Ecological site R028AY460UT
Mountain Shallow Loam (Curl-leaf mountain mahogany)

Last updated: 6/12/2025
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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): 028A–Ancient Lake Bonneville

MLRA 28A occurs in Utah (82%), Nevada (16%), and Idaho (2%). It encompasses approximately 36,775 square miles (95,246 square kilometers). A large area west and southwest of Great Salt Lake is a salty playa. This area is the farthest eastern extent of the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. It is an area of nearly level basins between widely separated mountain ranges trending north to south. The basins are bordered by long, gently sloping alluvial fans. The mountains are uplifted fault blocks with steep side slopes. Most of the valleys are closed basins containing sinks or playa lakes. Elevation ranges from 3,950 to 6,560 feet (1,204 to 2000 meters) in the basins and from 6,560 to 11,150 feet (1996 to 3398 meters) in the mountains. Much of the MLRA has alluvial valley fill and playa lakebed deposits at the surface from pluvial Lake Bonneville, which dominated this MLRA 13,000 years ago. A level line of remnant lake terraces on some mountain slopes indicates the former extent of this glacial lake. The Great Salt Lake is what remains of the pluvial lake. Mountains in the interior of this MLRA consist of tilted blocks of marine sediments from Cambrian to Mississippian age with scattered outcrops of Tertiary continental sediments and volcanic rocks. The average annual precipitation is 5 to 12 inches (13 to 30 cm) in the valleys and ranges up to 49 inches (124 cm) in the mountains. Most of the rainfall in the southern LRU occurs as high-intensity, convective thunderstorms during the growing season (April through September). The driest period is from midsummer to early autumn in the northern LRU. Precipitation in winter typically occurs as snow. The average annual temperature is 39 to 53 °F (4 to 12 °C). The freeze-free period averages 165 days and ranges from 110 to 215 days, decreasing in length with increasing elevation. The dominant soil orders in this MLRA are Aridisols, Entisols, and Mollisols. Soils are dominantly in the mesic or frigid soil temperature regime, aridic or xeric soil moisture regime, and mixed mineralogy. They generally are well drained, loamy or loamy-skeletal, and very deep.

LRU notes

More data is needed to determine correct LRU.

Ecological site concept

This site is located on mountain slopes and ridges on steep slopes (15 to 50 percent) between 7,400 and 8,500 feet (2,255 to 2,591 meters). The soil is loamy-skeletal and shallow. The soil has a restrictive layer between 10 and 20 inches to bedrock. The soil was formed in colluvium and/or residuum derived from quartzite and phyllite or weathered from igneous rock. The precipitation ranges from 15 to 22 inches (381 to 559 mm). The dominant vegetation is curl-leaf mountain mahogany (Cercocarpus ledifolius) and bluebunch wheatgrass (Pseudoroegneria spicata).

Associated sites

R028AY324UT	**Upland Shallow Loam (Utah Juniper - Singleleaf Pinyon)** This site occurs with site 460.

Table 1. Dominant plant species

Tree	Not specified

Shrub	(1) *Cercocarpus ledifolius*
Herbaceous	(1) *Pseudoroegneria spicata*

Physiographic features

This site is located on mountain slopes and ridges on steep slopes (15 to 50 percent) between 7,400 and 8,500 feet (2,255 to 2,591 meters). Flooding does not occur on this site.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	2,260 – 2,590 m
Slope	20 – 50 %
Aspect	Aspect is not a significant factor

Climatic features

The climate is characterized by warm, dry summers, cold, snowy winters and moist springs. The average annual precipitation is between 16 and 35 inches. October through May is the wettest part of the year and June through August are the driest. The effective moisture for plant growth is the portion that falls during the plant dormant period, which wets the soil deeply in the spring.

Table 3 Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	380-560 mm
Frost-free period (average)	
Freeze-free period (average)	
Precipitation total (average)	480 mm

Influencing water features

Due to its landscape position, this site is not typically influenced by streams or wetlands. It can sometimes be influenced by overland flow during heavy thunder storms and/or during wetter spring runoff periods.

Soil features

The characteristic soils of this site are shallow and well drained. The soil was formed in colluvium and/or residuum derived from quartzite and phyllite or weathered igneous rock. The surface horizon has a loam texture with cobbles occurring on the surface. Rock fragments occur frequently on the soil surface and make up more than 20 percent of the soil cover and more than 15 percent of the subsoil volume. Available water capacity ranges from 1.1 to 1.7 inches in the upper 40 inches of soil. These soils are neutral and are not calcareous on the surface. The soil moisture regime is xeric and the soil temperature regime is frigid.

Soil Map Units that may contain this site:
Soil Survey Area: Soil Components (Map units in parentheses)
Box Elder County, Utah, Western Part (UT601): Neilsen (73)
Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties (UT634): Onaqui (435), Tolman (435)

Table 4. Representative soil features

Parent material	(1) Colluvium – quartzite (2) Alluvium – phyllite
Surface texture	(1) Very cobbly loam (2) Cobbly loam (3) Very gravelly loam (4) Loam
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Depth to restrictive layer	30 – 50 cm
Soil depth	30 – 50 cm
Surface fragment cover <=3"	10 %
Surface fragment cover >3"	30 – 40 %
Available water capacity (Depth not specified)	2.79 – 4.32 cm

Soil reaction (1:1 water) (Depth not specified)	6.6 – 7.3
Subsurface fragment volume <=3" (Depth not specified)	10 – 30 %
Subsurface fragment volume >3" (Depth not specified)	10 – 40 %

Ecological dynamics

This site is found in the Great Salt Lake Area of the Basin and Range Ecological Provence. It developed under the natural ecological conditions found there, including the normal influences of native wildlife herbivory, fire and climate. Curl-leaf mountain mahogany and bluebunch wheatgrass are the dominant plants on this site. Various other shrubs, grasses, and forbs can also occur.

Two possible stable states have been hypothesized for this ecological site. These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. As 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 the “desired plant community”. According to the USDA NRCS National Range and Pasture Handbook, the desired plant community 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. Specific community phases and transitions will be described in the narratives below.

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 2.1 plant community composition

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

Type locality

Location 1: Box Elder County, UT	
Township/Range/Section	T5 N. R19 W. S3
General legal description	Pilot Mountains SW ¼, SE ¼ Sec. 3, T. 5N, R 19W

Approval

Kendra Moseley, 6/12/2025

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	08/31/2026
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):**

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

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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):**

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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:

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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:**
