

Ecological site R029XY320UT

Upland Shallow Loam (Singleleaf Pinyon-Utah Juniper)

Accessed: 05/19/2024

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.

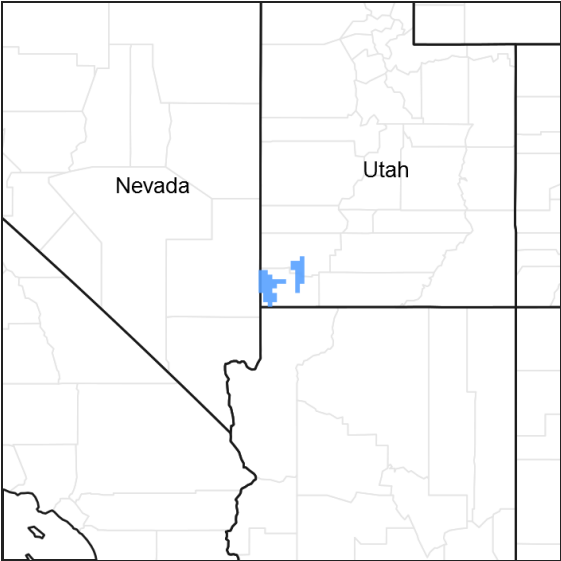


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R029XY310UT	<b>Upland Loam (Utah Serviceberry)</b> Upland Loam (Mountain big sagebrush)
R029XY330UT	<b>Upland Stony Loam (Shrub Liveoak)</b> Upland Stony Loam (Pinyon-Utah Juniper)

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Achnatherum hymenoides</i> (2) <i>Poa fendleriana</i>

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Bayou
Elevation	1,128–2,073 m

Slope	20–40%
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## Climatic features

Table 3. Representative climatic features

Frost-free period (average)	0 days
Freeze-free period (average)	150 days
Precipitation total (average)	356 mm

## Influencing water features

## Soil features

Characteristic soils in this site are shallow (10 to 20 inches) and well drained. They formed in material derived mainly from limestone and acid parent materials. The soils in this site are very gravelly sandy loam to loam in surface texture. The subsoils are gravelly or cobbly and range in texture from medium to fine. The soils are skeletal with more than 35 percent coarse fragments in the profile. The water supplying capacity is 8 to 13 cm (3 to 5 inches). Average annual soil loss in potential is approximately 1 to 2 tons/acre. The soil surface factor (ssf) in potential is moderate.

## Ecological dynamics

As ecological condition deteriorates due to over-grazing, indian ricegrass and nevada bluegrass decrease while pinyon-utah juniper, shrub live oak, and big sagebrush increase. When the potential natural plant community is burned, pinyon, utah-juniper, and big sagebrush decrease, while indian ricegrass, manzanita, and shrub live oak increase. Cheatgrass and russian thistle are most likely to invade this site.

## State and transition model

### Ecosystem states

1. Reference Site
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### State 1 submodel, plant communities

1.1. Reference Site
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## State 1 Reference Site

## Community 1.1 Reference Site

The dominant aspect of the plant community is pinyon-utah juniper. The understory composition by air-dry weight is approximately 45 percent grasses, 5 percent forbs, and 50 percent shrubs.

Table 4. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	239	420	588
Grass/Grasslike	214	379	530
Forb	24	43	59
Total	477	842	1177

Table 5. Ground cover

Tree foliar cover	19-21%
Shrub/vine/liana foliar cover	14-16%
Grass/grasslike foliar cover	9-11%
Forb foliar cover	4-6%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 6. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	—	4-6%
>0.15 <= 0.3	—	—	—	—
>0.3 <= 0.6	—	—	9-11%	—
>0.6 <= 1.4	—	14-16%	—	—
>1.4 <= 4	—	—	—	—
>4 <= 12	19-21%	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
0	Dominant Shrub			287–520	
	black sagebrush	ARNO4	Artemisia nova	45–90	—
	mountain big sagebrush	ARTRV	Artemisia tridentata ssp. vaseyana	45–90	—
	Utah juniper	JUOS	Juniperus osteosperma	45–90	—

	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	27–45	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	27–45	–
	Sonoran scrub oak	QUTU2	<i>Quercus turbinella</i>	27–45	–
	desert ceanothus	CEGR	<i>Ceanothus greggii</i>	27–45	–
	manzanita	ARCTO3	<i>Arctostaphylos</i>	27–45	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	18–27	–
3	<b>Sub-Dominant Shrub</b>			45–90	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	45–90	–
	aster	ASTER	<i>Aster</i>	–	–
	ashy silktassel	GAFL2	<i>Garrya flavescens</i>	–	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	–	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	–	–
<b>Grass/Grasslike</b>					
0	<b>Dominant Grass</b>			235–404	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	90–135	–
	muttongrass	POFE	<i>Poa fendleriana</i>	90–135	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	27–45	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	27–45	–
1	<b>Sub-Dominant Grass</b>			90–314	
	Grass, annual	2GA	<i>Grass, annual</i>	45–90	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	45–90	–
	sedge	CAREX	<i>Carex</i>	0–27	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–27	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–27	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–27	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–27	–
<b>Forb</b>					
0	<b>Dominant Forb</b>			36–54	
	sandwort	ARENA	<i>Arenaria</i>	18–27	–
	American vetch	VIAM	<i>Vicia americana</i>	18–27	–
2	<b>Sub-Dominant Forb</b>			18–72	
	Forb, annual	2FA	<i>Forb, annual</i>	9–18	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	9–18	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–9	–
	locoweed	OXYTR	<i>Oxytropis</i>	0–9	–
	beardtongue	PENST	<i>Penstemon</i>	0–9	–
	phlox	PHLOX	<i>Phlox</i>	0–9	–

## Wood products

None

## Contributors

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## 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	01/08/2013
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Approval date	
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).

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- 2. Presence of water flow patterns:** Water flow patterns are common. Some are long (15-20'). They are generally very widely spaced (about 20-30' apart). Flow patterns occur in low places associated with microtopography commonly occurring on this site.

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- 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, they are the result of litter and soil accumulating at plant bases, forming the appearance of a pedestal. Well-developed biological crusts may appear pedestalled, but are actually a characteristic of the crust formation. Some plants may appear to have a pedestal but rather than be formed by erosion, they are the result of litter and soil accumulating at plant bases, forming the appearance of a pedestal.

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- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20-35% bare ground (soil with no protection from raindrop impact). Very few if any bare spaces of greater than 1 square foot. In general, bare ground increases as production decreases. As species composition of shrubs relative to grasses increases, bare ground is likely to increase. Poorly developed biological soil crust that is susceptible to erosion from raindrop impact should be recorded as bare ground.

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- 5. Number of gullies and erosion associated with gullies:** None to very few. Gullies should show only minor signs of active erosion and should be mostly stabilized with perennial vegetation and rock fragments. Gullies may show slightly

more indication of erosion as slope steepens, or as the site occurs adjacent to steep areas with concentrated flow patterns.

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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.
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7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place but on steep slopes (>30%), at least half of the litter is likely to be transported downhill by wind or water short. Litter rarely moves more than 1-2' to next obstruction. Leaves, stems, and small twigs will accumulate at plant bases, against rocks, in soil depressions, or against larger woody litter. Woody litter is not likely to move.
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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 4 to 5 under plant canopies and a rating of 3 to 4 in the interspaces with an average rating of 4 using the soil stability kit test.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A--0 to 5 cm; brown (10YR 5/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate thick platy structure parting to moderate very fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few fine, few medium, and common very fine vesicular pores; 55 percent gravel; neutral (pH 6.8); abrupt smooth boundary. (3 to 8 cm thick)
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses and shrubs are more important than trees for enhancing infiltration and preventing runoff. Although tree canopies intercept rainfall and provide a barrier to raindrop impact, some evergreen trees such as pinyon and juniper may intercept so much rainfall that not enough water reaches the ground to supply the understory. In this situation, the soil beneath tree canopies is often unvegetated and susceptible to erosion. Bunchgrasses and shrubs, on the other hand, not only intercept rainfall, but contribute litter cover, soil organic matter, and physical stability to the soil. Bunchgrasses contribute organic matter directly to soil through root decay, and organic matter helps stabilize soil aggregates and maintain soil porosity. Shrubs hold snow and slow wind evaporation. Bunchgrass bases intercept litter and soil in water flow paths, reducing runoff. Biological soil crusts (where present) are resistant to raindrop impact and splash erosion. Spatial distribution of vascular plants and well-developed biological soil crusts (where present) provides detention storage and surface roughness that slows runoff, allowing time for infiltration. Water flow patterns are likely to develop under tree canopies, where herbaceous vegetation is sparse.
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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):** A compaction layer is not expected.
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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: Perennial cool-season bunchgrasses (Indian ricegrass, muttongrass) > sprouting shrubs

(manzanita, Sonoran scrub oak, antelope bitterbrush, desert ceanothus) = non-sprouting shrubs (mountain big sagebrush, black sagebrush) > trees (Utah juniper, singleleaf pinyon)

Sub-dominant: Sub-dominant: Perennial forbs (American vetch, sandwort), warm-season perennial bunchgrasses (James' galleta)

Other: Other: Other shrubs = other perennial grasses > other perennial forbs

Additional:

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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. Some mortality of bunchgrass and other shrubs may occur during very severe (long-term) droughts. There may be partial mortality of individual bunchgrasses and shrubs during less severe drought and toward the end of the fire cycle. Long-lived species dominate the site. Open spaces from disturbance are quickly filled by new plants through seedlings and asexual reproduction (tillering).
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14. **Average percent litter cover (%) and depth ( in):** Litter cover includes litter under plants. Most litter will be fine (herbaceous) litter. Litter will be concentrated under plant canopies and sparser between plant canopies, with an average cover of 5-15% and an average depth of 0.5-1 inches. Litter cover may increase 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):** 700-800 lbs/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, halogeton, kochia, Russian thistle, yerba santa
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17. **Perennial plant reproductive capability:** Reproduction restricted by effective precipitation, rock cover, soil depth, and generally harsh growing conditions; all to be expected for site. Site provides harsh environment for seedling establishment.
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