

Ecological site R028AY237UT

Semidesert Shallow Loam (Salina 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): 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 (1280 to 1554 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 (*Pseudoroegneria 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 Shallow Loam (Salina Wildrye) site is unique from other shallow Utah juniper sites in that it is dominated by saline wildrye (*Leymus salinus*) in the understory instead of bluebunch wheatgrass, which is the typical dominant grass. Black sagebrush (*Artemisia nova*) and saline wildrye dominant the understory. This site occurs on mountainsides and hillsides and on soils less than 20 inches deep. It is also typically found on steep slopes (20 to 80 percent). This site is very similar to R028AA234UT and it appears that the two sites were developed concurrently with two separate soil surveys, UT611 and UT601, each site only occurring in one of the surveys. The Semidesert Shallow Loam (Salina Wildrye) site needs to be evaluated in the field along with 234UT to adequately describe the differences between these sites or to determine if they should be combined.

Associated sites

R028AY122UT	Desert Gravelly Sandy Loam (Indian Ricegrass) This site occurs downslope and is not on shallow soil.
R028AY234UT	Semidesert Shallow Loam (Utah juniper-Salina wildrye) This site occurs adjacent and has Utah juniper scattered throughout the site.

Similar sites

R028AY234UT	Semidesert Shallow Loam (Utah juniper-Salina wildrye) This site is very similar and it appears that the two sites were developed concurrently with two separate soil surveys, UT611 and UT601, each site only occurring in one of the surveys. Both sites need to be evaluated in the field along with 234UT to adequately describe the differences between these sites or to determine if they should be combined.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The Semidesert Shallow Loam (Salina Wildrye) site occurs on mountainsides and hillsides between 4,400 and 7,000 feet. It is also typically found on steep slopes between 20 and 80 percent.

Table 2. Representative physiographic features

Landforms	(1) Mountainside (2) Hillside
Elevation	1,340 – 2,130 m
Slope	20 – 80 %

Climatic features

The climate is semi-arid and characterized by cold snowy winters and warm dry summers. The average annual precipitation is 10 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 (average)	130 days
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Freeze-free period (average)	
Precipitation total (average)	250 mm

- (1) UTAH TEST RANGE [USC00428978], Grouse Creek, UT

Influencing water features

Soil features

The characteristic soils are 10 to 20 inches deep over bedrock and well drained. They formed in colluvium and residuum derived mainly from limestone parent materials. The surface horizon is shallow loam textures 5 inches thick. About 20 to 60 percent of the soil surface is covered by rock fragments. The volume of rock fragments in the soil profile is 40 to 50 percent and well drained. These soils are medium textured and are calcareous throughout. Permeability is generally moderately rapid. The available water capacity is 1 to 2 inches.

Table 4. Representative soil features

Parent material	(1) Colluvium – limestone (2) Residuum – limestone
Surface texture	(1) Very gravelly, very cobbly loam
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	30 – 50 cm
Surface fragment cover ≤3"	20 – 40 %
Surface fragment cover >3"	10 – 40 %
Available water capacity (0-101.6cm)	3.05 – 5.33 cm
Calcium carbonate equivalent (Depth not specified)	20 – 40 %
Electrical conductivity (Depth not specified)	Not specified

Sodium adsorption ratio (Depth not specified)	0 – 10
Soil reaction (1:1 water) (Depth not specified)	7.4 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	40 %
Subsurface fragment volume >3" (Depth not specified)	10 %

Ecological dynamics

The Semidesert Shallow Loam (Salina Wildrye) site occurs on steep slopes in shallow and rocky soils. Salina wildrye is the dominant herbaceous species while black sagebrush is the dominant shrub.

Grazing appears to be minimal on this site because of the steepness of the site. The most prevalent disturbance is fire. Black sagebrush and Utah junipers are removed after a fire. In the Reference State, Salina wildrye readily returns after a fire along with other grasses and forbs. In State 2, where cheatgrass is present in the community, Salina wildrye also returns vigorously after a fire.

There is not much research on the ecology of Salina wildrye and it is unknown why it dominates in the mapped locations.

The Semidesert Shallow Loam (Salina Wildrye) site is similar to Semidesert Shallow Loam (Utah Juniper/Salina wildrye) R028AA234UT, however Utah juniper is not found on site 237UT.

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			278-379	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	252-336	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	26-43	–
3	Secondary Shrubs			43-84	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	9-26	–
	yellow rabbitbrush	CHV18	<i>Chrysothamnus viscidiflorus</i>	9-26	–
	dwarf goldenbush	ERNA7	<i>Ericameria nana</i>	9-26	–
	mat rockspirea	PECA12	<i>Petrophytum caespitosum</i>	9-26	–
	Stansbury's rockdaisy	PEST14	<i>Perityle stansburyi</i>	9-26	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	9-26	–
	Nuttall's horsebrush	TENU2	<i>Tetradymia nuttallii</i>	9-26	–
Grass/Grasslike					
0	Primary Grasses			336-420	
	saline wildrye	LESAS	<i>Leymus salinus ssp. salinus</i>	336-420	–

1	Secondary Grasses			43-84	
	Indian ricegrass	ACHY	Achnatherum hymenoides	9-26	–
	squirreltail	ELEL5	Elymus elymoides	9-26	–
	James' galleta	PLJA	Pleuraphis jamesii	9-26	–
	bluebunch wheatgrass	PSSP6	Pseudoroegneria spicata	9-26	–
Forb					
2	Forbs			26-43	
	freckled milkvetch	ASLE8	Astragalus lentiginosus	9-26	–
	cushion buckwheat	EROV	Eriogonum ovalifolium	9-26	–
	spiny phlox	PHHO	Phlox hoodii	9-26	–
	Anderson's buttercup	RAAN	Ranunculus andersonii	9-26	–
	scarlet globemallow	SPCO	Sphaeralcea coccinea	9-26	–
	stemless mock goldenweed	STAC	Stenotus acaulis	9-26	–

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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Animal community

The Semidesert Shallow Loam (Salina Wildrye) site is suited for grazing by cattle and sheep during fall, winter, and spring. Wildlife using this site include rabbit, coyote, fox, badger, pronghorn antelope, mule deer, and dove. 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 D with runoff curves ranging from 80 to 89 depending on hydrologic condition.

Recreational uses

Resources that have special aesthetic and landscape values are wildflowers. Some recreation uses of this site are hiking and horseback riding.

Wood products

None

Other information

Threatened and endangered species include plants and animals.

Type locality

Location 1: Box Elder County, UT	
Township/Range/Section	T7N R12W S8

General legal description	Southeast Hogup Mountain Area NW ¼, NW ¼, Section 8, Township 7N, Range 12W
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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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Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** Some rills present. Rill development may increase following large storm events, but should begin to heal during the following growing season. Frost heaving will accelerate recovery. Rill development may increase when run inflow enters site from other sites that produce large amounts of runoff (i.e. steeper sites, slickrock, rock outcrop).

2. **Presence of water flow patterns:** Water flow patterns will be short (2-5') and meandering; interrupted by plants and exposed rocks. Some evidence of erosion or deposition associated with flow patterns. Where slopes exceed 5%, water flow patterns may be longer (5-10').

3. **Number and height of erosional pedestals or terracettes:** Plants may have small pedestals (1-3") where they are adjacent to water flow patterns, but without exposed roots. Terracettes should be few and stable. Terracettes should be small (1-3") and show little sign of active erosion. Some plants may appear to have a pedestal but rather than be formed by erosion, the only place litter accumulates and soil collects is at plant bases forming the appearance of a pedestal.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-25% bare ground (soil with no protection from raindrop impact). Herbaceous communities are most likely to have lower values. As species composition by shrubs increases, bare ground is likely to increase. Poorly developed biological soil crust that is susceptible to raindrop splash erosion should be recorded as bare ground. Very few if any bare spaces of greater than 1 square foot.

5. **Number of gullies and erosion associated with gullies:** No gullies present.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Very minor evidence of active wind-generated soil movement. Wind scoured (blowouts) and depositional areas are rarely present. If present they have muted features and are mostly stabilized with vegetation and/or biological crust. Gravel or desert pavement protects the site from wind scour.

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water and wind movement. Very minor litter removal may occur in flow patterns and rills with deposition occurring at points of obstruction. The majority of litter accumulates at the base of plants. Some leaves, stems, and small twigs may accumulate in soil depressions adjacent to plants. Woody stems are not likely to move. On steep slopes (>30%), litter will move downhill to next obstruction.

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 an erosion rating of 5 or 6 under plant canopies and a rating of 4 to 5 in the interspaces with an average rating of 5 using the soil stability kit test.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** This description is based on the modal soil (Amtoft CBX-L GRV-L, soil survey area: 601, West Box Elder), the only soil correlated with this site. Soil surface horizon is typically 8 inches deep. Structure is typically weak medium subangular blocky. Color is typically pale brown (10YR 6/3), brown (10YR 4/3) moist. An ochric horizon extends to a depth of 8 inches. An ochric horizon typically extends to a depth of 2 to 10 inches. The ochric horizon is a surface horizon lacking fine stratification and which is either light colored, or thin, or has a low organic carbon content, or is massive and (very) hard when dry. The A horizon would be expected to be more strongly developed under plant canopies. It is important if you are sampling to observe the A horizon under plant canopies as well as the interspaces.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses important for increasing infiltration and reducing runoff. Litter plays a role in increasing infiltration and decreasing runoff. Plants provide microhabitat for seedlings, catch litter and soil, and slow raindrops and runoff.

Vascular plants and/or well-developed biological soil crusts (where present) will break raindrop impact and splash erosion. Spatial distribution of vascular plants and interspaces between well-developed biological soil crusts (where present) provide detention storage and surface roughness that slows runoff allowing time for infiltration. Interspaces between plants and any well-developed biological soil crusts (where present) may serve as water flow patterns during episodic runoff events, with natural erosion expected in severe storms. When perennial grasses decrease, reducing ground cover and increasing bare ground, runoff is expected to increase and any associated infiltration reduced.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None. Lithic contact (the boundary with hard bedrock) may occur at about 17 inches. Naturally occurring soil horizons may be harder than the surface because of an accumulation of calcium carbonate and should not be considered as compaction layers.
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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: saline wildrye > black sagebrush

Sub-dominant: Nevada jointfir

Other: other shrubs > other grasses > forbs

Additional: In the northern portion of the MLRA cool-season perennial grasses (Indian ricegrass, needle and thread) dominate. In the southernmost portion of the MLRA warm-season perennial grasses (galleta, sand dropseed) dominate. The two groups share dominance in the middle portion of the MLRA. Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state (e.g. crested wheatgrass and Russian wildrye may substitute for mid stature cool season perennial native bunchgrasses.). Biological soil crust is variable in its expression on this site and is measured as a component of ground cover. Forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

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. Some bunchgrass and shrub mortality may occur during severe droughts, particularly on the shallower and coarser soils associated with this site.
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14. Average percent litter cover (%) and depth (in): Litter cover includes litter under plants. Most litter will be fine litter. Depth should be 1-2 leaf thickness in the interspaces and up to 1/2" under canopies. Litter cover may increase to 25-30% following years with favorable growing conditions. Excess litter may accumulate in absence of disturbance. Vegetative production may be reduced if litter cover exceeds 40%.
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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): 650#/acre. Even the most stable communities exhibit a range of production values. Production will vary between communities and across the MRLA. Refer to the community descriptions in the ESD. Production will differ across the MLRA due to the naturally occurring variability in weather, soils, and aspect. The biological processes on this site are complex; therefore, representative values are presented in a land management context.
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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: Cheatgrass and annual forbs
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17. Perennial plant reproductive capability: All perennial plants should have the ability to reproduce sexually or asexually, except in drought years. Density of plants indicates that plants reproduce at level sufficient to fill available resource. Within capability of site there are no restrictions on seed or vegetative reproductive capacity.
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