

Ecological site R029XY220UT

Semidesert Shallow Hardpan (Blackbrush)

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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.

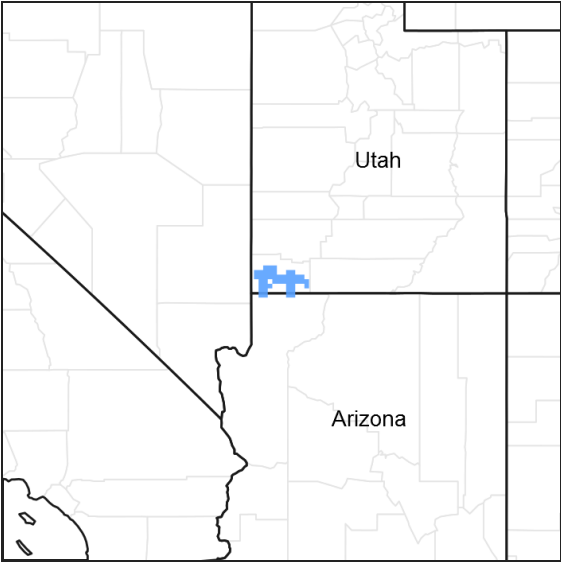


Figure 1. Mapped extent

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

R029XY320UT	<b>Upland Shallow Loam (Singleleaf Pinyon-Utah Juniper)</b> Upland Shallow Loam (Pinyon-Utah Juniper)
R030XY230UT	<b>Semidesert Shallow Hardpan (Blackbrush)</b> Semidesert Shallow Hardpan (Blackbrush)

Similar sites

R030XY230UT	<b>Semidesert Shallow Hardpan (Blackbrush)</b> Semidesert Shallow Hardpan (Blackbrush)
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Coleogyne ramosissima</i>
Herbaceous	(1) <i>Stipa speciosa</i>

Physiographic features

**Table 2. Representative physiographic features**

Landforms	(1) Bayou
Elevation	1,067–1,981 m
Slope	4–30%
Aspect	S

## Climatic features

N/A

**Table 3. Representative climatic features**

Frost-free period (average)	0 days
Freeze-free period (average)	190 days
Precipitation total (average)	279 mm

## Influencing water features

## Soil features

Soils are well-drained and shallow over a hardpan. The majority of the soils have less than 35 percent rock fragments in the profile but about 40 percent of the soils have over 50 percent rock fragments in the profile. There are inclusions of moderately deep to deep soils that this site has over-taken anciently.

**Table 4. Representative soil features**

Soil depth	0–51 cm
Subsurface fragment volume <=3" (Depth not specified)	35–50%

## Ecological dynamics

Fire causes some dramatic changes in this site. The blackbrush is removed and will not come back in at least the foreseeable future. Yerba santa invades along with snakeweed. Mormontea may increase along with several grasses. Some success has been realized with seeding this site after a burn.

## State and transition model

### Ecosystem states

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

1.1. Reference State
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## State 1 Reference State

### Community 1.1 Reference State

Blackbrush (cora) dominates this site with little evidence of a grass understory. Galleta appears to be limited to the eastern part of washington county near virgin, utah. Utah juniper is very evident in the aspect of the site. The plant community is composed of, by air-dry weight, approximately 85 percent shrubs, 10 percent grasses, and 5 percent forbs. Red brome and cheatgrass are always present.

**Table 5. Annual production by plant type**

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	381	572	762
Grass/Grasslike	45	67	90
Forb	22	28	45
Tree	13	17	27
<b>Total</b>	<b>461</b>	<b>684</b>	<b>924</b>

**Table 6. Ground cover**

Tree foliar cover	2-4%
Shrub/vine/liana foliar cover	24-26%
Grass/grasslike foliar cover	4-6%
Forb foliar cover	0%
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 7. Canopy structure (% cover)**

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	—	—
>0.15 <= 0.3	—	—	4-6%	—
>0.3 <= 0.6	—	24-26%	—	—
>0.6 <= 1.4	—	—	—	—
>1.4 <= 4	—	—	—	—
>4 <= 12	2-4%	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

## Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Shrub/Vine</b>					
0	<b>Dominant Shrubs</b>			492–5581	
	blackbrush	CORA	<i>Coleogyne ramosissima</i>	474–5464	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	22–37	–
	desert bitterbrush	PUGL2	<i>Purshia glandulosa</i>	15–37	–
	banana yucca	YUBA	<i>Yucca baccata</i>	15–22	–
	desert almond	PRFA	<i>Prunus fasciculata</i>	15–22	–
3	<b>Sub-Dominant Shrubs</b>			0–146	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–15	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–15	–
	narrowleaf goldenbush	ERLI6	<i>Ericameria linearifolia</i>	0–15	–
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	0–15	–
	Mojave indigobush	PSAR4	<i>Psorothamnus arborescens</i>	0–15	–
	Sonoran scrub oak	QUTU2	<i>Quercus turbinella</i>	0–15	–
	turpentinebroom	THMO	<i>Thamnosma montana</i>	0–15	–
<b>Grass/Grasslike</b>					
0	<b>Dominant Grass</b>			37–102	
1	<b>Sub-Dominant Grasses</b>			0–102	
	Grass, annual	2GA	<i>Grass, annual</i>	0–15	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–15	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	0–15	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0–15	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–15	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–15	–
<b>Forb</b>					
0	<b>Dominant Forb</b>			22–44	
	winding mariposa lily	CAFL	<i>Calochortus flexuosus</i>	8–15	–
	wingnut cryptantha	CRPT	<i>Cryptantha pterocarya</i>	8–15	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	8–15	–
2	<b>Sub-Dominant Forb</b>			0–52	
	Forb, annual	2FA	<i>Forb, annual</i>	0–8	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–8	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–8	–
	stinkgrass	ERCI	<i>Eragrostis cilianensis</i>	0–8	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–8	–
	common woolly sunflower	ERLA6	<i>Eriophyllum lanatum</i>	0–8	–
	Fremont's phacelia	PHFR2	<i>Phacelia fremontii</i>	0–8	–

## Animal community

Wildlife in this site include mule deer, quail cottontail rabbit, road runner, and coyote.

## Wood products

None

## Contributors

Tom 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.

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

## Indicators

- 1. Number and extent of rills:** No rills present. Very minor rill development may occur in sparsely vegetated areas. If rills are present, they should be widely spaced and not connected. 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 in flow enters site from adjacent sites that produce large amounts of runoff (i.e. steeper sites, slickrock, rock outcrop). Site is essentially level and rills do not form.

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- 2. Presence of water flow patterns:** Water flow patterns will be very short (1-3'), narrow (<1'), and meandering; interrupted by plants and exposed rocks. Slight to no evidence of erosion or deposition associated with flow patterns. Where slopes exceed 5%, water flow patterns may be of medium length (5 –10 feet).

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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. 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):** 30-50% 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:** No gullies present.

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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 with some redistribution caused by water and wind movement. Very minor litter removal may occur in water flow paths with deposition occurring at points of obstruction. Where litter movement does occur, litter accumulates at plant bases. Some leaves, stems, and small twigs may accumulate in soil depressions adjacent to plants. Woody stems are 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 3 inches; brown (7.5YR 5/4) very gravelly fine sandy loam, dark brown (7.5YR 3/4) moist; moderate very fine granular structure; soft, very friable, slightly sticky and nonplastic; few fine and common very fine roots; few fine and common very fine interstitial pores; 50 percent pebbles; slightly effervescent; strongly alkaline (pH 8.5); clear smooth boundary. (2 to 5 inches thick)

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Shrubs and well-developed biological soil crusts provide most of the interception of rainfall that prevents erosion. Biological soil crusts are resistant to raindrop impact and splash erosion. Biological soil crusts also provide surface roughness that slows runoff, allowing time for infiltration. Bunchgrasses, if present, may contribute to slowing runoff, but canopy cover from bunchgrasses is too low to provide much rainfall interception. Interspaces between shrubs and biological soil crusts may serve as water flow paths during episodic runoff events, with natural erosion expected in severe storms.

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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, but a naturally-occurring hardpan in the soil profile may be mistaken for a compaction layer. Harpan layers have formed through natural soil-forming processes that result in the chemical cementation of soil particles. Compaction layers can be differentiated from hardpan layers through careful examination of the soil profile by knowledgeable individuals.

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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: Shrubs (blackbrush, desert almond, Nevada jointfir, banana yucca)

Sub-dominant: Sub-dominant: Perennial cool-season bunchgrasses (Indian ricegrass, desert needlegrass) > perennial warm-season bunchgrass (James' galleta)

Other: Other: Other perennial grasses = other shrubs > 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. Almost all litter is concentrated under plant canopies. Litter between plant canopies is very sparse. Average litter cover is 5-15% and average litter depth is 0.25-0.5 inches.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 550-650 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, Utah juniper, singleleaf pinyon, 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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