

Ecological site R023XY098NV

DEEP LOAMY 10-12 P.Z.

Last updated: 4/10/2025
Accessed: 12/21/2025

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>

The site is less productive than the modal site with only 1000 lbs/ac in normal years. Slopes range from 2 to 15 percent and elevations range from 5000 to 6000 feet. The soils of this site have formed in mixed alluvium and are moderately deep to deep with a moderate available water capacity. A mollic epipedon is typically present. Unlike the group modal site, Thurber’s needlegrass is the dominant grass with bluebunch wheatgrass and basin wildrye as subdominates. A mix of Wyoming big sagebrush and mountain big sagebrush can seen in this site. This site has four states (no tree state).

Similar sites

R023XY099NV	CHANNERY HILL 8-10 P.Z. ACHY dominant grass; less productive site
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> (2) <i>Peraphyllum ramosissimum</i>

Herbaceous	(1) <i>Achnatherum thurberianum</i> (2) <i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>
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Physiographic features

This site occurs on summits and sideslopes of upper fan piedmonts. Slopes range from 2 to 15 percent. Elevations are 5000 to about 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont
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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 12 inches. Mean annual air temperature is 43 to 47 degrees F. The average growing season is about 90 to 100 days.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	
Precipitation total (average)	305 mm

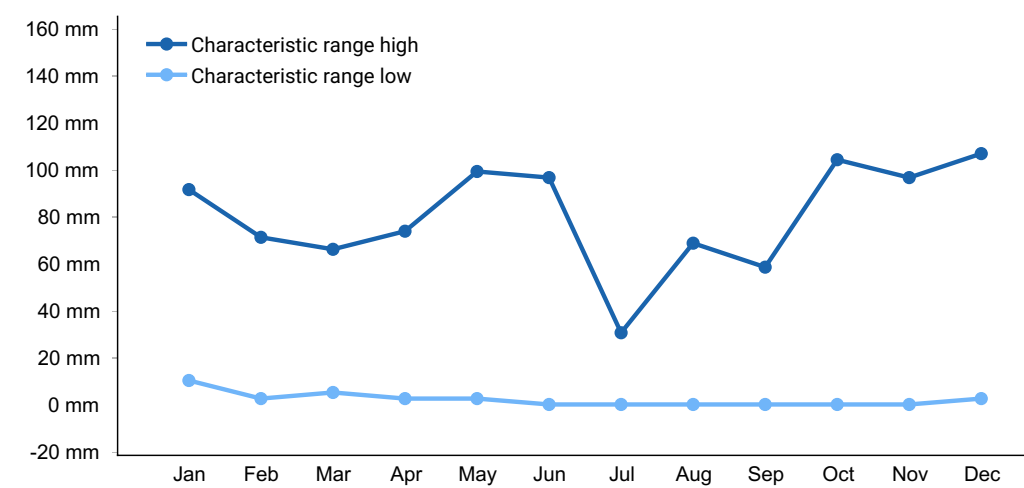


Figure 1. Monthly precipitation range

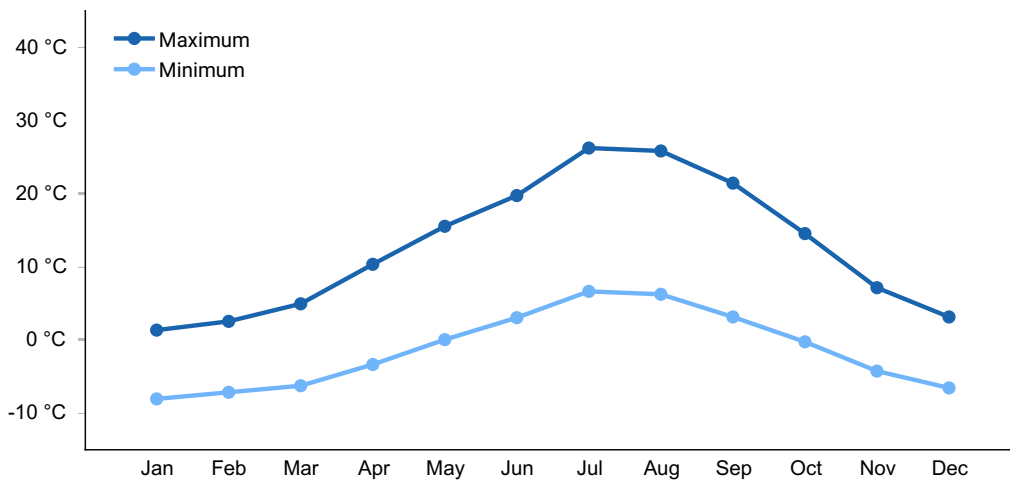


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site have formed in mixed alluvium. These soils are moderately deep to deep and have a moderate available water capacity. Surface soils are medium textured and usually more than ten inches thick to the subsoil or underlying material. A mollic epipedon is typically present. Permeability is moderate and the soils are well drained.

Ecological dynamics

As ecological condition declines, this site degrades from a bluebunch wheatgrass, Thurber's needlegrass site to a big sagebrush and squawapple dominated site. Cheatgrass and other introduced annual plants readily invade this site.

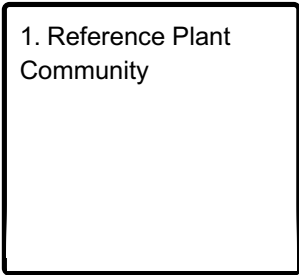
Fire Ecology:

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. 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. Fire effects for squawapple are unknown, but most species in the Rose family resprout after fire. 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. 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. Burning

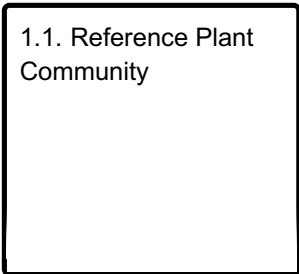
bluebunch wheatgrass may remove most of the aboveground biomass but does not usually result in plant mortality. Bluebunch wheatgrass is generally favored by burning. Burning stimulates flowering and seed production. However, season of burning affects mortality. Basin wildrye is top-killed by fire. Older 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. 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

Ecosystem states



State 1 submodel, plant communities



State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by bluebunch wheatgrass, Thurber’s needlegrass, big sagebrush and squawapple. Antelope bitterbrush is an important shrub associated with this site. Potential vegetative composition is about 55% grasses, 10% forbs and 35% shrubs and trees. Approximate ground cover (basal and crown) is about 20 to 35 percent.

Table 4. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	432	616	801
Shrub/Vine	259	370	481
Forb	78	112	146
Tree	16	22	29
Total	785	1120	1457

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			493–818	
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	280–392	–
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>	168–280	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	22–90	–
	bluegrass	POA	<i>Poa</i>	22–56	–
2	Secondary Perennial Grasses/Grasslikes			56–112	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	6–22	–
	sedge	CAREX	<i>Carex</i>	6–22	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	6–22	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	6–22	–
Forb					
3	Perennial			56–168	
	milkvetch	ASTRA	<i>Astragalus</i>	6–34	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	6–34	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	6–34	–
	fleabane	ERIGE2	<i>Erigeron</i>	6–34	–
	lupine	LUPIN	<i>Lupinus</i>	6–34	–

Shrub/Vine				
4	Primary Shrubs			191–482
	wild crab apple	PERA4	<i>Peraphyllum ramosissimum</i>	56–168
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	56–112
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	56–112
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	22–90
5	Secondary Shrubs			22–90
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	11–22
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	11–22
	rubber rabbitbrush	ERNAN5	<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>nauseosa</i>	11–22
	currant	RIBES	<i>Ribes</i>	11–22
Tree				
6	Evergreen			6–22
	western juniper	JUOC	<i>Juniperus occidentalis</i>	6–22

Animal community

Livestock Interpretations:

This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production. 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. 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. 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. 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. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available. Livestock will browse squawapple. 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.

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. 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. Wildlife will consume squawapple fruits and seeds. Deer browse squawapple lightly during the fall and winter. 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. Thurber needlegrass is valuable forage for wildlife. 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. 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.

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. 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. Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

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. 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: Washoe County, NV	
Township/Range/Section	T38N R16E S20
UTM zone	N
UTM northing	736596
UTM easting	4558969
Latitude	41° 8' 51"
Longitude	120° 10' 50"
General legal description	Just off of the south side of Bare Creek Ranch road, Modoc County, California. This site also occurs in Washoe 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

DSH/GKB

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	12/21/2025
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:**
