Ecological site R023XY064NV
SOUTH SLOPE 16+ 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 Ashy or Loamy Skeletal Mod Deep 10-20 PZ High-Resilience Mountain Big Sagebrush and Idaho Fescue 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/R023XY906NV This site is more productive than the group modal site with 1400 lbs/ac in normal years. Surface soils are medium to moderately coarse textured and generally more than 20 inches thick. Available water capacity is low to moderate. Because of the southerly exposures of this site, more sunlight is received and the soils tend to warm and plant growth is initiated earlier than on adjacent sites. High evapotranspiration potentials result in depletion of the available soil moisture supply sooner than on surrounding areas at the high elevations where this site occurs. Runoff is medium to rapid and the potential for sheet and rill erosion is moderate to high depending upon slope. This site is likely similar to the group modal site with 2 stable states, however this site was not seen during site visits for the group report.

Similar sites

R023XY048NV	**GRANITIC SLOPE 16+ P.Z.** PSSPS minor spp., BRMA4 dominant grass

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata var. vaseyana* (2) *Purshia tridentata*
Herbaceous	(1) *Pseudoroegneria spicata ssp. spicata* (2) *Bromus marginatus*

Physiographic features

This site occurs on mountain sideslopes having a southerly aspect. Slope gradients of 15 to 75 percent are typical. Elevations are 6500 to 8500 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain

Elevation	1,980 – 2,590 m
Slope	20 – 80 %
Aspect	S

Climatic features

The climate associated with this site is subhumid and characterized by cold, moist winters and cool, dry summers. Average annual precipitation is 16 to 20 inches. Mean annual air temperature is 40 to 45 degrees F. The average growing season is about 30 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)	70 days
Freeze-free period (average)	
Precipitation total (average)	460 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 and colluvium from volcanic rock sources. These soils are normally moderately deep to bedrock and well drained. Surface soils are medium to moderately coarse textured and generally more than 20 inches thick. Most soils are modified with 15 to 50 percent rock fragments throughout the soil profile. These soils have a mollic epipedon. Available water capacity is very low. Because of the southerly exposures of this site, more sunlight is received and the soils tend to warm and plant growth is initiated earlier than on adjacent sites. High evapotranspiration potentials result in depletion of the available soil moisture supply sooner than on surrounding areas at the high elevations where this site occurs. Runoff is high to very high and the potential for sheet and rill erosion is moderate to high depending upon slope. The soil series associated with this site include: Croesus and Erakatak.

Table 4. Representative soil features

Surface texture	(1) Very stony loam (2) Very gravelly loam (3) Very cobbly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	50 – 100 cm
Surface fragment cover <=3"	20 – 40 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-101.6cm)	15.49 – 18.54 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)	1.8 – 2.3
Subsurface fragment volume <=3" (Depth not specified)	20 – 50 %
Subsurface fragment volume >3" (Depth not specified)	0 – 30 %

Ecological dynamics

Where management results in abusive use by livestock and/or feral horses, mountain brome, bluebunch wheatgrass, and other palatable grasses decrease in the understory. With contiued site degradation, mountain big sagebrush, rabbitbrush, and snowberry increase in density and often dominate the site.

Fire Ecology:
Presettlement fire return intervals in mountain big sagebrush communities varied from 15 to 25 years. Mountain big sagebrush is highly susceptible to injury from fire. It is often top-killed by fire and will not resprout. Antelope bitterbrush is considered a weak sprouter and is often killed by summer or fall fire. Antelope bitterbrush in some areas may sprout after light-severity spring fire. High fuel consumptions increase antelope bitterbrush mortality and therefore favors seedling establishment. Fires top-kill mountain snowberry. Although plant survival may be variable, mountain snowberry root crowns usually survive even severe fires. Mountain snowberry sprouts from basal buds at the root crown following fire. 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. Mountain brome is likely to be top-killed by fire, although the coarse stems and broad leaves may be more fire-resistant than fine-leaved bunchgrasses. Mountain brome is most susceptible to fire damage when it is actively growing in spring and early summer. Basin wildrye is top-killed by fire. Older basin wildrye plants with large proportions of dead material within the perennial crown can be expected to show higher mortality due to fire than younger plants having little debris. Basin wildrye is generally tolerant of fire but may be damaged by early season fire combined with dry soil conditions. Idaho fescue grows in a dense, fine-leaved tuft. Fires tend to burn within the accumulated fine leaves at the base of the plant and may produce temperatures sufficient to kill some of the root crown. Mature Idaho fescue plants are commonly reported to be severely damaged by fire in all seasons. Nevada 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. Little specific information is available on adaptations of Letterman's needlegrass to fire. It is morphologically similar to Columbia needlegrass, which is only slightly to moderately damaged by fire. Season of burn affects the plant's ability to survive a fire. Post-fire regeneration is through seeding and tillering.

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**			690-1334	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	235-392	–
	mountain brome	BRMA4	*Bromus marginatus*	235-314	–
	Idaho fescue	FEID	*Festuca idahoensis*	78-235	–
	basin wildrye	LECI4	*Leymus cinereus*	78-235	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	31-78	–
2	**Secondary Perennial Grasses**			78-235	
	Columbia needlegrass	ACNEN2	*Achnatherum nelsonii ssp. nelsonii*	8-31	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	8-31	–
	big squirreltail	ELMU3	*Elymus multisetus*	8-31	–

	purple oniongrass	MESP	*Melica spectabilis*	8-31	–
	bluegrass	POA	*Poa*	8-31	–
Forb					
3	**Perennial**			157-314	
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	8-47	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	8-47	–
	helianthella	HELIA	*Helianthella*	8-47	–
	western stoneseed	LIRU4	*Lithospermum ruderale*	8-47	–
	lupine	LUPIN	*Lupinus*	8-47	–
	mule-ears	WYAM	*Wyethia amplexicaulis*	8-47	–
Shrub/Vine					
4	**Primary Shrubs**			267-628	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	157-314	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	78-235	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	31-78	–
5	**Secondary Shrubs**			31-78	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	16-31	–
	chokecherry	PRVI	*Prunus virginiana*	16-31	–
	currant	RIBES	*Ribes*	16-31	–

Animal community

Livestock Interpretations: This site has limited vallue for livestock grazing due to steep slopes. 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. Mountain brome is one of the most important forage grasses in the quaking aspen zone. Mountain brome is ranked as excellent forage for both cattle and horses and good for domestic sheep. Domestic sheep will graze mountain brome only when it is fairly succulent. The early growth and abundant production of basin wildrye make it a valuable source of forage for livestock. It is important forage for cattle and is readily grazed by cattle and horses in early spring and fall. Though coarse-textured during the winter, basin wildrye may be utilized more frequently by livestock and wildlife when snow has covered low shrubs and other grasses. Idaho fescue provides important forage for many types of domestic livestock. The foliage cures well and is preferred by livestock in late fall and winter. Nevada 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. Nevada 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. Letterman’s needlegrass begins growth early in the year and remains green throughout the relatively long growing season, thus, making it valuable forage for livestock. Mountain big sagebrush is eaten by domestic livestock but has long been considered to be of low palatability, and a competitor to more desirable species. Antelope bitterbrush is important browse for livestock. Domestic livestock and mule deer may compete for antelope bitterbrush in late summer, fall, and/or winter. Cattle prefer antelope bitterbrush from mid-May through June and again in September and October. Snowberry is readily eaten by all classes of livestock, particularly domestic sheep. 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: Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer and elk. 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. Pronghorn antelope, mule deer, elk, and bighorn sheep utilize antelope bitterbrush extensively. Mule deer use of antelope bitterbrush peaks in September, when antelope bitterbrush may compose 91 percent of the diet. Winter use is greatest during periods of deep snow. Antelope bitterbrush seed is a large part of the diets of rodents, especially deer mice and kangaroo rats. Snowberry is an important forage species for deer and elk on high elevation summer ranges. Snowberry is frequently one of the first species to leaf out, making it a highly sought after food in the early spring. Bluebunch wheatgrass is considered one of the most important forage grass species on western rangelands for wildlife. Bluebunch wheatgrass does not generally provide sufficient cover for ungulates, however, mule deer are frequently found in bluebunch-dominated grasslands. Mountain brome seedheads and seeds provide food for many birds and small mammals. Pronghorn antelope will consume mountain brome primarily in the spring. The palatability of mountain brome is excellent for deer, particularly during the late spring and early summer. Basin wildrye provides winter forage for mule deer, though use is often low compared to other native grasses. Basin wildrye provides summer forage for black-tailed jackrabbits. Because basin wildrye remains green throughout early summer, it remains available for small mammal forage for longer time than other grasses. Idaho fescue provides important forge for several wildlife species. It is reported to be good forage for pronghorn, and deer in ranges of northern Nevada. Nevada bluegrass is desirable for pronghorn antelope and mule deer in the spring

and preferable in the spring, summer, and fall for elk and desirable as part of their winter range. Letterman's needlegrass provides valuable forage for many species of wildlife. It is consumed by mule deer and is most palatable early in the season before the foliage becomes coarse and wiry.

Hydrological functions

Runoff is high to very high. Permeability is slow to moderate. Hydrologic soil group is C.

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.

Other products

Native Americans used big sagebrush leaves and branches for medicinal teas, and the leaves as a fumigant. Bark was woven into mats, bags and clothing. Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

Other information

Antelope bitterbrush has been used extensively in land reclamation. Antelope bitterbrush enhances succession by retaining soil and depositing organic material and in some habitats and with some ecotypes, by fixing nitrogen. Mountain snowberry is useful for establishing cover on bare sites and has done well when planted onto roadbanks. Mountain brome is an excellent native bunchgrass for seeding alone or in mixtures in disturbed areas, including depleted rangelands, burned areas, roadways, mined lands, and degraded riparian zones. Basin wildrye is useful in mine reclamation, fire rehabilitation and stabilizing disturbed areas. Its usefulness in range seeding, however, may be limited by initially weak stand establishment. Letterman’s needlegrass has been used successfully in revegetating mine spoils. This species also has good potential for erosion control.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T46N R19E S9
UTM zone	N
UTM northing	262856
UTM easting	4645166
Latitude	41° 55′22″
Longitude	119° 51′35″
General legal description	SE 1/4 NW 1/4, Bally Mountain area, 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

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)	
Contact for lead author	
Date	04/20/2026
Approved by	
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):**

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

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:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

---

14. **Average percent litter cover (%) and depth (in):**

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-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:

---

17. **Perennial plant reproductive capability:**
