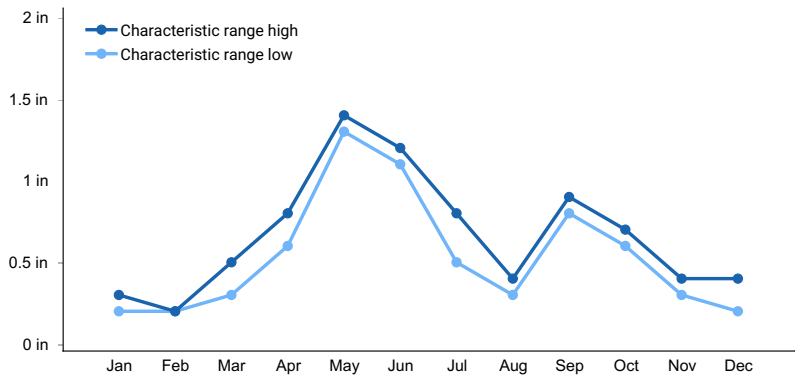


Figure 1. Monthly precipitation range

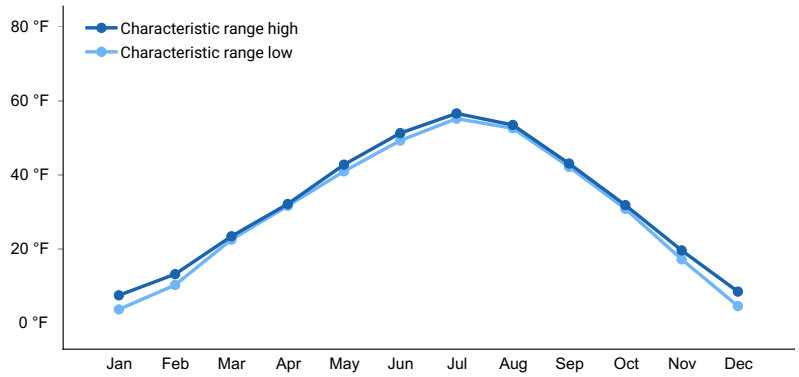


Figure 2. Monthly minimum temperature range

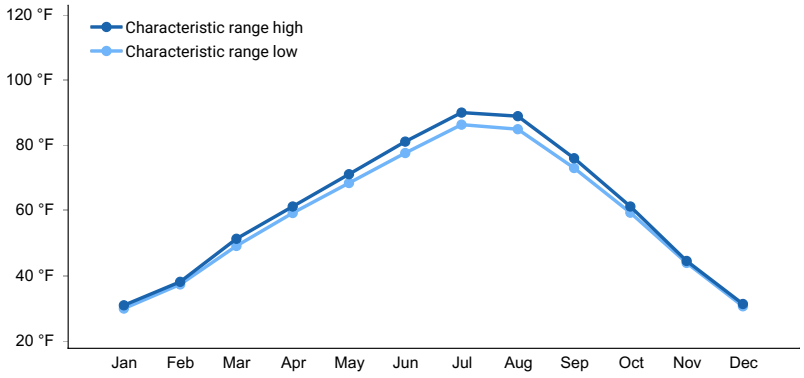


Figure 3. Monthly maximum temperature range

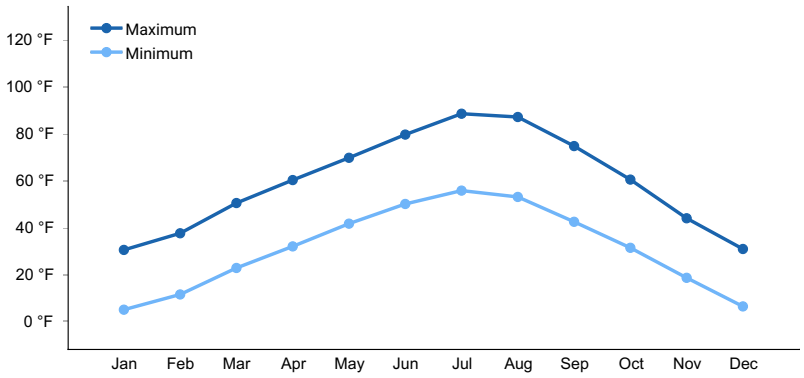


Figure 4. Monthly average minimum and maximum temperature

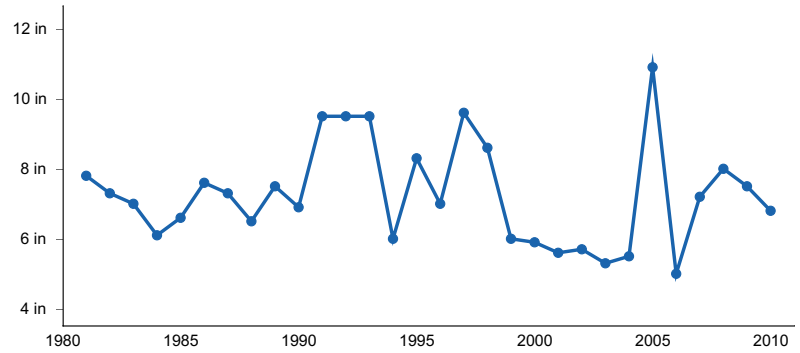


Figure 5. Annual precipitation pattern

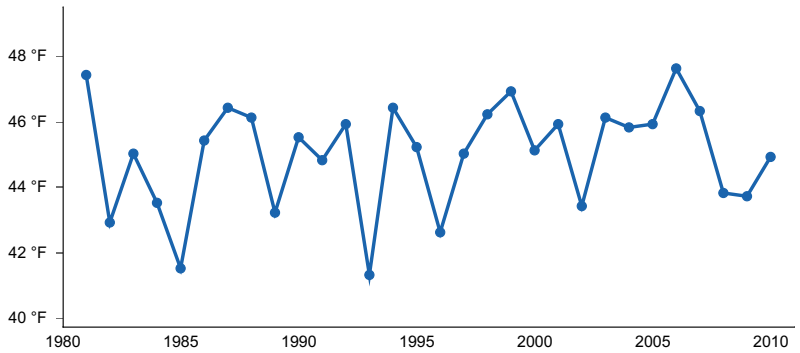


Figure 6. Annual average temperature pattern

Climate stations used

- (1) GREYBULL [USC00484080], Greybull, WY
- (2) EMBLEM [USC00483031], Burlington, WY
- (3) LOVELL [USC00485770], Lovell, WY
- (4) WORLAND [USC00489770], Worland, WY
- (5) WORLAND [USW00024062], Worland, WY
- (6) BASIN [USC00480540], Basin, 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. No streams are classified within this ecological site.

Soil features

The soils of this site are very shallow (less than 10”) to very deep, well to poorly drained soils formed in alluvium or alluvium over residuum. Layers of the soil most influential to the plant community varies from 3 to 6 inches thick. These soils have slow to very slow permeability. The topsoil, except for thin ineffectual layers, will be heavy clays and/or soils that develop large cracks when dry and are very sticky when wet. These sites typically have moderate saline and /or alkaline soils, but high amounts of soluble salt can occur. The soil characteristics having the most influence on plants are the very slow infiltration rate, which reduces the available moisture, and the amount of soluble salts.

Table 4. Representative soil features

Parent material	(1) Alluvium–interbedded sedimentary rock (2) Residuum–interbedded sedimentary rock

Surface texture	(1) Clay (2) Silty clay (3) Sandy clay loam (4) Clay loam
Drainage class	Poorly drained to well drained
Permeability class	Slow to very slow
Soil depth	1–60 in
Available water capacity (0-40in)	0.56–6.3 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–18 mmhos/cm
Sodium adsorption ratio (0-40in)	0–30
Soil reaction (1:1 water) (0-40in)	7.9–11

Ecological dynamics

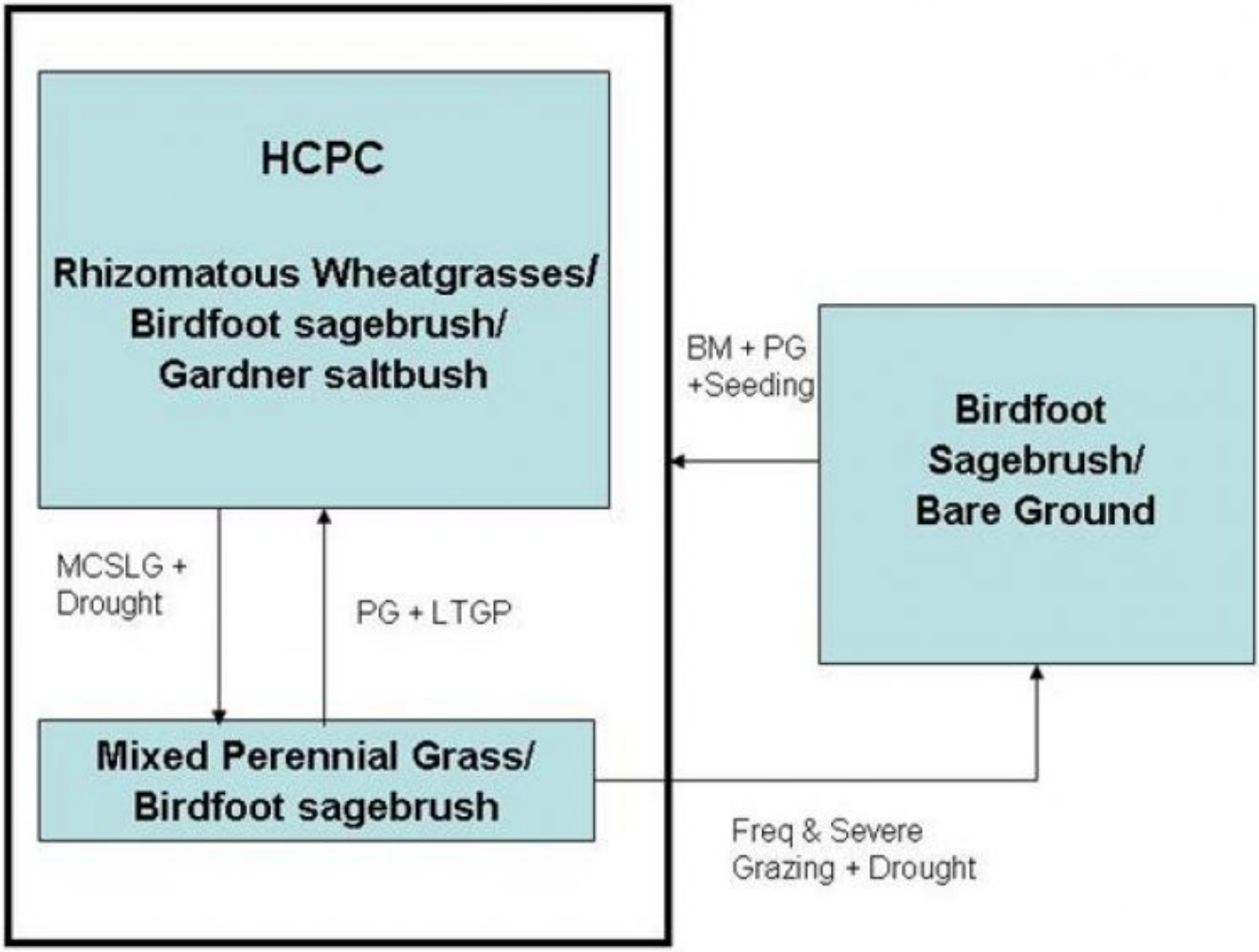
Potential vegetation on this site is dominated by salt tolerant, drought resistant, mid cool-season perennial grasses and shrubs. The expected potential composition for this site is about 50% grasses, 10% forbs and 40% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates, species such as Sandberg bluegrass and birdfoot sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool season grasses such as rhizomatous wheatgrass, 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

State 1
Rhizomatous Wheatgrasses/Birdfoot Sagebrush/Gardner Saltbush Plant Community

Community 1.1
Rhizomatous Wheatgrasses/Birdfoot Sagebrush/Gardner Saltbush Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and very droughty soils due to the very slow infiltration rate. Potential vegetation is dominated by salt tolerant, drought resistant, mid cool-season perennial grasses and shrubs. The expected potential composition for this site is about 50% grasses, 10% forbs and 40% woody plants. The major grasses include rhizomatous wheatgrasses, bottlebrush squirreltail, and Indian ricegrass. A variety of forbs and half-shrubs also occur, as shown in the preceding table. Birdfoot sagebrush and Gardner saltbush comprise almost half of the total annual production. Winterfat is a common component found on this site. 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 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 state is extremely stable and well adapted to the Northern Great Plains 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 this state to a Mixed Perennial Grass/Birdfoot Sagebrush Plant Community. Prolonged Drought will exacerbate this transition.

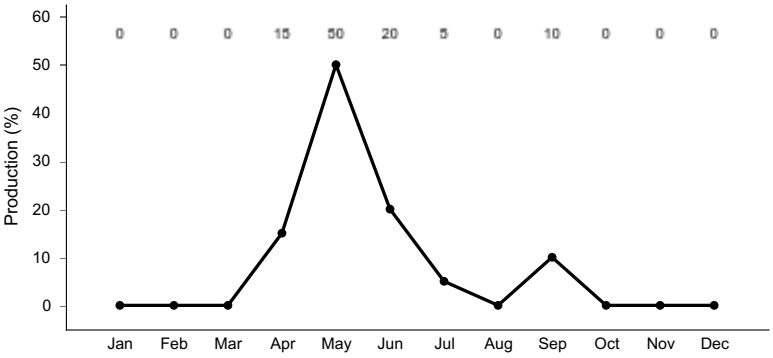


Figure 8. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

State 2
Mixed Perennial Grass/Birdfoot Sagebrush Plant Community

Community 2.1
Mixed Perennial Grass/Birdfoot Sagebrush Plant Community

This plant community is the result of moderate continuous season long grazing and is exacerbated by prolong drought conditions. Birdfoot sagebrush composes a significant percentage of the annual production of plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, and miscellaneous forbs. Dominant grasses include rhizomatous wheatgrasses, and bottlebrush squirreltail and Sandberg bluegrass. Forbs commonly found in this plant community include wild onion, scarlet globemallow, fringed sagewort, hairy goldaster, wild parsley, and phlox. Birdfoot Sagebrush can make up to 50% of the annual production. Plains pricklypear cactus can also occur. When compared to the Historic Climax Plant Community, birdfoot sagebrush has increased. Production of cool-season grasses, particularly Indian ricegrass, has been reduced, as have shrubs such as winterfat and Gardner saltbush. This diverse plant community provides support for domestic livestock and wildlife such as antelope. 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 225 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. Brush management is not usually necessary at the time these grazing systems are implemented. • Frequent and severe grazing, will convert the plant community to the Birdfoot Sagebrush/*Bare Ground* Vegetative State. The probability of this occurring is high on areas where birdfoot sagebrush is not adversely impacted by heavy browsing and prolong drought has occurred.

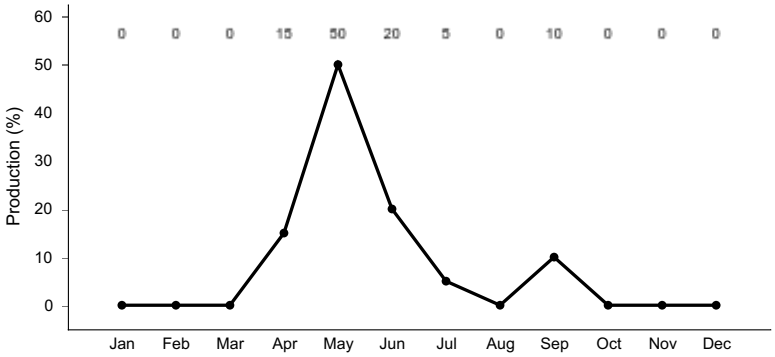


Figure 9. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

State 3
Birdfoot Sagebrush/Bare Ground Plant Community

Community 3.1
Birdfoot Sagebrush/Bare Ground Plant Community

This plant community is the result of frequent and severe grazing and is exacerbated by prolonged periods of drought. Birdfoot sagebrush dominates this plant community, as the annual production is in excess of 50%. The preferred cool season grasses have been eliminated or greatly reduced. The dominant grass is Sandberg bluegrass. Weedy annual species such as cheatgrass, halogeton, and Russian thistle will occupy the site if a seed source is available. Cactus has increased. Plant diversity is poor. The interspaces between plants have expanded significantly leaving mostly bare ground. When compared to the historic climax plant community the perennial cool-season grasses are absent and birdfoot sage and annuals dominate. The total annual production (air-dry weight) of this state is about 50 pounds per acre, but it can range from about 25 lbs/acre in unfavorable years to about 100 lbs./acre in above average years. This plant community is resistant to change as the stand becomes more decadent. Continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. 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. 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 are noticeable in the interspaces and gullies are being establishing where rills have concentrated down slope. The watershed may or may not be functional. Transitional pathways leading to other plant communities are as follows: • Brush Management with prescribed grazing where there are some remnants of perennial grasses may return this state to near Historic Climax Plant Community. If perennial cool-season grasses are not available on site, seeding is recommended.

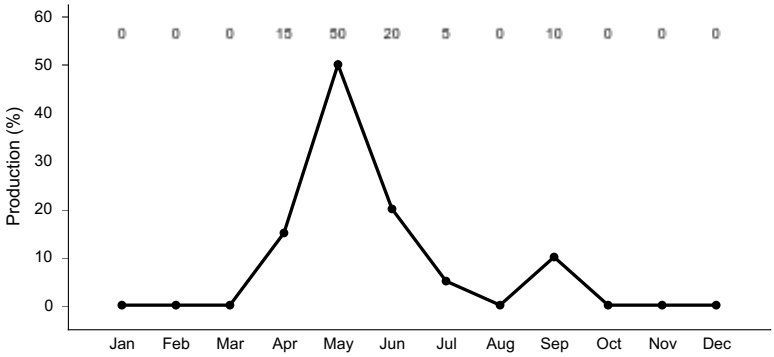


Figure 10. Plant community growth curve (percent production by month). WY0501, 5-9BH Upland sites. Monthly percentages of total annual growth for all upland sites with dominantly C3 Cool season plants..

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				30–50	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	30–50	–
2				10–30	
	western wheatgrass	PASM	*Pascopyrum smithii*	10–30	–
3				10–30	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	10–30	–
4				0–10	
	Sandberg bluegrass	POSE	*Poa secunda*	0–10	–
5				0–10	
	Grass, perennial	2GP	*Grass, perennial*	0–10	–
Forb					
6				0–20	
	Forb, perennial	2FP	*Forb, perennial*	0–10	–
	woodyaster	XYLOR	*Xylorhiza*	0–10	–
Shrub/Vine					
7				40–80	
	birdfoot sagebrush	ARPE6	*Artemisia pedatifida*	40–80	–
8				0–20	
	bud sagebrush	PICRO	*Picrothamnus*	0–20	–
9				0–20	
	Gardner's saltbush	ATGA	*Atriplex gardneri*	0–20	–
10				0–10	
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–10	–
11				0–10	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–10	–

Animal community

Animal Community – Wildlife Interpretations

Historic Climax Plant Community: The composition of grasses and shrubs in this plant community favors feeders, such as antelope. Because of the low growing shrub component this is not suitable for thermal and escape cover for deer, but may be preferred by antelope or other wildlife. 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. Prairie dogs and other small mammals prefer these areas as tall, dense stands of vegetation impede recognition and escape from predators.

Mixed Perennial Grass/Birdfoot Sagebrush: This plant community exhibits a low level of plant species diversity but is an important winter range for antelope. 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. Prairie dogs and other small mammals prefer these areas as tall, dense stands of vegetation impede recognition and escape from predators.

Birdfoot Sagebrush/*Bare Ground*: This plant community has a low level of diversity. Due to the dominance of annual weeds and grasses, feed for large mammals is limited. Areas of bare ground may provide leks for birds such as sage grouse or habitat for Prairie dogs and other small mammals.

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 (lb./ac)	Carrying Capacity* (AUM/ac)
Historic Climax Plant Community	100-300	.08
Mixed Perennial Grass/Birdfoot Sagebrush	50-225	.06
Birdfoot Sagebrush/*Bare Ground*	25-100	.02

* - 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 slow to very slow. Runoff potential for this site varies from high to very 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 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 variety 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.

Author(s)/participant(s)	Ray Gullion
Contact for lead author	ray.gullion@wy.usda.gov
Date	02/19/2008
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 slope < 9% to common on slopes > 25%

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

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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%.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 50-70%, occurring in small openings throughout the site.

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

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

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

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 30% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 5 or greater.

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

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse plant canopy, slow infiltration rates, and the high amount of bare ground contribute to 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.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer or soil surface crusting should be present.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Shrubs

    Sub-dominant: Mid stature Grasses

    Other: Forbs = short stature grasses

    Additional:

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

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 200lbs/ac

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Birdfoot sagebrush, Sandberg bluegrass, Woody aster, Annuals, Exotics, and Species found on Noxious Weed List

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17. **Perennial plant reproductive capability:** May be Limited due to effective moisture and seed to soil contact

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