USDA Natural Resources
Conservation Service

Ecological site R023XY094NV
ASHY SLOPE 12-14 P.Z.

Last updated: 4/10/2025
Accessed: 05/21/2025

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

This site is less productive than the modal site with only 1000 lbs/ac in normal years. Slopes typically range from 4 to 15 percent. Soils in this site have high amounts of vitric volcanic ash and glass throughout the soil profile, allowing for high available water capacity. Unlike the group modal site, Idaho fescue is the dominant grass on this site. This site is similar to the group modal with a five state model.

Similar sites

R023XY071NV	**ASHY LOAM 10-12 P.Z.** ARTRT dominant shrub
R023XY066NV	**ASHY LOAM 14-16 P.Z.** ARTRV-PUTR2 codominant shrubs
R023XY082NV	**LOAMY FAN 10-12 P.Z.** ACTH7-POA-LECI4 codominant grasses
R023XY072NV	**ASHY SLOPE 10-12 P.Z.** ARTRW8 dominant shrub
R023XY007NV	**LOAMY 14-16 P.Z.** FEID-PSSPS codominant

R023XY096NV	**ASHY SANDY LOAM 10-12 P.Z.** ACTH7-PSSPS-FEID codominant
R023XY020NV	**LOAMY 10-12 P.Z.** FEID minor species

Table 1. Dominant plant species

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

Physiographic features

This site occurs on backslopes of plateaus, ash flows, and hills on all aspects. Slopes range from 2 to over 30 percent, but slope gradients of 4 to 15 percent are most typical. Elevations are 5900 to 8000 feet.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Ash flow
Elevation	5,900–8,000 ft
Slope	2–30%
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 14 inches. Mean annual air temperature is 42 to 46 degrees F. The average growing season is about 70 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)	80 days
Freeze-free period (average)	
Precipitation total (average)	13 in

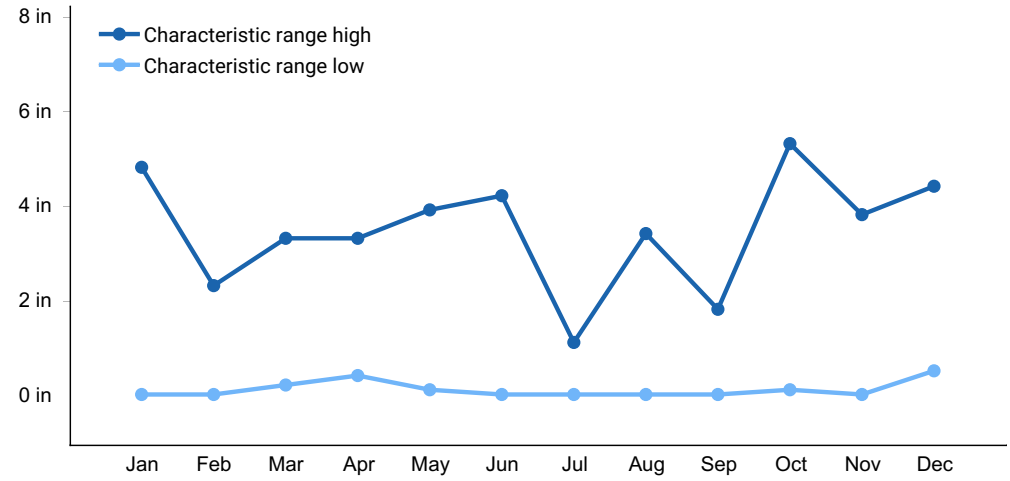


Figure 1. Monthly precipitation range

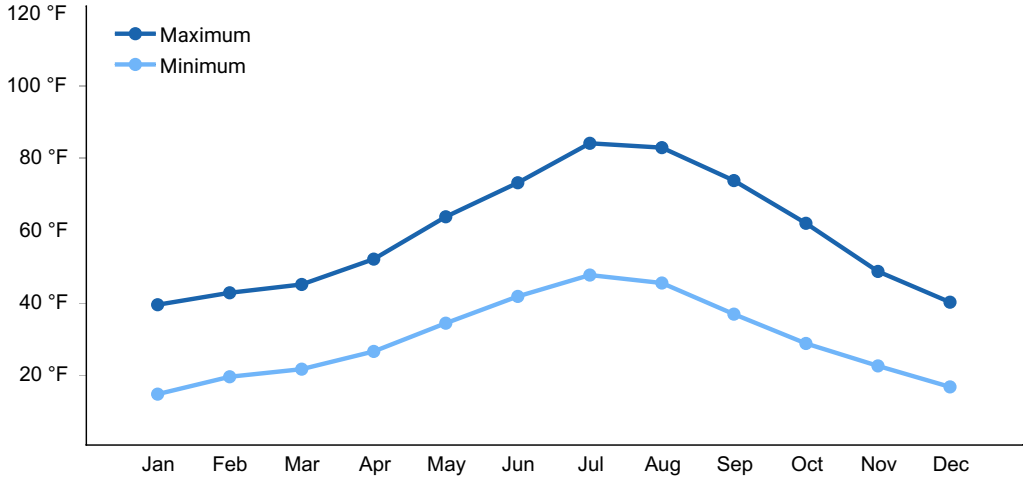


Figure 2. Monthly average minimum and maximum temperature

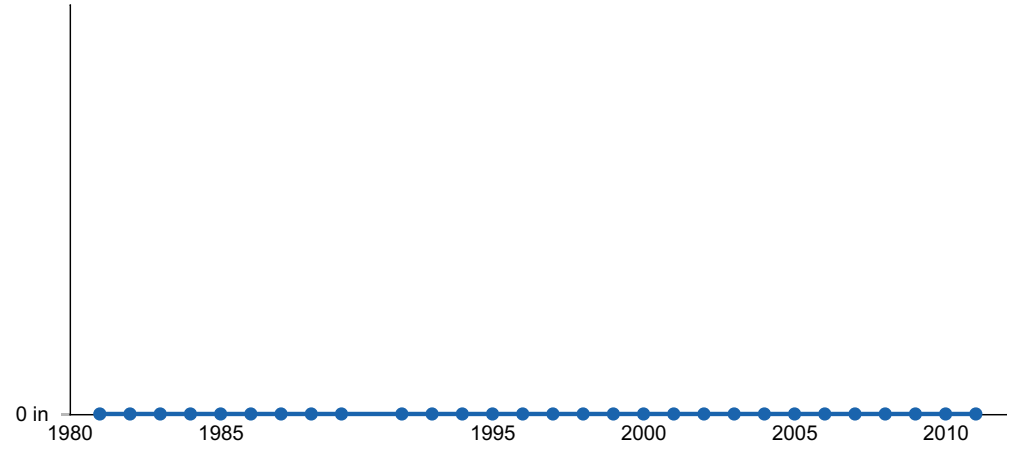


Figure 3. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are moderately deep to deep and well drained. Surface soils are moderately coarse to medium textured and more than ten inches thick to the subsoil or underlying material. There are high amounts of vitric volcanic ash and glass throughout the soil profile. Available water holding capacity is very low to moderate. Infiltration of water is rapid due to the relatively coarse textured surface soils. Permeability is slow to moderately slow and runoff is high to very high. The soil series associated with this site include: Ashtre and Devoy.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Gravelly loam (3) Ashy clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	20–40 in
Surface fragment cover <=3"	9–44%
Surface fragment cover >3"	1–18%
Available water capacity (0-40in)	3.2–5.5 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)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	9–44%
Subsurface fragment volume >3" (Depth not specified)	1–20%

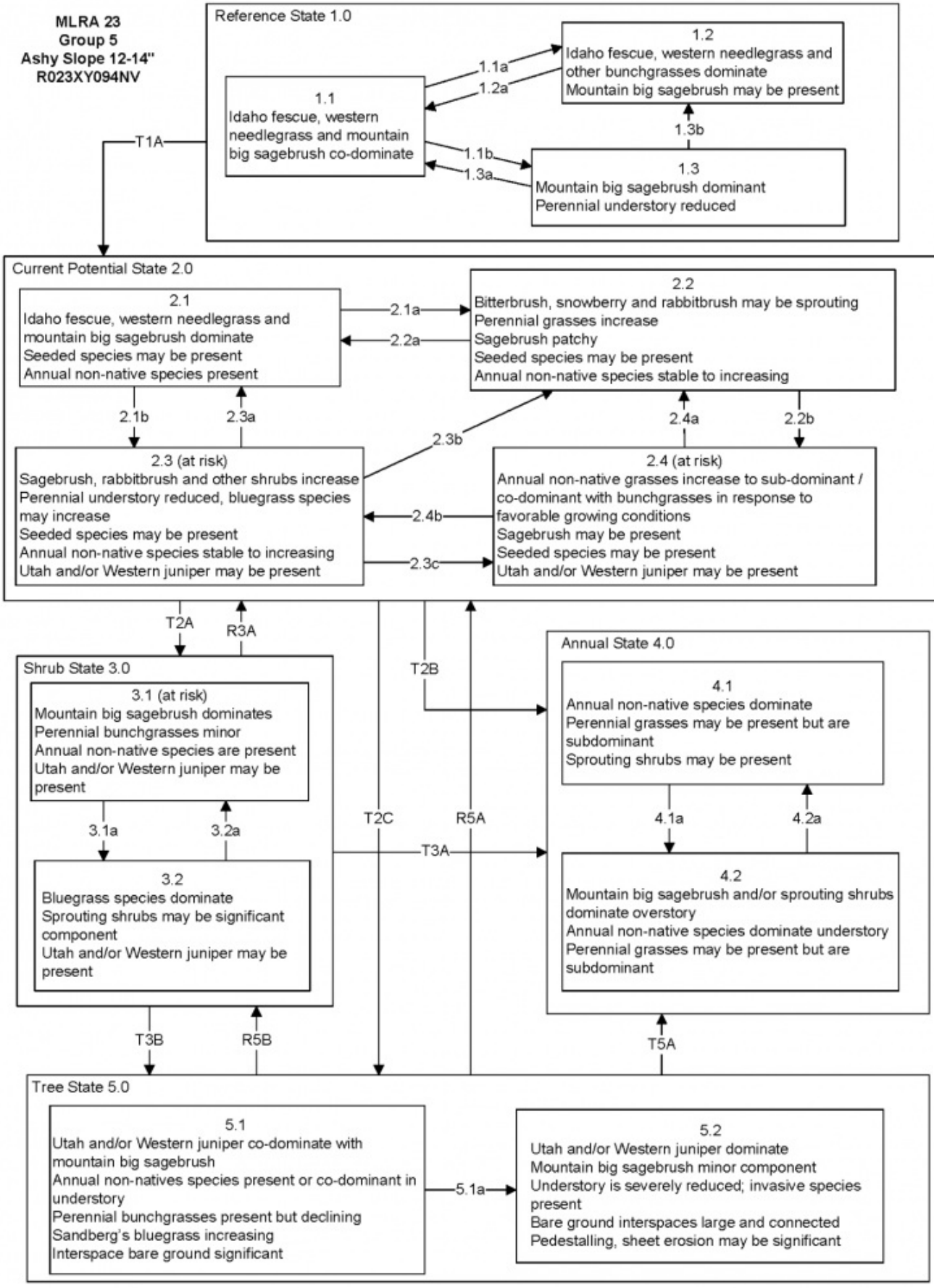
Ecological dynamics

Where management results in abusive grazing use by livestock and/or feral horses, woody plants, bottlebrush squirreltail, and Sandberg bluegrass increase as Idaho fescue, 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:
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. 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. 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. 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. Canby’s 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. Cusick’s bluegrass is unharmed to slightly harmed by light-severity fall fires. Cusick’s bluegrass regenerates after fire from seed and by tillering.

State and transition model


MLRA 23
Group 5
Ashy Slope 12-14"
R023XY094NV
Reference State 1.0
1.1
Idaho fescue, western needlegrass and mountain big sagebrush co-dominate
1.2
Idaho fescue, western needlegrass and other bunchgrasses dominate
Mountain big sagebrush may be present
1.3
Mountain big sagebrush dominant
Perennial understory reduced
1.1a
1.2a
1.1b
1.3a
1.3b
T1A
Current Potential State 2.0
2.1
Idaho fescue, western needlegrass and mountain big sagebrush dominate
Seeded species may be present
Annual non-native species present
2.2
Bitterbrush, snowberry and rabbitbrush may be sprouting
Perennial grasses increase
Sagebrush patchy
Seeded species may be present
Annual non-native species stable to increasing
2.1a
2.2a
2.1b
2.3a
2.3b
2.4a
2.2b
2.3 (at risk)
Sagebrush, rabbitbrush and other shrubs increase
Perennial understory reduced, bluegrass species may increase
Seeded species may be present
Annual non-native species stable to increasing
Utah and/or Western juniper may be present
2.4 (at risk)
Annual non-native grasses increase to sub-dominant / co-dominant with bunchgrasses in response to favorable growing conditions
Sagebrush may be present
Seeded species may be present
Utah and/or Western juniper may be present
2.4b
2.3c
T2A
R3A
T2B
Shrub State 3.0
3.1 (at risk)
Mountain big sagebrush dominates
Perennial bunchgrasses minor
Annual non-native species are present
Utah and/or Western juniper may be present
3.1a
3.2a
3.2
Bluegrass species dominate
Sprouting shrubs may be significant component
Utah and/or Western juniper may be present
T2C
R5A
T3A
Annual State 4.0
4.1
Annual non-native species dominate
Perennial grasses may be present but are subdominant
Sprouting shrubs may be present
4.1a
4.2a
4.2
Mountain big sagebrush and/or sprouting shrubs dominate overstory
Annual non-native species dominate understory
Perennial grasses may be present but are subdominant
T3B
R5B
T5A
Tree State 5.0
5.1
Utah and/or Western juniper co-dominate with mountain big sagebrush
Annual non-natives species present or co-dominant in understory
Perennial bunchgrasses present but declining
Sandberg's bluegrass increasing
Interspace bare ground significant
5.1a
5.2
Utah and/or Western juniper dominate
Mountain big sagebrush minor component
Understory is severely reduced; invasive species present
Bare ground interspaces large and connected
Pedestalling, sheet erosion may be significant

MLRA 23
Group 5
Ashy Slope 12-14"
R023XY094NV
KEY

Reference State 1.0 Community Phase Pathways
1.1a: Low severity fire or Aroga moth infestation creates sagebrush/grass mosaic; high severity fire significantly reduces sagebrush cover and leads to early/mid-seral community dominated by grasses and forbs.
1.1b: Time and lack of disturbance such as fire and/or excessive herbivory and/or chronic drought may also decrease perennial understory.
1.2a: Time and lack of disturbance such as fire allows for regeneration of sagebrush.
1.3a: Low severity fire or Aroga moth infestation creates sagebrush/grass mosaic.
1.3b: High severity fire or severe Aroga moth infestation significantly reduces sagebrush cover leading to early/mid-seral community.

Transition T1A: Introduction of non-native annual species.

Current Potential State 2.0 Community Phase Pathways
2.1a: Low severity fire or Aroga moth infestation creates grass/sagebrush mosaic; high severity fire significantly reduces sagebrush and leads to early/mid-seral community, dominated by grasses and forbs: non-native annual species present.
2.1b: Time and lack of disturbance such as fire and/or inappropriate grazing management and/or chronic drought facilitate an increased shrub overstory and decreased bunchgrass understory.
2.2a: Time and lack of disturbance allows for sagebrush reestablishment.
2.2b: Fall and spring growing conditions that favors the germination and production of non-native, annual grasses. Pathway typically occurs 3 to 5 years post-fire and 2.4 may be a transitory plant community.
2.3a: Low severity fire and/or Aroga moth infestation creates sagebrush/ bunchgrass mosaic. Brush management with minimal soil disturbance.
2.3b: High severity fire significantly reduces sagebrush and leads to early/mid-seral community. Brush management with minimal soil disturbance reduces sagebrush.
2.3c: Fall and spring growing season conditions that favors the germination and production of non-native annual grasses. 2.4 may be a transitory plant community.
2.4a: Fall and spring growing season conditions favoring perennial bunchgrass production and reduced cheatgrass production.
2.4b: Fall and spring growing season conditions unfavorable to cheatgrass production.

Transition T2A: Time and lack of disturbance such as fire combined with inappropriate grazing management (3.1).
Transition T2B: Multiple fires (4.1), inappropriate grazing management in the presence of annual non-native species (4.2).
Transition T2C: Time and lack of disturbance allows for an increase in tree cover; inappropriate grazing management and/or chronic drought can reduce fine fuels and lead to increased tree establishment and dominance (5.1).

Shrub State 3.0 Community Phase Pathways
3.1a: Fire and/or brush management with minimal soil disturbance.
3.2a: Time and lack of disturbance (not likely to occur).

Transition T3A: Catastrophic fire and/or soil disturbing vegetation and seeding treatments that fail (4.1). Inappropriate grazing management in the presence of annual non-native species (4.2).
Transition T3B: Time and a lack of fire allows for trees to dominate site; may be coupled with inappropriate grazing management (5.1).

Restoration R3A: Shrub removal/management with minimal soil disturbance coupled with seeding of desired species.

Annual State 4.0 Community Phase Pathways
4.1a: Time and lack of disturbance (unlikely to occur).
4.2a: Fire.

Tree State 5.0 Community Phase Pathways
5.1a: Time and lack of disturbance allows for tree maturation.

Restoration R5A: Tree removal and seeding of desired species or recovery of herbaceous understory.
Restoration R5B: Tree removal when Sandberg bluegrass is dominant and remains in understory.

Transition T5A: Catastrophic fire, inappropriate tree removal practices (4.1).

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by mountain big sagebrush and Idaho fescue. Thurber's and/or western needlegrass, and bluebunch wheatgrass are other important species associated with this site. Potential vegetative composition is about 70% grasses, 10% forbs and 20% shrubs and trees. Approximate ground cover (basal and crown) is 20 to 35 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	490	700	980
Shrub/Vine	126	180	252
Forb	70	100	140
Tree	14	20	28
Total	**700**	**1000**	**1400**

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**			490–810	
	Idaho fescue	FEID	*Festuca idahoensis*	400–500	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	20–80	–
	western needlegrass	ACOCO	*Achnatherum occidentale ssp. occidentale*	25–75	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	25–75	–
	Cusick's bluegrass	POCUE2	*Poa cusickii ssp. epilis*	10–40	–
2	**Secondary Perennial Grasses/Grasslikes**			20–80	
	threadleaf sedge	CAFI	*Carex filifolia*	5–30	–
	squirreltail	ELEL5	*Elymus elymoides*	5–30	–
	blue wildrye	ELGL	*Elymus glaucus*	5–30	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	5–30	–
	basin wildrye	LECI4	*Leymus cinereus*	5–30	–
Forb					
3	**Perennial**			50–150	
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	5–30	–
	lupine	LUPIN	*Lupinus*	5–30	–
Shrub/Vine					
4	**Primary Shrubs**			100–200	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	100–200	–
5	**Secondary Shrubs**			20–80	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	10–30	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	10–30	–
Tree					
6	**Evergreen**			5–20	
	western juniper	JUOC	*Juniperus occidentalis*	5–20	–

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. 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. 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. Canby’s 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. Canby’s 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. 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. 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.

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. 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. Western needlegrass provides valuable forage for many species of wildlife. 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. Canby’s 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. 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.

Hydrological functions

Runoff is high to very high. Permeability is slow to moderately slow. Hydrologic soil group is C. There are typically no rills. There may be a few, widely spaced and shallow, rills on steeper slopes (over 30% gradient). Water flow patterns and pedestals are typically non-existent but water flow patterns can rarely occur on steeper slopes in areas recently subjected to intense summer convection storms or rapid snowmelt. Frost heaving of shallow rooted plants should not be considered a "normal" condition. Gullies are non-existent in areas of this site that occur on stable landforms. 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.

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.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T43N R20E S3
UTM zone	N
UTM northing	273134
UTM easting	4617481
Latitude	41° 40′ 36″
Longitude	119° 43′ 31″
General legal description	SE 1/3 NW 1/4, Little Basin area, west side of Long Valley, 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
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	07/04/2014
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare. There may be a few, widely spaced and shallow, rills on steeper slopes (over 30% 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. Patterns are short (<1 m) and stable.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are typically non-existent.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ± 30%; surface rock fragments ± 35%

5. **Number of gullies and erosion associated with gullies:** Gullies are non-existent in areas of this site that occur on stable landforms.

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.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically moderate thin platy. Soil surface colors are dark browns and soils are typified by a mollic epipedon. Organic matter of the surface 2 to 4 inches is typically 1.50 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.

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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 structure or subsoil argillic horizons are not to be interpreted as compacted layers.

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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 (Idaho fescue)

    Sub-dominant: tall shrubs (mountain 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:

    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 (20-30%) and litter depth is <1/4 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) ± 1000 lbs/ac; Favorable: + 1400 lbs/ac; Unfavorable: + 700 lbs/ac

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 and annual mustards. Western juniper will increase and eventually dominate this site.

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