USDA Natural Resources
Conservation Service

Ecological site R030XB051NV
UPLAND WASH

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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 inset fans within drainageways of ephemeral streams. Slope gradients of 2 to 15 percent occur on this site with slopes of 2 to 8 percent being most typical. Elevations are 3500 to over 4500 feet. The soils associated with this site are very deep and have formed in alluvium from mixed sources.

Please refer to group concept R030XB050NV to view the provisional STM.

Associated sites

R030XB014NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.**
R030XB090NV	**GRAVELLY FAN 7-9 P.Z.**
R030XB015NV	**SHALLOW GRAVELLY SLOPE 7-9 P.Z.**

Similar sites

R030XB134NV	**QUARTZITE OUTWASH** ERFAP & Ephedra spp. codominant shrubs with AMDU2
R030XB133NV	**GRAVELLY INSET FAN 5-7 P.Z.** MESP2 & PSFR codominant shrubs with AMDU2

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ambrosia eriocentra*

Herbaceous	(1) *Pleuraphis rigida* (2) *Muhlenbergia porteri*

Physiographic features

This site occurs on inset fans within drainageways of ephemeral streams. Slope gradients of 2 to 15 percent occur on this site with slopes of 2 to 8 percent being most typical. Elevations are 3500 to over 4500 feet.

Table 2. Representative physiographic features

Landforms	(1) Inset fan (2) Drainageway
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	1,067–1,372 m
Slope	2–15%
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 7 to 10 inches. Mean annual air temperature is 55 to 68 degrees F. The average growing season is about 130 to 260 days.

Table 3. Representative climatic features

Frost-free period (average)	260 days
Freeze-free period (average)	
Precipitation total (average)	254 mm

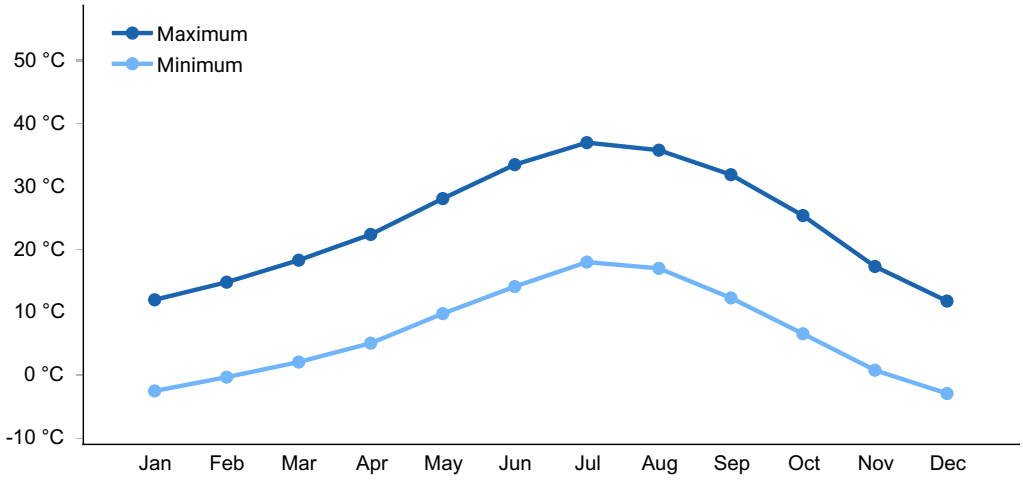

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

This site is intermittently flooded.

Soil features

The soils associated with this site are very deep and have formed in alluvium from mixed sources. Water intake rates are rapid, available water capacity is very low to low, runoff is very low to low, and soils are well to excessively drained with moderately rapid to rapid permeability. The soil series associated with this site include Arizo and Threelakes.

Table 4. Representative soil features

Surface texture	(1) Extremely gravelly loamy coarse sand (2) Extremely gravelly loamy sand (3) Extremely gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	183–213 cm
Surface fragment cover <=3"	69–70%
Surface fragment cover >3"	2–3%
Available water capacity (0-101.6cm)	4.83–7.11 cm
Calcium carbonate equivalent (0-101.6cm)	0–50%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	0–15
Soil reaction (1:1 water) (0-101.6cm)	6.1–9
Subsurface fragment volume <=3" (Depth not specified)	23–60%
Subsurface fragment volume >3" (Depth not specified)	4–17%

Ecological dynamics

Please refer to group concept R030XB050NV to view the provisional STM.

This site is quite variable and diverse in floristic composition reflecting a frequent, intense, flooding pattern.

Fire Ecology:
Fires tend to be infrequent in desert plant communities. Ephemeral drainageways can be susceptible to fires depending on the season. During wet periods drainageways tend be more resilient to burning due to higher moisture content of the soil and plants. During the dry months, these drainageways can be vulnerable to wildfires depending on plant community composition. Fires that occur uphill from drainageways can pose more of a threat due to increased erosion from burned sites. After fire, ephemeral drainageways act as sediment and ash catch basins, as post-fire storms increase runoff and erosion. Bursage species are easily top-killed but can resprout following fire. Damage to big galleta from fire varies. 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

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 big galleta, bush muhly, hollyleaf bursage, and a variety of other shrubs. Potential vegetative composition is about 25% perennial and annual grasses, 10% annual and perennial forbs and 65% shrubs and trees. Approximate ground cover (basal and crown) is 10 to 20 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	146	291	437
Grass/Grasslike	56	112	168
Forb	22	45	67
Total	**224**	**448**	**672**

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. Creosotebush and white bursage 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 (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			54–112	
	bush muhly	MUPO2	*Muhlenbergia porteri*	22–45	–
	big galleta	PLRI3	*Pleuraphis rigida*	22–45	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	9–22	–
2	**Secondary Perennial Grasses**			9–45	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–13	–
	threeawn	ARIST	*Aristida*	2–13	–
	black grama	BOER4	*Bouteloua eriopoda*	2–13	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–13	–
3	**Annual Grasses**			1–13	
Forb					
4	**Perennial forbs**			9–36	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	9–22	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–13	–
5	**Annual**			1–45	
Shrub/Vine					
6	**Primary shrubs**			145–386	
	woolly fruit bur ragweed	AMER	*Ambrosia eriocentra*	67–157	–
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	9–36	–
	water jacket	LYAN	*Lycium andersonii*	9–22	–
	desert almond	PRFA	*Prunus fasciculata*	9–22	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	1–22	–
	Apache plume	FAPA	*Fallugia paradoxa*	9–22	–
	singlewhorl burrobrush	HYMO	*Hymenoclea monogyra*	11–22	–

	burrobrush	HYSA	*Hymenoclea salsola*	11–22	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	9–22	–
7	**Secondary shrubs**			45–112	
	catclaw acacia	ACGR	*Acacia greggii*	4–13	–
	burrobush	AMDU2	*Ambrosia dumosa*	4–13	–
	blackbrush	CORA	*Coleogyne ramosissima*	4–13	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	4–13	–
	creosote bush	LATR2	*Larrea tridentata*	4–13	–
	Joshua tree	YUBR	*Yucca brevifolia*	4–13	–

Animal community

Livestock Interpretations:
This site is suited to livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub production. 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). Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. Hollyleaf bursage has low forage value for livestock. 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. Anderson wolfberry is sometimes used as forage by livestock. Palatability of Anderson wolfberry browse is presumably fair to low. This species is used as forage only when more desirable species are unavailable. The fruit, however, appears to be moderately palatable. Fourwing saltbush is one of the most palatable shrubs in the West. Its protein, fat, and carbohydrate levels are comparable to alfalfa. It provides nutritious forage for all classes of livestock. Palatability is rated as good for domestic sheep and domestic goats; fair for cattle; fair to good for horses in winter, poor for horses in other seasons. Apache-plume is generally considered fair food for livestock. 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 a seasonally important forage species on the dry ranges where it grows. Livestock consume the foliage in the spring and following rainy periods. Bladdersage is grazed only lightly by cattle and horses except on ranges where little other forage is available.

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:
In southern Nevada, big galleta is heavily utilized by bighorn sheep and in some blackbrush communities it is referred to as preferred habitat. Mule deer utilize trace amounts of big galleta. The palatability of bush muhly for wildlife species is rated fair to poor. Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass. Hollyleaf bursage has low forage value 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. Palatability of Anderson wolfberry browse is presumably fair to low. Anderson wolfberry is sometimes used as forage by feral burros. The red berries are eaten by some birds and mammals. In some areas of southern Nevada, the fleshy leaves and juicy berries provide part of the succulence permitting Gamble quail to occupy desert areas devoid of drinking water. In desert washes Anderson wolfberry grows in dense thorny thickets which provide good cover for quail and other small wildlife. Fourwing saltbush provides valuable habitat and year-round browse for wildlife. Fourwing saltbush also provides browse and shelter for small mammals. Additionally, the browse provides a source of water for black-tailed jackrabbits in arid environments. Granivorous birds consume the fruits. Wild ungulates, rodent and lagomorphs readily consume all aboveground portions of the plant. Palatability is rated good for deer, elk, pronghorn and bighorn sheep. 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 and various small mammals feed on desert almond and/or utilize habitats where desert almond is dominant. Bladdersage is browsed by several different species of wildlife.

Hydrological functions

Runoff is low to medium. Permeability is moderately rapid to rapid.

Other information

Big galleta's clumped growth form stabilizes blowing sand.

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

RWA

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)	P NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	07/20/2012
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare.

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2. **Presence of water flow patterns:** long (> 5 ft).

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas within 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 to 20%; surface rock fragments to 70%; shrub canopy to 13%; perennial herbaceous plant cover to 7%.

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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 large rainfall 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 1 to 4 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):** Surface structure is typically weak coarse platy to moderate medium subangular blocky. Soil surface colors are light and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent.

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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 provide some protection from raindrop impact.

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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):** None. Platy or massive sub-surface horizons, not to be interpreted as compacted layers.

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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: Mojave Desert shrubs

    Sub-dominant: warm-season, perennial bunchgrasses > annual forbs > cool-season, perennial bunchgrasses = perennial forbs > annual grasses

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 common and standing dead shrub canopy material may be as much as 25% of total woody canopy; mature bunchgrasses commonly (±25%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces and under canopy up to 25% and depth (±¼-inch).

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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 ±400lbs/ac. Favorable years 600 lbs/ac and unfavorable years 200 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:** Potential invaders on this site include red brome, Mediterranean grass, mustards, salt cedar and redstem filaree.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above-average growing season years. Little reproduction occurs in drought years.
