USDA Natural Resources
Conservation Service

Ecological site R030XB041NV
SHALLOW DROUGHTY LOAM 5-7 P.Z.

Last updated: 2/18/2025
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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.

Ecological site concept

This site occurs on fan remnants on all exposures. Slopes range from 0 to 15 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 3100 to 5000 feet. The soils associated with this site are shallow to a duripan and are formed in alluvium from mixed parent material.

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

Associated sites

R030XB036NV	**DROUGHTY LOAM 5-7 P.Z.**

Similar sites

R030XB036NV	**DROUGHTY LOAM 5-7 P.Z.** MESP2 rare to absent; less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Grayia spinosa* (2) *Menodora spinescens*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Pleuraphis rigida*

Physiographic features

This site occurs on fan remnants on all exposures. Slopes range from 0 to 15 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 3100 to 5000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant
Elevation	3,100–5,000 ft
Slope	0–15%
Aspect	Aspect is not a significant factor

Climatic features

The climate of the Mojave Desert has extreme fluctuations of daily temperatures, strong seasonal winds, and clear

skies. The climate is arid and is characterized with cool, moist winters and hot, dry summers. Most of the rainfall falls between November and April. Summer convection storms from July to September may contribute up to 25 percent of the annual precipitation. Average annual precipitation is 5 to 7 inches. Mean annual air temperature is 58 to 65 degrees F. The average growing season is about 180 to 250 days.

Table 3. Representative climatic features

Frost-free period (average)	250 days
Freeze-free period (average)	
Precipitation total (average)	7 in

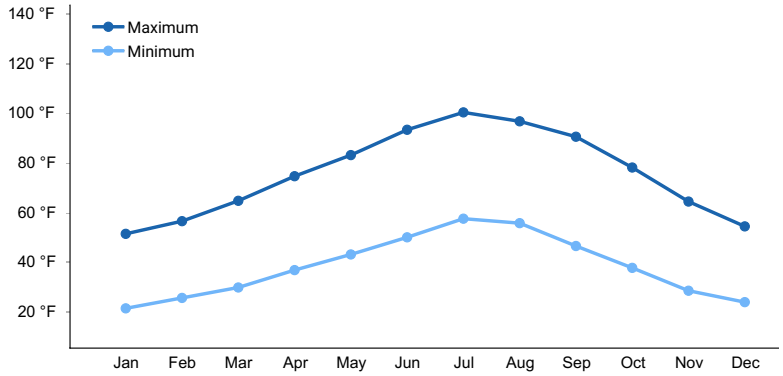

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are shallow to a duripan and are formed in alluvium from mixed parent material. Textures are moderately coarse. Runoff is very high, permeability is moderately rapid above the duripan, and available water capacity is very low. Potential for sheet and rill erosion is moderate. The soil series associated with this site include: Alko.

Table 4. Representative soil features

Surface texture	(1) Loamy coarse sand (2) Gravelly sandy loam (3) Gravelly coarse sand
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	10–20 in
Surface fragment cover <=3"	10–18%
Surface fragment cover >3"	2–3%
Available water capacity (0-40in)	1.3–1.4 in
Calcium carbonate equivalent (0-40in)	5–15%
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)	10–18%
Subsurface fragment volume >3" (Depth not specified)	2–3%

Ecological dynamics

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

As ecological condition deteriorates, white burrobrush, Anderson wolfberry, white bursage, long spice horsebrush and big galleta will increase as bush muhly, Indian ricegrass, spiny hopsage and Nevada ephedra decrease. Species likely to invade this site are introduced annuals such as red brome and cutleaf filaree.

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. Spiny hopsage is considered to be somewhat fire tolerant and often survives. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy. Spiny menodora often survives fire because its foliage does not readily burn. Nevada ephedra is top-killed by fire. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. Nevada ephedra generally sprouts after fire damages aboveground vegetation and may increase in plant cover. Fire typically destroys aboveground parts of Anderson wolfberry, but the degree of damage to the plant depends on fire severity. Budsage is killed by 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. Fire most likely top-kills big galleta. Big galleta sprouts from rhizomes following fire. Damage to big galleta from fire varies, depending on whether big galleta is dormant when burned. If big galleta is dry, damage may be severe. However, when plants are green, fire will tend to be less severe and damage may be minimal, with big galleta recovering quickly. 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. Bush muhly regenerates following fire from soil-stored seed. Fire probably top-kills bush muhly. Burning causes at least short-term decline of bush muhly. Recovery time is thought to vary considerably and is probably dependent on postfire weather and competition.

State and transition model

Ecosystem states

1. Reference State

2. Invaded

State 1 submodel, plant communities

1.1. Reference Plant Community

State 1

Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by spiny hopsage, spiny menodora, Indian ricegrass and big galleta. Other important species on this site are Nevada ephedra and desert needlegrass. Potential vegetative composition is about 30% grasses, 10% annual and perennial forbs, and 60% shrubs. Approximate ground cover (basal and crown) is 20 to 30 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	240	360	480
Grass/Grasslike	120	180	240
Forb	40	60	80
Total	**400**	**600**	**800**

State 2
Invaded

Introduced annuals such as red brome, schismus and redstem stork's bill have invaded the reference plant community and have become a dominant component of the herbaceous cover. This invasion of non-natives is attributed to a combination of factors including: 1) surface disturbances, 2) changes in the kinds of animals and their grazing patterns, 3) drought, and 4) changes in fire history. These non-natives annuals are highly flammable and promote wildfires where fires historically have been infrequent. GRSP and MESP2 would persist after this invasion by non-native annuals, but the other shrubs and desirable grasses would either be unsuccessful in competing with the non-natives or removed from the system. The threshold that is crossed, is the introduction of non-native annuals that cannot be removed from the system and will alter disturbance regimes significantly from their natural or historic range of disturbances.

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**			144–300	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	60–120	–
	big galleta	PLRI3	*Pleuraphis rigida*	60–90	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	12–60	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	12–30	–
2	**Secondary Perennial Grasses**			12–30	
	low woollygrass	DAPU7	*Dasyochloa pulchella*	3–12	–
	squirreltail	ELEL5	*Elymus elymoides*	3–12	–
	needle and thread	HECO26	*Hesperostipa comata*	3–12	–
3	**Annual Grasses**			1–30	
Forb					
4	**Perennial forbs**			12–60	
	woolly desert marigold	BAPL3	*Baileya pleniradiata*	3–12	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	3–12	–
5	**Annual forbs**			1–50	
Shrub/Vine					
6	**Primary shrubs**			192–408	
	spiny hopsage	GRSP	*Grayia spinosa*	90–150	–
	spiny menodora	MESP2	*Menodora spinescens*	60–120	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	12–48	–
	water jacket	LYAN	*Lycium andersonii*	12–30	–
	burrobush	AMDU2	*Ambrosia dumosa*	12–30	–
7	**Secondary shrubs**			30–90	
	burrobrush	HYSA	*Hymenoclea salsola*	6–30	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	6–30	–
	creosote bush	LATR2	*Larrea tridentata*	6–30	–
	longspine horsebrush	TEAX	*Tetradymia axillaris*	6–30	–
	banana yucca	YUBA	*Yucca baccata*	6–30	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. 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. Big galleta is considered a valuable forage plant for cattle and domestic sheep. Its coarse, rigid culms make it relatively resistant to heavy grazing and trampling. 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. Bush muhly is readily eaten by livestock throughout the year when available; however, it is usually not abundant enough to provide much forage. It is grazed heavily in winter when other species become scarce. Because of its branching habit, it is extremely susceptible to heavy grazing. Bush muhly is damaged when continuously grazed to a stubble height of less than 4 inches (10 cm). Spiny hopsage is browsed by livestock in the fall, winter, and spring. Spiny hopsage is used as forage to at least some extent by domestic sheep and goats. The large quantities of seeds produced are valuable for fattening domestic sheep. Cattle will graze the stems of spiny menodora in the spring before the stems become woody and spiny. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Anderson wolfberry is sometimes used as forage by livestock and feral burros. 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. Budsage can be poisonous or fatal to calves when eaten in quantity. Cattle and horses seldom utilize budsage, possibly because of its aromatic oil content.

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:
Spiny hopsage provides a palatable and nutritious food source for big game, particularly during late winter through spring. Elk will graze the stems of spiny menodora in the spring before the stems become woody and spiny. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Mountain quail eat ephedra seeds. White bursage is an important browse species for wildlife. 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. Desert bighorn sheep and feral horses and burros will graze desert needlegrass. The palatability of bush muhly for wildlife species is rated fair to poor. Budsage provides browse for mule deer in Nevada in winter and is utilized by bighorn sheep in summer. Black-tailed jackrabbits and small rodents generally eat only leaves, small branches, and twigs of budsage.

Hydrological functions

Runoff is very high. Permeability is moderately rapid.

Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source. Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour. Some Native American tribes steeped the twigs of Nevada ephedra and drank the tea as a general beverage. Native Americans used the fleshy berries of Anderson wolfberry either fresh or boiled and then dried them for later use. White bursage is a host for sandfood, a parasitic plant. Sandfood was a valuable food supply for Native Americans.

Other information

Big galleta's clumped growth form stabilizes blowing sand. Desert needlegrass may be used for groundcover in areas of light disturbance, but it is susceptible to excessive trampling. Spiny hopsage has moderate potential for erosion control and low to high potential for long-term revegetation projects. It can improve forage, control wind erosion, and increase soil stability on gentle to moderate slopes. Spiny hopsage is suitable for highway plantings on dry sites in Nevada. Anderson wolfberry is also used as an ornamental valued chiefly for its showy red berries. White bursage may be used to revegetate disturbed sites in southwestern deserts.

Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T7S R62E S3
General legal description	About 7 air miles east of Alamo, Eightmile Valley area, Lincoln County, Nevada. This site also occurs in Clark and southern Lincoln Counties, 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

RKK/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):**

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

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

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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):**

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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:

    Sub-dominant:

    Other:

    Additional:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
