

## Ecological site R029XY013NV SHALLOW GRAVELLY LOAM 5-8 P.Z.

Last updated: 2/20/2025  
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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): 029X–Southern Nevada Basin and Range

The Southern Nevada Basin and Range MLRA (29) represents the transition from the Mojave Desert to the Great Basin. It is cooler and wetter than the Mojave. It is warmer and typically receives more summer precipitation than the Great Basin. This area is in Nevada (73 percent), California (25 percent), and Utah (2 percent). It makes up about 26,295 square miles (68,140 square kilometers). Numerous national forests occur in the area, including the San Bernardino, Angeles, Sequoia, Inyo, Humboldt-Toiyabe, and Dixie National Forests. Portions of Death Valley National Monument, the Nuclear Regulatory Commission's Nevada Test Site, the Hawthorne Ammunition Depot, and the Nellis Air Force Range in Nevada and the China Lake Naval Weapons Center in California also are in this MLRA. The northeast part of the Paiute Indian Reservation and the southern third of the Walker River Indian Reservation are in the part of this MLRA in Nevada, and the Lone Pine, Fort Independence, and Big Pine Indian Reservations are in the part in California.

#### Physiography:

The entire area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The area of broad, nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by sloping fans and pluvial lake terraces. The mountains are uplifted fault blocks with steep side slopes and not well dissected due to limited annual precipitation. Most of the valleys in this MLRA are closed basins or bolsons containing sinks or playa lakes.

#### Geology:

The mountains are dominated by Pliocene and Miocene andesite and basalt rocks, Paleozoic and Precambrian carbonate rocks prominent in some areas. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments (Pliocene and Miocene) are in the western and eastern thirds of this MLRA. The valleys consist mostly of alluvial fill and playa deposits at the lowest elevations in the closed basins.

#### Climate:

The average annual precipitation is 3 to 12 inches (75 to 305 millimeters) in most of this area. It may be as high as 29 inches (735 millimeters), on the higher mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Summers are dry, but sporadic storms are common in July and August.

#### Water Resources:

Water resources are scarce. Ground water and surface water sources are limited. Streams are small and intermittent. Quality of surface water is naturally degraded as streams cross area of valley fill effected by dissolved salts. Irrigation water may raise the levels of dissolved salts and suspended sediments causing contamination.

#### Soils:

Dominant soil orders include Entisols and Aridisols.

### Ecological site concept

The Shallow Gravelly Loam 5-8 P.Z. site occurs on summits and sideslopes of hills and lower mountains on all exposures. Slopes range from 15 to 50 percent. Elevations are 3800 to about 5400 feet. The soils shallow to volcanic tuff bedrock. These soils have formed in residuum or colluvium from volcanic flow rock or tuff.

## Associated sites

R029XY010NV	<p><b>LOAMY SLOPE 8-10 P.Z.</b></p> <p>This site occurs on piedmont slopes, rock pediments, hills, and lower mountain sideslopes on all exposures. Slopes range from 4 to 75 percent, but slope gradients of 15 to 50 percent are typical. Elevations are 4400 to about 8200 feet. The soils are very shallow to moderately deep and are derived from a variety of parent materials. The surface may be stony, cobbly or gravelly.</p>
R029XY017NV	<p><b>LOAMY 5-8 P.Z.</b></p> <p>This site occurs on piedmont slopes, fan skirts, inset fans, fan remnants and alluvial plains on all exposures. Slopes range from 0 to 30 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 3100 to 7000 feet. The soils associated with this site are typically very shallow to very deep and well drained. Some soils have a restrictive layer below the main plant rooting depth (at soil depths greater than 14 inches).</p>
R029XY019NV	<p><b>SHALLOW GRAVELLY SLOPE 8-10 P.Z.</b></p> <p>This site occurs on fan remnants, hills, and mountains on all exposures. Slopes range from 4 to 50 percent. Elevations are 3000 to 7200 feet. The soils are typically shallow and are derived from mixed parent material. A duripan or bedrock limit plant rooting depth. Soil texture varies from sandy loams to loams and surfaces may be gravelly to extremely gravelly.</p>

## Similar sites

R029XY077NV	<p><b>SHALLOW GRAVELLY LOAM 8-10 P.Z.</b></p> <p>ACSP12 dominant grass</p>
R030XB136NV	<p><b>SHALLOW LIMESTONE 7-9 P.Z.</b></p> <p>MOU major shrub</p>
R029XY127NV	<p><b>SHALLOW LIMESTONE SLOPE 8-10 P.Z.</b></p> <p>ACAR14 dominant grass</p>
R030XA094NV	<p><b>SHALLOW GRAVELLY LOAM 5-7 P.Z.</b></p> <p>LATR2 and AMDU2 may occur</p>
R029XY019NV	<p><b>SHALLOW GRAVELLY SLOPE 8-10 P.Z.</b></p> <p>ACHY-ACSP12 codominant grasses</p>

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Coleogyne ramosissima</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i>

## Physiographic features

The Shallow Gravelly Loam 5-8 P.Z. site occurs on summits and sideslopes of hills and lower mountains on all exposures. Slopes range from 15 to 50 percent. Elevations are 3800 to about 5400 feet.

**Table 2. Representative physiographic features**

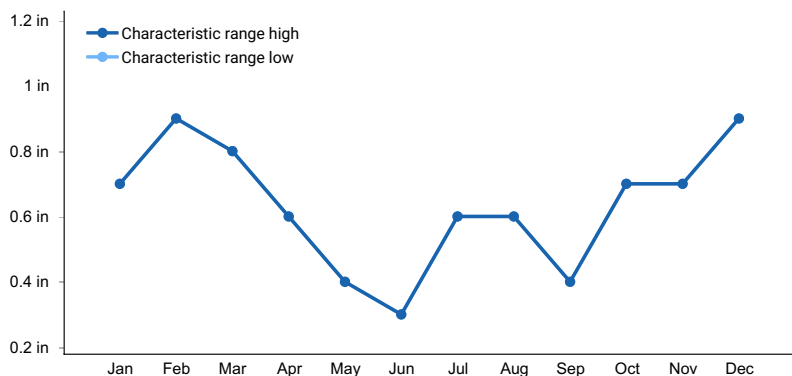
Landforms	(1) Mountain (2) Hill (3)
Runoff class	Very high
Elevation	3,800–5,400 ft
Slope	15–50%
Water table depth	72 in
Aspect	Aspect is not a significant factor

## Climatic features

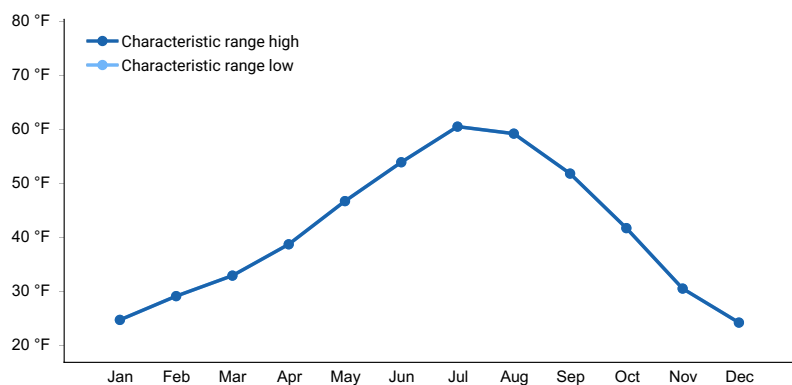
The climate associated with this site is semiarid, characterized by cold, moist winters and warm, somewhat dry summers. Average annual precipitation is 5 to 8 inches. Mean annual air temperature is 49 to 55 degrees F. The average growing season is about 150 to 190 days.

**Table 3. Representative climatic features**

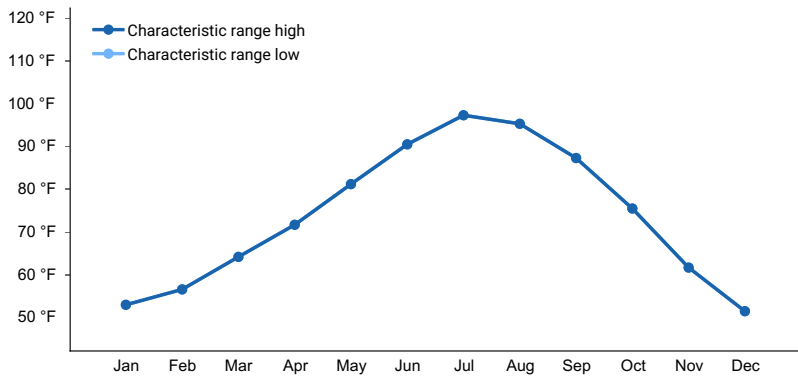
Frost-free period (characteristic range)	132 days
Freeze-free period (characteristic range)	178 days
Precipitation total (characteristic range)	7 in
Frost-free period (actual range)	132 days
Freeze-free period (actual range)	178 days
Precipitation total (actual range)	7 in
Frost-free period (average)	132 days
Freeze-free period (average)	178 days
Precipitation total (average)	7 in



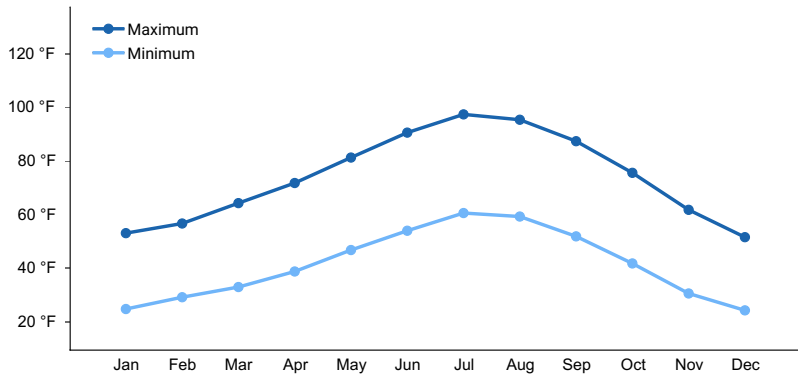
**Figure 1. Monthly precipitation range**



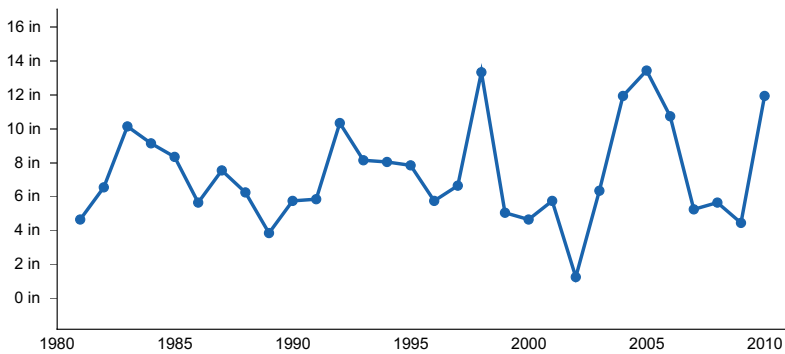
**Figure 2. Monthly minimum temperature range**



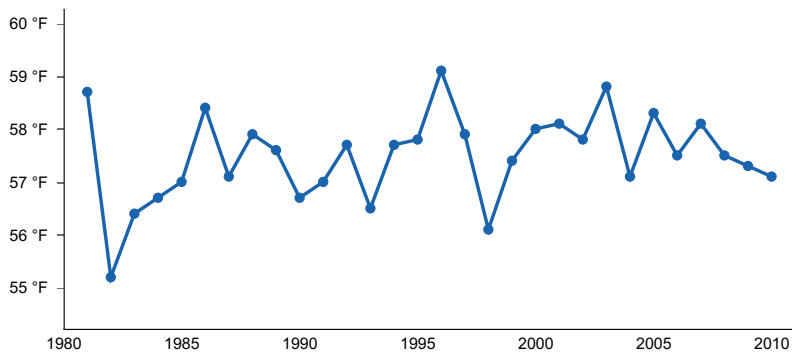
**Figure 3. Monthly maximum temperature range**



**Figure 4. Monthly average minimum and maximum temperature**



**Figure 5. Annual precipitation pattern**



**Figure 6. Annual average temperature pattern**

### Climate stations used

- (1) HIKO [USC00263671], Hiko, NV

### Influencing water features

There are no influencing water features associated with this site.

## Soil features

The soils shallow to volcanic tuff bedrock. These soils have formed in residuum or colluvium from volcanic flow rock or tuff. The soils are well drained, have rapid runoff, and have moderately slow permeability. Available water capacity is very low. Water and wind erosion hazards are slight unless the surface is physically disturbed. The soils have an ochric epipedon and a calcic horizon. Soils correlated to this site include Rochpah, a loamy-skeletal, mixed, superactive, mesic Lithic Haplocalcids.

**Table 4. Representative soil features**

Parent material	(1) Residuum–tuff
Surface texture	(1) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	14–20 in
Surface fragment cover ≤3"	30–50%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	1–2 in
Calcium carbonate equivalent (0-40in)	15–30%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	8.4–8.8
Subsurface fragment volume ≤3" (Depth not specified)	15–30%
Subsurface fragment volume >3" (Depth not specified)	5–30%

## Ecological dynamics

Where management results in abusive livestock use, blackbrush increases, while Indian ricegrass, ephedra, fourwing saltbush and other desirable shrubs decrease. Species likely to invade this site are annuals such as brome grasses.

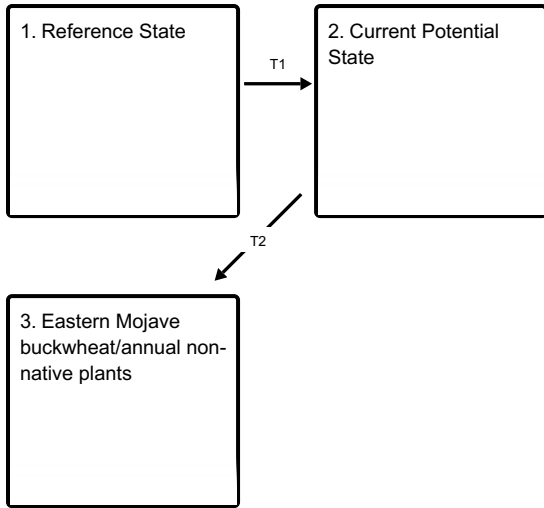
### Fire Ecology:

Low amounts of fine fuels in interspaces probably limited fire spread to only extreme fire conditions, during which high winds, low relative humidity, and low fuel moisture led to high intensity stand-replacing crown fires. Historical fire return intervals appear to have been on the order of centuries, allowing late seral blackbrush stands to reestablish. Blackbrush stands are subject to fire, and fire will start and spread easily due to the dense, close spacing nature and resinous foliage of blackbrush. Blackbrush is slow to reestablish. It is generally removed from the site for 25 to 30 years.

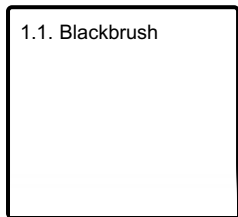
Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas.

## State and transition model

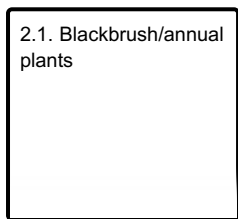
**Ecosystem states**



**State 1 submodel, plant communities**



**State 2 submodel, plant communities**



**State 1 Reference State**

Blackbrush (*Coleogyne ramosissima*) is dominant with a sparse understory of native forb and grasses.

**Dominant plant species**

- blackbrush (*Coleogyne ramosissima*), shrub
- Indian ricegrass (*Achnatherum hymenoides*), grass

**Community 1.1 Blackbrush**

The reference plant community is dominated by blackbrush. Indian ricegrass, Nevada ephedra and bud sagebrush are other important species associated with this site. Potential vegetative composition is about 15 percent grasses, 5 percent forbs and 80 percent shrubs. Approximate ground cover (basal and crown) is 10 to 20 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	80	200	280
Grass/Grasslike	15	37	52
Forb	5	13	18
<b>Total</b>	<b>100</b>	<b>250</b>	<b>350</b>

## **State 2**

### **Current Potential State**

Blackbrush is dominant with annual non-native plants in the understory. This state is at risk for fire.

#### **Dominant plant species**

- blackbrush (*Coleogyne ramosissima*), shrub
- Grass, annual (*Grass, annual*), grass
- Forb, annual (*Forb, annual*), other herbaceous

## **Community 2.1**

### **Blackbrush/annual plants**

Community Phase 2.1 is still dominated by blackbrush, however the herbaceous vegetation is dominated by annual species. The shift from perennial bunchgrass to annual species may allow this community to burn more readily than Community Phase 1.1. This community is at-risk for transition to State 3.

## **State 3**

### **Eastern Mojave buckwheat/annual non-native plants**

Post fire state. The plant community is dominated by eastern Mojave buckwheat (*Eriogonum fasciculatum*) and non-native annual plants, like red brome (*Bromus rubens*).

#### **Dominant plant species**

- Grass, annual (*Grass, annual*), grass
- Eastern Mojave buckwheat (*Eriogonum fasciculatum*), other herbaceous

## **Transition T1**

### **State 1 to 2**

Establishment of non-native annual plants.

## **Transition T2**

### **State 2 to 3**

Fire. Blackbrush does not resprout after fire.

## **Additional community tables**

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Primary Perennial Grasses</b>			8–25	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	8–25	–
2	<b>Secondary Perennial Grasses</b>			5–25	
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	1–8	–
	threeawn	ARIST	<i>Aristida</i>	1–8	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	1–8	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	1–8	–
<b>Forb</b>					
3	<b>Perennial</b>			5–20	
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	1–5	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	1–5	–
	princesplume	STANL	<i>Stanleya</i>	1–5	–
4	<b>Annual</b>			1–13	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	1–5	–
<b>Shrub/Vine</b>					
5	<b>Primary Shrubs</b>			150–175	
	blackbrush	CORA	<i>Coleogyne ramosissima</i>	150–175	–
6	<b>Secondary Shrubs</b>			13–63	
	Shockley's goldenhead	ACSH	<i>Acamptopappus shockleyi</i>	3–13	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	3–13	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	3–13	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	3–13	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	3–13	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	3–13	–
	water jacket	LYAN	<i>Lycium andersonii</i>	3–13	–
	Nevada dalea	PSPO	<i>Psoralea polydenius</i>	3–13	–
	yucca	YUCCA	<i>Yucca</i>	3–13	–

## Animal community

### Livestock Interpretations:

This site has limited value for livestock grazing due to low forage production. Indian ricegrass is highly palatable to all classes of livestock in both green and cured condition. It supplies a source of green feed before most other native grasses have produced much new growth. Blackbrush is not preferred as forage by domestic livestock, but does provide some forage during the spring, summer and fall.

Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year.

### Wildlife Interpretations:

Blackbrush is a valuable browse species for bighorn sheep. It may also comprise up to 25% of the mule deer winter diet. Blackbrush provides cover for upland game birds, nongame birds and small mammals. Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat



large amounts of shattered Indian ricegrass seed lying on the ground.

## Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site is used for camping and hiking and has potential for upland and big game hunting.

## Wood products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.

## Other products

Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used seed as a reserve food source.

## Other information

Blackbrush contributes to desert fertility by 1) protecting the soil against wind erosion through retarding the movement of soil and increasing the accumulation of fine soil particles around its base; 2) protecting understory vegetation from the effects of high temperatures, thereby helping to retain surface nitrogen and adding organic matter to the soil; and 3) serving as a nitrogen reservoir through the storage of nitrogen in roots, leaves, and stems.

## Inventory data references

NASIS data used for abiotic narratives and tables.

## Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T7S R63E S33
General legal description	Delamar Valley area, Lincoln County, Nevada
Location 2: Esmeralda County, NV	
Township/Range/Section	T10S R42E S36
General legal description	Westside of Grapevine Mountains, Esmeralda County, Nevada

## Other references

Fire Effect Information System (Online; <http://www.fs.fed.us/database/feis/plants/>).

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

USDA-NRCS Plants Database (Online; <http://www.plants.usda.gov>).

## Contributors

HA

## Approval

Kendra Moseley, 2/20/2025

## 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.

Author(s)/participant(s)	P NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	07/12/2012
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

- 1. Number and extent of rills:** Rills are none to rare. A few rills can be expected on steeper slopes in areas recently subjected to summer convection storms.  

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- 2. Presence of water flow patterns:** Water flow patterns are none to rare but can be expected in areas recently subjected to summer convection storms, usually on steeper slopes.  

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- 3. Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of water flow patterns.  

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- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground up to 25% depending on amount of surface rock fragments  

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- 5. Number of gullies and erosion associated with gullies:** None  

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- 6. Extent of wind scoured, blowouts and/or depositional areas:** None  

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- 7. Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.  

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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):** Soil stability values should be 3 to 6 on most soil textures found on this site. (To be field tested.)  

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically moderate thin platy structure. Soil surface colors are brownish-grays and A horizon is typically 0-3 inches. Organic matter of the surface horizon is typically <1.5 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial bunchgrasses and shrub canopy and associated litter provide some protection from raindrop impact.
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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):** Compacted layers are none. Massive subsoil horizons not to be interpreted as compacted.
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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: Evergreen shrubs (blackbrush)
- Sub-dominant: associated shrubs > deep-rooted, cool-season, bunchgrasses > deep rooted perennial forbs > warm season, bunchgrasses > annual forbs
- Other: rhizomatous warm season grasses, succulents
- Additional:
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 25% of total woody canopy; some of the mature bunchgrasses (<20%) have dead centers.
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14. **Average percent litter cover (%) and depth ( in):** Reference Plant Community: Under shrubs and between plant interspaces up to 25%
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season  $\pm$  250 lbs/ac. Favorable years  $\pm$  350 lbs/ac and unfavorable years  $\pm$  100 lbs/ac.
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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:** Potential invaders include cheatgrass, red brome, annual mustards, Mediterranean grass, and red-stem filaree.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years. Little growth or reproduction occurs in extreme or extended drought periods.
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