Ecological site R029XY092NV
BARREN FAN 8-10 P.Z.

Last updated: 2/20/2025
Accessed: 11/02/2026

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 in 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 Barren Fan 8-10 P.Z. site is on fan remnants and hills. Slopes range from 0 to about 30 percent, but slope gradients of 2 to 8 are most typical. Elevation is 4,800 to about 7,000 feet. The soils are very shallow and well to somewhat excessively drained. Effective rooting depths are very shallow to shallow. These soils typically formed from alluvial sediments or residuum weather from tuff. Soil surfaces are generally very gravelly.

Associated sites

R028BY011NV	**SHALLOW CALCAREOUS LOAM 8-10 P.Z.** This site is on fan remnants on all exposures. Slopes gradients of 2 to 10 are typical. Elevations are 5,000 to 7,000 feet. The soils associated with this site formed in alluvium derived from limestone. They are well drained and have carbonatic minerology. They have an ochric epipedon and a calcic horizon within 50 centimeters of the surface. The reference state is dominated by black sagebrush, Indian ricegrass, and needle and thread.

R028BY059NV	**SHALLOW CALCAREOUS HILL 8-12 P.Z.** The site typically occurs on hills and mountains. Slopes gradients greater than 30 percent are typical. Elevations range from 5,500 to 7,500 feet. The soils associated with this site are shallow, well drained, and characterized by an ochric epipedon. They formed in residuum and colluvium derived from limestone. The presence of this site is driven by droughty soil conditions resulting from low available water holding capacity and carbonatic parent material.
R029XY017NV	**LOAMY 5-8 P.Z.** This site is on piedmont slopes, fan skirts, inset fans, fan remnants, and alluvial plains on all exposures. Slopes range from 0 to 30 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 3,100 to 7,000 feet. The soils associated with this site are typically very shallow to very deep and well drained. Some soils have a restrictive layer below the main plant rooting depth (at soil depths greater than 14 inches). Surface layers are usually gravelly or very gravelly and have less than 20 percent clay. Surface soils are moderately to strongly alkaline, non-saline to slightly saline, and non-sodic to very slightly sodic.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia pygmaea*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Hesperostipa comata*

Physiographic features

The Barren Fan 8-10 P.Z. site occurs on fan remnants and hills. Slopes range from 0 to about 30 percent, but slope gradients of 2 to 8 are most typical. Elevation is 4,800 to about 7,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Fan remnant
Runoff class	Medium to very high
Elevation	1,460 – 2,130 m
Slope	0 – 30 %
Water table depth	180 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 8 to 10 inches. Mean annual air temperature is 47 to 52 degrees F. The average growing season is about 100 to 120 days. No climate stations are associated with the site.

Table 3 Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	250 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils are very shallow and well to somewhat excessively drained. Effective rooting depths are very shallow to shallow to bedrock on hill landforms or petrocalcic horizons on fan remnants. These soils typically formed from alluvial sediments or residuum weather from tuff. Soil surfaces are generally very gravelly. Available water capacity is very low to low and runoff is low to very high. In many of soils, moderate to heavy concentrations of salts and sodium accumulate in the lower subsoil. The soil series associated with this site include: Baberwit, Barfan, Calcic Petrocalcids and Durinodic Xeric Haplocalcids.

Table 4. Representative soil features

Parent material	(1) Residuum – tuff (2) Alluvium
Surface texture	(1) Gravelly, ashy sandy loam (2) Gravelly loam (3) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	20 – 40 cm
Surface fragment cover <=3"	20 – 50 %
Surface fragment cover >3"	Not specified

Available water capacity (0-101.6cm)	4.83 – 13.72 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 40 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 10
Subsurface fragment volume <=3" (Depth not specified)	10 – 60 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

As ecological condition deteriorates, grasses and forbs decrease leaving mainly pigmy sagebrush. Cheatgrass and other exotic annuals are the species most likely to invade this site. At the upper elevations of this site, singleleaf pinyon, and Utah juniper will occur.

Fire Ecology:
Habitats of dwarf sagebrush species such as pygmy sagebrush seldom support enough vegetation to carry a fire; however, invasive annuals such as cheatgrass (Bromus tectorum) can increase fire frequency in sagebrush communities. Pygmy sagebrush does not sprout after a disturbance such as fire. Little is known of the fire ecology of pygmy sagebrush. Pygmy sagebrush may be similar to other woody sagebrush taxa, establishing primarily from on-site seed sources after fire. 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. Needle and thread grass is top-killed by fire. It may be killed if the aboveground stems are completely consumed. Needle and thread grass is classified as slightly to severely damaged by fire. Needle and thread grass sprouts from the caudex following fire, if heat has not been sufficient to kill underground parts. Recovery usually takes 2 to 10 years.

The Reference State 1.0 is a representative of the natural range of variability under pristine conditions. The reference state has two general community phases; a shrub-grass dominant phase and a shrub dominant phase. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Plant community phase changes are primarily driven by precipitation, periodic long term or insect or disease attack. This site is very stable, with little variation in plant community composition. Wet years will increase grass production, while drought years will reduce production. Shrub production will also increase during wet years.

The reference plant community is dominated by pigmy sagebrush. Potential vegetative composition is about 20 percent grasses, 5 percent forbs, and 75 percent shrubs and trees. Approximate ground cover (basal and crown) is 8 to 15 percent.

State and transition model

Additional community tables

Animal community

Livestock Interpretations: This site is suited for livestock grazing. Grazing management should be keyed to perennial grass production. Indian ricegrass has good forage value for domestic sheep, cattle and horses. It supplies a source of green feed before most other native grasses have produced much new growth. Needle and thread is important to livestock, especially in the spring before fruits have developed. Needlegrasses are grazed in the fall only if the fruits are softened by rain. Pygmy sagebrush provides little value to livestock due to its scarcity and small size. 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: Pygmy sagebrush provides little value to large mammals due to its scarcity and small size. It is important to small animals on some sites. Pygmy sagebrush provides important ground cover for small animals in dry, alkaline areas where it is difficult for other plants to grow. Needle and thread is a moderately important spring forage for mule deer, but use declines considerably as more preferred forages become available. Indian ricegrass is an important wildlife species.

Hydrological functions

A few rills can be expected particularly in areas subjected to summer convection storms or rapid spring snowmelt. Water flow patterns may commonly occur in areas subjected to summer convection storms. Flow patterns are short and stable. High amount of surface rock fragments limit development of extensive flow patterns. Pedestals are rare with occurrence typically limited to area within water flow patterns. Frost heaving of shallow rooted plants should not be considered as a normal condition. Gullies are rare on this site. Sparse shrub canopy and associated litter break raindrop impact. Medium to fine textured surface soils have moderate to slow infiltration and medium runoff.

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

Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Needle and thread grass is useful for stabilizing eroded or degraded sites.

Inventory data references

NASIS soil component data.

Type locality

Location 1: White Pine County, NV	
Township/Range/Section	T13N R61E S9
Latitude	39° 0′19″

Longitude	115° 7′24″
General legal description	SE¼SW¼ Section 9, T13N. R61E. MDBM. About 12 miles north of Lund and 0.3 miles south of USHwy 6 and NvHwy 38 junction on east side of NvHwy 38, White Pine County, Nevada. Also found in Nye County, NV.

Other references

Fire Effects 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

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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	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** A few rills can be expected particularly in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns may commonly occur in areas subjected to summer convection storms. Flow patterns are short and stable. High amount of surface rock fragments limit development of extensive flow patterns.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to area within water flow patterns. Frost heaving of shallow rooted plants should not be considered as a normal condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground up to 50%; surface cover of rock fragments variable but often more than 35%; shrub canopy to 15%; foliar cover for perennial herbaceous plants <2%.

5. **Number of gullies and erosion associated with gullies:** Gullies are rare on this site.

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) is expected to move the 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.

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 2 to 4 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. Soils having thin surface sand sheet will have lower stability values. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically fine to medium platy or prismatic. Soil surface colors are light and soils are typified by an ochric epipedon. Organic carbon of the surface 2 to 3 inches is less than to 1 percent.

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 break raindrop impact. Medium to fine textured surface soils have moderate to slow infiltration and medium runoff.

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 not typical. Platy or massive sub-surface horizons, subsoil argillic horizons or hardpans shallow to the surface are not to be interpreted as compacted layers.

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: Reference Plant Community: Low-statured shrubs (pygmy sagebrush) >> deep-rooted, cool season, bunchgrasses

    Sub-dominant: Associated shrubs > rhizomatous grasses = shallow-rooted, bunchgrasses = deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, perennial forbs = annual 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 are common and standing dead shrub canopy material may be as much as 35% of total woody canopy; mature bunchgrasses commonly (±25%) have dead centers.**

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14. **Average percent litter cover (%) and depth (in):** **Trace amounts of herbaceous litter in plant interspaces.**

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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 April [May]) ±175lbs/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:** **Galleta, horsebrush and Douglas rabbitbrush are increasers on this site. Cheatgrass, snakeweed, burrobrush, halogeton, Russian thistle and annual mustards are invaders on this site.**

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17. **Perennial plant reproductive capability:** **All functional groups should reproduce in above average growing season years.**
