

Ecological site R027XY068NV

GRANITIC CLAYPAN 8-10 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.

MLRA notes

Major Land Resource Area (MLRA): 027X–Fallon-Lovelock Area

Physiography Found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus this area is characterized by isolated uplifted fault block mountain ranges trending north to south that are separated by broad, hydrologically closed basins. The entire area occurs in the rain-shadow of the Sierra Nevada mountains and is influenced by Pleistocene Lake Lahontan which reached its most recent high stand about 12,000 years ago. There is substantial evidence suggesting the western Great Basin has been the site of pluvial-interpluvial cycles for at least the past two million years. The mountains and valleys are dissected by the Humboldt, Truckee, Carson, and Walker Rivers and their tributaries, all of which terminate within MLRA 27. Extensive playas can be found throughout this area and are the result of drying of ancient Lake Lahontan. Elevation generally ranges from 3,300 to 5,900 feet (1,005 to 1,800 meters) in valleys, but on some mountain peaks it is more than 7,870 feet (2,400 meters). Geology Landforms and soils of this MLRA have been heavily influenced by fluctuating lake level over the last 40,000 years. There is a level line evident on the higher slopes marking the former extent of glacial Lake Lahontan. Almost half of this area has surface deposits of alluvial valley fill influenced by lacustrine sediment. The rest has andesite and basalt rocks of different ages. Mesozoic and Tertiary intrusives are concentrated along the western border of the area, and Lower Volcanic Rocks (17 to 43 million years old) are common on the eastern side of the area. Also, some scattered outcrops of Mesozoic sedimentary and volcanic rocks and tuffaceous sedimentary rocks are in the mountains within the interior of this MLRA. Climate The average annual precipitation is 5 to 10 inches (125 to 255 millimeters) in most of the area but is as much as 19 inches (485 millimeters) on high mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The amount of precipitation is very low from summer to midautumn. The precipitation in winter occurs mainly as snow. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 155 days and ranges from 110 to 195 days, decreasing in length with elevation. Water The amount of precipitation is very low, and water for irrigation is obtained principally from diversions on the four large rivers in the area and from water stored in the Lahontan, Rye Patch, and Weber Reservoirs. Pyramid Lake and Walker Lakes are terminal lakes for the Truckee and Walker Rivers, respectively. Much of the annual flow of both rivers is diverted for irrigation, causing lake levels to fall and levels of dissolved salts to increase causing problems for the native Lahontan cutthroat trout. Soils The dominant soil orders are Aridisols and Entisols. The soils in the area are predominantly a mesic temperature regime, aridic moisture regime, and have a mixed mineralogy. They are generally well drained, loamy or sandy, commonly skeletal, and shallow to very deep. Accumulation of salts, tufa deposits, and eolian sediments with soluble salts over lacustrine deposits influence most of the soils in the basin landforms of this MLRA. Soils on bedrock-controlled landforms are typically comprised of volcanic or tuffaceous sedimentary colluvium over residuum. Biological Resources This area supports extensive areas of salt-desert shrub vegetation. Shadscale and Bailey's greasewood are widespread, occurring both individually and together. Grasses are generally sparse, although Indian ricegrass is prominent, especially on the sandy soils. Fourwing saltbush, winterfat, spiny hopsage, wolfberry, ephedra, dalea, and bud sagebrush are common shrubs. Basin wildrye, creeping wildrye, alkali sacaton, saltgrass, black greasewood, rubber rabbitbrush, and big saltbush are important plants on saline bottom lands and terraces. A few marsh areas support cattail, bulrushes, sedges, and rushes. Big sagebrush, along with scattered Utah juniper and singleleaf pinyon, is associated with Thurber needlegrass, desert needlegrass, Sandberg bluegrass, and squirreltail on the higher elevation piedmont slopes and mountains.

Ecological site concept

The Granitic Claypan 8-10 P.Z. site occurs on mountains and hills on all aspects. Slope gradients of 4 to 50 percent are typical. Elevations are 4100 to 6600 feet. The soils are shallow to very shallow and well drained. The soil surface is moderately coarse textured and is usually gravelly. Subsurface layers are moderately fine textured. Lithic or paralithic material is usually present within 20 inches and restricts root penetration.

Associated sites

R027XY020NV	SHALLOW CLAYPAN 8-10 P.Z. Less productive site; ACSP12 dominant grass
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Similar sites

R027XY070NV	DROUGHTY CLAYPAN 8-10 P.Z. Less productive site; SAVEB major shrub
R027XY079NV	GRAVELLY CLAYPAN 8-10 P.Z. Less productive site; ACTH7 dominant grass
R027XY049NV	COBBLY CLAYPAN 8-10 P.Z. ARAR8 dominant shrub; less productive site
R027XY087NV	CLAYPAN 14+ P.Z. ARAR8 dominant shrub
R027XY046NV	COBBLY CLAYPAN 12-14 P.Z. ARAR8 dominant shrub; FEID dominant grass
R027XY083NV	MOUNTAIN RIDGE ARAR8 dominant shrub; less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia arbuscula ssp. longicaulis</i>
Herbaceous	(1) <i>Achnatherum speciosum</i>

Physiographic features

The Granitic Claypan 8-10 P.Z. site occurs on mountains and hills on all aspects. Slope gradients of 4 to 50 percent are typical. Elevations are 4100 to 6600 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
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Runoff class	High to very high
Elevation	1,250 – 2,010 m
Slope	0 – 50 %
Water table depth	180 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is semiarid with cool, moist winters and warm, dry summers. Average annual precipitation is 8 to 10 inches. Mean annual air temperature is 48 to 55 degrees F. The average growing season is about 90 to 120 days.

Table 3 Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	250 mm

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 shallow and well drained. These soils have formed in residuum from mixed rock sources. The soil surface is moderately coarse textured and is usually gravelly. Subsurface layers are moderately fine textured. Lithic or paralithic material is usually present within 20 inches and restricts root penetration. Available water capacity is very low. Infiltration is rapid and permeability is moderately slow. Surface runoff is high to very high and the potential for sheet and rill erosion is moderate. The soil series associated with this site includes: Soar.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Very gravelly coarse sandy loam (2) Very gravelly sandy clay loam (3) Very gravelly loam
Family particle size	(1) Loamy

Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	20 – 40 cm
Surface fragment cover <=3"	40 – 50 %
Surface fragment cover >3"	10 – 30 %
Available water capacity (0-101.6cm)	1.02 – 1.78 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 7.4
Subsurface fragment volume <=3" (Depth not specified)	40 – 50 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

As ecological condition deteriorates, Lahontan sagebrush, Douglas' rabbitbrush, bottlebrush squirreltail, and Sandberg's bluegrass increase while desert needlegrass decreases. Following major disturbances such as wildfire, winterfat, spiny hopsage and Nevada ephedra increase. Species likely to invade this site are cheatgrass, halogeton, and annual mustards.

Fire Ecology:

The mean fire return intervals for Lahontan sagebrush communities have been estimated to be from 35 to over 100 years. Fire most often occurs during wet years with high forage production. Lahontan sagebrush is very susceptible to fire damage. Lahontan sagebrush is

usually killed by fire and does not re-sprout. The recovery in burned areas is usually via small, light, wind-dispersed seed for all low sagebrush subspecies. Partially injured Lahontan sagebrush may re-grow from living branches, but sprouting does not occur. Spiny hopsage is considered to be somewhat fire tolerant and often survives fires that kill sagebrush. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy. 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. 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. Most perennial grasses have root crowns that can survive wildfire.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			336-404	
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	336-404	–
2	Secondary Perennial Grasses			13-54	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	3-20	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	3-20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	3-20	–
Forb					
3	Perennial Forbs			13-54	
	buckwheat	ERIOG	<i>Eriogonum</i>	3-20	–
	desertparsley	LOMAT	<i>Lomatium</i>	3-20	–
	phlox	PHLOX	<i>Phlox</i>	3-20	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	3-20	–
Shrub/Vine					
4	Primary Shrubs			195-309	
	little sagebrush	ARARL3	<i>Artemisia arbuscula ssp. longicaulis</i>	168-202	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	13-54	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	13-54	–
5	Secondary Shrubs			34-67	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	3-20	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	3-20	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	3-20	–

Animal community

Livestock Interpretations: This site is suitable for livestock grazing. Grazing management should be keyed to desert needlegrass. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. Lahontan sagebrush is considered a valuable browse plant during the spring, fall and winter months. In some areas it is of little value in winter due to heavy snow. Spiny hopsage provides a palatable and nutritious food source for livestock, particularly during late winter through spring. Domestic sheep browse the succulent new growth of spiny hopsage in late winter and early spring. Winterfat is an important forage plant for livestock, especially during winter when forage is scarce. Abusive grazing practices have reduced or eliminated winterfat on some areas even though it is fairly resistant to browsing. Effects depend on severity and season of grazing. 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: Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Lahontan sagebrush is considered a valuable browse plant during the spring,

fall and winter months. In some areas it is of little value in winter due to heavy snow. Mule deer utilize and sometimes prefer Lahontan sagebrush, particularly in winter and early spring. Spiny hopsage provides a palatable and nutritious food source for big game animals. Spiny hopsage is used as forage to at least some extent by domestic goats, deer, pronghorn, and rabbits. Winterfat is an important forage plant for wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents and are a staple food for black-tailed jackrabbits. Mule deer and pronghorn antelope browse winterfat. Winterfat is used for cover by rodents. It is potential nesting cover for upland game birds, especially when grasses grow up through its crown.

Hydrological functions

Runoff is high to very high. Permeability is moderately slow.

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. This site is used for camping and hiking and has potential for upland and big game hunting.

Other products

Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour.

Other information

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. 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.

Type locality

Location 1: Pershing County, NV	
Township/Range/Section	T25N R26E S8
General legal description	Sahwave Mountains, Pershing County, Nevada.
Location 2: Pershing County, NV	
Township/Range/Section	T24N R21E S32
General legal description	Pyramid Lake Paiute Tribe, Virginia Mountains, Pershing County, Nevada. This site also occurs in Churchill, Lyon, Storey and Washoe 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

Approval

Kendra Moseley, 6/03/2024

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)	Patti Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	07/19/2013
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns are none to rare but can be expected in areas subjected to summer convection storms or rapid snowmelt.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to area within water flow patterns. Frost heaving of shallow rooted plants should not be considered as normal condition.

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 3 to 6 on most soil textures found on this site. (To be field tested.)

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Surface structure is typically prismatic to columnar or subangular blocky. Soil surface colors are brownish grays and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is typically 1 to 1.5 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Perennial herbaceous plants slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

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. Subsoil argillic horizons are not to be interpreted as compacted.

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: deep-rooted, cool season perennial bunchgrasses

Sub-dominant: evergreen shrub (Lahontan sagebrush) >associated shrubs>deep-rooted, cool season, perennial forbs> fibrous, shallow-rooted, cool season, annual and perennial forbs= deep-rooted, cool season, perennial grasses

Other:

Additional: After wildfires, deep-rooted, cool season perennial bunchgrasses, perennial forbs and sprouting shrubs (spiny hopsage, ephedra, rabbitbrush) dominate. Lahontan sagebrush is removed for 5 to 10 years.

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; some of the mature bunchgrasses (<20%) have dead centers.

14. Average percent litter cover (%) and depth (in): Between plant interspaces 20-30% and depth <¼-in.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
For normal or average growing season, ± 600 lbs/ac; Favorable years ± 900 lbs/ac and unfavorable years ± 350 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 cheatgrass, medusa head, halogeton, Russian thistle and annual mustards.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season year. Reduced growth and reproduction occur during extended or extreme drought conditions.
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