

**Ecological site R061XY130WY**  
**Overflow (Ov)**  
**15-19" Precipitation Zone, Black Hills**

Accessed: 09/24/2026

### 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

|             |                                                     |
|-------------|-----------------------------------------------------|
| R061XW104WY | Clayey-West (16-20" PZ)                             |
| R061XY128WY | Lowland (LL) 15-19" Precipitation Zone, Black Hills |

Table 1. Dominant plant species

|            |               |
|------------|---------------|
| Tree       | Not specified |
| Shrub      | Not specified |
| Herbaceous | Not specified |

### Physiographic features

#### Physiographic Features

This site occurs on areas that receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

Table 2. Representative physiographic features

|                    |                                        |
|--------------------|----------------------------------------|
| Landforms          | (1) Alluvial fan<br>(2) Stream terrace |
| Flooding duration  | Very brief (4 to 48 hours)             |
| Flooding frequency | Frequent                               |
| Ponding frequency  | None                                   |
| Elevation          | 1,070 – 1,520 m                        |

|                   |                                    |
|-------------------|------------------------------------|
| Slope             | 0 – 10 %                           |
| Ponding depth     | 0 cm                               |
| Water table depth | 150 cm                             |
| Aspect            | Aspect is not a significant factor |

## Climatic features

### Climatic features

Annual precipitation ranges from 15-19 inches per year. 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. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Strong winds are less frequent than over other areas of Wyoming. Occasional storms, however, can bring brief periods of high winds with gusts exceeding 50 mph.

Growth of native cool season plants begins about April 1 and continues to about July 1. Native warm season plants begin about May 15 and continue to about August 15. Fall green-up may occur in September and last through October.

The following information is from the "Devils Tower 2" climate station:

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days) (32°F): 58 93 June 6 – September 7

Freeze-free period (days) (28°F): 95 125 May 18 – September 20

Annual Precipitation (inches): 14.81 20.17

Mean annual precipitation: 17.66 inches

Mean annual air temperature: 44.4 F (28.6 F Avg. Min. to 60.1 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 "Hulett" and "Sundance".

**Table 3 Representative climatic features**

|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 90 days  |
| Freeze-free period (average)  | 130 days |
| Precipitation total (average) | 510 mm   |

## Influencing water features

### Influencing Water Features

Wetland Description: System Subsystem Class Sub-class  
None None None None None

Stream Type: C  
(Rosgen type)

## Soil features

### Representative Soil Features

The soils of this site are deep to very deep well-drained soils formed in mixed alluvium. Layers of the soil most influential to the plant community varies from 3 to 6 inches thick. These soils have moderate to rapid permeability. The surface soil will vary from 2 to 8 inches in thickness and will be one or more of the following textures: very fine sandy loam, fine sandy loam, sandy loam, loam, silt loam, clay loam, and silty clay loam. These areas receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

Parent Material Kind: alluvium

Parent Material Origin: sandstone, shale

Surface Texture: loam, clay loam, clay, fine sandy loam, sandy loam, loamy sand, silt loam

Surface Texture Modifier: none

Subsurface Texture Group: loam

Surface Fragments 3" (% Cover): 0

Surface Fragments > 3" (%Cover): 0

Subsurface Fragments 3" (% Volume): 0

Subsurface Fragments > 3" (% Volume): 0

Minimum Maximum

Drainage Class: moderately well excessive

Permeability Class: moderate rapid

Depth (inches): 20 >60

Electrical Conductivity (mmhos/cm) 20": 0 8

Sodium Absorption Ratio 20": 0 10

Soil Reaction (1:1 Water) 20": 6.6 8.4

Soil Reaction (0.1M CaCl<sub>2</sub>) 20": NA NA

Available Water Capacity (inches) 30": 2 6.2

Calcium Carbonate Equivalent (percent) 20": 0 5

Table 4. Representative soil features

|                                         |                                                |
|-----------------------------------------|------------------------------------------------|
| Surface texture                         | (1) Loam<br>(2) Clay loam<br>(3) Clay          |
| Family particle size                    | (1) Loamy                                      |
| Drainage class                          | Moderately well drained to excessively drained |
| Permeability class                      | Moderate to rapid                              |
| Soil depth                              | 50 – 150 cm                                    |
| Surface fragment cover <=3"             | Not specified                                  |
| Surface fragment cover >3"              | Not specified                                  |
| Available water capacity<br>(0-101.6cm) | 5.08 – 15.75 cm                                |

|                                                          |                 |
|----------------------------------------------------------|-----------------|
| Calcium carbonate equivalent<br>(0-101.6cm)              | 0 – 10 %        |
| Electrical conductivity<br>(0-101.6cm)                   | 0 – 10 mmhos/cm |
| Sodium adsorption ratio<br>(0-101.6cm)                   | 0 – 10          |
| Soil reaction (1:1 water)<br>(0-101.6cm)                 | 6.6 – 8.4       |
| Subsurface fragment volume <=3"<br>(Depth not specified) | Not specified   |
| Subsurface fragment volume >3"<br>(Depth not specified)  | Not specified   |

## Ecological dynamics

Ecological Dynamics of the Site:

As this site deteriorates, species such as American licorice, western yarrow, green sagewort and snowberry will increase and species such as Kentucky bluegrass and annuals will invade. Grasses such as big bluestem, green needlegrass, slender wheatgrass and western wheatgrass will decrease in frequency and production.

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

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

### Plant Community Narratives

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

## State and transition model

## Additional community tables

Table 5. Community 1.1 plant community composition

| Group                  | Common Name              | Symbol | Scientific Name                          | Annual Production () | Foliar Cover (%) |
|------------------------|--------------------------|--------|------------------------------------------|----------------------|------------------|
| <b>Grass/Grasslike</b> |                          |        |                                          |                      |                  |
| 1                      |                          |        |                                          | 336-841              |                  |
|                        | green needlegrass        | NAVI4  | <i>Nassella viridula</i>                 | 336-841              | –                |
| 2                      |                          |        |                                          | 336-841              |                  |
|                        | western wheatgrass       | PASM   | <i>Pascopyrum smithii</i>                | 336-841              | –                |
| 3                      |                          |        |                                          | 336-504              |                  |
|                        | prairie sandreed         | CALO   | <i>Calamovilfa longifolia</i>            | 336-504              | –                |
| 4                      |                          |        |                                          | 168-336              |                  |
|                        | big bluestem             | ANGE   | <i>Andropogon gerardii</i>               | 168-336              | –                |
| 5                      |                          |        |                                          | 168-336              |                  |
|                        | blue wildrye             | ELGL   | <i>Elymus glaucus</i>                    | 168-336              | –                |
| 6                      |                          |        |                                          | 168-336              |                  |
|                        | Columbia needlegrass     | ACNE9  | <i>Achnatherum nelsonii</i>              | 168-336              | –                |
| 7                      |                          |        |                                          | 168-841              |                  |
|                        | Grass, perennial         | 2GP    | <i>Grass, perennial</i>                  | 0-168                | –                |
|                        | Richardson's needlegrass | ACRI8  | <i>Achnatherum richardsonii</i>          | 0-168                | –                |
|                        | bearded wheatgrass       | ELCA11 | <i>Elymus caninus</i>                    | 0-168                | –                |
|                        | slender wheatgrass       | ELTR7  | <i>Elymus trachycaulus</i>               | 0-168                | –                |
|                        | needle and thread        | HECO26 | <i>Hesperostipa comata</i>               | 0-168                | –                |
|                        | mat muhly                | MURI   | <i>Muhlenbergia richardsonis</i>         | 0-168                | –                |
|                        | switchgrass              | PAVI2  | <i>Panicum virgatum</i>                  | 0-168                | –                |
|                        | fowl bluegrass           | POPA2  | <i>Poa palustris</i>                     | 0-168                | –                |
| <b>Forb</b>            |                          |        |                                          |                      |                  |
| 8                      |                          |        |                                          | 168-504              |                  |
|                        | Forb, perennial          | 2FP    | <i>Forb, perennial</i>                   | 0-168                | –                |
|                        | yarrow                   | ACHIL  | <i>Achillea</i>                          | 0-168                | –                |
|                        | tarragon                 | ARDR4  | <i>Artemisia dracunculus</i>             | 0-168                | –                |
|                        | water-starwort           | CALLI6 | <i>Callitriche</i>                       | 0-168                | –                |
|                        | prairie clover           | DALEA  | <i>Dalea</i>                             | 0-168                | –                |
|                        | American licorice        | GLLE3  | <i>Glycyrrhiza lepidota</i>              | 0-168                | –                |
|                        | groundsel                | TEPHR3 | <i>Tephrosia</i>                         | 0-168                | –                |
|                        | American vetch           | VIAM   | <i>Vicia americana</i>                   | 0-168                | –                |
|                        | violet                   | VIOLA  | <i>Viola</i>                             | 0-168                | –                |
| <b>Shrub/Vine</b>      |                          |        |                                          |                      |                  |
| 9                      |                          |        |                                          | 168-336              |                  |
|                        | Shrub (>.5m)             | 2SHRUB | <i>Shrub (&gt;.5m)</i>                   | 0-168                | –                |
|                        | hawthorn                 | CRATA  | <i>Crataegus</i>                         | 0-168                | –                |
|                        | American plum            | PRAM   | <i>Prunus americana</i>                  | 0-168                | –                |
|                        | chokecherry              | PRVIV  | <i>Prunus virginiana var. virginiana</i> | 0-168                | –                |
|                        | western snowberry        | SYOC   | <i>Symphoricarpos occidentalis</i>       | 0-168                | –                |

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

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. Mixed Shrub/Grass: The combination of an overstory of shrubs 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. Snowberry/Cheatgrass: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds. Rhizomatous wheatgrass/Green needlegrass: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds. 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\* (Lbs/acre) (AUM/ac) Historic Climax Plant Community 2000-4000 .7 Mixed Shrub/Grass 1000-1800 .6 Snowberry/Cheatgrass 600-1400 .3 Rhizomatous wheatgrass/Green needlegrass 1000-3200 .6 \* - 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 moderate to rapid. 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 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 clipping data and other 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.

## Contributors

G. Mitchell

## 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)                    |                   |
| Contact for lead author                     |                   |
| Date                                        | 04/01/2005        |
| Approved by                                 |                   |
| 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 10-20% occurring in small areas throughout site

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5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present

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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. Plant litter remains in place and is not moved by erosional forces.

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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 80% 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: Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration is Moderately Slow to Slow.

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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:

Sub-dominant:

Other:

Additional: Mid stature Cool Season Grasses > Mid stature Warm Season Grasses > Forbs > Shrubs > Short stature Grasses/Grasslikes

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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 35-45% with depths of 0.25 to 1.0 inches

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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): 3000 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: Cheatgrass/other annuals, American licorice, Western yarrow, Green sagewort, Snowberry, Kentucky bluegrass, and Species found on Noxious Weed List
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17. Perennial plant reproductive capability: All species are capable of reproducing
-