

# Ecological site R034AY166WY

## Shallow Sandy

### Green River and Great Divide Basins (SwSy)

Last updated: 2/26/2025

Accessed: 07/21/2026

#### 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

|             |                                                                    |
|-------------|--------------------------------------------------------------------|
| R034AY122WY | <b>Loamy Green River and Great Divide Basins (Ly)</b><br><br>Loamy |
| R034AY150WY | <b>Sandy Green River and Great Divide Basins (Sy)</b><br><br>Sandy |

#### Similar sites

|             |                                                                                                                                                          |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| R034AY162WY | <b>Shallow Loamy Green River and Great Divide Basins (SwLy)</b><br><br>Shallow Loamy (SwLy) 7-9GR has finer soil texture and more diverse plant species. |
| R034AY266WY | <b>Shallow Sandy Foothills and Basins West (SwSy)</b><br><br>Shallow Sandy (SwSy) 10-14W has higher production.                                          |

Table 1. Dominant plant species

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

#### Physiographic features

This site usually occurs in an upland position on south and west facing slopes, but may be found on all slopes and positions.

Table 2. Representative physiographic features

|                    |                                         |
|--------------------|-----------------------------------------|
| Landforms          | (1) Hill<br>(2) Escarpment<br>(3) Ridge |
| Flooding frequency | None                                    |
| Ponding frequency  | None                                    |
| Elevation          | 1,830 – 2,200 m                         |
| Slope              | 0 – 50 %                                |
| Ponding depth      | 0 cm                                    |
| Aspect             | Aspect is not a significant factor      |

### Climatic features

Annual precipitation ranges from 7-9 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.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about July 15. Some green up of cool season plants may occur in September if moisture is available.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=wy> website. Other climate stations representative of this precipitation zone include “Bitter Creek”, “Farson”, “Rock Springs FAA AP”, and “Wamsutter” in Sweetwater County; “Church Buttes Gas PLT”, and Mountain View” in Uinta County; “Fontenelle”, “La Barge”, and “Sage 4 NNW” in Lincoln County; and “Big Piney” in Sublette County.

**Table 3 Representative climatic features**

|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 120 days |
| Freeze-free period (average)  | 130 days |
| Precipitation total (average) | 230 mm   |

### Influencing water features

There are no water features associated with this site.

## Soil features

The soils of this site are shallow (8-15" deep to hard or soft bedrock, or less commonly, sandy-skeletal material) well-drained soils formed in alluvium, residuum or eolian deposits from sedimentary rocks.

Major Soil Series correlated to this site include: Gasson and Huguston.

Other Soil Series in MLRA 34 correlated to this site include: Pepton, some phases of Haterton and Tasselman series.

Table 4. Representative soil features

|                                             |                                                                  |
|---------------------------------------------|------------------------------------------------------------------|
| Surface texture                             | (1) Fine sandy loam<br>(2) Sandy loam<br>(3) Gravelly sandy loam |
| Family particle size                        | (1) Loamy                                                        |
| Drainage class                              | Well drained to somewhat excessively drained                     |
| Permeability class                          | Moderate to rapid                                                |
| Soil depth                                  | 20 – 40 cm                                                       |
| Surface fragment cover <=3"                 | 0 – 20 %                                                         |
| Surface fragment cover >3"                  | Not specified                                                    |
| Available water capacity<br>(0-101.6cm)     | 2.29 – 7.11 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)    | 7.4 – 10                                                         |

|                                                          |          |
|----------------------------------------------------------|----------|
| Subsurface fragment volume <=3"<br>(Depth not specified) | 0 – 30 % |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 0 – 10 % |

## Ecological dynamics

As this site deteriorates from improper grazing management, species such as rabbitbrush, low sage, needleleaf sedge, and Sandberg bluegrass will increase. Bunchgrasses such as Indian ricegrass and needleandthread will decrease in frequency and production. This site has relatively low productivity potential, and is not well suited to grazing improvement practices unless treated as part of a larger unit containing more productive areas.

These plant communities narratives 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.

The Reference 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                      |                         |         |                                            | 59-118               |                  |
|                        | needle and thread       | HECO26  | <i>Hesperostipa comata</i>                 | 59-118               | –                |
| 2                      |                         |         |                                            | 59-118               |                  |
|                        | Indian ricegrass        | ACHY    | <i>Achnatherum hymenoides</i>              | 59-118               | –                |
| 3                      |                         |         |                                            | 20-59                |                  |
|                        | thickspike wheatgrass   | ELLAL   | <i>Elymus lanceolatus ssp. lanceolatus</i> | 20-59                | –                |
| 4                      |                         |         |                                            | 20-59                |                  |
|                        | galleta grass           | PLEUR12 | <i>Pleuraphis</i>                          | 20-59                | –                |
| 5                      |                         |         |                                            | 39-78                |                  |
|                        | Grass, perennial        | 2GP     | <i>Grass, perennial</i>                    | 0-20                 | –                |
|                        | Letterman's needlegrass | ACLE9   | <i>Achnatherum lettermanii</i>             | 0-20                 | –                |
|                        | needleleaf sedge        | CADU6   | <i>Carex duriuscula</i>                    | 0-20                 | –                |
|                        | squirreltail            | ELEL5   | <i>Elymus elymoides</i>                    | 0-20                 | –                |
|                        | prairie Junegrass       | KOMA    | <i>Koeleria macrantha</i>                  | 0-20                 | –                |
|                        | saline wildrye          | LESA4   | <i>Leymus salinus</i>                      | 0-20                 | –                |
|                        | Sandberg bluegrass      | POSE    | <i>Poa secunda</i>                         | 0-20                 | –                |

|                   |                          |        |                                    |       |   |
|-------------------|--------------------------|--------|------------------------------------|-------|---|
|                   | bluebunch wheatgrass     | PSSP6  | <i>Pseudoroegneria spicata</i>     | 0-20  | – |
| <b>Forb</b>       |                          |        |                                    |       |   |
| 6                 |                          |        |                                    | 20-39 |   |
|                   | Forb, perennial          | 2FP    | <i>Forb, perennial</i>             | 0-20  | – |
|                   | common yarrow            | ACMI2  | <i>Achillea millefolium</i>        | 0-20  | – |
|                   | rosy pussytoes           | ANRO2  | <i>Antennaria rosea</i>            | 0-20  | – |
|                   | milkvetch                | ASTRA  | <i>Astragalus</i>                  | 0-20  | – |
|                   | Indian paintbrush        | CASTI2 | <i>Castilleja</i>                  | 0-20  | – |
|                   | buckwheat                | ERIOG  | <i>Eriogonum</i>                   | 0-20  | – |
|                   | aster                    | EUCEP2 | <i>Eucephalus</i>                  | 0-20  | – |
|                   | granite prickly phlox    | LIPU11 | <i>Linanthus pungens</i>           | 0-20  | – |
|                   | nailwort                 | PARON  | <i>Paronychia</i>                  | 0-20  | – |
|                   | beardtongue              | PENST  | <i>Penstemon</i>                   | 0-20  | – |
|                   | phacelia                 | PHACE  | <i>Phacelia</i>                    | 0-20  | – |
|                   | spiny phlox              | PHHO   | <i>Phlox hoodii</i>                | 0-20  | – |
|                   | stonecrop                | SEDUM  | <i>Sedum</i>                       | 0-20  | – |
|                   | stemless mock goldenweed | STAC   | <i>Stenotus acaulis</i>            | 0-20  | – |
|                   | clover                   | TRIFO  | <i>Trifolium</i>                   | 0-20  | – |
|                   | violet                   | VIOLA  | <i>Viola</i>                       | 0-20  | – |
| <b>Shrub/Vine</b> |                          |        |                                    |       |   |
| 7                 |                          |        |                                    | 20-39 |   |
|                   | yellow rabbitbrush       | CHVI8  | <i>Chrysothamnus viscidiflorus</i> | 20-39 | – |
| 8                 |                          |        |                                    | 20-59 |   |
|                   | little sagebrush         | ARAR8  | <i>Artemisia arbuscula</i>         | 0-20  | – |
|                   | big sagebrush            | ARTR2  | <i>Artemisia tridentata</i>        | 0-20  | – |
|                   | shadscale saltbush       | ATCO   | <i>Atriplex confertifolia</i>      | 0-20  | – |
|                   | winterfat                | KRLA2  | <i>Krascheninnikovia lanata</i>    | 0-20  | – |

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 (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

## Animal community

Animal Community – Wildlife Interpretations Needleandthread/Indian Ricegrass Plant Community (HCPC): Suitable thermal and escape cover for most wildlife is limited due to the low height and density of woody plants. However, sagebrush, which can approach 15% protein and 40-60% digestibility, provides important winter forage for mule deer and antelope. Open and bare ridges are suitable locations for sage grouse leks. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles. Low Sagebrush/Bunchgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community. Rabbitbrush/Rhizomatous Wheatgrass Plant Community: These communities provide limited forage for antelope and mule deer due to low production. Generally, these are not target plant communities for wildlife habitat management. 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. Plant Community Production (lb./ac) and Carrying Capacity\* (AUM/ac) Needleandthread/Indian Ricegrass (HCPC) 200-450 lb./ac and .11 AUM/ac Low

Sagebrush/Bunchgrass 200-400 lb./ac and .09 AUM/ac Rabbitbrush/Rhizomatous Wheatgrass 50-250 lb./ac and .04 AUM/ac \* - 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 D. Infiltration is low when soils are wet due to shallow depth to bedrock and/or impervious subsurface layer. Runoff potential for this site varies from high to moderate depending on soil depth, bedrock type (impervious vs. permeable) and ground cover (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. Cryptogammic crusts are present, but only cover 1-2% of the soil surface.

## Recreational uses

This site provides hunting opportunities for upland game species.

## 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. Those involved in developing this site include: Bill Christensen, Range Management Specialist, NRCS; Karen Clause, Range Management Specialist, NRCS; and Everet Bainter, Range Management Specialist, NRCS. 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

Karen Clause

## Approval

Kirt Walstad, 2/26/2025

## 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) | K. Clause, E. Bainter                    |
| Contact for lead author  | karen.clause@wy.usda.gov or 307-367-2257 |
| Date                     | 03/16/2007                               |

|                                             |                   |
|---------------------------------------------|-------------------|
| Approved by                                 |                   |
| Approval date                               |                   |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** Rare to nonexistent. Where present, short and widely spaced.

---

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

---

3. **Number and height of erosional pedestals or terracettes:** Rare to nonexistent.

---

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground can range from 35-65%.

---

5. **Number of gullies and erosion associated with gullies:** Active gullies, where present, should be rare.

---

6. **Extent of wind scoured, blowouts and/or depositional areas:** Minimal to nonexistent.

---

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move only in small amounts (to leeward side of shrubs) due to wind. Large woody debris from sagebrush will show no movement.

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Stability Index ratings range from 1 (interspaces) to 6 (under plant canopy), but average values should be 2.5 or greater.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Typically an A-horizon of 3-6 inches (7-15 cm) with weak granular structure that is brown to light brownish gray (hues of 10YR or 2.5 Y, values of 5-6, and chromas of 2-3) in color with OM of .5 to 1%.

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 65-75% grasses, 10% forbs, and 15-25% shrubs. A sparse plant canopy (20-40%) and litter, but moderately rapid infiltration rates result in minimal to slight runoff. Basal cover is typically less than 5% for this site and

does very little to effect runoff on this site. Surface rock fragments of 10-20% provide stability to the site, but reduce infiltration.

---

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None. A coarse, dry subsurface will often refuse a probe, causing misidentification of a compaction layer. Most soil profiles must be described by hand dug holes.
- 

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-size cool season bunchgrasses>> cool season rhizomatous grasses=perennial shrubs>perennial forbs>short cool season bunchgrasses

---

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Minimal decadence, typically associated with shrub component.
- 

14. Average percent litter cover (%) and depth ( in): Litter ranges from 5-20% of total canopy measurement with total litter (including beneath the plant canopy) from 10-40% expected. Herbaceous litter depth is typically very shallow, ranging from 1-5mm. Woody litter can be up to a couple inches (4-6cm).
- 

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): English: 200-450 lb/ac (350 lb/ac average); Metric: 224-504 kg/ha (392 kg/ha average).
- 

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: Bare ground greater than 80% is the most common indicator of a threshold being crossed. Rabbitbrush, Sandberg bluegrass, and phlox are common increasers. Annual weeds such as halogeton, kochia, and Russian thistle are common invasive species in disturbed sites.
- 

17. Perennial plant reproductive capability: All species are capable of reproducing, except in drought years.
-