

Ecological site R023XY018NV STONY SOUTH SLOPE 12-16 P.Z.

Last updated: 4/10/2025
Accessed: 12/19/2025

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 Loamy 10-20 PZ Mountain Big Sagebrush and Bluebunch Wheatgrass 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/R023XY905NV>

This site is slightly less productive with 1000 lbs/ac in normal years. Slopes typically range from 50 to 75 percent. Unlike the modal site, the soils of this site are shallow to moderately deep to bedrock and have have very stony or cobbly to extremely stony or cobbly surfaces. Due to the stones and cobbles this site may be more resilient and less susceptible to fire. Basin wildrye is a subdominant grass in this site, below bluebunch wheatgrass. Bush oceanspray (*Holodiscus dumosus*) can also be found on this site and is a small component of the shrub community. This site has four states (no tree state).

Associated sites

R023XY014NV	SHALLOW LOAM 14+ P.Z.
R023XY016NV	SOUTH SLOPE 12-16 P.Z.
R023XY031NV	CLAYPAN 10-14 P.Z.
R023XY039NV	LOAMY SLOPE 10-14 P.Z.

Similar sites

R023XY016NV	SOUTH SLOPE 12-16 P.Z. less surface stones; LECI4 not codominant
R023XY064NV	SOUTH SLOPE 16+ P.Z. BRMA4-PSSPS codominant; more productive site
R023XY042NV	GRANITIC SOUTH SLOPE 12-14 P.Z. granitic parent material; less productive site
R023XY015NV	STONY LOAM 12-14 P.Z. PUTR2 dominant shrub; slopes less than 30%
R023XY039NV	LOAMY SLOPE 10-14 P.Z. lower elevations; LECI4 not codominant; less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> var. <i>vaseyana</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> ssp. <i>spicata</i> (2) <i>Leymus cinereus</i>

Physiographic features

This site occurs on very steep sideslopes of plateaus and mountains on all exposures. This plant community typically occurs in association with talus slopes (scree) that form below steep, basalt rock, escarpments. Slope gradients of 50 to 75 percent are most typical. Elevations are 4000 to 6400 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Plateau
Elevation	4,000–6,400 ft
Slope	50–75%
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid and characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 12 to 16 inches. Mean annual air temperature is 42 to 45 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)	14 in

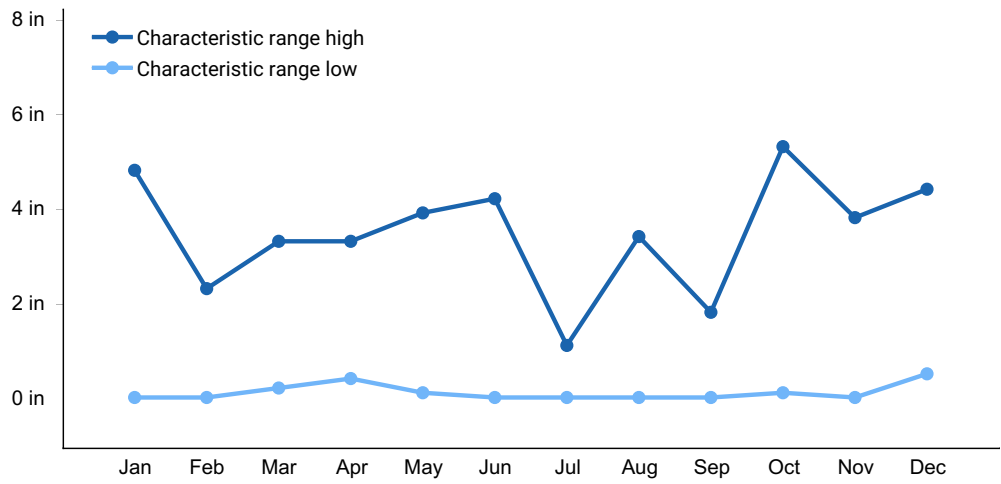


Figure 1. Monthly precipitation range

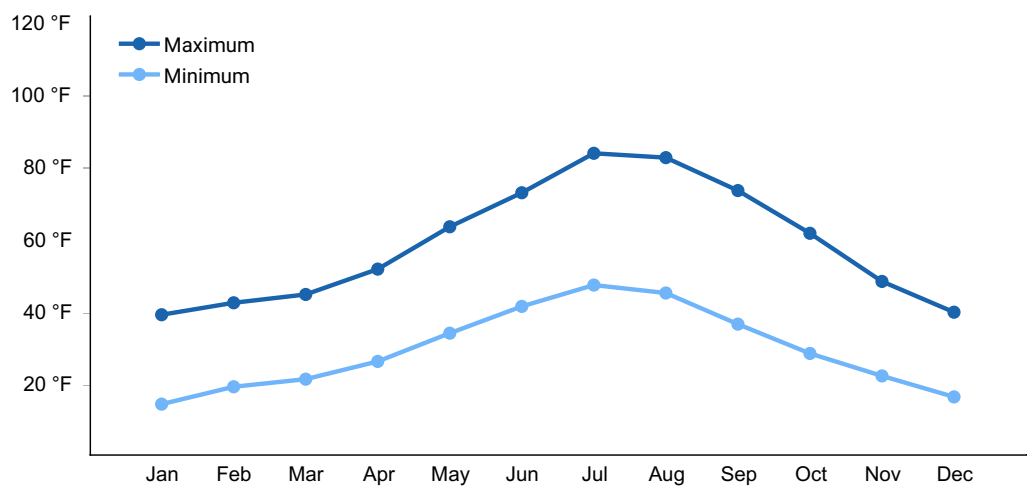


Figure 2. Monthly average minimum and maximum temperature

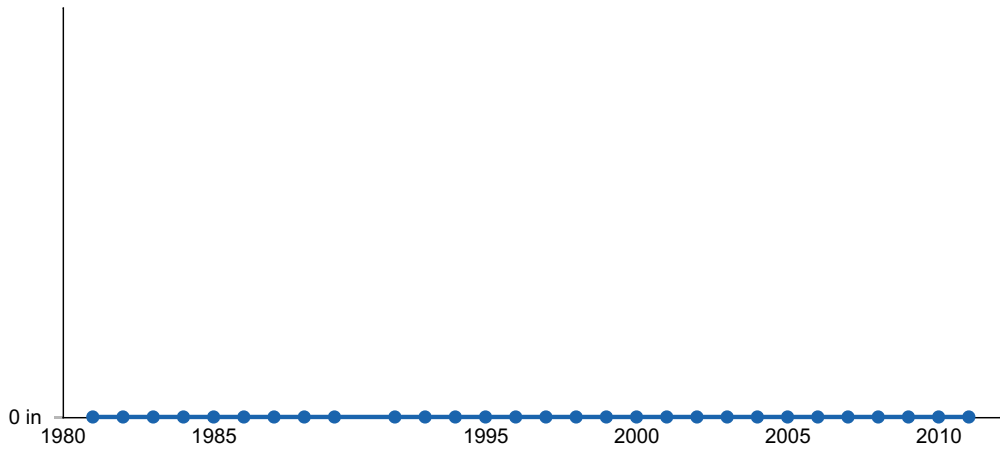


Figure 3. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are shallow and well drained. These soils have very stony or cobbly to extremely stony or cobbly surfaces. Available water capacity is very low, permeability is slow, and runoff is very high. Large rock fragments at the soil surface occupy plant growing space yet encourage snow entrapment and reduce evaporation. Surface stones and cobbles thus enhance soil moisture conditions for plant growth. The soil series associated with this site include: Longcreek.

Table 4. Representative soil features

Surface texture	(1) Very cobbly loam (2) Extremely stony loam (3) Very stony loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow
Soil depth	14–20 in
Surface fragment cover ≤3"	0–20%
Surface fragment cover >3"	21–40%
Available water capacity (0-40in)	1.1–1.2 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–7.8
Subsurface fragment volume ≤3" (Depth not specified)	10–17%
Subsurface fragment volume >3" (Depth not specified)	20–23%

Ecological dynamics

As ecological condition declines, bluebunch wheatgrass and Thurber needlegrass decrease as shrub density increases. Due to extreme stoniness and steep slopes, this site has limited value for livestock grazing. Thistle and cheatgrass are species likely to invade this site. Where this site occurs adjacent to juniper woodland communities these trees

readily invade the site.

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. 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. Bush oceanspray is top-killed by fire. Bush oceanspray is only moderately resistant to fire, but is well adapted to disturbance by fire. Bush oceanspray survives fire by regenerating from soil-stored seed or sprouting from surviving root crowns. Full recovery from a fire disturbance can be expected in 5 to 10 years. 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. 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. Western needlegrass is moderately damaged by fire. The recovery time is between 3 and 5 years. 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.

State and transition model

Ecosystem states

1. Reference Plant
Community

State 1 submodel, plant communities

1.1. Reference Plant
Community

State 1

Reference Plant Community

Community 1.1

Reference Plant Community

The reference plant community is dominated by bluebunch wheatgrass, basin wildrye, and mountain big sagebrush. Potential vegetative composition is about 70% grasses, 10% forbs and 20% shrubs and trees. Approximate ground cover (basal and crown) is about 25 to 35 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	560	700	840
Shrub/Vine	144	180	216
Forb	80	100	120
Tree	16	20	24
Total	800	1000	1200

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			650–1000	
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>	400–500	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	200–400	–
	western needlegrass	ACOCO	<i>Achnatherum occidentale</i> ssp. <i>occidentale</i>	25–50	–
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	25–50	–
2	Secondary Perennial Grasses			50–100	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	5–30	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	5–30	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	5–30	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	5–30	–

Forb					
3	Perennial			50–150	
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	5–30	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	5–30	–
	buckwheat	ERIOG	<i>Eriogonum</i>	5–30	–
	lupine	LUPIN	<i>Lupinus</i>	5–30	–
Shrub/Vine					
4	Primary Shrubs			140–330	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	100–200	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	20–80	–
	oceanspray	HODI	<i>Holodiscus discolor</i>	20–50	–
5	Secondary Shrubs			20–80	
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	10–20	–
	desert sweet	CHMI2	<i>Chamaebatiaria millefolium</i>	10–20	–
	rubber rabbitbrush	ERNAS	<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>salicifolia</i>	10–20	–
	wild crab apple	PERA4	<i>Peraphyllum ramosissimum</i>	10–20	–
	currant	RIBES	<i>Ribes</i>	10–20	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	10–20	–
Tree					
6	Evergreen			5–20	
	western juniper	JUOC	<i>Juniperus occidentalis</i>	5–20	–

Animal community

Livestock Interpretations:

This site has limited value for livestock grazing due to steep slopes and stoniness. 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. 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. Western needlegrass has a spreading and deeply penetrating root system, which makes it resistant to trampling. 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. 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. Bush oceanspray is generally unpalatable to the majority of livestock.

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. Bush oceanspray is generally unpalatable to the majority of big game. However, it comprised an average relative density of 10 percent of the summer diet of bighorn sheep populations. Plants are utilized by a variety of small bird species. 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. 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. Western needlegrass provides valuable forage for many species of wildlife. Thurber needlegrass is valuable forage for wildlife.

Hydrological functions

Runoff is very high. Permeability is 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

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. Bark and leaves of oceanspray are sometimes dried and pulverized for application to burns or sores, and infusions are made from seeds and used to prevent contagious diseases. 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. 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: Lassen County, CA	
Township/Range/Section	T37N R17E S34
UTM zone	N
UTM northing	750643
UTM easting	4546326
Latitude	41° 1' 46"
Longitude	120° 1' 7"
General legal description	NE 1/4 NE 1/4, Near Little Hat Mountain off Tuledad Road, Lassen County, California. This site also occurs in Wahoe County, Nevada.

Other references

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

Contributors

BH/SW

T Stringham (UNR under contract with BLM)

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	12/19/2025
Approved by	Kendra Moseley
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:**
