Ecological site R023XY072NV
ASHY SLOPE 10-12 P.Z.

Last updated: 4/10/2025
Accessed: 12/20/2025

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 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

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. wyomingensis*
Herbaceous	(1) *Festuca idahoensis* (2) *Achnatherum thurberianum*

Physiographic features

This site occurs on upper fan piedmont backslopes of hills, ash flows, and plateaus on predominantly north aspects. Slopes range from 15 to 50 percent. Elevations are 5500 to 6500 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ash flow (3) Plateau
Elevation	1,676–1,981 m

Slope	15–50%
Aspect	N

Climatic features

The climate associated with this site is semiarid and characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 8 to about 12 inches. Mean annual air temperature is 43 to 45 degrees F. The average growing season is about 50 to 90 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)	254 mm

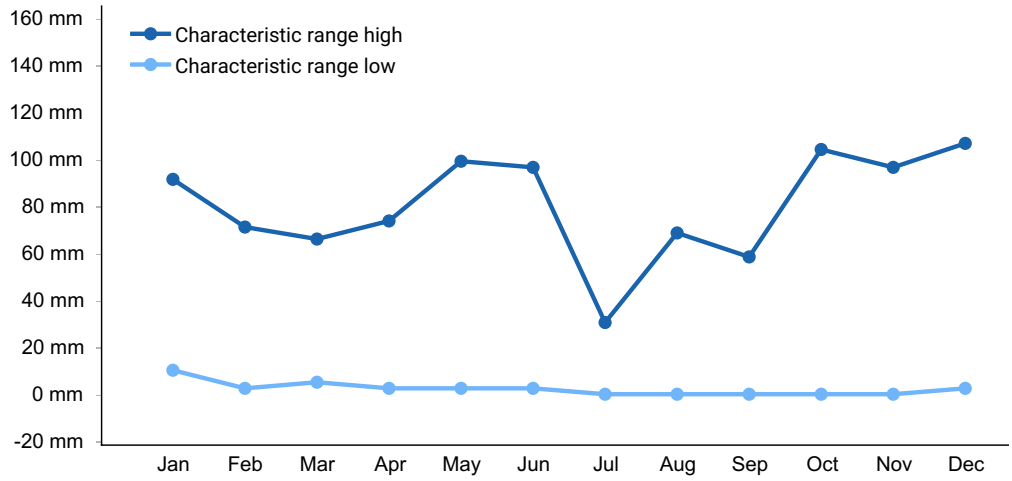

Figure 1. Monthly precipitation range

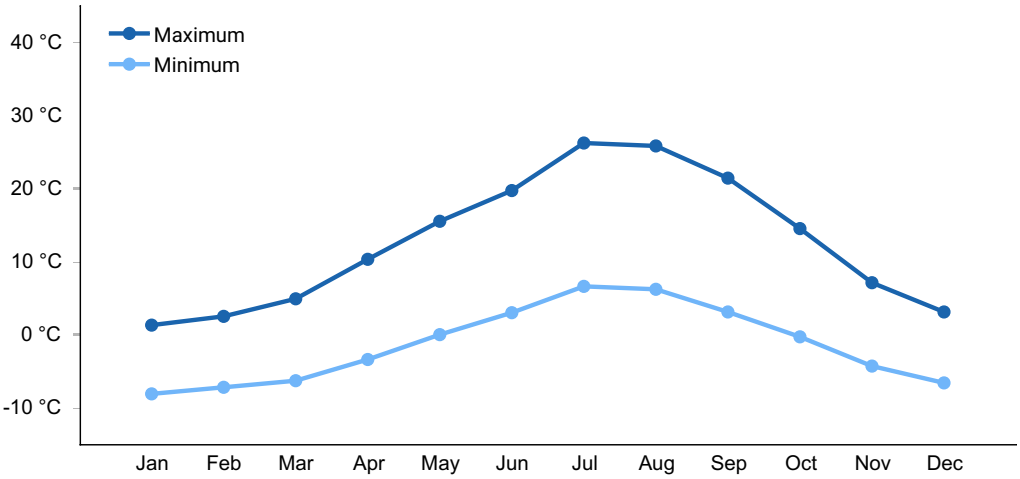

Figure 2. Monthly average minimum and maximum temperature

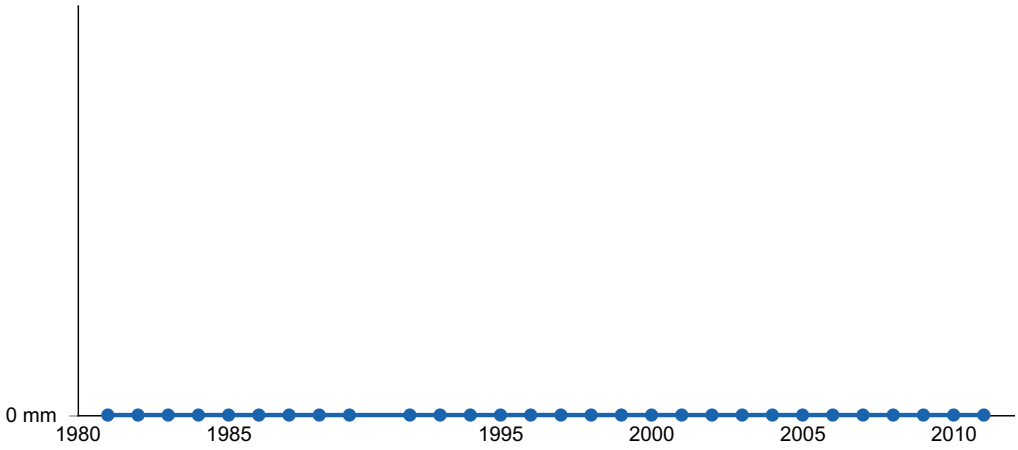

Figure 3. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are moderately deep and well drained. They are formed in colluvium derived from tuff, and eolian deposits derived from volcanic ash. These soils are moderately coarse to medium textured throughout. Available water capacity is moderate. There are very high amounts of vitric volcanic ash and glass throughout the soil profile which enhances the water holding capacity of these soils. These soils have a mollic epipedon. Infiltration is rapid and permeability is moderate to moderately rapid. Runoff is high and the potential for sheet and rill erosion is moderate to high depending on slope. A typical soil series correlated to this site is Frentera, ashy, glassy, frigid Vitritorrandic Haploxerolls.

Table 4. Representative soil features

Parent material	(1) Colluvium–tuff
Surface texture	(1) Ashy loam (2) Ashy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	76–102 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%

Available water capacity (0-101.6cm)	12.7–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.9–7
Subsurface fragment volume <=3" (Depth not specified)	15–35%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Where management results in abusive grazing use by livestock and/or feral horses, woody plants, bottlebrush squirreltail, and Sandberg bluegrass increase as Idaho fescue, Thurber's needlegrass and other desirable forage grasses decrease. 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:
The fire return interval for Wyoming big sagebrush communities ranges from 10 to 70 years. Fire is the principal means of renewal for decadent stands of Wyoming big sagebrush. 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. 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. 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. Cusick’s bluegrass is unharmed to slightly harmed by light-severity fall fires. Cusick’s bluegrass regenerates after fire from seed and by tillering. 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

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 Idaho fescue and Wyoming big sagebrush. Thurber's needlegrass, bluebunch wheatgrass, and Cusick's bluegrass are other important species. Potential vegetative composition is about 70% grasses, 10% forbs and 20% shrubs. Approximate ground cover (basal and crown) is about 20 to 30 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	392	549	706
Shrub/Vine	112	157	202
Forb	56	78	101
Total	**560**	**784**	**1009**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			384–714	

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	Idaho fescue	FEID	*Festuca idahoensis*	314–471	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	39–118	–
	Cusick's bluegrass	POCUE2	*Poa cusickii ssp. epilis*	16–63	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	16–63	–
2	**Secondary Perennial Grasses**			16–63	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	4–16	–
	squirreltail	ELEL5	*Elymus elymoides*	4–16	–
	needle and thread	HECO26	*Hesperostipa comata*	4–16	–
	basin wildrye	LECI4	*Leymus cinereus*	4–16	–
	Sandberg bluegrass	POSE	*Poa secunda*	4–16	–
Forb					
3	**Perennial**			39–118	
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	4–24	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	4–24	–
	bladderpod	LESQU	*Lesquerella*	4–24	–
	smallflower woodland-star	LIPA5	*Lithophragma parviflorum*	4–24	–
	lupine	LUPIN	*Lupinus*	4–24	–
	phlox	PHLOX	*Phlox*	4–24	–
Shrub/Vine					
4	**Primary Shrubs**			118–196	
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	118–196	–
5	**Secondary Shrubs**			16–63	
	threetip sagebrush	ARTR4	*Artemisia tripartita*	8–24	–
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	8–24	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	8–24	–
	antelope	PUTR2	*Purshia tridentata*	8–24	–

	bitterbrush				
	horsebrush	TETRA3	*Tetradymia*	8–24	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing due to steep slopes. 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. 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. 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. 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. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available.

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:
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. 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. Thurber needlegrass is valuable forage for 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. 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 high. Permeability is moderate to moderately rapid. 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 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.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T42N R25E S13
UTM zone	N
UTM northing	327078
UTM easting	4602596
Latitude	41° 33′ 22″
Longitude	119° 4′ 24″
General legal description	SW 1/4 SW 1/4, Immediate western edge of Summit Lake Paiute Tribe lands along southside of road to USF&WS Sheldon Refuge, 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

GKB

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)	PNOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	11/16/2012
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Typically none. There may be a few rills (widely spaced and shallow) on steeper slopes (over 20% gradient).

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2. **Presence of water flow patterns:** Water flow patterns are typically non-existent but can rarely occur on steeper slopes in areas recently subjected to intense summer convection storms or rapid snowmelt. Short (< 1 m) and stable.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are typically non-existent. Frost heaving of shallow rooted plants should not be considered a "normal" condition.

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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 35-50% depending on amount of surface rock fragments

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

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

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.

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 3 to 6 on most soil textures found on this site. (To be field tested.)

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 grayish brown 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.

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.

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. Subsoil subangular blocky structure is not to be interpreted as compaction.

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 (Wyoming big sagebrush) > deep-rooted, cool season, perennial forbs > associated shrubs > fibrous, shallow-rooted, cool season, perennial and annual forbs = shallow-rooted, cool season, perennial grasses

Other: succulents

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):** Under canopy and between plant interspaces (25-35%) and litter depth is ± ¼ 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 June) ± 700 lbs/ac; Favorable years 900 lb/ac and unfavorable years 500 lbs/ac. Spring moisture significantly affects total production

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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, knapweeds and juniper.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years

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