Ecological site R047XA310UT
Upland Loam
(basin wildrye)

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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.

MLRA notes

Major Land Resource Area (MLRA): 047X–Wasatch and Uinta Mountains

MLRA 47 occurs in Utah (86 percent), Wyoming (8 percent), Colorado (4 percent), and Idaho (2 percent). It encompasses approximately 23,825 square miles (61,740 square kilometers). The northern half of this area is in the Middle Rocky Mountains Province of the Rocky Mountain System. Parts of the western edge of this MLRA are in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The MLRA includes the Wasatch Mountains, which trend north and south. The steeply sloping, precipitous Wasatch Mountains have narrow crests and deep valleys. Active faulting and erosion are a dominant force in controlling the geomorphology of the area. The mountains in this area are primarily fault blocks that have been tilted up. Alluvial fans at the base of the mountains are recharge zones for the basin fill aquifers. An ancient shoreline of historic Bonneville Lake is evident on the footslopes along the western edge of the area. Rocks exposed in the mountains are mostly Mesozoic and Paleozoic sediments. The average precipitation is from 12 to 16 inches in the valleys and can range up to 73 inches in the mountains. Peak precipitation occurs in the winter months. The average annual temperature is 30 to 50 degrees Fahrenheit (-1 to 15 C). The freeze-free period averages 140 days and ranges from 60 to 220 days, generally decreasing in length with elevation. The dominant soil orders in this MLRA are Entisols, Inceptisols, and Mollisols. The lower elevations are dominated by a frigid temperature regime, while the higher elevations experience cryic temperature regimes. The soil moisture regime is typically xeric. The minerology is generally mixed and the soils are very shallow to very deep, generally well drained, and loamy or loamy-skeletal.

LRU notes

This LRU includes the Wasatch Mountains which tend to run north and south. These steeply sloping, precipitous mountains have narrow crests and deep valleys. They are primarily fault blocks that have been tilted up. The alluvial fans located at the base of these mountains are important recharge zones for valley aquifers.

Ecological site concept

The soils of this site formed mostly in alluvium from andesite, dacite, basalt, or tuff. Surface soils are very dark grayish brown and fine sandy loam in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up less than 35 percent of the soil volume. These soils are deep to very deep, moderately well-drained, and have moderately permeability. The pH is neutral. Available water-holding capacity ranges from 3 to 5.2 inches of water in the upper 60 inches of soil. The soil moisture regime is mostly xeric and the soil temperature regime is frigid. Precipitation ranges from 16 to 22 inches annually.

Associated sites

R047XA320UT	**Upland Shallow Loam (Wyoming big sagebrush)**

Similar sites

R047XA308UT	**Upland Loam (basin big sagebrush)**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. tridentata*
Herbaceous	(1) *Leymus cinereus*

Physiographic features

This site occurs on stream terraces and fan remnants at elevations between 5,200 and 8,000 feet. Slopes are gentle and range from 2 to 10 percent. Runoff is low to medium and flooding and ponding are not typical of this site.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	1,590 – 2,440 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is characterized by warm, dry summers and cold snowy winters. Average annual precipitation ranges from 14 to 18 inches, with 55 to 65 percent coming during the plant dormant season (October to March). This winter moisture, along with spring rains in April and May, serves as the primary source of water for plant growth. Summer storms are typically lighter and less frequent than the cool season precipitation events on this site.

Table 3 Representative climatic features

Frost-free period (characteristic range)	50-60 days
Freeze-free period (characteristic range)	100-100 days
Precipitation total (characteristic range)	430 mm
Frost-free period (actual range)	50-60 days

Freeze-free period (actual range)	100-110 days
Precipitation total (actual range)	430 mm
Frost-free period (average)	50 days
Freeze-free period (average)	100 days
Precipitation total (average)	430 mm

- (1) COALVILLE 13 E [USC00421590], Coalville, UT
- (2) COALVILLE [USW00024120], Coalville, UT

Influencing water features

This site is not influenced by water from a wetland or stream.

Wetland description

N/A

Soil features

The soils of this site are deep, well-drained loams that formed in alluvium from sandstone, quartzite and shale parent rock. Permeability is moderate and available water-holding capacity ranges from 5.5 to 6.7 inches of water in the upper 40 inches of soil. Rock fragments are typically not found on the soil surface, but the profile can contain up to 25 percent gravel by volume. The soil moisture regime is xeric and the soil temperature regime is frigid.

This site is correlated to the Echocreek (126, 127) soil component of the Summit County Area Soil Survey (UT613).

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale (2) Alluvium – quartzite
Surface texture	(1) Loam
Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate

Available water capacity (0-101.6cm)	13.97 – 17.02 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (0-101.6cm)	Not specified
Subsurface fragment volume >3" (0-101.6cm)	Not specified

Ecological dynamics

Historic vegetation on this site was dominated by tall (7 ft) cool-season grasses, which are adapted to occasional high water tables. Other significant vegetation includes a variety of forbs and shrubs.

The dominant aspect of this site was grasses. The composition and production will vary naturally due to location (north to south of the MLRA), fluctuating precipitation, and fire return interval.

Due to the abundant forage, thermal cover, and often close proximity to water sources, this site has a high probability of receiving grazing pressures from domestic and wildlife grazers as well as having received historical grazing pressure.

Great basin wildrye is sensitive to spring grazing and clipping and frequent herbage removal during the growing season (Perry and Chapman 1976). Thus, under repetitive harvesting, Great basin wildrye can be “grazed out” of the system. As ecological condition deteriorates due to improper grazing, cool-season grasses Great basin wildrye and Nevada bluegrass decrease in frequency and production. The ungrazed plants or grazing tolerant plants such as Basin big sagebrush, rabbitbrush and other will increase in frequency and production. This increase combined with the declining perennial grasses can lead to a site dominated by sagebrush and rabbitbrush with little to no understory. The area without an understory of perennial grasses and forbs has little value as a functioning ecosystem.

As a result of the grass dominated system, this site had lots of root mass and vegetation production which creates and maintains an organic layer and a mollic epipedon. If the perennial grasses are removed from the system, it is typical to see a decrease in organic matter and accelerated erosion.

Great Basin wildrye is also susceptible to black grass bugs. Black grass bugs populations will invade a site, and can destroy most of the living grasses.

The fire regime for this site is similar to the surrounding sagebrush lands. The intensity of a fire determines the vegetation succession and

structure. Low intensity or ground fires typically result in the removal of litter and decadent grasses while maintaining the nominal shrub cover, while higher intensity fires will remove the shrub species. After normal to high intensity fires, basin big sagebrush decreases while rubber rabbitbrush increases. If the fire regime is suppressed, this site may be invaded by junipers.

Because of the position on the landscape, this site is typically one of the first to be invaded. Junipers will start to creep down into the sagebrush communities by using this site as a corridor. The fire transition stages are relatively short-lived and tend to be mosaic in nature.

If thistles, houndstongue or other strongly invasive species, invade the site concurrent to the area being stressed by disturbances or drought, they are likely to invade and dominate this site.

When more information is available, this section will include a discussion of seral stages; fire influence and effects; effects of prolonged wet or dry periods; resistance to change; the influence of such things as grazing, rodent concentrations, insects, diseases, introduced species, and soil erosion or deposition; other stable vegetative states associated with this site as a result of extreme disturbance.

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 (%)

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Table 8. Community 2.1 plant community composition

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

Table 9. Community 2.2 plant community composition

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

Table 10. Community 2.3 plant community composition

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

Table 11. Community 3.1 plant community composition

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

Table 12. Community 3.2 plant community composition

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

Table 13. Community 4.1 plant community composition

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

Table 14. Community 4.2 plant community composition

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

Table 15. Community 5.1 plant community composition

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

Table 16. Community 5.2 plant community composition

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

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 references

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Contributors

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Approval

Kendra Moseley, 2/05/2025

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)	
Contact for lead author	
Date	08/29/2026
Approved by	
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

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

   _____

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

   _____

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

   _____

5. **Number of gullies and erosion associated with gullies:**

   _____

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

   _____

7. **Amount of litter movement (describe size and distance expected to travel):**

   _____

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

   _____

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

   _____

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

    _____

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

    _____

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:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
