Ecological site R032XY166WY
Shallow Sandy (SwSy)
5-9” Big Horn Basin Precipitation Zone

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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.

Associated sites

R032XY150WY	**Sandy (Sy) 5-9” Big Horn Basin Precipitation Zone,**
R032XY162WY	**Shallow Loamy (SwLy) 5-9” Big Horn Basin Precipitation Zone**

Similar sites

R032XY366WY	**Shallow Sandy (SwSy) 10-14" East Precipitation Zone** Shallow Sandy 10-14” Foothills and Basins East P.Z., 032XY366WY has higher production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on nearly level to 50% slopes.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Escarpment
Flooding frequency	None

Ponding frequency	None
Elevation	1,130 – 1,830 m
Slope	0 – 50 %
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 5-9 inches per year. 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 1 and continues to about July 1. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the “Emblem” climate station:
Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 98 171 May 13 – September 19
Freeze-free period (days): 120 184 May 1 – October 5
Mean Annual Precipitation (inches): 3.22 10.97

Mean annual precipitation: 7.42 inches
Mean annual air temperature: 45.01 F (31.2 F Avg. Min. to 58.7 F Avg. Max.)
For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/ website. Other climate station(s) representative of this precipitation zone include” Basin”, “Deaver”, “Lovell”, and “Worland”.

Table 3 Representative climatic features

Frost-free period (average)	170 days
Freeze-free period (average)	180 days
Precipitation total (average)	230 mm

Influencing water features

Soil features

The soils of this site are shallow (8”-15”to bedrock) well to excessively well-drained soils formed in eolian deposits or alluvium over residuum or residuum. These soils have rapid to very rapid permeability and may occur on all slopes. The bedrock may be of any kind except igneous or volcanic and 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 and light textures which can affect the available moisture.

Major Soil Series correlated to this site include: Oceanet

Table 4. Representative soil features

Surface texture	(1) Loamy fine sand (2) Fine sandy loam (3) Sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Rapid to very rapid
Soil depth	20 – 40 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	1.02 – 7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 8.4

Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

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

As this site deteriorates, species such as threadleaf sedge, blue grama, and big sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool season grasses such as needleandthread, rhizomatous wheatgrasses, 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

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				18-55	
	thickspike wheatgrass	ELLA3	*Elymus lanceolatus*	18-55	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	18-55	–
	western wheatgrass	PASM	*Pascopyrum smithii*	18-55	–
2				91-146	
	needle and thread	HECO26	*Hesperostipa comata*	91-146	–
3				37-91	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	37-91	–
4				37-73	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	37-73	–
5				18-55	
	Grass, perennial	2GP	*Grass, perennial*	0-18	–
	blue grama	BOGR2	*Bouteloua gracilis*	0-18	–
	sedge	CAREX	*Carex*	0-18	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0-18	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0-18	–
	Sandberg bluegrass	POSE	*Poa secunda*	0-18	–

Forb					
6				0-37	
	Forb, perennial	2FP	*Forb, perennial*	0-18	–
	textile onion	ALTE	*Allium textile*	0-18	–
	larkspur	DELPH	*Delphinium*	0-18	–
	fleabane	ERIGE2	*Erigeron*	0-18	–
	desertparsley	LOMAT	*Lomatium*	0-18	–
	phlox	PHLOX	*Phlox*	0-18	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0-18	–
Shrub/Vine					
7				0-37	
	silver sagebrush	ARCA13	*Artemisia cana*	0-37	–
8				0-18	
	big sagebrush	ARTR2	*Artemisia tridentata*	0-18	–
9				0-18	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0-18	–
10				0-18	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	0-18	–
11				0-18	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0-18	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

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 Plant Community: 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, 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. Mixed Shrub/Blowout Dune Plant Community: These communities provide limited foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover and if the Historic Climax Plant Community or the Perennial Grass/Mixed Shrub Plant Community is limiting. Generally, these are not target plant communities for wildlife habitat management. Threadleaf Sedge Sod Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope. This community provides excellent escape and thermal cover for large ungulates, as well as nesting habitat for sage grouse. 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 200-400 .10 Perennial Grass/Mixed Shrub 75-300 .08 Mixed Shrub/Blowout Dune 35-200 .03 Threadleaf Sedge Sod 50-250 .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 B and C. Infiltration ranges from rapid to very rapid. Runoff potential for this site varies from low to moderate depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information). Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

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

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Information presented 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

Contributors

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

Indicators

1. **Number and extent of rills:** **Rills should not be present**

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

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3. **Number and height of erosional pedestals or terracettes:** **Essentially non-existent**

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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 40-60% occurring in small areas throughout site**

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5. **Number of gullies and erosion associated with gullies:** **Active gullies should be restricted to areas of concentrated water flow patterns on steeper slopes**

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6. **Extent of wind scoured, blowouts and/or depositional areas:** **Small scoured sites may be observed**

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7. **Amount of litter movement (describe size and distance expected to travel):** **Litter movement is little to none based on topography and water flow patterns**

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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 50% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 3 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:** **Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Infiltration is rapid to very rapid**

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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: Mid stature Bunch Grasses > Mid Stature Rhizomatous Grasses > Shrubs > Short grasslikes = Short grasses > Forbs

    Sub-dominant:

    Other:

    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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 250 lbs/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:** Threadleaf sedge, Blue grama, Big sagebrush, Silver sagebrush, Green rabbitbrush, skunkbush sumac, Badlands mules-ear, Prickly Pear, Broom Snakeweed, Unpalatable forbs, Annuals, Exotics, and Species found on Noxious Weed List

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17. **Perennial plant reproductive capability:** All species are capable of reproducing

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