USDA Natural Resources
Conservation Service

Ecological site R030XA093NV
QUARTZITE FAN 5-7 P.Z.

Last updated: 2/18/2025
Accessed: 05/10/2025

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 summits and sideslopes of mid- to upper erosional fan remnants. Slope gradients of 4 to 15 percent are most typical. Elevations are 3000 to 4500 feet. The soils associated with this site are shallow to moderate to a layer restrictive to root development.

Please refer to group concept R030XB029NV to view the provisional STM.

Associated sites

R030XA071NV	**COBBLY LOAM 5-7 P.Z.**
R030XB134NV	**QUARTZITE OUTWASH**

Similar sites

R030XB134NV	**QUARTZITE OUTWASH** PLRI3 important grass; CORA minor species
R030XA094NV	**SHALLOW GRAVELLY LOAM 5-7 P.Z.** AMDU2 minor shrub, if present
R030XA006NV	**SHALLOW LIMESTONE SLOPE 5-7 P.Z.** ATCO codominant shrub
R030XA095NV	**SHALLOW GRAVELLY SLOPE 5-7 P.Z.** AMDU2 minor shrub, if present; less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Ambrosia dumosa*
Herbaceous	(1) *Achnatherum speciosum* (2) *Achnatherum speciosum*

Physiographic features

This site occurs on summits and sideslopes of mid- to upper erosional fan remnants. Slope gradients of 4 to 15 percent are most typical. Elevations are 3000 to 4500 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant

Elevation	3,000–4,500 ft
Slope	4–15%
Aspect	Aspect is not a significant factor

Climatic features

The climate is hot and arid, with mild winters and very hot summers. Precipitation is greatest in the winter with a lesser secondary peak in summer, typical of the Mojave Desert. Average annual precipitation is 5 to 7 (8) inches. Mean annual air temperature is 60 to 70 degrees F. The average growing season is about 180 to 290 days.

Table 3. Representative climatic features

Frost-free period (average)	290 days
Freeze-free period (average)	
Precipitation total (average)	7 in

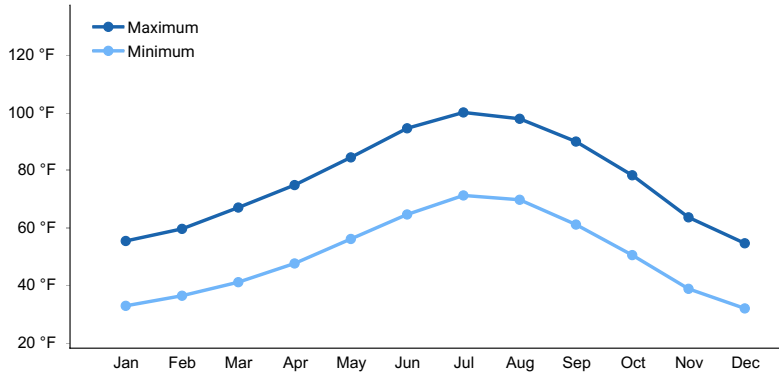

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are shallow to moderate to a layer restrictive to root development. The soils are derived from alluvium parent material. Available water capacity is very low. Runoff is very high and soils are well drained. A surface cover of more than 50 percent rock fragments (gravels) provides a stabilizing effect on surface erosion conditions. The soil series associated with this site include: Jonnic and Longjim.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Extremely gravelly fine sandy loam (3) Very gravelly clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	14–40 in
Surface fragment cover <=3"	50–60%
Surface fragment cover >3"	2–4%

Available water capacity (0-40in)	1.2–3.1 in
Calcium carbonate equivalent (0-40in)	5–30%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	25–66%
Subsurface fragment volume >3" (Depth not specified)	2–29%

Ecological dynamics

Please refer to group concept R030XB029NV to view the provisional STM.

Following wildfire (or other major disturbance), snakeweed, threeawn, Mojave buckwheat, ephedra, and other fire-tolerant plants significantly increase and may dominate the site. Current knowledge indicates that upwards of one hundred, or more, years may be required for reestablishing a blackbrush stand following a fire.
With abusive grazing management, white bursage, desert needlegrass and Indian ricegrass decline. Introduced annual forbs and grasses readily invade this site.

Fire Ecology:
Fires in the Mojave desert are infrequent and of low severity because production of annual and perennial herbs seldom provides a fuel load capable of sustaining fire. Fire generally kills white bursage. However, most white bursage plants burned because their canopies contained numerous small branches in proximity to herbaceous fuels. 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. Mojave buckwheat is vulnerable to hot fires. Resprout success is low and most regeneration is from seeds. Frequent fires deplete the seed bank, making populations vulnerable to extinction. Range ratany is top-killed by fire. Range ratany resprouts from the root crown after fire. Spiny menodora often survives fire because its foliage does not readily burn. 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 and surviving tufts will resprout. 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

1. Reference Plant Community

State 1 submodel, plant communities

1.1. Reference Plant Community

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by blackbrush and white bursage. Ephedra spp., Mojave buckwheat, spiny menodora, and range ratany are other important shrubs associated with this site. Potential vegetative composition is about 15% annual and perennial grasses, 5% annual and perennial forbs and 80% shrubs. Approximate ground cover (basal and crown) is 12 to 18 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	200	320	480
Grass/Grasslike	38	60	90
Forb	12	20	30
Total	**250**	**400**	**600**

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**			16–64	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	8–32	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	8–32	–
2	**Secondary Perennial Grasses**			1–32	
	threeawn	ARIST	*Aristida*	2–12	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–12	–
	bluegrass	POA	*Poa*	2–12	–
3	**Annual Grasses**			1–18	
Forb					
4	**Perennial forbs**			8–32	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–8	–
5	**Annual forbs**			1–32	
Shrub/Vine					
6	**Primary shrubs**			212–380	
	blackbrush	CORA	*Coleogyne ramosissima*	120–180	–
	burrobush	AMDU2	*Ambrosia dumosa*	60–120	–
	jointfir	EPHED	*Ephedra*	8–20	–
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	8–20	–
	spiny menodora	MESP2	*Menodora spinescens*	8–20	–
7	**Secondary shrubs**			18–53	
	sweetbush	BEJU	*Bebbia juncea*	4–12	–
	Virgin River brittlebush	ENVI	*Encelia virginensis*	4–12	–
	goldenbush	ERICA2	*Ericameria*	4–12	–
	spiny hopsage	GRSP	*Grayia spinosa*	4–12	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	4–12	–
	creosote bush	LATR2	*Larrea tridentata*	4–12	–
	water jacket	LYAN	*Lycium andersonii*	4–12	–
	wirelettuce	STEPH	*Stephanomeria*	4–12	–
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	4–12	–
	Mojave yucca	YUSC2	*Yucca schidigera*	4–12	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to the low forage production. Desert needlegrass produces considerable basal foliage and is good forage while young. 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. Blackbrush areas are economically important for winter grazing by domestic livestock, especially sheep. But it does provide poor forage during the spring, summer, and fall for domestic cattle, horses, and domestic sheep. White bursage is of intermediate forage value. It is fair to good forage for horses and fair to poor for cattle and sheep. However, because there is often little other forage where white bursage grows, it is often highly valuable to browsing animals and is sensitive to browsing.

Mojave buckwheat has a browse rating of fair to poor for cattle. Range ratany is an important forage species for all classes of livestock. Palatability of range ratany is rated fair to good for cattle and sheep. Cattle will graze the stems of spiny menodora in the spring before the stems become woody and spiny. Spiny menodora has lower palatability than the other shrubs but is consumed during early spring before spines mature.

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 areas are economically important for winter grazing primarily for several wildlife species. Mule deer and bighorn sheep generally use the blackbrush vegetation type in winter. White bursage is an important browse species for wildlife. Range ratany is an important forage species for deer. Mule deer browse range ratany year-long with seasonal peaks. Mule deer peak use is from February to April and from August to October. Elk will graze the stems of spiny menodora in the spring before the stems become woody and spiny. Desert bighorn sheep and feral horses and burros will graze desert needlegrass. Indian ricegrass is eaten by pronghorn in "moderate" amounts whenever available. In Nevada it is consumed by desert bighorns. 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. In Nevada, Indian ricegrass may even dominate jackrabbit diets during the spring through early summer months. 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.

Hydrological functions

Runoff is very high. Permeability is slow to moderate.

Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source. White bursage is a host for sandfood, a parasitic plant. Sandfood was a valuable food supply for Native Americans. The Papago Indians used an infusion of range ratany twigs externally for treating sore eyes and internally for dysentery. The roots provided them with a red dye for wool and other materials. The dye was also used as an ink.

Other information

Desert needlegrass may be used for groundcover in areas of light disturbance, but it is susceptible to excessive trampling. White bursage may be used to revegetate disturbed sites in southwestern deserts.

Type locality

Location 1: Mineral County, NV	
Township/Range/Section	T17S R52E S14
General legal description	Upper fan piedmonts, west side of Mount Schader, about 20 miles northeast of Pahrump, Nye County, Nevada.

Other references

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

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

Contributors

GKB

Approval

Kendra Moseley, 2/18/2025

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)	
Contact for lead author	
Date	05/10/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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:**

17. **Perennial plant reproductive capability:**