USDA Natural Resources
Conservation Service

Ecological site R030XC036NV
STEEP GRAVELLY SLOPE 9-11 P.Z.

Last updated: 2/25/2025
Accessed: 05/21/2025

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.

Ecological site concept

This site occurs on mountain backslopes. Slopes range from 15 to over 75 percent, but slopes of 30 to 50 percent are most typical. Elevations range from 4600 to 6900 feet. The soils associated with this site are very shallow to bedrock and formed in residuum and colluvium derived from limestone and dolomite.

This is a group concept and provisional STM that also covers the following ecological sites: R030XC038NV R030XC031NV, R030XC015NV, R030XC017NV, R030XC039NV

Associated sites

R030XC040NV	**STEEP NORTH SLOPE 9-11 P.Z.**
R030XC038NV	**SHALLOW GRAVELLY SLOPE 9-11 P.Z.**

Similar sites

R030XC007NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.** Occurs on fan remnants; BOGR2, PLJA absent.
R030XC037NV	**SHALLOW LOAM 9-11 P.Z.** ATCA2 & EPNE important species.
R030XC008NV	**SHALLOW LIMESTONE SLOPE 7-9 P.Z.** ACAR14 & GLSP important species, less productive.
R030XC038NV	**SHALLOW GRAVELLY SLOPE 9-11 P.Z.** FAPA & AGUT important species; less productive.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Purshia stansburiana*
Herbaceous	(1) *Achnatherum*

Physiographic features

This site occurs on mountain backslopes. Slopes range from 15 to over 75 percent, but slopes of 30 to 50 percent are most typical. Elevations range from 4600 to 6900 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Elevation	1,402–2,103 m
Slope	15–75%

Climatic features

The climate is semiarid with cool, moist winters and warm, intermittently moist summers. Precipitation is greatest in the winter with a lesser secondary peak in the summer, typical of the Mojave Desert transitional to the Great Basin. Average annual precipitation is 9 to 11 inches. Mean annual air temperature is 48 to 55 degrees F. The average growing season is about 130 to 180 days.

Table 3. Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	
Precipitation total (average)	279 mm

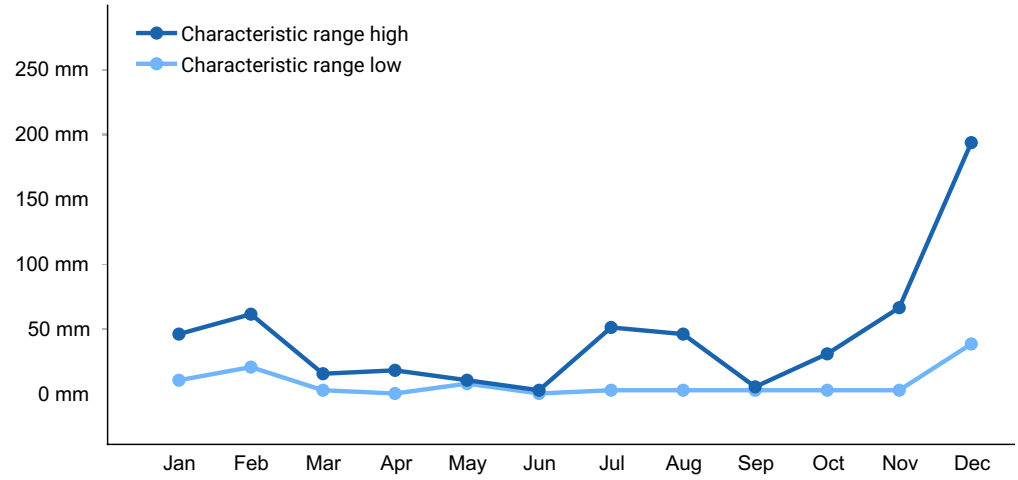


Figure 1. Monthly precipitation range

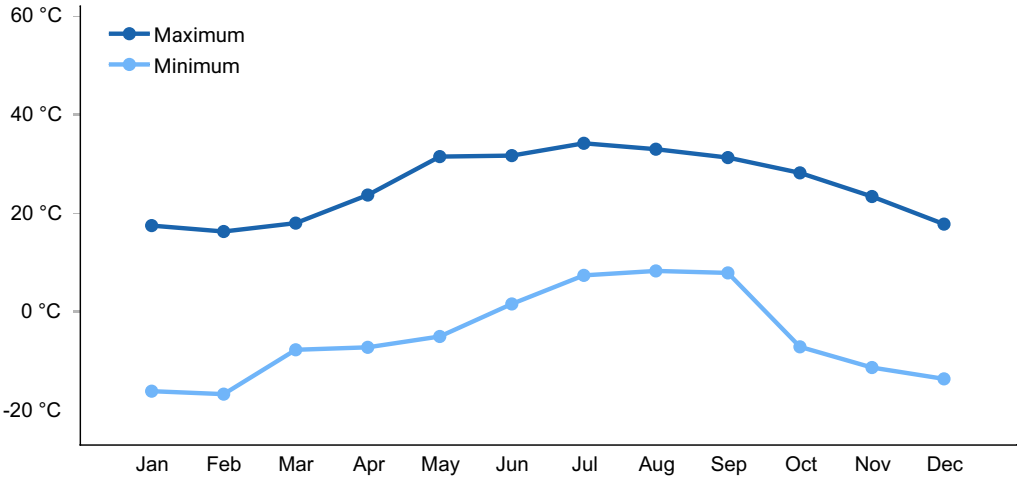


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow to bedrock and formed in residuum and colluvium derived from limestone and dolomite. Available water capacity is low. Soils are somewhat excessively drained and runoff is very high. Surface gravels cover up to 75 percent and lithic contact occurs within 23 cm of the soil surface. The soil moisture regime is typic-aridic and the temperature regime is mesic. Soil series correlated to this ecological site include Sheeppass, a loamy-skeletal, carbonatic, mesic, Lithic Torriorthents.

Table 4. Representative soil features

Parent material	(1) Residuum–limestone (2) Colluvium–dolomite

Surface texture	(1) Very gravelly sandy loam (2) Extremely gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid
Soil depth	10–25 cm
Surface fragment cover <=3"	50–60%
Surface fragment cover >3"	4–15%
Available water capacity (0-101.6cm)	1.45–3.76 cm
Calcium carbonate equivalent (0-101.6cm)	40–55%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	8.1–8.2
Subsurface fragment volume <=3" (Depth not specified)	35–50%
Subsurface fragment volume >3" (Depth not specified)	0–13%

Ecological dynamics

Blackbrush communities are most prevalent in the transitional zone between the Mojave Desert and Great Basin. Blackbrush is a paleoendemic species as originally postulated by Stebbins and Major (1965). Blackbrush is a transitional species that occupies a boundary that has shifted in recent geologic time. Analysis of packrat middens suggests a 50–100m downward movement of the blackbrush zone along elevational gradients in the Mojave Desert (Cole and Webb, 1985; Hunter and McAuliffe, 1994).

Blackbrush is long-lived and generally considered a climax species. It is a non-sprouter; regeneration depends on wind pollinated seed and heavy winter precipitation, and is therefore slow to re-colonize disturbed areas (Anderson 2001). Blackbrush seeds are frequently cached away by rodents, until conditions are conducive for germination. Typically, germination occurs during the winter and early spring, given the proper moisture conditions and cool soil temperature (Pendleton 2008). Seeds require cold stratification before germination and the survival of seedlings following germination is dependent on the availability of spring time moisture (Pendleton 2008).

On undisturbed sites, blackbrush dominates the landscape and species diversity is generally low. Undisturbed blackbrush communities are fairly resistant to invasion by non-

natives (Brooks and Matchett 2003). Mature blackbrush plants are well adapted to persist under less than optimal conditions, and individuals' may live as long as 400 years (Pendleton and Meyer 2004). Communities are characterized by a flammable shrub architecture allowing fire to easily spread, thus these communities experience stand replacing fire regimes. The short-lived seed of blackbrush is readily destroyed by fire. There is frequently 100 percent mortality of mature blackbrush following fire (Brooks and Matchett 2003).

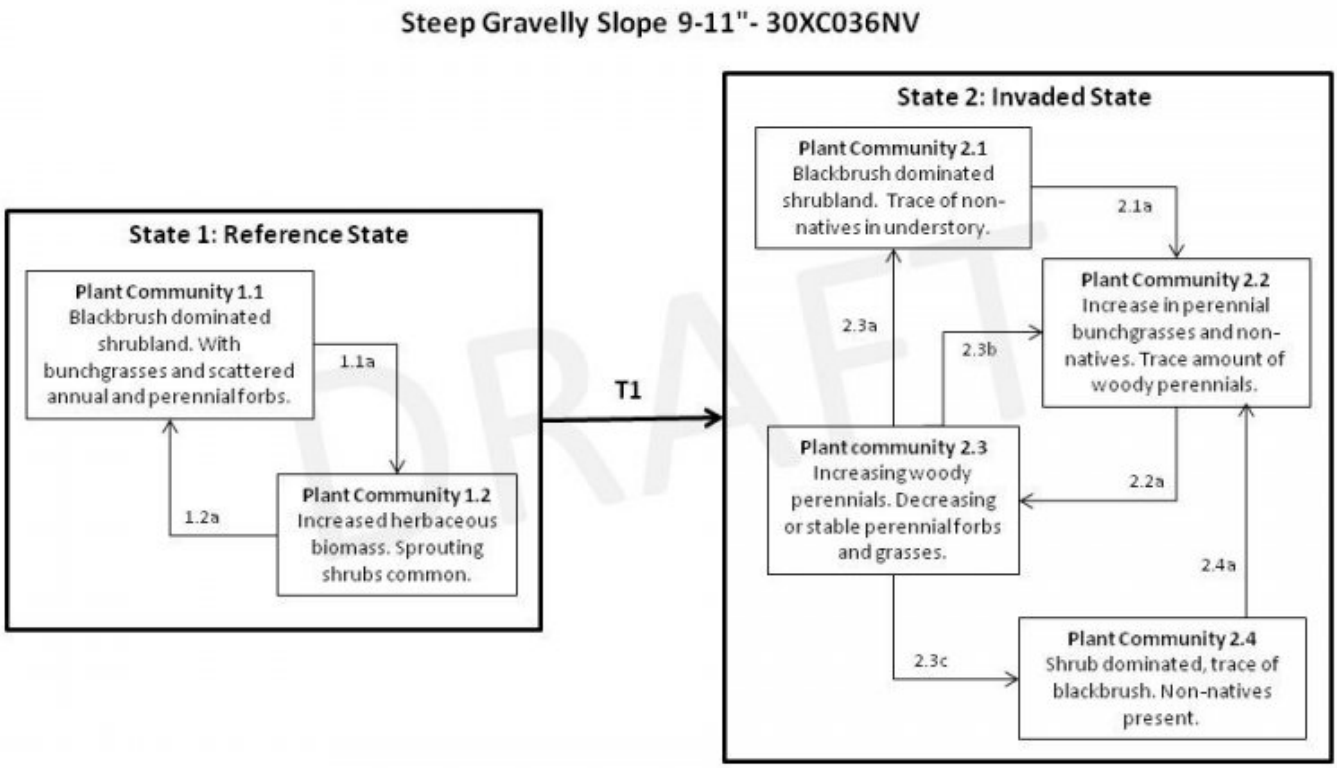
Fire Ecology:

Blackbrush stands are considered to be one of the most flammable native plant assemblages in the Mojave Desert. Fire will start and spread easily due to the close spacing nature and resinous foliage of blackbrush. During periods with high winds, low relative humidity and low fuel moisture blackbrush will experience stand replacing fires. The short-lived seed of blackbrush is readily destroyed by fire and it may take upwards of 60 years for blackbrush to achieve pre-fire conditions. There is frequently 100 percent mortality of mature blackbrush following fire (Brooks and Matchett 2003) and reestablishment occurs solely from seed. Fire effects on Stansbury cliffrose are variable. Fire may kill or severely damage plants. Late-season fire also increases the risk of mortality. Stansbury cliffrose is a weak sprouter that is generally killed by severe fire. Aboveground portions of Apache-plume are top-killed by fire. It exhibits vigorous sprouting from root suckers after top-kill by fire. 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. Fire has an impact on agave populations. Depending on time of year, duration, season of burn and frequency of burn, fire could create a nutrient rich agave seedbed, but could also eliminate shade needed for seedlings. 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. Most perennial grasses have root crowns that can survive wildfire.

Post-fire plant communities vary, depending on use history and species present prior to the fire. Post fire sprouting shrub species such as yucca, Stansbury cliffrose, Apache plume and ephedra increase along with perennial grasses. Species that readily reestablish from seed such as saltbush and snakeweed also increase.

This ecological site is currently described by a two state model, which includes the reference state and the invaded state. This site also has the potential to be invaded by pinyon and juniper trees. However, a tree state has not been identified at this time. If in the future a tree state is indentified on the landscape, this model will be revised to reflect findings.

State and transition model



State 1
Reference State

The reference state is representative of the natural range of variability under pristine conditions. The reference state is dominated by a long-lived evergreen shrub community with an understory of cool and warm season perennial bunchgrasses, as well as, annual and perennial forbs. Plant community phase changes are primarily driven by long term drought. Historically, fire is rare in this system, but can have long-term impacts on plant community dynamics. Reproduction and recruitment are episodic, based on favorable environmental conditions (Pendleton and Meyer 2004). Very old stands of blackbrush may have established hundreds to thousands of years ago under very different climatic conditions and will take a considerable amount of time to recover following disturbances.

Community 1.1
Reference Plant Community

The reference plant community is dominated by blackbrush. Stansbury cliffrose, Apache plume, Utah agave, and desert needlegrass are other important species associated with this site. Potential vegetative composition by weight is about 20 percent grasses, 10

percent forbs and 70 percent shrubs, and less than 1 percent trees. Approximate ground cover (basal and crown) is 25 to 35 percent. This plant community can persist on the landscape for extended periods of time.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	273	390	545
Grass/Grasslike	78	112	157
Forb	39	56	78
Tree	1	2	4
Total	**391**	**560**	**784**

Community 1.2
Plant Community 1.2

This plant community is characterized by an early seral, post-disturbance community phase. Initially post-disturbance plant communities are heavily dominated by herbaceous biomass. Sprouting shrubs quickly return and provide favorable environment for the establishment of other shrub seedlings. This plant community is ‘at-risk’ of invasion by non-native annuals, such as red brome and cheatgrass. Non-natives take advantage of the increased availability of critical resources following a disturbance. Composition of the post-fire plant community may vary depending on season of burn. Early summer fires cause higher rates of mortality in desert needlegrass.

Pathway 1.1a
Community 1.1 to 1.2

Wildfire, prolonged drought and/or disease/insect attack.

Pathway 1.2a
Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time. Recovery of blackbrush to pre-fire conditions may take greater than 60 years.

State 2
Invaded State

The invaded state is characterized by a blackbrush community with non-native annuals in the understory. A biotic threshold has been crossed, with the introduction of non-native annuals that are difficult to remove from the system and have the potenital to alter disturbance regimes significantly from their natural or historic range of variability. These

non-natives annuals are highly flammable and promote wildfires where fires historically have been infrequent.

Community 2.1
Invaded Plant Community 2.1

Figure 4. Invaded Plant Community with a trace of red brome

Compositionally this plant community is similar to the reference plant community with the presence of non-native species in the understory. Ecological processes are not compromised at this time. However ecological resilience is reduced by the presence of non-native species. This plant community will respond differently following a disturbance, when compared to the reference plant community. Management focused on protecting native vegetation is needed to prevent further degradation.

Community 2.2
Invaded Plant Community 2.2

This plant community is characteristic of an post disturbance plant community. This plant community phase is heavily dominated by herbaceous vegetation, which may or may not be non-native annual grasses. Sprouting shrubs quickly recover and provide favorable conditions for the establishment of other shrub seedlings. Following a disturbance, reestablishment of blackbrush relies on the availability of a nearby seed source. Recovery of blackbrush to pre-disturbance conditions can take more than 60 years. It is also possible that very old stands of blackbrush established hundreds to thousands of years ago and may not be able to recover under the current climatic conditions. Frequently reoccurring surface disturbances in this plant community phase, including wildfire, can result in the complete removal of blackbrush.

Community 2.3
Invaded Plant Community 2.3

This plant community is characterized by recovering native woody perennials. Sprouting species such as Ephedra, Apache plume and desert almond will be first shrubs to appear post-fire. Non-natives are present in the understory. Wildfire has long term effects on blackbrush communities. Recovery of blackbrush is highly dependent on intensity of the fire. Fast moving, low intensity fires result in incomplete removal of blackbrush, which allows for direct reestablishment. Abundance of non-native biomass varies annually depending on weather, droughty conditions favor native perennials and decrease abundance of non-natives.

Community 2.4
Invaded Plant Community 2.4

This plant community is characterized by the dominance of shrubs that were present in smaller quantities in the reference plant community. Species that sprout from the root crown such as Apache plume, desert almond and ephedra. Shrubs that readily establish from seed are also common. Natural succession post-fire may result in dominance by a variety of shrubs depending on weather conditions and disturbance regimes. Blackbrush is present in trace amounts. Blackbrush establishes solely from seed and is characterized by a pulse recruitment dependent on periods of ideal climatic conditions. This plant community is representative of conditions where blackbrush has been unable to regain dominance due to changes in climatic patterns, disturbance regimes or both.

Pathway 2.1a
Community 2.1 to 2.2

Wildfire, prolonged drought and/or insect/disease attack.

Pathway 2.2a
Community 2.2 to 2.3

Absence from disturbance, seedling establishment and/or sprouting of native woody perennials.

Pathway 2.3a
Community 2.3 to 2.1

Absence from disturbance and natural regeneration over time. Sufficient time for blackbrush to reestablish on a site can range from to 50 to >100 years.

Pathway 2.3b
Community 2.3 to 2.2

Wildfire, prolonged drought and/or insect/disease attack.

Pathway 2.3c
Community 2.3 to 2.4

Absence from disturbance and natural regeneration over time.

Pathway 2.4a
Community 2.4 to 2.2

Wildfire, prolonged drought, and/or insect/disease attack.

Transition T1
State 1 to 2

Introduction of non-native species due to a combination of factors including: 1) surface disturbance, 2) changes in the kinds of animals and their grazing patterns, 3) drought and/or 4) changes in fire history.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			28–84	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	15–43	–
	little Parish's needlegrass	ACPAD	*Achnatherum parishii var. depauperatum*	13–41	–
2	**Secondary Perennial Grasses**			28–56	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–11	–
	purple threeawn	ARPU9	*Aristida purpurea*	2–11	–
	blue grama	BOGR2	*Bouteloua gracilis*	2–11	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–11	–
	squirreltail	ELEL5	*Elymus elymoides*	2–11	–
	James' galleta	PLJA	*Pleuraphis jamesii*	2–11	–
	muttongrass	POFE	*Poa fendleriana*	2–11	–
	Sandberg bluegrass	POSE	*Poa secunda*	2–11	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	2–11	–
3	**Annual Grasses**			1–11	
	sixweeks fescue	VUOC	*Vulpia octoflora*	1–11	–

Forb					
4	**Primary Perennial Forbs**			1–28	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–28	–
5	**Secondary Perennial Forbs**			1–28	
	Indian paintbrush	CASTI2	*Castilleja*	2–11	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	2–11	–
	hoary tansyaster	MACA2	*Machaeranthera canescens*	2–11	–
	four o'clock	MIRAB	*Mirabilis*	2–11	–
	beardtongue	PENST	*Penstemon*	2–11	–
6	**Annual Forbs**			1–28	
Shrub/Vine					
7	**Primary Shrubs**			275–454	
	blackbrush	CORA	*Coleogyne ramosissima*	196–252	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	28–84	–
	Apache plume	FAPA	*Fallugia paradoxa*	28–56	–
	mormon tea	EPVI	*Ephedra viridis*	6–17	–
	Utah agave	AGUT	*Agave utahensis*	6–17	–
8	**Secondary Shrubs**			28–84	
	black sagebrush	ARNO4	*Artemisia nova*	2–17	–
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	2–17	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	2–17	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	2–17	–
	Heermann's buckwheat	ERHE	*Eriogonum heermannii*	2–17	–
	spiny greasebush	GLSP	*Glossopetalon spinescens*	2–17	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	2–17	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	2–17	–
	banana yucca	YUBA	*Yucca baccata*	2–17	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	1–3	–
	Wiggins' cholla	CYEC3	*Cylindropuntia*	1–3	–

			echinocarpa		
	hedgehog cactus	ECHIN3	*Echinocereus*	1–3	–
Tree					
9	**Evergreen**			1–4	
	Utah juniper	JUOS	*Juniperus osteosperma*	1–2	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	1–2	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to the low forage production and steep slopes. Attentive grazing management is required due to steep slopes and erosive soil surface condition. Grazing management should be keyed to dominant grasses and palatable shrub production. Blackbrush is not preferred as forage by domestic livestock, but does provide some forage during the spring, summer and fall. Stansbury cliffrose is an important browse species for livestock, especially in the winter. Apache-plume is usually considered low to fair in palatability to livestock. However, in the southeastern part of its range and in winter it is considered important forage. Desert almond is seasonally important forage. Ephedra is important winter range browse for domestic cattle, sheep and goats. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep.

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. Stansbury cliffrose is an important browse species for mule deer, pronghorn, game birds, and songbirds. Wild ungulates use it heavily in winter. Reports of its value as food to wildlife vary, but most sources rate it as fair or moderate. There are no references in the literature describing its value as cover for large wildlife, but it does provide cover for small mammals and birds. Mule deer, bighorn sheep, and pronghorn browse ephedra, especially in spring and late summer when new growth is available. Young desert needlegrass is palatable to many species of wildlife.Apache plume is a fair to moderate forage resource for wildlife. Desert almond is seasonally used by a variety of wildlife species. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass.

Hydrological functions

Runoff is very high. Permeability is moderately high.

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 hiking and has potential for upland and big game hunting.

Other products

Triterpenoids extracted from Stansbury cliffrose have been shown to have inhibitory effects on HIV and Epstein-Barr virus. Native Americans used the inner bark for making clothing and ropes, and the branches for making arrows. Bundles of twigs from Apache plume were used by Native Americans as brooms and older stems for arrow shafts. A concoction from leaves was used as a growth stimulant for hair. Native Americans used ephedra as a tea to treat stomach and kidney ailments.

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. Stansbury cliffrose is recommended for wildlife, roadside, construction, and mine spoils plantings; and for restoring pinyon-juniper woodland, mountain brushland, basin big sagebrush grassland, and black sagebrush communities. It can be established on disturbed seedbeds by broadcast seeding, drill seeding, or transplanting. Fall or winter seeding is recommended. Apache-plume's chief value for rehabilitation of disturbed sites is erosion control/soil stabilization. It is valuable for erosion control/soil stabilization because it spreads underground vegetatively. In addition to its utilization for erosion control, Apache-plume is also used for seeding rangeland. Ephedra is listed as a successful shrub for restoring western rangeland communities and can be used to rehabilitate disturbed lands. It also has value for reducing soil erosion on both clay and sandy soils. Ephedra establishes readily through direct seeding, transplants, and stem cuttings

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T16 R61 S23
UTM zone	N

UTM northing	4044833
UTM easting	668829
Latitude	36° 32′ 2″
Longitude	115° 6′ 50″
General legal description	NW1/4 section 23 T16S. R61E. MDBM. Approximately 11 kilometers north and 22 kilometers east of Corn Creek at the north end of Peekaboo Canyon, Desert National Wildlife Refuge, Clark Co. Nevada. USGS Hayford Peak SE, NV 7.5 minute quadrangle.

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Contributors

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Approval

Sarah Quistberg, 2/25/2025

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)	Patti Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	06/28/2011
Approved by	Sarah Quistberg
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** 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 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 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 10-15% depending on amount of surface cover of 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 catastrophic 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):** A horizon thickness is 2 inches. Surface structure is typically moderate, medium subangular blocky. Soil surface colors are pale brown and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 4 inches is typically <1.0 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:** Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on this site. Deep-rooted perennial bunchgrasses slow runoff and increase infiltration.

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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.

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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 shrub (blackbrush)

    Sub-dominant: associated shrubs > deep-rooted, cool-season, bunchgrasses > perennial forbs > annual forbs > shallow-rooted, cool-season bunchgrasses > evergreen trees

Other: succulents, warm-season bunchgrasses

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 (<10%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Litter mostly concentrated under shrubs. Total litter cover between and under plants 10-20%

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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 ± 500 lbs/ac, below average 350 lbs/ac; above-average 700 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:** Cheatgrass is an invader on this site. Singleleaf pinyon and Utah juniper are increasers on this site.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years. Less reproduction, although rarely none, will occur in below average precipitation years.
