USDA Natural Resources
Conservation Service

Ecological site R030XA066NV
CALCAREOUS 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 alluvial flats, fan aprons, and fan remnants. The fan remnants are typically quite stable and not subject to disturbance from overland flooding. Slopes range from 0 to 30 percent, but slope gradients of 2 to 15 percent are most typical. Elevations are 2200 to 4600 feet.

The soils associated with this site have formed in alluvium from calcareous sedimentary parent material that is high in sodium. These soils are typically very deep and have a calcic horizon.

This site is connected to group concept R030XB241CA.

Associated sites

R030XA010NV	**GRAVELLY SANDY LOAM 3-5 P.Z.**
R030XA053NV	**CALCAREOUS LOAM 3-5 P.Z.**
R030XA058NV	**LIMY 5-7 P.Z.**
R030XA076NV	**UPLAND WASH**

Similar sites

R030XA063NV	**SANDY 5-7 P.Z.** occurs on sand sheets
R030XA050NV	**LOAMY 3-5 P.Z.** AMDU2 minor species
R030XA061NV	**LOAMY 5-7 P.Z.** ATCO dominant shrub
R030XA051NV	**COBBLY CLAYPAN 5-7 P.Z.** MESP2 major shrub

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ambrosia dumosa* (2) *Atriplex confertifolia*
Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

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subject to disturbance from overland flooding. Slopes range from 0 to 30 percent, but slope gradients of 2 to 15 percent are most typical. Elevations are 2200 to 4600 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Alluvial flat (3) Fan apron
Ponding frequency	None
Elevation	2,200–4,600 ft
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

This climate is arid, characterized by hot, dry summers and cool, somewhat moist winters. Average annual precipitation is 5 to 7 inches. Mean annual air temperature is 58 to 67 degrees F. The average growing season is about 170 to 260 days.

Table 3. Representative climatic features

Frost-free period (average)	260 days
Freeze-free period (average)	
Precipitation total (average)	7 in

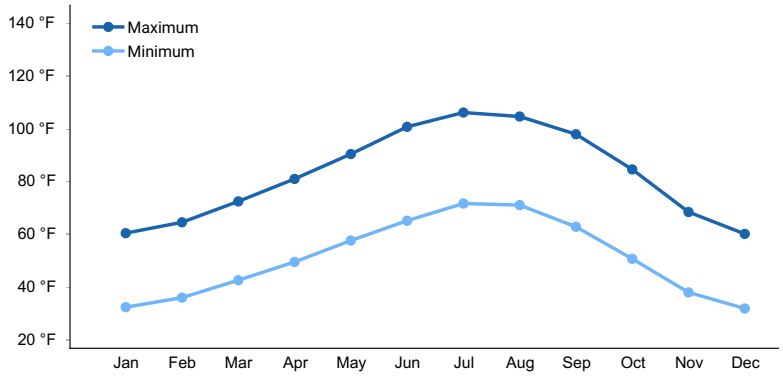


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site have formed in alluvium from calcareous sedimentary parent material that is high in sodium. These soils are typically very deep and have a calcic horizon. The soil surface is covered by more than 65 percent large gravels and small cobbles. The soils are well drained and available water capacity is very low to low. Potential for sheet and rill erosion is slight. The soil series associated with this site include: Commski, Corncreek, Pahrump, Threelakes, Vegastorm, and Wodavar.

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone (2) Alluvium–dolomite

Surface texture	(1) Very gravelly sandy loam (2) Extremely gravelly fine sandy loam (3) Gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	72–84 in
Surface fragment cover <=3"	30–85%
Surface fragment cover >3"	5–10%
Available water capacity (0-40in)	0.9–4.5 in
Calcium carbonate equivalent (0-40in)	40–60%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–45
Soil reaction (1:1 water) (0-40in)	7.9–9.6
Subsurface fragment volume <=3" (Depth not specified)	3–70%
Subsurface fragment volume >3" (Depth not specified)	0–12%

Ecological dynamics

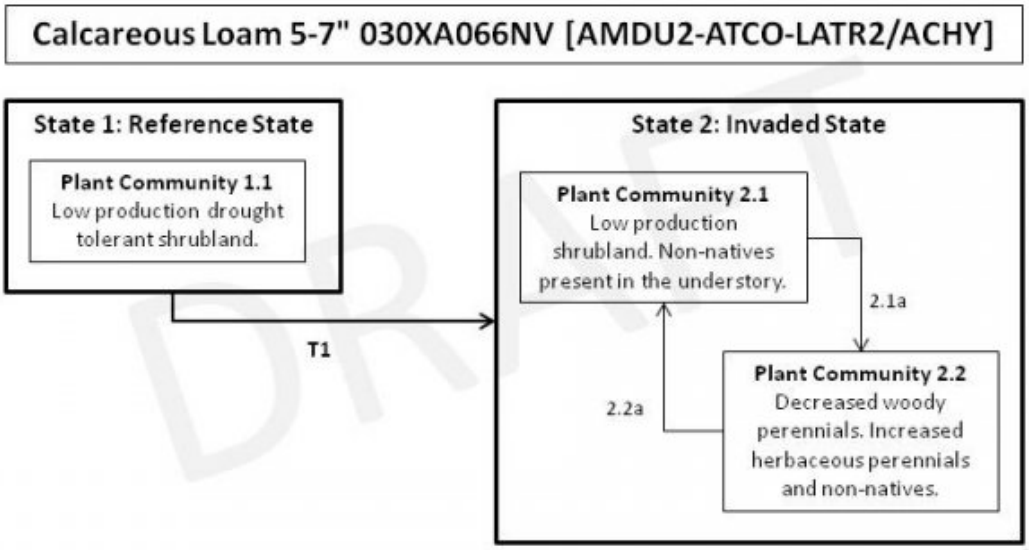
The plant communities of this site are dynamic in response to changes in disturbance regimes and weather patterns. Community phase changes are primarily driven by long term drought. Historically wildfire was infrequent and patchy and had a minimal impact. This site likely experienced light grazing disturbance.
The plant community composition of this site is dominated by shrubs with a small component of native forbs and bunchgrasses. The root systems of desert shrubs generally have equal amounts of resources dedicated to lateral and tap root production (Osmond et al 1990). Extensive tap root allows shrubs to extract water from deep in the soil profile, while shallow lateral roots can utilize water in the upper profile. Production of herbaceous vegetation is relatively low, but is dominated by warm season perennial bunchgrasses. Warm season grasses have higher light and temperature requirements to begin photosynthesis, therefore grow most actively during the summer. Vegetation plays an important role in reducing the erodibilty of the soil surface. Incorrect management actions may result in reduced vegetative cover and increased soil erosion.
As ecological condition declines, creosotebush, white burrobrush, and wolfberry increase. Deep-rooted perennial bunchgrasses decrease and bare ground increases. Following mechanical disturbance or wildfire, introduced annual grasses and forbs readily invade or increase on this site. Disturbances, including wildfire, can increase resource availability by reducing the amount of resources (moisture, nutrients) used by resident vegetation through mortality or injury (Zouhar et al. 2008). The increased resource availability can make the system even more susceptible to invasion by non-natives.

Fire Ecology:

It appears that wildfire was not historically a dominating influence in creosotebush scrub landscapes. The mean fire return interval ranges from 35 to 100 years. Creosotebush scrub fuels are comprised primarily of woody shrubs, but it is the fine fuels from annuals and perennial grasses that facilitate the ignition and spread of wildfires. Native annual plants usually break down rapidly during the summer and do not create a long-lived fuelbed. Fine fuels from non-native annual grasses currently represent the most important fuelbed component. The Fire generally kills white bursage. Shadscale is fire intolerant and it does not readily recover from fire, except for establishment through seed. Creosotebush is poorly adapted to fire because of its limited sprouting ability. Creosotebush survives some fires that

burn patchily or are of low severity. Fire typically destroys aboveground parts of Anderson wolfberry, but the degree of damage to the plant depends on fire severity. Ephedra generally sprouts after fire damages aboveground vegetation. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. However, severe fires may kill shallowly buried regenerative structures. 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.

State and transition model



State 1
Reference State

The Reference State is representative of the natural range of variability under pristine conditions. Plant communities are dynamic in response to changes in disturbance regimes and weather patterns. Plant community phase changes are primarily driven by long-term drought. Historically, fire had little impact in this system due to low fuel loading.

Community 1.1
Reference Plant Community

The reference plant community is dominated by shadscale, white bursage, and creosotebush. Indian ricegrass and wolfberry are other important species associated with this site. Potential vegetative composition is about 10% grasses, 5% perennial and annual forbs and 85% shrubs. Approximate ground cover (basal and crown) is less than 10 percent (˜6%).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	85	170	298
Grass/Grasslike	10	20	35
Forb	5	10	17
Total	**100**	**200**	**350**

State 2
Invaded State

The Invaded State is characterized by the presence of non-native annuals in the understory. State 2 is functionally similar to the Reference State, however the presence of non-natives has reduced the ecological resilience of the site. Introduced annuals such as red brome 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. A biotic threshold is crossed, with the introduction of non-native annuals that are difficult to remove from the system and will alter disturbance regimes significantly from their natural or historic range of disturbances. The presence of non-natives has reduced the ecological resilience of the site.

Community 2.1
Invaded Plant Community

This plant community is compositionally similar to the reference plant community with a trace of non-natives in the understory. Ecological processes have not been compromised at this time, but ecological resilience is reduced by the presence of non-natives. Non-natives likely to invade this site include red brome and Mediterranean grass.

Community 2.2
Invaded Plant Community

This plant community is characterized by decreased native woody perennials and increased annual grasses and forbs, as well as, increased perennial grasses and forbs. Non-native plant cover increases post disturbance, species include annual grasses and forbs. Native woody perennials capable of sprouting from the root crown will recover quickly and may increase in cover following disturbance. Disturbance may result in increased bare ground, increasing the risk of soil erosion. This plant community is considered at-risk, due to the increased fuel loading from herbaceous biomass. Management should be focused on minimizing the threat of wildfire and reducing anthropogenic impacts to protect soil and ecological resources.

Pathway 2.1a
Community 2.1 to 2.2

Surface disturbance or fire removes mature shrubs and favors an increase of herbaceous vegetation, native and non-native.

Pathway 2.2a
Community 2.2 to 2.1

Recovery of woody perennials and absence from disturbance.

Transition T1
State 1 to 2

Introduction of non-natives due to anthropogenic disturbances including recreation, linear corridors, and historic mining and grazing.

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**			4–16	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	4–16	–
2	**Secondary Perennial Grasses**			1–10	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	1–6	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	1–6	–
	big galleta	PLRI3	*Pleuraphis rigida*	1–6	–
3	**Annual Grasses**			1–10	
Forb					
4	**Perennial Forbs**			1–16	
5	**Annual Forbs**			1–15	
Shrub/Vine					
6	**Primary shrubs**			108–220	
	burrobush	AMDU2	*Ambrosia dumosa*	60–80	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	30–70	–
	creosote bush	LATR2	*Larrea tridentata*	10–40	–
	jointfir	EPHED	*Ephedra*	4–10	–
	water jacket	LYAN	*Lycium andersonii*	1–7	–
	peach thorn	LYCO2	*Lycium cooperi*	1–7	–
	pale desert-thorn	LYPA	*Lycium pallidum*	1–7	–
7	**Secondary shrubs**			10–30	
	spiny hopsage	GRSP	*Grayia spinosa*	2–6	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	2–6	–
	desert pepperweed	LEFR2	*Lepidium fremontii*	2–6	–
	spiny menodora	MESP2	*Menodora spinescens*	2–6	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	2–6	–

Animal community

Livestock Interpretations:
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. Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of wildlife and livestock. The fruits and leaves are a food source for deer, desert bighorn sheep, pronghorn, small rodents, jackrabbits, game birds, and songbirds. Many animals bed in or under creosotebush. Domestic sheep dig shallow beds under creosotebush because it provides the only shade in the desert scrub community. Creosotebush is unpalatable to livestock and most browsing wildlife. Consumption of creosotebush may be fatal to sheep.

Indian ricegrass has good forage value for domestic sheep, cattle, and horses. It can be important cattle forage in winter, particularly in salt desert communities. Indian ricegrass is often used most heavily in late winter, when succulent and nutritious new green leaves are produced.

Hydrological functions

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

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 desert peoples.

Historically, shadscale was a food source for native Americans of the southwestern United States. Seeds were used by native Americans of Arizona, Utah and Nevada for bread and mush.

Creosotebush has been highly valued for its medicinal properties by desert peoples. It has been used to treat at least 14 illnesses.
Twigs and leaves may be boiled as tea, steamed, pounded into a powder,pressed into a poultice, or heated into an infusion.

Indian ricegrass seeds make a gluten-free, nutritious flour with a potentially good market. Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used seed as a reserve food source.

Other information

White bursage may be used to revegetate disturbed sites in southwestern deserts. For instance, white bursage may be planted along California highways where unirrigated perennial vegetation has not survived.

Revegetation of shadscale communities is inherently difficult. Dry soil surfaces resulting from low humidity, high irradiation, and moderate to strong winds are major obstacles in revegetation projects.

Creosotebush may be used to rehabilitate disturbed environments in southwestern deserts. 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.

Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Certain native ecotypes exhibit desirable characteristics such as drought and salinity tolerance, low seed dormancy, and good nutritional qualities

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T17 R58 S24
General legal description	About 31/2 miles west of Conr Creek Springs north Las Vegas Valley, Clark County, Nevada.

Other references

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

Osmond, C.B., L.F. Pitelka and G.M. Hidy. 1990. Plant Biology of the Basin and Range. Ecological Studies. Vol. 80.

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

Zouhar, K., J.K. Smith and S. Sutherland. 2008. Effect of Fire on Nonnative Invasive Plants and Invasibility of Wildland Ecosystems. USDA Forest Service Gen. Tech. Rep. RMRS GTR-42-Vol. 6.

Contributors

HA/BLS/GKB

Approval

Kendra Moseley, 12/18/2024

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	05/10/2010
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms.

2. **Presence of water flow patterns:** Water flow patterns are rare to few in areas subjected to summer convection storms. Flow patterns short(<1m) and stable.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas within water flow patterns.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground up to 30% depending on amount of surface rock fragments.

5. **Number of gullies and erosion associated with gullies:** None

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) 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.

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 thick platy or medium subangular blocky. Soil surface colors are browns and yellowish browns and soils are typified by an ochric epipedon (0-7inches) and a calcic horizon. Organic matter of the surface 2 to 3 inches is less than to 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. Medium to fine textured surface soils have moderate to slow infiltration and moderate to rapid 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):** Compacted layers are none. Platy or massive sub-surface horizons or calcic horizons are 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: deep-rooted, cool season, bunchgrasses = shallow-rooted perennial grasses = 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 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):** Interspaces: 10-20% cover <1/4 inch depth

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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]) ± 200 lbs/ac. Favorable years ±350 lbs/ac and unfavorable years ±100 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 include red brome, redstem filaree, annual mustards, and Mediterranean grass.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Little or no growth or reproduction occurs in extreme drought or extended drought periods.
