

Ecological site R023XY077NV SHALLOW LOAM 10-14 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 Loamy Aridic Plateaus Low Production Wyoming and Lahontan Sagebrush sites w Sparse Juniper 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/R023XY910NV> This site is less productive than the modal site with 100 lbs/ac in normal years. This site occurs on summits, sideslopes of hills and low elevation plateaus and mountains but is found on higher elevations than the modal site at 5000 to 6500 feet with an average annual precipitation from 10 to 14 inches. The soils on this site behave similarly to the modal site with shallow depths and high runoff potential but the plant community is dominated by Wyoming sagebrush and Salmon wildrye. Utah juniper is also present on this site up to 10% canopy cover. This model is similar to the group modal site with four stable states.

Associated sites

R023XY075NV	SHALLOW HILL 10-12 P.Z.
R023XY076NV	LOAMY HILL 10-14 P.Z.

Similar sites

F023XY046NV	JUOS/ARTRTW8/ACTH7/ACSP12 JUOS canopy cover greater than 10%
R023XY075NV	SHALLOW HILL 10-12 P.Z. ARARL3 dominant shrub
R023XY076NV	LOAMY HILL 10-14 P.Z. more productive site

Table 1. Dominant plant species

Tree	Not specified
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Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i>
Herbaceous	(1) <i>Leymus salinus ssp. salmonis</i>

Physiographic features

This site occurs on summits and sideslopes of hills and low elevation plateaus and mountains. Although the site may be found on all aspects, at lower elevations the site is restricted to north-facing slopes. Slope gradients of 50 to 75 percent are typical. Elevations are 5000 to 6500 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Plateau
Elevation	1,520 – 1,980 m
Slope	50 – 80 %
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 10 to 14 inches. Mean annual air temperature is 48 to 52 degrees F. The average growing season is about 80 to 110 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)	100 days
Freeze-free period (average)	
Precipitation total (average)	310 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow and have formed in residuum and colluvium from extrusive igneous rocks. The soil surface is medium in texture over a fine-textured subsoil. Permeability is moderate and the soils are well drained. Available water capacity is very low. Runoff is very high and the potential for sheet and rill erosion is high. The soils have high amounts of gravel and/or cobbles on the surface which provide a stabilizing affect on surface erosion conditions. The soils are classified as Lithic Torriorthents.

Table 4. Representative soil features

Surface texture	(1) Extremely stony loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	10 – 30 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
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Ecological dynamics

As ecological condition declines, Lahontan sagebrush, rabbitbrush, bottlebrush squirreltail, and Sandberg bluegrass increase as Salmon wildrye and other desirable forage grasses decrease.

Fire Ecology:

The fire return intervals for Utah juniper communities range from 10 to 30 years. Utah juniper is usually killed by fire, especially when trees are small. Wyoming big sagebrush is killed by fire and establishes after fire from a seedbank; from seed produced by remnant plants that escaped fire; and from plants adjacent to the burn that seed in. Purple sage has a high tolerance to fire and will resprout following fire. Common pricklygilia is severely damaged by fire. Little is known regarding the specific relationship between Salmon wildrye and fire. Salmon wildrye can survive fire via its root crown and rhizomes. Bottlebrush squirreltail's small size, coarse stems, and sparse leafy material aid in its tolerance of fire. Postfire regeneration occurs from surviving root crowns and from on- and off-site seed sources. Frequency of disturbance greatly influences postfire response of bottlebrush squirreltail. Undisturbed plants within a 6 to 9 year age class generally contain large amounts of dead material, increasing bottlebrush squirreltail's susceptibility to fire. Sandberg 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			9-22	
	Salmon wildrye	LESAS2	<i>Leymus salinus ssp. salmonis</i>	6-11	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	1-6	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2-6	–
2	Secondary Perennial Grasses			2-6	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	1-2	–
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	1-2	–
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata ssp. spicata</i>	1-2	–
Forb					
3	Perennial			2-9	
	milkvetch	ASTRA	<i>Astragalus</i>	1-3	–
	buckwheat	ERIOG	<i>Eriogonum</i>	1-3	–
	skeletonplant	LYGOD	<i>Lygodesmia</i>	1-3	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	1-3	–
Shrub/Vine					
4	Primary Shrubs			44-67	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	34-45	–
	purple sage	SADOI	<i>Salvia dorrii ssp. dorrii var. incana</i>	6-11	–
	goldenweed	PYRRO	<i>Pyrocoma</i>	2-6	–
5	Secondary Shrubs			6-17	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	1-3	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	1-3	–
	jointfir	EPHED	<i>Ephedra</i>	1-3	–
	buckwheat	ERIOG	<i>Eriogonum</i>	1-3	–

	littleleaf horsebrush	TEGL	<i>Tetradymia glabrata</i>	1-3	-
Tree					
6	Evergreen			6-22	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	6-22	-

Animal community

Livestock Interpretations: This site has limited value for livestock grazing, due to the low forage production and steep slopes. Little information is available concerning livestock utilization of Salmon wildrye, though it is utilized by domestic sheep and presumably other grazing animals. Salmon wildrye provides a moderate amount of fair quality, coarse forage during the growing season, but is unpalatable when mature and dried. Palatability has been rated poor to good for sheep and fair to good for cattle and horses. Bottlebrush squirreltail is very palatable winter forage for domestic sheep of Intermountain ranges. Domestic sheep relish the green foliage. Overall, bottlebrush squirreltail is considered moderately palatable to livestock. Sandberg 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. Sandberg 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. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available. Purple sage has low to medium palatability for livestock. The palatability for common pricklygilia is poor for cattle and horses and poor to fair for sheep. Common pricklygilia is moderately grazed by sheep in early and late summer. Utah juniper is used by and livestock for cover and food. 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: Utah juniper is used by many birds and wildlife for cover and food. The foliage is grazed by mule deer when other foliage is scarce and during periods of deep snow. Juniper "berries" or berry-cones are eaten by jackrabbits and coyotes. Many bird species depend on juniper berry-cones for fall and winter food. Wyoming big sagebrush is preferred browse for wild ungulates. Pronghorn usually browse Wyoming big sagebrush heavily. 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. Purple sage has low to medium palatability for wildlife. Common pricklygilia is used by bighorn sheep in December and by mule deer in February and April. Little information is available concerning wildlife utilization of Salmon wildrye. Salmon wildrye cover value has been rated poor to fair for mule deer, poor to good for upland game birds, and fair to good for small nongame birds and small mammals. Bottlebrush squirreltail is a dietary component of several wildlife species. Sandberg 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.

Hydrological functions

Runoff is very high. Permeability is moderate. Hydrologic soil group is D.

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 made tea from big sagebrush leaves. They used the tea as a tonic, an antiseptic, for treating colds, diarrhea, and sore eyes and as a rinse to ward off ticks. Big sagebrush seeds were eaten raw or made into meal.

Other information

Wyoming big sagebrush is used for stabilizing slopes and gullies and for restoring degraded wildlife habitat, rangelands, mine spoils and other disturbed sites. It is particularly recommended on dry upland sites where other shrubs are difficult to establish. Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation.

Type locality

Location 1: Humboldt County, NV	
General legal description	Jackson Mountains, 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>).

Great Basin Ecological Site Development Project: State and Transition Models for Major Land Resource Area 23, Nevada and portions of California (Online; <https://naes.agnt.unr.edu/PMS/Pubs/2019-4060.pdf>)

Contributors

RWA

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:
