

## **Ecological site R029XY020NV SILTY 5-8 P.Z.**

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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 Silty 5-8 P.Z. site occurs on alluvial flats, fan skirts, and inset fans on all exposures. Slopes range from 0 to 8 percent, but slope gradients of 0 to 2 percent are typical. Elevations are 3500 to about 7000 feet. The soils are very deep and moderately well drained. Surface soils are typically very fine sandy loams to silt loams. The surface layer of these soils will normally develop a vesicular crust, inhibiting water infiltration and seedling emergence.

## Associated sites

R029XY016NV	<b>LOAMY UPLAND 5-8 P.Z.</b>
R029XY017NV	<b>LOAMY 5-8 P.Z.</b>
R029XY042NV	<b>COARSE SILTY 5-8 P.Z.</b>
R029XY046NV	<b>SANDY LOAM 5-8 P.Z.</b>
R029XY059NV	<b>SHALLOW SILTY 5-8 P.Z.</b>
R029XY079NV	<b>DROUGHTY LOAM 5-8 P.Z.</b>

## Similar sites

R029XY042NV	<b>COARSE SILTY 5-8 P.Z.</b> More productive site; greater shrub diversity; ACHY dominant plant
R029XY046NV	<b>SANDY LOAM 5-8 P.Z.</b> More productive site; ATCA2 and KRLA2 codominant shrub
R029XY017NV	<b>LOAMY 5-8 P.Z.</b> ATCO dominant shrub
R029XY059NV	<b>SHALLOW SILTY 5-8 P.Z.</b> ATCO dominant shrub

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Krascheninnikovia lanata</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i> (2) <i>Elymus elymoides</i>

## Physiographic features

The Silty 5-8 P.Z. site occurs on alluvial flats, fan skirts, and inset fans on all exposures. Slopes range from 0 to 8 percent, but slope gradients of 0 to 2 percent are typical. Elevations are 3500 to about 7000 feet.

Table 2. Representative physiographic features

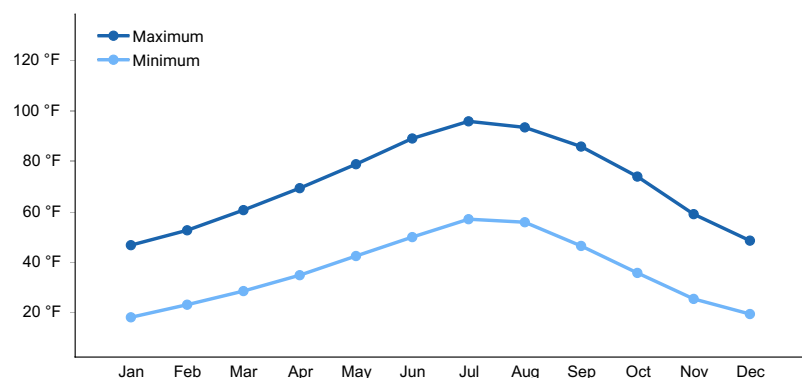
Landforms	(1) Alluvial flat (2) Inset fan (3) Stream terrace
Runoff class	Very low to low
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	3,500–7,000 ft
Slope	0–8%
Water table depth	72 in
Aspect	Aspect is not a significant factor

## 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 52 to 58 degrees F. The average growing season is about 130 to 170 days. No climate stations are available.

**Table 3. Representative climatic features**

Frost-free period (average)	170 days
Freeze-free period (average)	
Precipitation total (average)	8 in

**Figure 1. Monthly average minimum and maximum temperature**

## Influencing water features

Additional moisture is received on this site as overland flow from adjacent ephemeral streams or as run on from higher landscapes.

## Soil features

The soils are very deep and moderately well drained. Surface soils are typically very fine sandy loams to silt loams. The surface layer of these soils will normally develop a vesicular crust, inhibiting water infiltration and seedling emergence. Permeability is moderately slow to moderately rapid with very low to high available water holding capacity. Additional moisture is received on this site as overland flow from adjacent ephemeral streams or as run on from higher landscapes. Runoff is very low to low, ponding occurs in some areas, particularly following intense storms or low elevation snow melt. Potential for sheet and rill erosion is moderate. These soils have potential for gully formation where concentration of overland flows occur. Soil series associated with this site include: Cliffdown, Fawin, Flatnose, Gardenvally, Geer, Linoyer, Penoyer, and Puddle.

**Table 4. Representative soil features**

Parent material	(1) Alluvium–volcanic rock (2) Alluvium–limestone (3) Alluvium–welded tuff (4) Lacustrine deposits
Surface texture	(1) Fine sandy loam (2) Silt loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	72–84 in
Surface fragment cover ≤3"	23–50%
Surface fragment cover >3"	0–2%
Available water capacity (0–40in)	2.7–7.9 in

Calcium carbonate equivalent (0-40in)	0–60%
Electrical conductivity (0-40in)	0–32 mmhos/cm
Sodium adsorption ratio (0-40in)	0–30
Soil reaction (1:1 water) (0-40in)	7.4–9.6
Subsurface fragment volume <=3" (Depth not specified)	2–82%
Subsurface fragment volume >3" (Depth not specified)	0–2%

## Ecological dynamics

Where management results in abusive livestock use by cattle and /or feral horses, bottlebrush squirreltail, winterfat and Indian ricegrass decrease. With further site degradation, halogeton, Russian thistle and annual mustards invade the interspace areas between shrubs. These annual species, particularly halogeton, become dominant on disturbed sites. The soils of this site are highly erodible and, with site degradation, gullies may form which interrupt and concentrate overland flow patterns.

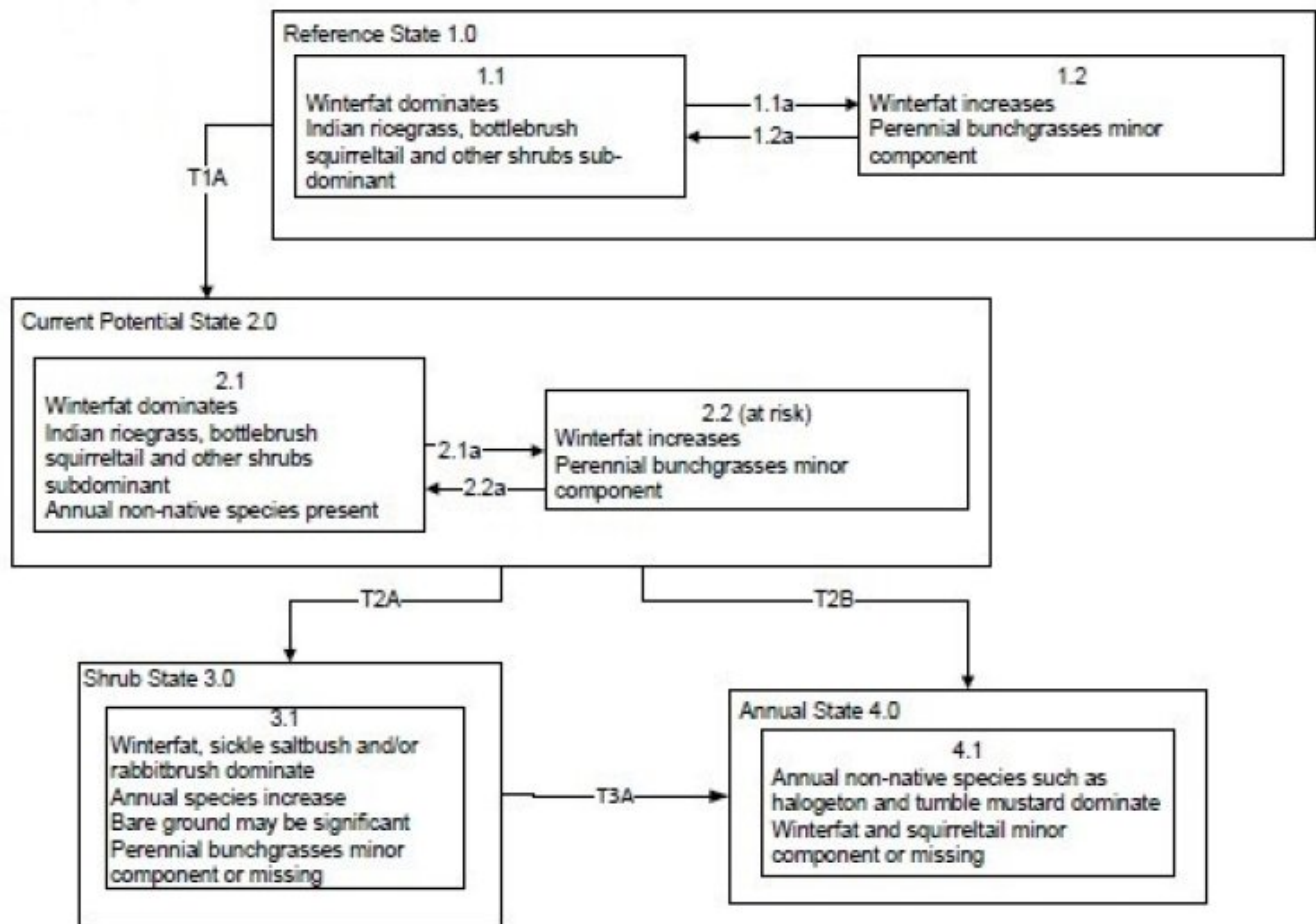
### Fire Ecology:

Prior to the invasion of exotic annuals, fire was an uncommon component of salt-desert shrub communities. Salt-desert communities dominated by winterfat produced little fine fuel. The introduction of annual grasses, including the highly flammable cheatgrass (*Bromus tectorum*), into these communities has altered fuel loads and fuel distribution. After wet years when annual grass production is high, salt-desert shrub communities are susceptible to fire. Fire drastically alters the community composition because salt-desert shrubs are not adapted to periodic fire. Winterfat is either killed or top-killed by fire, depending on fire severity. Severe fire can kill the perennating buds located several inches above the ground surface and thus kills the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the aboveground portions of winterfat and thus does not cause high mortality.

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.

Bottlebrush squirreltail's small size, coarse stems, and sparse leafy material aid in its tolerance of fire. Postfire regeneration occurs from surviving root crowns and from on- and off-site seed sources. Frequency of disturbance greatly influences postfire response of bottlebrush squirreltail. Undisturbed plants within a 6 to 9 year age class generally contain large amounts of dead material, increasing bottlebrush squirreltail's susceptibility to fire.

## State and transition model



#### Reference State 1.0 Community Phase Pathways

1.1a: Drought and/or excessive herbivory favors as decrease in perennial bunchgrasses. Fire was infrequent but would be patchy due to low fuel loads.

1.2a: Time and lack of disturbance and/or release from drought

Transition T1A: Introduction of non-native species such as cheatgrass and halogeton.

#### Current Potential State 2.0 Community Phase Pathways

2.1a: Drought and/or inappropriate grazing management

2.2a: Time and lack of disturbance and/or release from drought

Transition T2A: Inappropriate grazing management in the presence of non-native species (3.1)

Transition T2B: Catastrophic fire and/or multiple fires, inappropriate grazing management and/or soil disturbing treatments (4.1)

Transition T3A: Catastrophic fire and/or multiple fires, inappropriate grazing management and/or soil disturbing treatments (4.1)

## State 1

### Reference Plant Community

#### Community 1.1

### Reference Plant Community

The reference plant community is dominated by winterfat. Indian ricegrass, bottlebrush squirreltail and bud sagebrush are other important species associated with this site. Potential vegetative composition is about 25% grasses, 5% forbs, and 70% 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	140	245	350
Grass/Grasslike	50	88	125
Forb	10	17	25
<b>Total</b>	<b>200</b>	<b>350</b>	<b>500</b>

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			36–88	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	18–53	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	18–35	
2	Secondary Perennial Grasses			7–28	
	threeawn	ARIST	<i>Aristida</i>	2–11	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	2–11	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	2–11	–
Forb					
3	Perennial			7–28	
	threeawn	ARIST	<i>Aristida</i>	1–7	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	2–7	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	2–7	–
4	Annual			1–11	
Shrub/Vine					
5	Primary Shrubs			252–308	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	245–280	
	globemallow	SPHAE	<i>Sphaeralcea</i>	7–28	–
6	Secondary Shrubs			7–35	
	Forb, annual	2FA	<i>Forb, annual</i>	0–11	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	4–11	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	4–11	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	4–11	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	4–11	–
	greasewood	SAVE4	<i>Sarcobatus vermiculatus</i>	4–11	–

## Animal community

Livestock Interpretations:

This site is suited to livestock production. Grazing management should be keyed to winterfat and perennial grass production.

Bottlebrush squirreltail is very palatable winter forage for domestic sheep of Intermountain ranges. Domestic sheep relish the green foliage. Overall, bottlebrush squirreltail is considered moderately palatable to livestock. 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. Winterfat is an important forage plant for livestock, especially during winter when forage is scarce. Abusive grazing practices have reduced or

eliminated winterfat on some areas even though it is fairly resistant to browsing. Effects depend on severity and season of grazing. Budsage is palatable and nutritious forage for domestic sheep in the winter and spring although it is known to cause mouth sores in lambs. Budsage can be poisonous or fatal to calves when eaten in quantity. Budsage, while desired by cattle in spring, is poisonous to cattle when consumed alone.

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:

Winterfat is an important forage plant for wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents. Winterfat is a staple food for black-tailed jackrabbit. Mule deer and pronghorn antelope browse winterfat. Winterfat is used for cover by rodents. It is potential nesting cover for upland game birds, especially when grasses grow up through its crown. Bottlebrush squirreltail is a dietary component of several wildlife species. Bottlebrush squirreltail may provide forage for mule deer and pronghorn. Indian ricegrass is an important forage for several wildlife species. Budsage is palatable, nutritious forage for upland game birds, small game and big game in winter. Budsage is rated as "regularly, frequently, or moderately taken" by mule deer in Nevada in winter and is utilized by bighorn sheep in summer, but the importance of budsage in the diet of bighorns is not known. Bud sage comprises 18 – 35% of a pronghorn's diet during the spring where it is available. Chukar will utilize the leaves and seeds of bud sage. Budsage is highly susceptible to effects of browsing. It decreases under browsing due to year-long palatability of its buds and is particularly susceptible to browsing in the spring when it is physiologically most active.

### Hydrological functions

Runoff is very low to low. Rills are rare. A few can be expected on steeper slopes (>4%) in areas subjected to summer convection storms or rapid spring snowmelt. Water flow patterns are often numerous in areas subjected to summer convection storms. Flow patterns short and stable. Pedestals are rare with occurrence typically limited to areas within water flow patterns. Frost heaving of shallow rooted plants is not considered a "normal" condition. Gullies are rare in areas of this site that occur on stable landforms. Where this site occurs on inset fans, gullies and head-cuts associated with ephemeral channel entrenchment are common. Gullies and head-cuts should be healing or stable. Sparse shrub canopy and associated litter break raindrop impact.

### 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.

### Other products

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

### Other information

Winterfat adapts well to most site conditions, and its extensive root system stabilizes soil. However, winterfat is intolerant of flooding, excess water, and acidic soils. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Bottlebrush squirreltail is tolerant of disturbance.

### Inventory data references

NASIS data used for abiotic narratives and tables.

### Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T4S R65E S7
UTM zone	N
UTM northing	4165396
UTM easting	699009
Latitude	37° 36' 50"
Longitude	114° 44' 42"
General legal description	Air strip just off USHwy 93, approximately ½ mile north of Delamar. Delamar Valley area, Lincoln County, Nevada. This site also occurs in Esmeralda, Mineral and Nye counties, 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/GD/VWM

## 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)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006
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.

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2. **Presence of water flow patterns:** Water flow patterns are often numerous after summer convection storms where run-in occurs on lake plains



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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas within 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 65 to 75%
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5. **Number of gullies and erosion associated with gullies:** These soils have potential for gully formation where concentration of overland flows occur.
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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 1 to 4 on most soil textures found on this site. Soils having thin surface sand sheet will have low stability values. (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):** Structure of soil surface typically is medium platy. Soil surface colors are light grays and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent. Surface soils are typically very fine sandy loams to silt loams. The surface layer of these soils will normally develop a vesicular crust, inhibiting water infiltration and seedling emergence.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse 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. Platy or massive sub-surface horizons are not to be interpreted as compacted 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: Low-statured shrub (winterfat)

Sub-dominant: deep-rooted, cool season, perennial bunchgrass (Indian ricegrass) > shallow-rooted, cool season, perennial bunchgrasses > associated shrubs > deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, annual and perennial forbs

Other:

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 35% of total woody canopy; mature bunchgrasses commonly ( $\pm 25\%$ ) have dead centers.
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14. **Average percent litter cover (%) and depth ( in):** Between plant interspaces 10-20% and depth <  $\frac{1}{4}$  in
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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 (February thru May)  $\pm 350$  lbs/ac; Favorable years  $\pm 500$  lbs/ac and unfavorable years  $\pm 200$  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 halogeton, Russian thistle, annual mustards, and cheatgrass.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Little growth or reproduction occurs during extreme or extended drought periods.
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