USDA Natural Resources
Conservation Service

Ecological site R030XB102NV
GRAVELLY LOAM 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 erosional fan remnants and mountains. Slopes range from 2 to 30 percent, but slope gradients of 2 to 15 percent are most typical. Elevations are 1800 to 4000 feet.

These soils have formed in alluvium high in carbonates. Surface cover of rock fragments is typically greater than 60 percent with gravel-sized fragments comprising at least 80 percent of the total rock cover.

Associated sites

R030XB075NV	**GRAVELLY FAN 5-7 P.Z.**

Similar sites

R030XB075NV	**GRAVELLY FAN 5-7 P.Z.** KRLA2 minor species, if present.
R030XB053NV	**SHALLOW HILL 5-7 P. Z.** MUPO2 major grass.
R030XB044NV	**COBBLY CLAYPAN 5-7 P.Z.** More productive site; KRLA2 minor species, if present.
R030XB080NV	**STONY LOAM 5-7 P.Z.** More productive site; KRLA2 dominant shrub.

Table 1. Dominant plant species

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

Physiographic features

This site occurs on summits and sideslopes of erosional fan remnants and mountains. Slopes range from 2 to 30 percent, but slope gradients of 2 to 15 percent are most typical. Elevations are 1800 to 4000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Fan remnant
Flooding frequency	None

Ponding frequency	None
Elevation	1,800–4,000 ft
Slope	2–30%
Water table depth	0 in
Aspect	Aspect is not a significant factor

Climatic features

The climate on this site is arid, characterized by cool winters, and hot, dry summers. Average annual precipitation is 5 to 7 inches. Mean annual air temperature is 56 to 65 degrees F. The average growing season is about 190 to 240 days.

Table 3. Representative climatic features

Frost-free period (average)	240 days
Freeze-free period (average)	
Precipitation total (average)	7 in

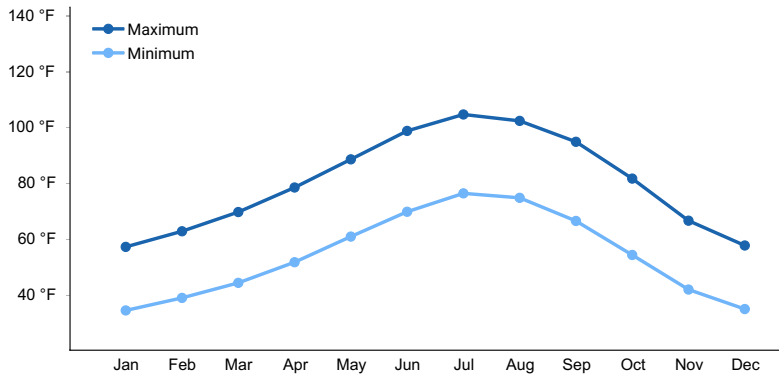

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are shallow to very deep. These soils have formed in alluvium high in carbonates. Surface cover of rock fragments is typically greater than 60 percent with gravel-sized fragments comprising at least 80 percent of the total rock cover. Runoff is low to very high. The soils series associated with this site include Ifteen, Wechech, and Weiser.

Table 4. Representative soil features

Surface texture	(1) Extremely gravelly fine sandy loam (2) Very gravelly sandy loam (3) Extremely gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	8–84 in
Surface fragment cover <=3"	45–70%

Surface fragment cover >3"	1–3%
Available water capacity (0-40in)	0.9–5.5 in
Calcium carbonate equivalent (0-40in)	10–60%
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)	7–69%
Subsurface fragment volume >3" (Depth not specified)	5–14%

Ecological dynamics

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

As ecological condition deteriorates, creosotebush and white bursage increase as perennial grasses decline in the community. Snakeweed, burrobrush, and annual grasses and forbs greatly increase following major disturbance such as wildfire. Non-native annual forbs and grasses are invaders on this site.

Fire Ecology:
Fires in the 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, thus killing the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the above ground portions of winterfat and thus does not cause high mortality.

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.

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 white bursage, creosotebush, and winterfat. Spiny hopsage and spiny menodora occur sporadically throughout the range of this plant community. Potential vegetative composition is about 20% grasses, 5% annual and perennial forbs and 75% shrubs and trees. Approximate ground cover (basal and crown) is 5 to 10 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	150	263	375
Grass/Grasslike	40	70	100
Forb	10	17	25
Total	**200**	**350**	**500**

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. AMDU and KRLA2 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**			20–109	
	big galleta	PLRI3	*Pleuraphis rigida*	18–53	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	1–28	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	1–28	–
2	**Secondary Perennial Grasses**			1–18	
	threeawn	ARIST	*Aristida*	2–6	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–6	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	2–6	–
3	**Annual Grasses**			1–21	
Forb					
4	**Annual Forbs**			1–35	
	threeawn	ARIST	*Aristida*	2–7	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	2–7	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–6	–
5	**Perennial Forbs**			1–35	
Shrub/Vine					
6	**Primary shrubs**			114–330	
	burrobush	AMDU2	*Ambrosia dumosa*	53–123	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	18–53	–
	littleleaf ratany	KRER	*Krameria erecta*	14–35	–
	spiny hopsage	GRSP	*Grayia spinosa*	7–28	–
	creosote bush	LATR2	*Larrea tridentata*	7–28	–
	spiny menodora	MESP2	*Menodora spinescens*	1–28	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	7–18	–
	Torrey's jointfir	EPTO	*Ephedra torreyana*	7–18	–
7	**Secondary shrubs**			18–53	
	fourwing saltbush	ATCA2	*Atriplex canescens*	3–9	–
	Virgin River brittlebush	ENVI	*Encelia virginensis*	3–9	–
	water jacket	LYAN	*Lycium andersonii*	3–9	–
	pricklypear	OPUNT	*Opuntia*	3–9	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	3–9	–
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	3–9	–
	Joshua tree	YUBR	*Yucca brevifolia*	3–9	–
	Mojave yucca	YUSC2	*Yucca schidigera*	3–9	–

Animal community

Livestock Interpretations:
This site is suitable for spring grazing by sheep and also cattle where water is available. Grazing management should be keyed to big galleta and winterfat. Big galleta is considered a valuable forage plant for cattle and domestic sheep in the Mohave Desert. Big galleta has been referred to as highly palatable to cattle and horses during growth periods following rain. White bursage is an important browse species. Browsing pressure on white bursage is particularly heavy during years of low precipitation, when production of winter annuals is low. White bursage is of intermediate forage value. It is fair to good forage for horses and fair to poor for cattle and sheep.

Winterfat is an important forage plant for livestock in salt-desert shrub rangelands, especially during winter when forage is scarce.

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:
White bursage is highly valuable to browsing animals. Many desert rodents, including kangaroo rats, eat white bursage seeds.
Animals that browse winterfat include mule deer, desert bighorn sheep, and pronghorn. Winterfat seeds are eaten by rodents including the chisel-toothed kangaroo rat and Great Basin pocket mouse.
Big galleta is valuable forage for desert bighorn sheep.

Hydrological functions

Runoff is low to very high. Permeability is moderatel to moderately rapid.

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.

Other products

White bursage is a host for sandfood (Pholisma sonorae), a parasitic plant with a sweet, succulent, subterranean flowerstalk. Sandfood was a valuable food supply for Native Americans.

Other information

White bursage may be used to revegetate disturbed sites in southwestern deserts. White bursage may be planted from containerized plants with a high probability of success. Plantings should be made in late winter or early spring, although the time of planting is less important than the vigor of the seedlings. Rodent protectors should be used.

Winterfat is a useful shrub for reclamation and revegetation of disturbed sites in arid climates. Winterfat adapts well to most site conditions, and its extensive root system stabilizes soil. However, winterfat is intolerant of flooding, excess water, and acidic soils.
Big galleta's clumped growth form stabilizes blowing sand and stabilizes sand dunes.

Inventory data references

NV-ECS-1: 3 records

Type locality

Location 1: Clark County, NV

Other references

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

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

Contributors

GKB

Approval

Kendra Moseley, 3/10/2025

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):**

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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):**

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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:**