

# Ecological site R049XA162WY

## Shallow Loamy (Foothills and Mountains Southeast)

Accessed: 04/17/2026

### 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

|                    |   |
|--------------------|---|
| <b>R049XA122WY</b> | <b>Loamy (Foothills and Mountains Southeast)</b><br><br>Loamy |
|--------------------|---|

### Similar sites

|                    |   |
|--------------------|---|
| <b>R049XA122WY</b> | <b>Loamy (Foothills and Mountains Southeast)</b><br><br>Loamy, 049XA122WY has higher production |
|--------------------|---|

**Table 1. Dominant plant species**

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

### Physiographic features

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

**Table 2. Representative physiographic features**

|                    |   |
|--------------------|---|
| Landforms          | (1) Hill<br>(2) Ridge<br>(3) Escarpment |
| Flooding frequency | None                                    |
| Ponding frequency  | None                                    |

|               |                                    |
|---------------|------------------------------------|
| Elevation     | 1,980 – 2,590 m                    |
| Slope         | 0 – 60 %                           |
| Ponding depth | 0 cm                               |
| Aspect        | Aspect is not a significant factor |

### 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.

Prevailing winds are from the southwest and 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 May 1 and continues to about August 1.

The following information is from the "Hecla 1E" climate station:

Minimum Maximum 5 yrs. out of 10 between  
 Frost-free period (days): 93 151 May 20 – September 14  
 Freeze-free period (days): 106 184 May 9 – September 26  
 Annual Precipitation (inches): 9.56 24.23

Mean annual precipitation: 16.04 inches

Mean annual air temperature: 44.7F (32.1F Avg. Min. to 57.2F 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 "Glenrock 14 SSE", "Foxpark" and "Horse Creek 2 NW".

Table 3 Representative climatic features

|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 150 days |
| Freeze-free period (average)  | 180 days |
| Precipitation total (average) | 480 mm   |

### Influencing water features

#### Soil features

The soils of this site are shallow (less than 20" to bedrock) well-drained soils formed in alluvium over residuum or residuum. These soils have moderate permeability and may occur on all slopes. The bedrock may be any kind which is virtually impenetrable to plant roots, except igneous. The surface soil will have one or more of the following textures: very fine sandy loam, loam, silt loam, sandy clay loam, silty clay loam, and clay loam. Thin ineffectual layers of other textures are disregarded. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick.

Major Soil Series correlated to this site includes:

Other Soil Series correlated to this site include:

**Table 4. Representative soil features**

|   |   |
|---|---|
| Surface texture                             | (1) Loam<br>(2) Sandy loam<br>(3) Clay loam |
| Family particle size                        | (1) Loamy                                   |
| Drainage class                              | Well drained                                |
| Permeability class                          | Moderate to moderately rapid                |
| Soil depth                                  | 30 – 50 cm                                  |
| Surface fragment cover <=3"                 | 0 – 10 %                                    |
| Surface fragment cover >3"                  | 0 – 20 %                                    |
| Available water capacity<br>(0-101.6cm)     | 2.79 – 10.67 cm                             |
| Calcium carbonate equivalent<br>(0-101.6cm) | 0 – 10 %                                    |
| Electrical conductivity<br>(0-101.6cm)      | Not specified                               |
| 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) | 0 – 20 %      |
| Subsurface fragment volume >3"<br>(Depth not specified)  | Not specified |

## Ecological dynamics

As this site deteriorates because of a combination of frequent and severe grazing, species such as Sandberg bluegrass, threadleaf sedge, prairie junegrass, and onespoke oatgrass will increase. Grasses such as bluebunch wheatgrass, Montana wheatgrass, and Parry's oatgrass 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 (%) |
|------------------------|----------------------|--------|--------------------------------|----------------------|------------------|
| <b>Grass/Grasslike</b> |                      |        |                                |                      |                  |
| 1                      |                      |        |                                | 432-801              |                  |
|                        | bluebunch wheatgrass | PSSP6  | <i>Pseudoroegneria spicata</i> | 247-432              | –                |
|                        | Parry's oatgrass     | DAPA2  | <i>Danthonia parryi</i>        | 62-185               | –                |
|                        | Montana wheatgrass   | ELAL7  | <i>Elymus albicans</i>         | 62-185               | –                |
| 2                      |                      |        |                                | 308-555              |                  |
|                        | Grass, perennial     | 2GP    | <i>Grass, perennial</i>        | 0-62                 | –                |
|                        | Indian ricegrass     | ACHY   | <i>Achnatherum hymenoides</i>  | 0-62                 | –                |
|                        | threadleaf sedge     | CAFI   | <i>Carex filifolia</i>         | 0-62                 | –                |
|                        | onespike danthonia   | DAUN   | <i>Danthonia unispicata</i>    | 0-62                 | –                |
|                        | Idaho fescue         | FEID   | <i>Festuca idahoensis</i>      | 0-62                 | –                |
|                        | needle and thread    | HECO26 | <i>Hesperostipa comata</i>     | 0-62                 | –                |
|                        | prairie Junegrass    | KOMA   | <i>Koeleria macrantha</i>      | 0-62                 | –                |
|                        | spike fescue         | LEK12  | <i>Leucopoa kingii</i>         | 0-62                 | –                |
|                        | slimstem muhly       | MUFI   | <i>Muhlenbergia filiculmis</i> | 0-62                 | –                |
|                        | mountain muhly       | MUMO   | <i>Muhlenbergia montana</i>    | 0-62                 | –                |
|                        | Sandberg bluegrass   | POSE   | <i>Poa secunda</i>             | 0-62                 | –                |
|                        | spike trisetum       | TRSP2  | <i>Trisetum spicatum</i>       | 0-62                 | –                |
| <b>Forb</b>            |                      |        |                                |                      |                  |
| 3                      |                      |        |                                | 62-185               |                  |
|                        | Forb, perennial      | 2FP    | <i>Forb, perennial</i>         | 0-62                 | –                |

|                   |                      |        |                                    |        |   |
|-------------------|----------------------|--------|------------------------------------|--------|---|
|                   | yarrow               | ACHIL  | <i>Achillea</i>                    | 0-62   | - |
|                   | pond water-starwort  | CAST   | <i>Callitriche stagnalis</i>       | 0-62   | - |
|                   | larkspur             | DELPH  | <i>Delphinium</i>                  | 0-62   | - |
|                   | beardtongue          | PENST  | <i>Penstemon</i>                   | 0-62   | - |
|                   | spiny phlox          | PHHO   | <i>Phlox hoodii</i>                | 0-62   | - |
|                   | Forb, perennial      | 2FP    | <i>Forb, perennial</i>             | 0-62   | - |
|                   | yarrow               | ACHIL  | <i>Achillea</i>                    | 0-62   | - |
|                   | Indian paintbrush    | CASTI2 | <i>Castilleja</i>                  | 0-62   | - |
|                   | larkspur             | DELPH  | <i>Delphinium</i>                  | 0-62   | - |
|                   | beardtongue          | PENST  | <i>Penstemon</i>                   | 0-62   | - |
|                   | spiny phlox          | PHHO   | <i>Phlox hoodii</i>                | 0-62   | - |
| <b>Shrub/Vine</b> |                      |        |                                    |        |   |
| 4                 |                      |        |                                    | 62-123 |   |
|                   | Shrub (>.5m)         | 2SHRUB | <i>Shrub (&gt;.5m)</i>             | 0-62   | - |
|                   | black sagebrush      | ARNO4  | <i>Artemisia nova</i>              | 0-62   | - |
|                   | big sagebrush        | ARTR2  | <i>Artemisia tridentata</i>        | 0-62   | - |
|                   | threetip sagebrush   | ARTR4  | <i>Artemisia tripartita</i>        | 0-62   | - |
|                   | yellow rabbitbrush   | CHVI8  | <i>Chrysothamnus viscidiflorus</i> | 0-62   | - |
|                   | antelope bitterbrush | PUTR2  | <i>Purshia tridentata</i>          | 0-62   | - |

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 Bluebunch wheatgrass, Montana wheatgrass, Parry’s oatgrass Plant Community (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. Birds that would frequent this plant community include Western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here. Mixed Sagebrush/Grass 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. Brewer’s sparrows’ nest in big sagebrush plants, and hosts of other nesting birds utilize stands in the 20-30% cover range. Low Plant Density, Excess Litter Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time. Sandberg bluegrass, Annuals Plant Community: 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

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) Bluebunch & Montana wheatgrasses, Parry’s oatgrass 1100 .5 Mixed Sagebrush/Grass 800 .25 Low Plant Density, Excess Litter 1000 .3 Sandberg bluegrass, Annuals 600 .15

\* - 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, with localized areas in hydrologic group D. Infiltration ranges from moderate to moderately 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 such as bluebunch wheatgrass. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

## Recreational uses

This site provides hunting opportunities for upland game species. The wide 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

Inventory Data References (narrative) Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Inventory Data References Data Source Number of Records Sample Period State County SCS-RANGE-417 24 1963 -1987 WY Albany & others

## Other references

Other sources used as references include: High Plains Regional Climate Center, USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

## 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                     | 03/01/2005 |
| 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

---

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

---

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

---

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

---

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

---

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

---

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

---

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 4 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:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Infiltration is moderate.

---

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.

---

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 > Short Grasses/Grasslikes > Forbs > Shrubs

---

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

---

14. **Average percent litter cover (%) and depth ( in):** Average litter cover is 15-25% with depths of 0.25 to 0.5 inches

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**  
1100 lbs/ac

---

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, Sandberg bluegrass, Mat forming Forbs and Species found on Noxious Weed List

---

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

---