

# Ecological site R023XY084NV DEEP LOAMY 14-16 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

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 modal site with 1500 lbs/ac in normal years. Soils on this site are deep, fertile, and well-drained. These soils have high amounts of vitric volcanic ash and glass throughout the soil profile which enhances water holding capacity. Unlike the group modal site, the grass community is dominated by Idaho fescue and needlegrasses (i.e. Letterman's, Columbia, and western) with bluebunch wheatgrass representing only a small component. This site is likely similar to the modal site with 2 stable states, however this site was not seen during site visits for the group report.

## Associated sites

<b>R023XY054NV</b>	<b>STEEP NORTH SLOPE</b>
<b>R023XY066NV</b>	<b>ASHY LOAM 14-16 P.Z.</b>
<b>R023XY079NV</b>	<b>ASHY CLAYPAN (COOL) 10-14 P.Z.</b>

## Similar sites

<b>R023XY066NV</b>	<b>ASHY LOAM 14-16 P.Z.</b> FEID-ACTH7 codominant; less productive site
<b>R023XY019NV</b>	<b>LOAMY 16+ P.Z.</b> BRMA4 codominant grass; higher elevations
<b>R023XY065NV</b>	<b>LOAMY SLOPE 16+ P.Z.</b> occurs on straight to convex mountain backlsopes; higher elevations

<b>R023XY007NV</b>	<b>LOAMY 14-16 P.Z.</b> PSSPS-FEID codominant; less productive site
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. vaseyana</i>
Herbaceous	(1) <i>Festuca idahoensis</i> (2) <i>Achnatherum</i>

### Physiographic features

This site occurs on inset fans. Slopes range from 4 to 15 percent. Elevations are 6300 to 6900 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Inset fan
Elevation	1,920 – 2,100 m
Slope	0 – 20 %
Aspect	Aspect is not a significant factor

### Climatic features

The climate associated with this site is semiarid and characterized by cold, moist winters and cool, dry summers. Average annual precipitation is 12 to 16 inches. Mean annual air temperature is 41 to 44 degrees F. The average growing season is about 50 to 85 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 precipitation 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)	360 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 derived from pyroclastic and volcanic rocks. These soils are very deep, fertile, and well drained. Available water capacity is high. There are high amounts of vitric volcanic ash and glass throughout the soil profile which enhances the water holding capacity of these soils. Infiltration is rapid and permeability is moderate. The soils are classified as Vitrandic Haplocryolls.

**Table 4. Representative soil features**

Surface texture	(1) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	180 – 210 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	22.86 – 23.11 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 – 7.8
Subsurface fragment volume ≤3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

### Ecological dynamics

As ecological condition deteriorates, mountain big sagebrush, snowberry, and rabbitbrush increase in density as perennial grasses and forbs decrease in the understory.

#### Fire Ecology:

Presettlement fire return intervals in mountain big sagebrush communities varied from 15 to 25 years. Plants are readily killed in all seasons, even light severity fires. Mountain big sagebrush is highly susceptible to injury from fire. It is often top-killed by fire and will not resprout. 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. 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. Columbia needlegrass is only slightly to moderately damaged by fire, because it has relatively few culms per clump which may help to minimize the amount of subsurface heat transfer and subsequent damage. Western needlegrass is moderately damaged by fire. The recovery time is between 3 and 5 years. Cusick's bluegrass is unharmed to slightly harmed by light-severity fall fires. Cusick's bluegrass regenerates after fire from seed and by tillering. 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. 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.

### 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 (%)
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Grass/Grasslike					
1	<b>Primary Perennial Grasses</b>			1076-1950	
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	841-1177	-
	Cusick's bluegrass	POCUE2	<i>Poa cusickii ssp. epilis</i>	84-252	-
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata ssp. spicata</i>	34-135	-
	basin wildrye	LECI4	<i>Leymus cinereus</i>	34-135	-
	western needlegrass	ACOCO	<i>Achnatherum occidentale ssp. occidentale</i>	41-127	-
	Columbia needlegrass	ACNEN2	<i>Achnatherum nelsonii ssp. nelsonii</i>	43-126	-
2	<b>Secondary Perennial Grasses/Grasslikes</b>			84-168	
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	9-50	-
	mountain brome	BRMA4	<i>Bromus marginatus</i>	9-50	-
	sedge	CAREX	<i>Carex</i>	9-50	-
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	9-50	-
	bluegrass	POA	<i>Poa</i>	9-50	-
<b>Forb</b>					
3	<b>Perennial</b>			84-252	
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	9-84	-
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	9-84	-
	lupine	LUPIN	<i>Lupinus</i>	9-84	-
	ragwort	SENEC	<i>Senecio</i>	9-84	-
<b>Shrub/Vine</b>					
4	<b>Primary Shrubs</b>			85-336	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	84-252	-
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	1-84	-
5	<b>Secondary Shrubs</b>			34-135	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	17-50	-
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	17-50	-

## Animal community

**Livestock Interpretations:** This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production. 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. Columbia needlegrass provides valuable forage for all classes of livestock. Overall production is generally low in the upper sagebrush and mountain brush zones and at the limits of its range where Columbia needlegrass grows only in scattered patches. It is especially valuable to cattle and horses on summer ranges and to domestic sheep on lambing grounds. It is more often cropped closely by cattle and horses than by sheep. Columbia needlegrass is palatable to livestock throughout its range. As with most needlegrasses, it is most palatable early in the season before the foliage becomes coarse and wiry. Palatability to cows and horses is increased because large amounts of fine leafage remain green throughout the growing season. Palatability of Columbia needlegrass is described as fair to good for cattle and horses, becoming nearly unpalatable at maturity. Western needlegrass has a spreading and deeply penetrating root system, which makes it resistant to trampling. Cusick's bluegrass makes up only a small proportion of the biomass of the sagebrush communities in which it lives, but it is often taken preferentially by cattle, especially early in the season. 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. 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 big sagebrush is eaten by domestic livestock but has long been considered to be of low palatability, and a competitor to more desirable species. 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. 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. Idaho fescue provides important forage for several wildlife species. It is reported to be good forage for pronghorn, and deer in ranges of northern Nevada. Columbia needlegrass provides valuable forage for many species of wildlife. It is also consumed by mule deer and other wildlife species throughout the growing season. Needlegrasses are a significant component in the diet of pocket gophers. Columbia needlegrass is palatable to many species of wildlife throughout its range. As with most needlegrasses, it is most palatable early in the season before the foliage becomes coarse and wiry. Palatability of Columbia needlegrass is described as fair for wildlife overall, becoming nearly unpalatable at maturity. Western needlegrass provides valuable forage for many species of wildlife. Deer, elk, and mountain goat also use Cusick's bluegrass early in the season. The value of Cusick's bluegrass as cover for small animals has been rated as poor to fair. 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. 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.

### Hydrological functions

Runoff is low. Permeability is moderately rapid. Hydrologic soil group is A and B.

### 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

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

Mountain snowberry is useful for establishing cover on bare sites and has done well when planted onto roadbanks. 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.

### Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T42N R21E S34
UTM zone	N
UTM northing	282188
UTM easting	4599505
Latitude	41° 31'3"
Longitude	119° 36'37"

General legal description	NW 1/4 SW 1/4, About ½ mile west of Grassy Canyon on road to Massacre Mountain, Washoe County, Nevada.
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### 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

GKB

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)	P NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	04/07/2014
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

### Indicators

1. **Number and extent of rills:** Rills are non-existent.

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2. **Presence of water flow patterns:** Water flow patterns are none to rare. A few may occur on steeper slopes in areas subjected to summer convection storms or rapid snowmelt. Patterns are short (<1 m) and stable.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**  
Bare Ground 5-30% depending on amount of surface rock fragments

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None

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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.

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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):** Soil stability values should be 4 to 6 on most soil textures found on this site.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically fine granular. Soil surface colors are dark gray 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.

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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 [i.e., Idaho fescue] ) slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

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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. Subangular blocky or massive sub-surface horizons are not to be interpreted as compacted.

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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: Deep-rooted, cool season, perennial bunchgrasses

Sub-dominant: tall shrubs (big sagebrush & antelope bitterbrush)=deep-rooted, cool season, perennial forbs >>associated shrubs>shallow-rooted, cool season, perennial grasses >fibrous, shallow-rooted, cool season, perennial and 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 25% of total woody canopy; some of the mature bunchgrasses (<10%) have dead centers.
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14. **Average percent litter cover (%) and depth ( in):** Between plant interspaces (40-50%) and litter depth is <1 inch.
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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 (through mid-June)  $\pm$  1500 lbs/ac; Favorable years: 1800 lbs/ac; Unfavorable years: 1200 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 annual mustards, and thistles.**
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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 occurs during drought years.**
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