

Ecological site R023XY037NV CLAY SLOPE 8-12 P.Z.

Last updated: 4/10/2025
Accessed: 04/20/2026

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

Currently there is only a draft of the initial concept for this ecological site. The initial concept for this site places it within the Clay or Claypan ,12" PZ Low and Lahontan sagebrush and bluebunch wheatgrass/ Thurber's needlegrass Ecological Site Group. To view the General STM and other information available for this ESG please go to <https://edit.jornada.nmsu.edu/catalogs/esg/023X/R023XY901NV> This site has a Lahontan sagebrush, bluebunch wheatgrass, and Thurber's needlegrass community that is very similar to the modal site, however with less precipitation and less production. Elevations range from 4500 to 6000 feet and production varies from 400 lbs/ac to 700 lbs/ac. This site is similar to the modal site, with five stable states.

Associated sites

R023XY006NV	LOAMY 8-10 P.Z.
R023XY020NV	LOAMY 10-12 P.Z.
R023XY031NV	CLAYPAN 10-14 P.Z.
R023XY047NV	GRAVELLY CLAY 8-10 P.Z.

Similar sites

R023XY047NV	<p>GRAVELLY CLAY 8-10 P.Z.</p> <p>ACTH7 dominant grass; much less productive site</p>
R023XY093NV	<p>GRAVELLY CLAY 10-12 P.Z.</p> <p>ACTH7 dominant grass; less productive site</p>

Table 1. Dominant plant species

Tree	Not specified
------	---------------

Shrub	(1) <i>Artemisia arbuscula ssp. longicaulis</i>
Herbaceous	(1) <i>Pseudoroegneria spicata ssp. spicata</i>

Physiographic features

This site occurs on summits and sideslopes of plateaus, hills and lower mountains on all aspects. At lower elevations, this site is restricted to cooler, northerly exposures. Slopes range from 0 to 50 percent, but slope gradients of 15 to 50 percent are most typical. Elevations are 4300 to about 8000 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Plateau (3) Mountain
Elevation	1,310 – 2,440 m
Slope	0 – 50 %
Aspect	N

Climatic features

The climate associated with this site is semiarid and characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 8 to 12 inches. Mean annual air temperature is 48 to 53 degrees F. The average growing season is about 80 to 100 days.

Nevada's climate is predominantly arid, with large daily ranges of temperature, infrequent severe storms, heavy snowfall in the higher mountains, and great location variations with elevation. Three basic geographical factors largely influence Nevada's climate: continentality, latitude, and elevation. Continentality is the most important factor. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the West but throughout the state, with the result that the lowlands of Nevada are largely desert or steppes. The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with well-developed seasons and the terrain responds quickly to changes in solar heating.

Nevada lies within the mid-latitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in weather during the late fall, winter and spring months, when most of the precipitation occurs. To the south of the mid-latitude westerlies, lies a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with scattered thundershowers. The eastern portion of the state receives significant summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Average annual precipitation is 16 to over 20 inches. Mean annual air temperature is 41 to 44 degrees F. The average growing season is about 50 to 70 days.

Mean annual precipitaion at the Bear Creek, Nevada SNOTEL station (170501020301) is 37.69 inches.

monthly mean precipitation is:

January 3.84; February 3.75; March 4.38; April 4.9;

May 3.99; June 2.82; July .95; August 1.66;
 September 1.22; October 2.12;
 November 3.67; December 4.38.

Table 3 Representative climatic features

Frost-free period (average)	90 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 have formed in residuum or alluvium derived from volcanic rocks. These soils are very shallow to moderately deep and well drained. The soil surface is generally medium in texture and usually has high amounts of cobbles and stones. Clay subsoils form an abrupt soil boundary that is restrictive to deep root development of most plants. Potential for sheet and rill erosion is moderate to severe depending on slope and the amount of surface stones and cobbles present. The soil series associated with this site include: Arclay, Chalco, Halvert, Pickup, Rocconda, Verdigo, and Wylo.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Very stony loam (3) Very stony clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow to moderately slow
Soil depth	10 – 100 cm
Surface fragment cover <=3"	10 – 50 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-101.6cm)	1.02 – 11.43 cm

Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	10 – 40 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

Where management results in abusive grazing use by livestock and/or feral horses, palatable perennial grass and forb species will decline while Lahontan sagebrush and other shrubs increase. Species likely to invade this site are cheatgrass, tansy mustard, Russian thistle, and other annual grasses and forbs. Fire on this site in lower ecological condition can result in cheatgrass monocultures. Juniper trees readily invade this site where it occurs adjacent to these woodlands.

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. Burning bluebunch wheatgrass may remove most of the aboveground biomass but does not usually result in plant mortality. Bluebunch wheatgrass is generally favored by burning. Burning stimulates flowering and seed production. However, season of burning affects mortality. Thurber's needlegrass is classified as moderately resistant, but depending on season of burn, phenology, and fire severity, this perennial bunchgrass is moderately to severely damaged by fire. Early season burning is more damaging to this needlegrass than late season burning. Bluegrass is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Its rapid maturation in the spring also reduces fire damage, since it is dormant when most fires occur.

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			316-558	
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata ssp. spicata</i>	269-404	-
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	34-101	-
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	7-27	-
2	Secondary Perennial Grasses			34-67	
	Webber needlegrass	ACWE3	<i>Achnatherum webberi</i>	3-20	-
	squirreltail	ELEL5	<i>Elymus elymoides</i>	3-20	-
Forb					
3	Perennial			54-148	
	Hooker's balsamroot	BAHO	<i>Balsamorhiza hookeri</i>	13-34	-
	buckwheat	ERIOG	<i>Eriogonum</i>	3-20	-
	lupine	LUPIN	<i>Lupinus</i>	3-20	-
	beardtongue	PENST	<i>Penstemon</i>	3-20	-
	phlox	PHLOX	<i>Phlox</i>	3-20	-
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	7-13	-
Shrub/Vine					
4	Primary Shrubs			67-135	
	little sagebrush	ARARL3	<i>Artemisia arbuscula ssp. longicaulis</i>	67-135	-
5	Secondary Shrubs			13-54	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	7-13	-
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	7-13	-
	mormon tea	EPVI	<i>Ephedra viridis</i>	7-13	-
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	7-13	-

Animal community

Livestock Interpretations: This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production. Bluebunch wheatgrass is considered one of the most important forage grass species on western rangelands for livestock. Although bluebunch wheatgrass can be a crucial source of forage, it is not necessarily the most highly preferred species. Thurber's needlegrass species begin growth early in the year and remain green throughout a relatively long growing season. This pattern of development enables animals to use Thurber's needlegrass when many other grasses are unavailable. Cattle prefer Thurber's needlegrass in early spring before fruits have developed as it becomes less palatable when mature. Thurber's needlegrasses are grazed in the fall only if the fruits are softened by rain. Bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Bluegrass is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial bunchgrasses. 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. 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: 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. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Meadows surrounded by sagebrush may be used as feeding and strutting grounds. Sagebrush is a crucial component of their diet year-round, and sage-grouse select sagebrush almost exclusively for cover. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities.

Hydrological functions

Runoff is high to very high. Permeability is very slow to moderately slow. Hydrologic soil group is B, C, and D. Rills and pedestals are rare. Occurrence of pedestals is usually limited to areas of water flow patterns. Frost heaving of shallow rooted plants should not be considered a "normal" condition. Water flow patterns are rare but can be expected in areas recently subjected to summer convection storms or rapid snowmelt, usually on steeper slopes. Gullies are none to rare. Perennial herbaceous plants (especially deep-rooted bunchgrasses [bluebunch wheatgrass]) slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

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 hiking and has potential for upland and big game hunting.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T34N R21E S2
UTM zone	N
UTM northing	282723
UTM easting	4526300
Latitude	40° 51'32"
Longitude	119° 34'40"
General legal description	SW 1/4 West side of Nevada Highway 447, Buffalo Hills area. Washoe County, Nevada. This site also occurs in Humboldt County, Nevada.
Location 2: Washoe County, NV	
Township/Range/Section	T31N R19E S16
UTM zone	N
UTM northing	258622
UTM easting	4493942
Latitude	40° 33'39"
Longitude	119° 51'3"

General legal description	NE1/4 Approximately 1.2 miles southeast of Burro Mountain Pass, west side of Smoke Creek Desert, Washoe County, Nevada. This site also occurs in Humboldt County, 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

DK/SW/CP

T Stringham (UNR under contract with BLM)

Approval

Kendra Moseley, 4/10/2025

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)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** Rills are rare. A few rills 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 rare but can be expected in areas recently subjected to summer convection storms or rapid snowmelt, usually on steeper slopes.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare. Occurrence is usually limited to areas of water flow patterns. Frost heaving of shallow rooted plants should not be considered a "normal" condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**
Bare Ground 30-40%, depending on amount of 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 weak to medium platy. Soil surface colors are browns and soils are typified by a mollic epipedon. Organic matter of the surface 2 to 4 inches is typically 1.25 to 3 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 (especially deep-rooted bunchgrasses [bluebunch wheatgrass]) 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: low shrubs (Lahontan sagebrush) > deep-rooted, cool season, perennial forbs >shallow-rooted, cool season, perennial bunchgrasses > associated shrubs > fibrous, shallow-rooted, cool season, perennial and annual forbs.

Other:

Additional:

- 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 ($\pm 15\%$) have dead centers.
-

- 14. Average percent litter cover (%) and depth (in):** Under canopy and between plant interspaces up to 30% and litter depth is $\pm 1/4$ inch.
-

- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
For normal or average growing season (through mid-June) ± 600 lbs/ac; Favorable years 700 lbs/ac and unfavorable years 400 lbs/ac.
Spring moisture significantly affects total 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: Potential invaders include cheatgrass, annual mustards, medusahead and western juniper.**
-

- 17. Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years
-