USDA Natural Resources
Conservation Service

Ecological site R028AY263UT
Semidesert Stony Loam (Black Greasewood)

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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 percent), Nevada (16 percent), and Idaho (2 percent). 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. The soils are generally well drained, loamy or loamy-skeletal, and very deep.

LRU notes

The Basin and Range North LRU exhibits dry summer with stronger xeric patterns than the Basin and Range South LRU. Ranges in the north LRU are about 50 percent Paleozoic sedimentary/metasedimentary (limestone/quartzite dominant) and about 10 percent Tertiary volcanics. The basin floors are between 4,200 and 5,100 feet (1,280 to 1,554 meters) in elevation. Pinyon and juniper sites have a greater percentage of Utah juniper (Juniperus osteosperma) in the plant community than pinyon pine (Pinus edulis or monophylla). The Basin and Range North have few semidesert ecological sites with Utah juniper. Cool season grasses, such as bluebunch wheatgrass (Pseudorogneria spicata), are dominant in the plant community, while warm season grasses are largely absent or a small component of the plant community.

Ecological site concept

The Semidesert Stony Loam (Black Greasewood) site is found on alluvial fans and dominated by black greasewood (Sacrobatus vermiculatus). This site is a concept based on soil information collected with previous soil survey work. There is no vegetation data associated with this site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus*
Herbaceous	(1) *Sitanion hystrix*

Physiographic features

The Semidesert Stony Loam (Black Greasewood) site occurs on alluvial fans at elevations between 5,280 and 6,030 feet. The slopes are steep and are typically between 15 and 75 percent.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan
Flooding frequency	None
Ponding frequency	None
Elevation	1,609–1,838 m
Slope	15–75%

Climatic features

The climate is semi-arid and characterized by cold snowy winters and warm dry summers. The average annual precipitation is about 9 inches. Approximately 70 percent comes as rain from March through October. On the average, June through September are the driest months and March through May are the wettest months.

Table 3. Representative climatic features

Frost-free period (characteristic range)	89 days
Freeze-free period (characteristic range)	124 days
Precipitation total (characteristic range)	229 mm
Frost-free period (actual range)	89 days
Freeze-free period (actual range)	124 days
Precipitation total (actual range)	229 mm
Frost-free period (average)	89 days
Freeze-free period (average)	124 days
Precipitation total (average)	229 mm

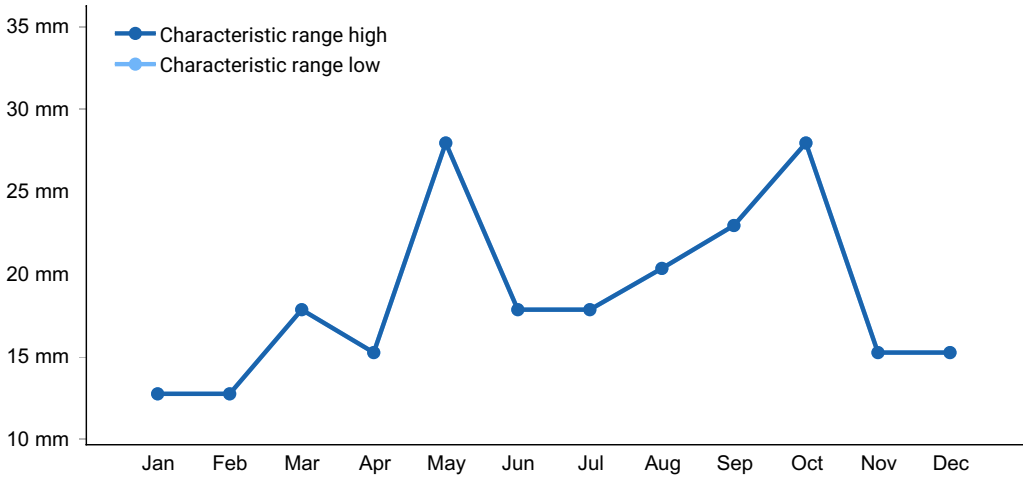


Figure 1. Monthly precipitation range

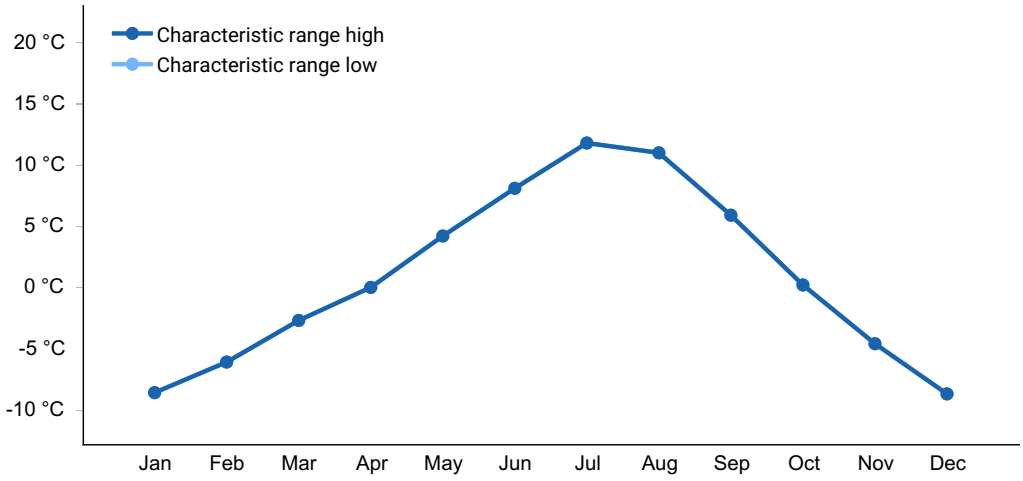


Figure 2. Monthly minimum temperature range

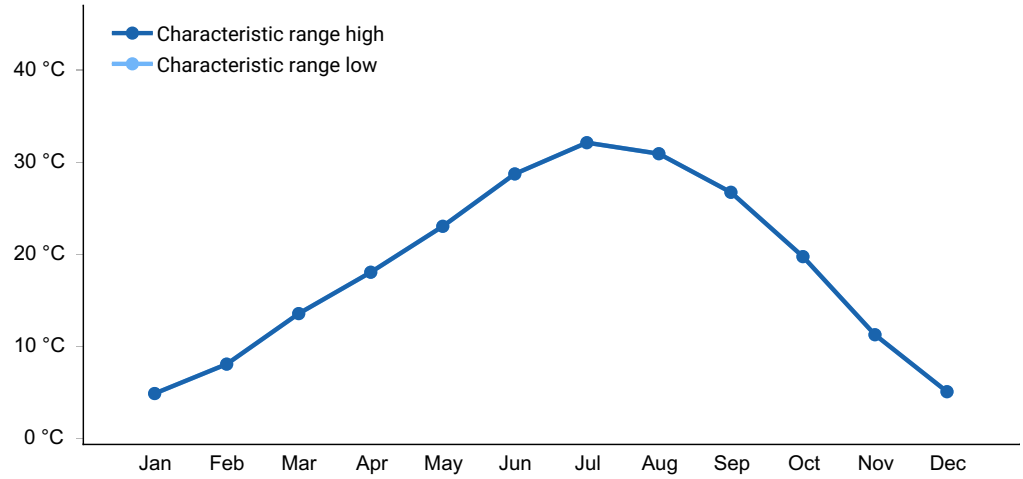


Figure 3. Monthly maximum temperature range

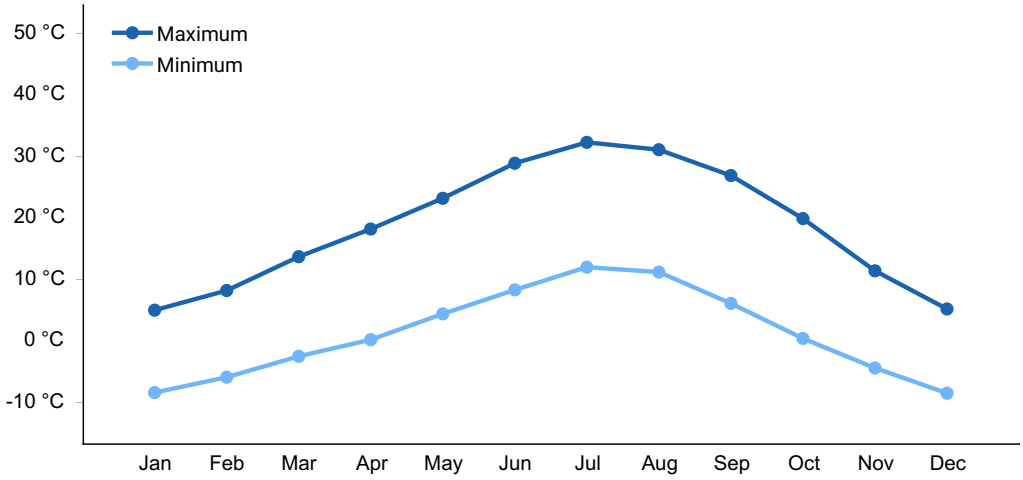


Figure 4. Monthly average minimum and maximum temperature

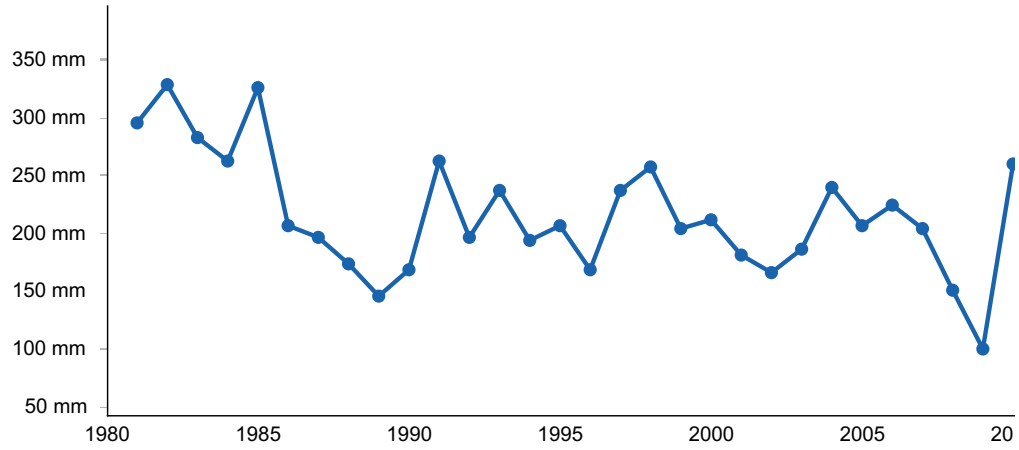


Figure 5. Annual precipitation pattern

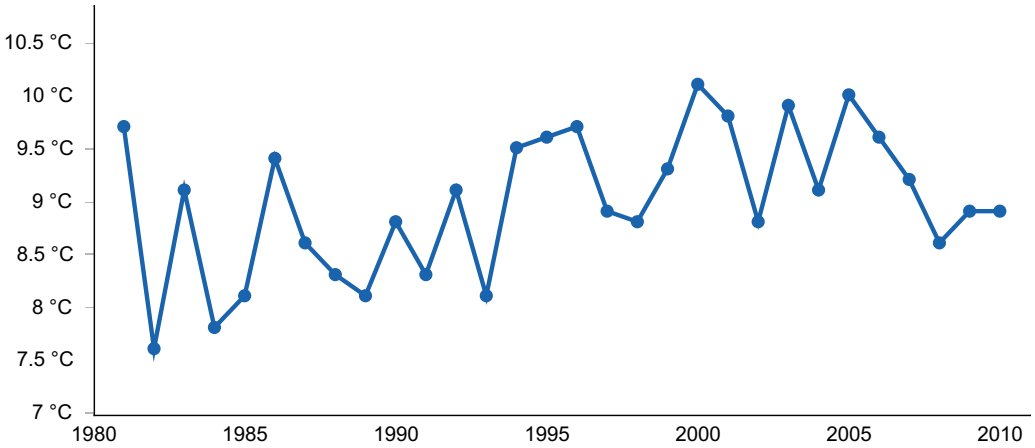


Figure 6. Annual average temperature pattern

Climate stations used

- (1) RICHFIELD RADIO KSVC [USC00427260], Richfield, UT

Influencing water features

Soil features

The soils formed in alluvium derived mainly from igneous and sedimentary parent materials. The surface horizon is loam textures and 4 inches thick. About 10 percent of the soil surface is covered by rock fragments. The volume of rock fragments in the soil profile is 5 to 50 percent.

These soils are moderately coarse through moderately fine textured and are calcareous throughout. Permeability is moderate rapid in the upper 10 inches. The available water capacity is 0 to 1 inches.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous and sedimentary rock
Surface texture	(1) Sandy loam
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderately rapid
Surface fragment cover <=3"	10–15%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	3.56–11.18 cm
Calcium carbonate equivalent (Depth not specified)	5–15%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–5
Soil reaction (1:1 water) (Depth not specified)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	44–52%
Subsurface fragment volume >3" (Depth not specified)	5–6%

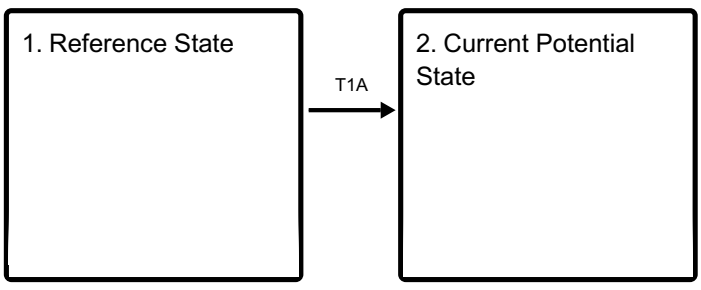
Ecological dynamics

The Semidesert Stony Loam (Black Greasewood) site is dominated by black greasewood and shadscale (*Atriplex confertifolia*). Data on plant communities is lacking and no documentation of reference conditions have been found.

The state and transition model has two states, a Reference State and a Current Potential State. Each state has one community phase.

State and transition model

Ecosystem states



State 1 submodel, plant communities

1.1. Black greasewood

State 2 submodel, plant communities

2.1. Black greasewood

State 1
Reference State

The Reference State is dominated by black greasewood and shadscale.

Community 1.1
Black greasewood

Black greasewood and shadscale are dominant in the plant community.

State 2
Current Potential State

The Current Potential State is dominated by black greasewood, shadscale, and forbs. Common invasive species are annual forbs, such as Halogeton and stickseed.

Community 2.1
Black greasewood

Black greasewood and shadscale are dominant in the community. Forbs, both native and non-native, can make up to 15 percent air-dry weight in the community. No grasses have been documented on the site.

Transition T1A
State 1 to 2

Non-native species establish in the plant community. Resistance and resilience to disturbance is lowered from the Reference State.

Additional community tables

Contributors

T. Simper

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	12/08/2025
Approved by	Kendra Moseley
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:

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

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

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

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:**

17. **Perennial plant reproductive capability:**