

Ecological site R028AY139UT

Desert Silt Loam (Winterfat)

Last updated: 5/02/2025
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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

The Basin and Range South LRU has mountain ranges that are about 40 percent sedimentary/metasedimentary (limestone/quartzite dominant) and about 40 percent Tertiary volcanics. The basin floors are generally higher in the southern LRU than in the north LRU between 4,900 and 6,100 feet (1493 to 1859 meters) in elevation. The Basin and Range South LRU also exhibits patterns of summers with a greater relative amount of precipitation in July and August coming from convective storms (ustic trending pattern). Pinyon and juniper ecological sites have a great percentage of pinyon pine (*Pinus edulis* or *monophylla*) than Utah juniper (*Juniperus osteosperma*), with pinyon pine up to 50 percent of the tree composition in the semidesert zones and more than 50 percent in upland zones. Warm season grasses, such as James' galleta (*Pleuraphis jamesii*) or blue grama (*Bouteloua gracilis*), are present within the plant community, and can make up a large portion of the subdominant grass composition. Bristlecone pine (*Pinus longaeva*) and cliffrose (*Purshia* sp.) are also present and dominant on some ecological sites in the southern LRU, while they are sparse or absent in the northern LRU.

Classification relationships

MLRA 28A, LRU E, southern desert ecological zone

Ecological site concept

This site is dominated by winterfat in reference condition. It is found relatively flat alluvial flats, alluvial fans and valley floors on fine texture soils. Site R028AY140UT has been combined in this site.

Associated sites

R028AY124UT	Desert Loam (Shadscale) This site will also occur on finer textured soils but is dominated by shadscale.
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Similar sites

R028AY140UT	Desert Silt Flat (Winterfat) This site has been combined with R028AY139UT.
R028AY040UT	Silt Flat (Winterfat) This site is the same
R028AY030NV	SILTY 8-10 P.Z. Similar site with winterfat dominance.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Krascheninnikovia lanata</i> (2) <i>Atriplex confertifolia</i>
Herbaceous	Not specified

Physiographic features

This site occurs on alluvial flats, alluvial fans, valley floors and deltas. It is found on very gentle to flat slopes between 0 and 2 percent. It is found at elevations between 4300 to 5800 feet. There is no ponding or flooding on this site.

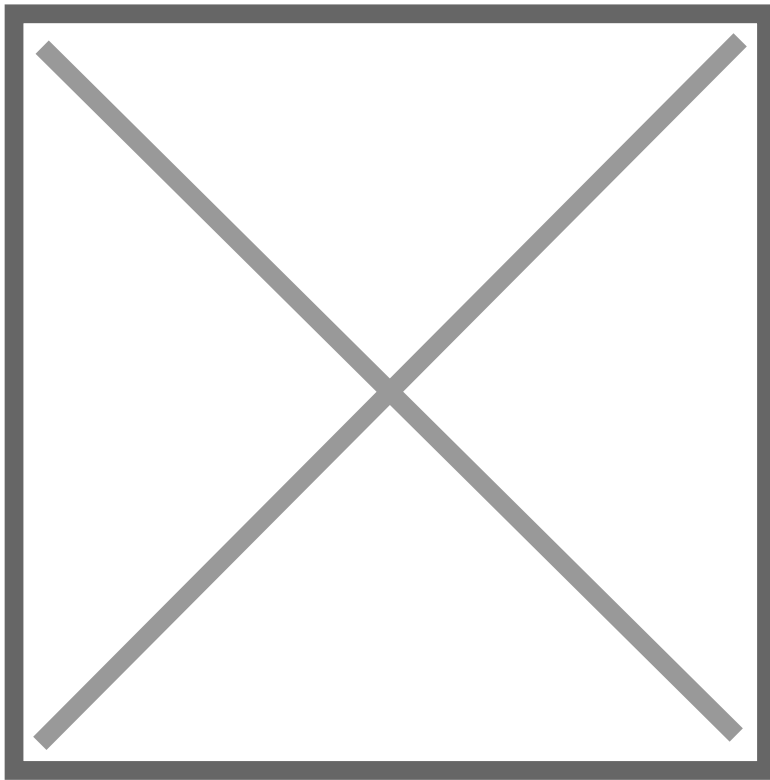


Figure 1.

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Alluvial fan (3) Valley floor
Flooding frequency	None
Ponding frequency	None
Elevation	1,310 – 1,770 m
Slope	0 %

Climatic features

The climate is cold and snowy in the winter and warm and dry in the summer. The average annual precipitation is 5 to 8 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.

Mean Annual Air Temperature: 45-50
Mean Annual Soil Temperature: 54-58

Table 3 Representative climatic features

Frost-free period (average)	120 days
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Freeze-free period (average)	150 days
Precipitation total (average)	230 mm

- (1) DESERET [USC00422101], Delta, UT

Influencing water features

Soil features

The characteristic soils in this site are deep and well drained. They formed in alluvium and residuum derived mainly from lacustrine parent materials. The surface horizon is silt loam and very fine sandy loam textures and 4 inches thick. Rock fragments are not found in or on this soil.

Soils are strongly to very strongly alkaline. They are also strongly calcareous.

The water supplying capacity is 3 to 6 inches. Natural geologic erosion in potential is approximately 0.2 tons/acre/year.

This site (R028AY139UT) has been correlated to the following soil components (soil survey area, component, mapunit):
UT617: Penoyer (54, 94)

Site R028AY140UT has been correlated to the following soil components (soil survey area, component, mapunit):
UT601: Smaug (83)
UT617: Hiko Springs (71), Penoyer (55, 71)
UT626: Saltydog (176, 180), Siltcliffe (148, 171, 175, 177, 179, 180, 182, 183), Threedogs (171, 178, 179, 180, 183)
UT632: Curdli (CU), Penoyer (PE)

Table 4. Representative soil features

Parent material	(1) Alluvium – limestone and sandstone
Surface texture	(1) Very fine sandy loam (2) Loam (3) Silty clay loam
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified

Available water capacity (0-101.6cm)	2.03 – 17.02 cm
Calcium carbonate equivalent (0-101.6cm)	10 – 50 %
Electrical conductivity (0-101.6cm)	0 – 30 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 70
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 – 30 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

As ecological condition deteriorates due to overgrazing, Indian ricegrass and squirreltail decrease while horsebrush, rabbitbrush, snakeweed, and shadscale increase.

When the potential natural plant community is burned, Indian ricegrass and shadscale decrease while rabbitbrush and horsebrush increase.

Cheatgrass, halogeton, and other annual forbs are most likely to invade this site.

This site is the same as R028AY140UT, R028AY040UT and similar to 028BY013NV, 028AY030NV, and 028AY002NV (Stringham et al. 2015). STMs were developed by Nevada for the 028BY013NV site and they are used in this ESD (Stringham et al. 2015).

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 (%)
Shrub/Vine					
0	Primary Shrubs			179-269	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	90-135	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	45-67	–

	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	45-67	—
3	Secondary Shrubs			13-22	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	4-13	—
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	4-13	—
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	4-13	—
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	4-13	—
	shortspine horsebrush	TESP2	<i>Tetradymia spinosa</i>	4-13	—
Grass/Grasslike					
0	Primary Grasses			103-188	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	45-90	—
	squirreltail	ELEL5	<i>Elymus elymoides</i>	45-67	—
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	9-22	—
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	4-9	—
1	Secondary Grasses			13-22	
Forb					
0	Primary Forbs			27-45	
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	13-22	—
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	9-13	—
	showy Townsend daisy	TOFL5	<i>Townsendia florifer</i>	4-9	—
2	Secondary Forbs			13-22	

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 4.1 plant community composition

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

This site is suited for sheep and cattle grazing during fall, winter, and spring. Wildlife using this site include rabbit, coyote, fox, and pronghorn antelope. This is a short list of the more common species found. Many other species are present as well and migratory birds are present at times.

Hydrological functions

The soils are in hydrologic group B with runoff curves ranging from 61 to 79 depending on hydrologic condition.

Recreational uses

Resources that have special aesthetic and landscape value are indian ricegrass, scarlet globemallow, and winterfat. Some recreation uses of this site are hiking and picnicing.

Wood products

None

Other information

Threatened and endangered species include plants and animals.

Type locality

Location 1: Millard County, UT	
Township/Range/Section	T23S R7W S17
General legal description	Fourteen Miles West of Kanosh, Utah; SE ¼ of the NE ¼, Section 17, Township 23S, Range 7W

Other references

Stringham, T.K., P. Novak-Echenique, P. Blackburn, C. Coombs, D. Snyder, and A. Wartgow. 2015. Final Report for USDA Ecological Site Description State-and-Transition Models, Major Land Resource Area 28A and 28B Nevada. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-01. p. 1524.

Contributors

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Approval

Jamin Johanson, 5/02/2025

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.

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Date	02/03/2009
Approved by	

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** Very minor rill development may be evident in reference communities on this site following significant storm or snow melt events. The presence of rills may also be more apparent where run-on from adjacent upland sites or exposed bedrock concentrate flows. Rill development will be moderately short (< 6') and spaced 8' – 10'.

- 2. Presence of water flow patterns:** Evidence of stable overland water flow is apparent in the reference community; increased flow activity may be observed immediately following significant weather events. Flow patterns are normally <20 feet long, follow natural contours, and are typically spaced 10 to 15 feet apart.

- 3. Number and height of erosional pedestals or terracettes:** Slight evidence of pedestals or terracettes caused by accelerated water erosion may be evident in the reference community. 1 – 2 inches of elevational mounding under Winterfat and Shadscale canopies and within biological soil crusts is normal and may not be water erosion caused. There are no exposed roots around perennial grass bunches.

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 50% - 60% in the reference community. Ground cover (the inverse of bare ground) typically includes: coarse fragments – < 1%; plant canopy – 20% to 30%; litter – 10% to 20%, and biological soil crusts – 2% to 5%.

- 5. Number of gullies and erosion associated with gullies:** Developed gully channels are a normal component of desert environments. Gullies associated with reference areas will typically have stable, partially vegetated sides and bottoms with no evidence of head-cutting. Some evidence of disturbance may be evident following significant weather events or when gullies convey runoff from higher elevation rocky or naturally eroding areas.

- 6. Extent of wind scoured, blowouts and/or depositional areas:** Some minor evidence of wind generated soil movement is present in reference communities. Slight depositional mounding in perennial grass bunches, under Winterfat and Shadscale canopies and within biological soil crusts is a normal characteristic of this site.

- 7. Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place within or under plant canopies. Some movement of the finest material (< 1/8" or less) may move (1' – 2') in the direction of prevailing winds or down slope if being transported by water. Little accumulation is observed behind obstructions.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** This site should have a soil stability rating of 4 to 5. Surface textures are typically silt loams containing very few coarse fragments. Where surface soil is lost, a slight increased silt percentage may occur in the remaining soil material.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface is 4 inches deep and structure is moderately thick platy. The A-horizon color is 10YR 6/3. Soils have an Ochric epipedon that extends 7 inches into the soil profile. The A horizon is normally deeper and better developed under plant canopies.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The presents of healthy perennial bunchgrasses, Winterfat and Shadscale in the reference community provides for the best infiltration and least runoff from storm events and snow melt. As perennial vegetation decreases and bare ground increases, runoff increases and soil loss is accelerated.
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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):** None. Soils are deep to very deep.
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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:** Dominant: A mix of sprouting and non-sprouting shrubs (e.g. Winterfat and Shadscale) 30 – 45%, > cool season grasses (e.g. Indian ricegrass and Bottlebrush squirreltail) 30 – 45%.
- Sub-dominant:** Sub-dominant: Non- sprouting shrubs (e.g. Bud sage and Nevada jointfir) 15 - 20% > Cool and warm season grasses (e.g. James galleta and Sand dropseed) 5 - 8%.
- Other:** Others: Shrubs (e.g. Low rabbitbrush and Four-wing saltbush) 1-3%, perennial forbs (e.g. Scarlet globemallow and Utah milkvetch) 3-5%, biological crusts (e.g. lichens, mosses, cyanobacteria) trace%.
- Additional:** Moss and lichen communities will normally be found under plant canopies while the cyanobacteria will be found throughout the site. Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with average to above-average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. During severe (multi-year) drought or insect infestations up to 20% of the winterfat may die. There may be partial mortality of individual bunchgrasses and other shrubs during severe drought.
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14. **Average percent litter cover (%) and depth (in):** Litter cover ranges from 10 to 20% with a spike when Bud Sage drops its leaves. Depth varies from ½ - ¾ inch with depth increasing near plant canopies.
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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
350 – 400 pounds on an average year.

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: Russian thistle, annual bromes and Halogeton are likely to invade this site.

17. Perennial plant reproductive capability: All perennial plant species have the ability to reproduce in most years except drought years.
