Ecological site R030XB053NV
SHALLOW HILL 5-7 P. Z.

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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 summits and sideslopes of upper fan remnants. Slopes range from 2 to 50 percent. Elevations are 2500 to 4000 feet. The soils associated with this site are very shallow to shallow and are relatively high in sodium near the surface.

Please refer to group concept R030XB188CA to view the provisional STM.

Similar sites

R030XB043NV	**CLAYPAN 5-7 P.Z.** More productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ambrosia dumosa* (2) *Krascheninnikovia lanata*
Herbaceous	(1) *Pleuraphis rigida* (2) *Muhlenbergia porteri*

Physiographic features

This site occurs on summits and sideslopes of upper fan remnants. Slopes range from 2 to 50 percent. Elevations are 2500 to 4000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant
Elevation	2,500–4,000 ft
Slope	2–50%
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 56 to 60 degrees F. The average growing season is about 190 to 220 days.

Table 3. Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	
Precipitation total (average)	7 in

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 shallow and are relatively high in sodium near the surface. Surface soils are typically medium to moderately fine textured. The soil surface has high amounts of gravel, cobbles, or stones. Water intake rate is moderate and available water capacity is very low. Runoff is very high and these soils are well drained. The soil series associated with this site include: Crosgrain.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Extremely gravelly loam (3) Stony sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	6–24 in
Surface fragment cover <=3"	12–71%
Surface fragment cover >3"	7–22%
Available water capacity (0-40in)	0.8–0.9 in
Calcium carbonate equivalent (0-40in)	1–15%
Electrical conductivity (0-40in)	0–2 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)	12–71%
Subsurface fragment volume >3" (Depth not specified)	7–22%

Ecological dynamics

Please refer to group concept R030XB188CA to view the provisional STM.

As ecological condition deteriorates, creosotebush and white bursage increase as perennial grasses decrease. Species likely to invade this site are annual forbs and grasses.

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. Winterfat is either killed or top-killed by fire, depending on fire severity. Severe fire can kill the perennating buds located several inches above the ground surface and thus kills the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the aboveground portions of winterfat and thus does not cause high mortality. 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. Fire kills many creosotebush. Creosotebush is poorly adapted to fire because of its limited sprouting ability. Creosotebush survives some fires that burn patchily or are of low severity. 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. Range ratany is top-killed by fire. Range ratany resprouts from the root crown after fire. Fire typically destroys aboveground parts of Anderson wolfberry, but the degree of damage to the plant depends on fire severity. 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. 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

State 1 submodel, plant communities

1.1. Reference Plant Community

State 1
Reference State

Community 1.1
Reference Plant Community

The plant community is dominated by white bursage, winterfat, spiny hopsage, and big galleta. Potential vegetative composition is about 45% grasses, 5% forbs and 50% 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	125	200	300
Grass/Grasslike	113	180	270
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**			140–200	
	big galleta	PLRI3	*Pleuraphis rigida*	120–160	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	20–40	–
2	**Secondary Perennial grasses**			8–32	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–12	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	2–12	–
	threeawn	ARIST	*Aristida*	2–12	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–12	–
Forb					
3	**Perennial forbs**			8–32	
	lupine	LUPIN	*Lupinus*	2–12	–
	globemallow	SPHAE	*Sphaeralcea*	2–12	–
4	**Annual forbs**			1–20	
Shrub/Vine					
5	**Primary shrubs**			130–312	
	burrobush	AMDU2	*Ambrosia dumosa*	40–80	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	40–80	–
	spiny hopsage	GRSP	*Grayia spinosa*	20–60	–
	creosote bush	LATR2	*Larrea tridentata*	6–32	–
	water jacket	LYAN	*Lycium andersonii*	8–20	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	8–20	–
6	**Secondary shrubs**			20–40	
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	4–12	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	4–12	–
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	4–12	–
	Joshua tree	YUBR	*Yucca brevifolia*	4–12	–
	Mojave yucca	YUSC2	*Yucca schidigera*	4–12	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. 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. 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). Winterfat is an important forage plant for livestock. Winterfat palatability is rated as good for sheep, good to fair for horses, and fair for cattle. Abusive grazing practices have reduced or eliminated winterfat on some areas even though it is fairly resistant to browsing. Grazing season has more influence on winterfat than grazing intensity. Early winter grazing may actually be beneficial. 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.

Spiny hopsage as being 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. Spiny hopsage readily establishes and increases on overgrazed and denuded ranges. Creosotebush is unpalatable to livestock. Consumption of creosotebush may be fatal to sheep. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. 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. Anderson wolfberry is sometimes used as forage by livestock and feral burros.

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:
Winterfat is an important forage plant for wildlife. Animals that browse winterfat include mule deer, desert bighorn sheep, and pronghorn antelope. White bursage is an important browse species for wildlife. Spiny hopsage provides a palatable and nutritious food source for big game, particularly during late winter through spring. Creosotebush is unpalatable to most browsing wildlife. 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. 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. The palatability of bush muhly for wildlife species is rated fair to poor.

Hydrological functions

Runoff is very high. Permeability is moderate.

Other products

White bursage is a host for sandfood, a parasitic plant. Sandfood was a valuable food supply for Native Americans. Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour. Creosotebush has been highly valued for its medicinal properties by Native Americans. Twigs and leaves may be boiled as tea, steamed, pounded into a powder, pressed into a poultice, or heated into an infusion. Some Native American tribes steeped the twigs of Nevada ephedra and drank the tea as a general beverage. The dye was also used as an ink. Native Americans used the fleshy berries of Anderson wolfberry either fresh or boiled and then dried them for later use.

Other information

Big galleta's clumped growth form stabilizes blowing sand. White bursage may be used to revegetate disturbed sites in southwestern deserts. 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. Once established, creosotebush may improve sites for annuals that grow under its canopy by trapping fine soil, organic matter, and symbiont propagules. It may also increase water infiltration and storage. Anderson wolfberry is also used as an ornamental valued chiefly for its showy red berries.

Type locality

Location 1: Clark County, NV

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

BLS

Approval

Sarah Quistberg, 2/24/2025

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	05/11/2025
Approved by	Sarah Quistberg
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:**