

Ecological site R029XY019NV SHALLOW GRAVELLY SLOPE 8-10 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 Slope 8-10 P.Z. 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.

Associated sites

R029XY010NV	LOAMY SLOPE 8-10 P.Z.
R029XY013NV	SHALLOW GRAVELLY LOAM 5-8 P.Z.
R029XY077NV	SHALLOW GRAVELLY LOAM 8-10 P.Z.

Similar sites

R029XY077NV	SHALLOW GRAVELLY LOAM 8-10 P.Z. More productive site
R030XA095NV	SHALLOW GRAVELLY SLOPE 5-7 P.Z. LATR2 and AMDU2 may occur
R029XY013NV	SHALLOW GRAVELLY LOAM 5-8 P.Z. Less productive site; ATCO and PIDE4 important shrubs
R030XA094NV	SHALLOW GRAVELLY LOAM 5-7 P.Z. LATR2 and AMDU2 may occur

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Coleogyne ramosissima</i>
Herbaceous	(1) <i>Achnatherum speciosum</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

The Shallow Gravelly Slope 8-10 P.Z. site occurs on fan remnants, hills, and mountains on all exposures. Slopes range from 4 to 50 percent. Elevations are 3000 to 7200 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Hill (3) Mountain
Runoff class	Very high
Elevation	3,000–7,200 ft
Slope	4–50%
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 7 to about 10 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

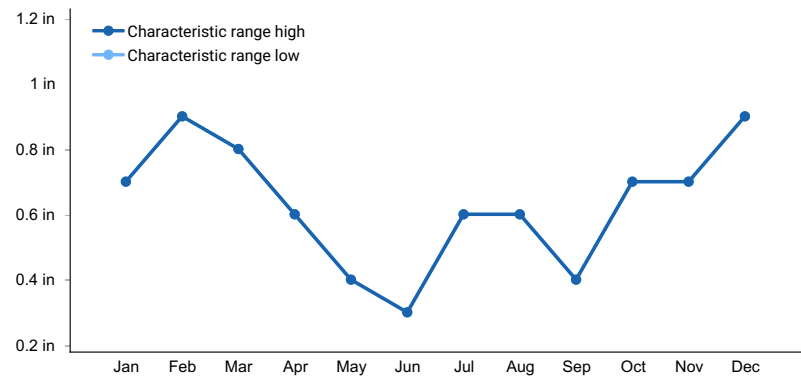


Figure 1. Monthly precipitation range

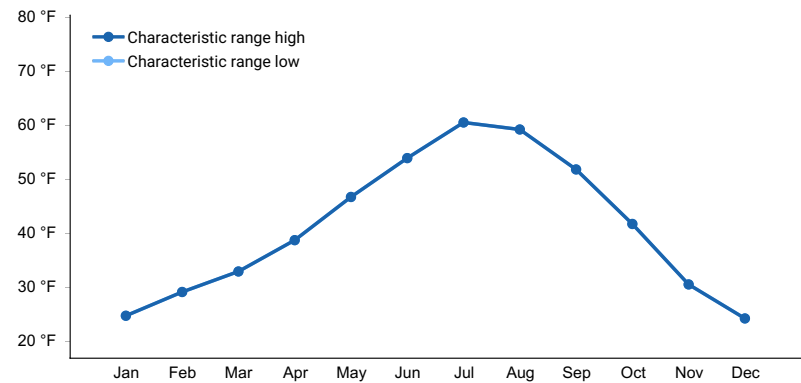


Figure 2. Monthly minimum temperature range

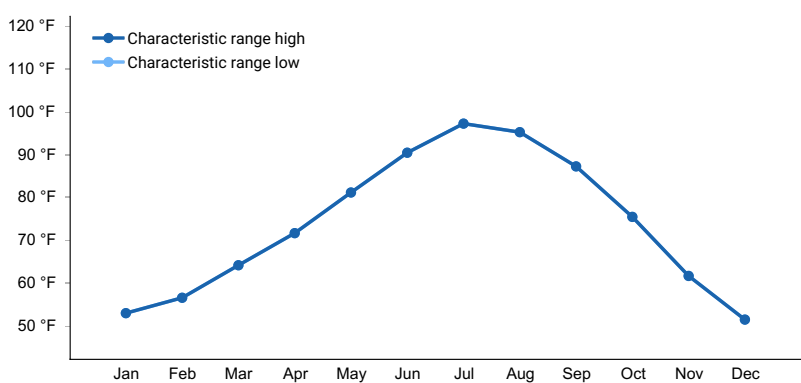


Figure 3. Monthly maximum temperature range

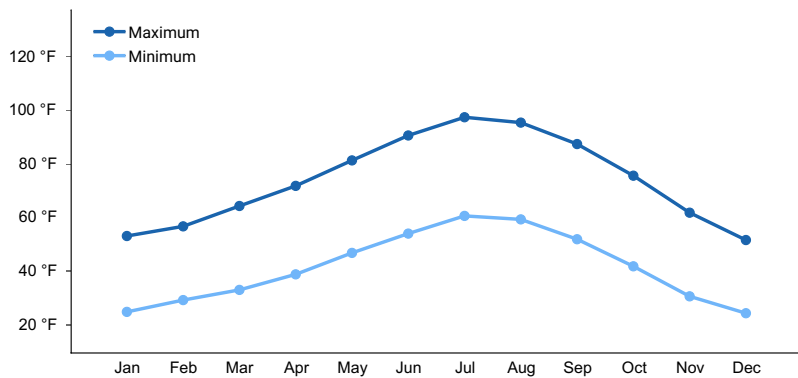


Figure 4. Monthly average minimum and maximum temperature

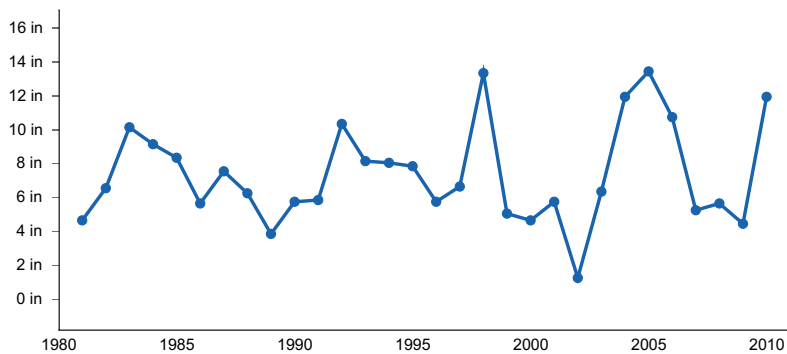


Figure 5. Annual precipitation pattern

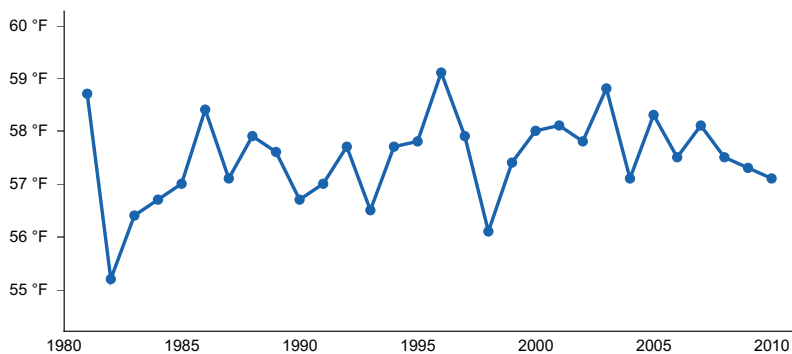


Figure 6. Annual average temperature pattern

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 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. Water intake rates are slow to moderate, available water capacity is very low, runoff is medium to very high and soils are well drained. The soil is dry most of the year but is moist for short periods during the winter and early spring months and occasionally for short intermittent periods following summer convection storms. Soil series associated with this site are Boxspring, Longjim, Pahroc, Zagua, and Zibate.

Table 4. Representative soil features

Parent material	(1) Colluvium–limestone and dolomite (2) Residuum–limestone and dolomite (3) Alluvium–volcanic rock
Surface texture	(1) Very gravelly sandy loam (2) Extremely gravelly loam (3) Very gravelly very fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	10–20 in
Surface fragment cover ≤3"	30–50%
Surface fragment cover >3"	0–5%
Available water capacity (0–40in)	1.5–1.9 in
Calcium carbonate equivalent (0–40in)	0–15%
Electrical conductivity (0–40in)	0–4 mmhos/cm
Sodium adsorption ratio (0–40in)	0–12
Soil reaction (1:1 water) (0–40in)	7.4–9
Subsurface fragment volume ≤3" (Depth not specified)	20–65%
Subsurface fragment volume >3" (Depth not specified)	0–20%

Ecological dynamics

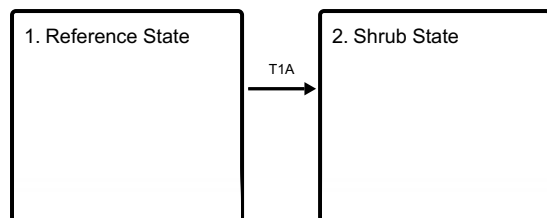
Where management results in abusive livestock use, blackbrush increases, while Indian ricegrass, ephedra, fourwing saltbush and other desirable shrubs decrease. Galleta density greatly increases following wildfire. Species likely to invade this site are annuals such as brome grasses.

Fire Ecology:

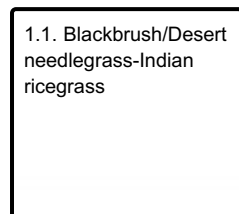
Low amounts of fine fuels in interspaces probably limited fire spread to only extreme fire conditions, during which high winds, low relative humidity, and low fuel moisture led to high intensity stand-replacing crown fires. Historical fire return intervals appear to have been on the order of centuries, 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. Nevada ephedra generally sprouts after fire damages aboveground vegetation. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. However, severe fires may kill shallowly buried regenerative structures. Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. Fire removes the accumulation; a rapid, cool fire will not burn deep into the root crown. 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. Galleta is a rhizomatous perennial which can resprout after top-kill by fire.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1 Reference State

Blackbrush (*Coleogyne ramosissima*) is the dominant shrub in the Reference State. Perennial bunchgrasses are the dominant grasses in the understory.

Community 1.1 Blackbrush/Desert needlegrass-Indian ricegrass

The reference plant community is dominated by blackbrush. Desert needlegrass, Indian ricegrass and ephedra are other important species associated with this site. Potential vegetative composition is about 20 percent grasses, 5 percent forbs and 75 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	150	262	375
Grass/Grasslike	40	70	100
Forb	10	18	25
Total	200	350	500

State 2 Shrub State

Blackbrush dominates the plant community.

Dominant plant species

- blackbrush (*Coleogyne ramosissima*), shrub

Transition T1A State 1 to 2

Herbaceous species removal and an increase of blackbrush. This may occur through grazing.

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			15–88	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	7–35	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	7–35	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	1–18	–
2	Secondary Perennial Grasses			7–18	
	threeawn	ARIST	<i>Aristida</i>	2–11	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2–11	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	2–11	–
Forb					
3	Perennial			7–28	
	globemallow	SPHAE	<i>Sphaeralcea</i>	2–7	–
	princesplume	STANL	<i>Stanleya</i>	2–7	–
4	Annual			1–18	
	threeawn	ARIST	<i>Aristida</i>	1–4	–
Shrub/Vine					
5	Primary Shrubs			157–203	
	blackbrush	CORA	<i>Coleogyne ramosissima</i>	150–175	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	7–28	–
6	Secondary Shrubs			18–53	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	4–18	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	4–18	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	4–18	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	4–18	–
	spiny menodora	MESP2	<i>Menodora spinescens</i>	4–18	–
	Stansbury cliffrose	PUST	<i>Purshia stansburiana</i>	4–18	–
	banana yucca	YUBA	<i>Yucca baccata</i>	4–18	–

Animal community

Livestock Interpretations:

This site has limited value for livestock grazing due to low forage production. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. 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. When actively growing, galleta provides good to excellent forage for cattle and horses and fair forage for domestic sheep. Although not preferred, all classes of livestock may use galleta when it is dry. Domestic sheep show greater use in winter than summer months and typically feed upon central portions of galleta tufts, leaving coarser growth around the edges. Galleta may prove somewhat coarse to domestic sheep. Blackbrush is not preferred as forage by domestic livestock, but does provide some forage during the spring, summer and fall. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats.

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. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass. 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. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species.

Hydrological functions

Runoff is very high. Permeability is slow to moderate.

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 bird and big game hunting.

Other products

Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the 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. Nevada ephedra is useful for erosion control, and seedlings have been successfully planted onto reclaimed strip mines, with survival ranging from 12 to 94%. Atrazine may be effective in controlling Nevada ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine.

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	North end of Six Mile Flat, Lincoln 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/RRK

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.

- 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.

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

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground up to 35% depending on amount of surface rock fragments.

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

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

- 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.

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 weak, thick platy structure or medium subangular blocky. Soil surface colors are brownish-grays or yellowish browns and A horizon is typically 0 to 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 or duripans 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

Additional:

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 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 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 drought years
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