USDA Natural Resources
Conservation Service

Ecological site R023XY033NV
CLAYEY 10-14 P.Z.

Last updated: 4/10/2025
Accessed: 05/20/2025

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 Clayey Plateaus 10-12 PZ Sagebrush with Rhizomatous Grass 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/R023XY915NV

This site occurs on gently sloping plateaus with precipitation ranging from 9-14 inches. The elevation range for this group is from 4,200 to 6,000 feet with typical slope gradients that range from 2 to 4 percent. The soils in this site are typically moderately deep to deep and underlain by basalt parent material with clay textured surface soils. The thin surface layers are underlain by heavy clay subsoils having strong to massive structure. The fine textured soils swell on wetting then shrink and crack upon drying. When dry, the soils have wide cracks into which the granulated surface layers tend to slough. Upon wetting the cracks close. This continual, active, soil movement damages the root system of many plants. Infiltration of water is restricted once the surface soils are saturated and the site is subject to loss of water by runoff and evaporation. These soils normally have a high percentage of gravels and cobbles on the surface which occupy plant growing space yet provide a stabilizing effect on surface erosion conditions. Pedestalling of plants is common due to the high shrink-swell characteristics of the clay soils. Wind erosion potential is slight.

Associated sites

R023XY001NV	**CHURNING CLAY**
R023XY044NV	**VERY COBBLY CLAYPAN**

R023XY047NV	**GRAVELLY CLAY 8-10 P.Z.**

Similar sites

R023XY044NV	**VERY COBBLY CLAYPAN** ARAR8 dominant shrub
R023XY001NV	**CHURNING CLAY** ERNAN5 and ARAR8 dominant shrubs

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata*
Herbaceous	(1) *Pascopyrum smithii* (2) *Elymus elymoides*

Physiographic features

This site occurs on gently sloping to flat basalt plateaus and mountains. Slopes range from 0 to 8 percent, but slope gradients of 2 to 4 percent are most typical. Elevations are 4300 to 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Mountain
Elevation	4,300–6,000 ft
Slope	0–8%
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 (8)10 to 14 inches. Mean annual air temperature is 45 to 53 degrees F. The average growing season is about 90 to 120 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)	105 days
Freeze-free period (average)	
Precipitation total (average)	11 in

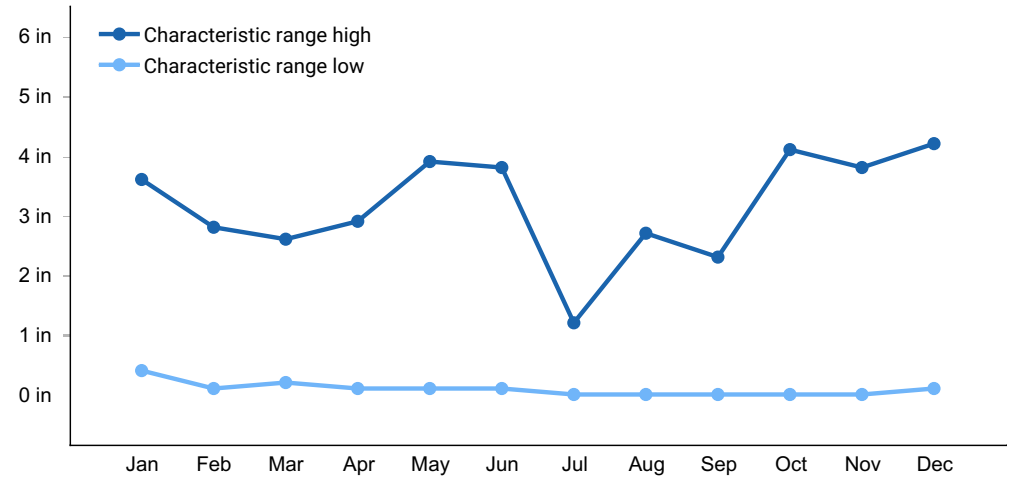


Figure 1. Monthly precipitation range

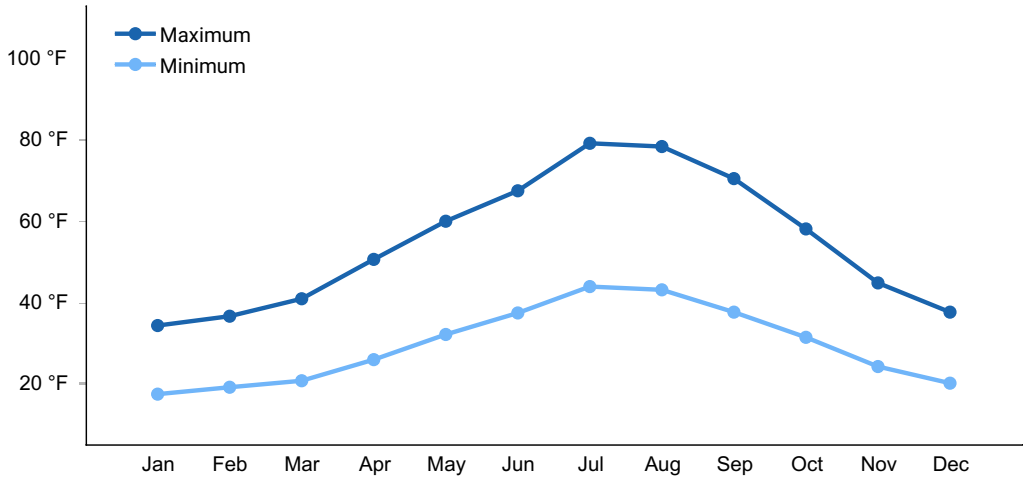


Figure 2. Monthly average minimum and maximum temperature

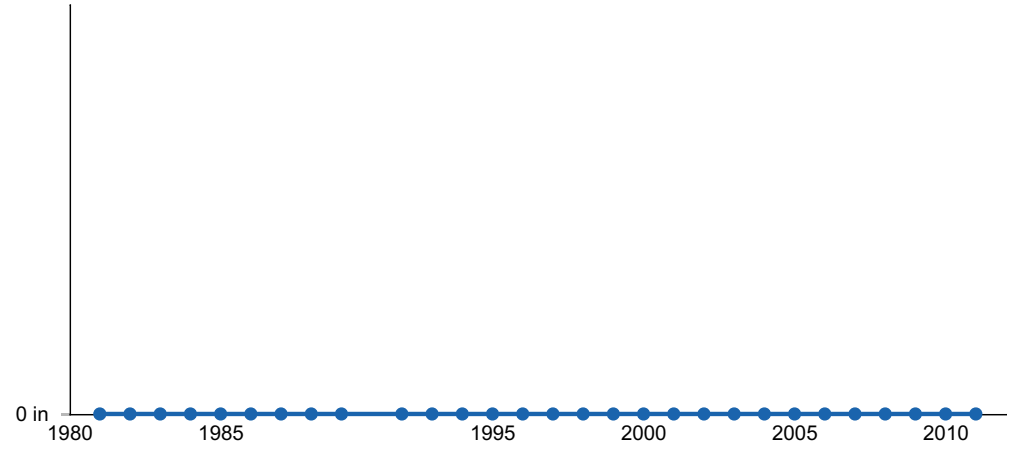


Figure 3. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are typically moderately deep to very deep and underlain by basalt parent material. Surface soils are clay textured. The thin surface layers are underlain by heavy clay subsoils having strong to massive structure. The fine textured soils swell on wetting then shrink and crack upon drying. When dry, the soils have wide cracks into which the granulated surface layers tend to slough. Upon wetting the cracks close. This continual, active, soil movement damages the root system of many plants. Infiltration of water is restricted once the surface soils are saturated and the site is subject to loss of water by runoff. These soils normally have a high percentage of gravels and cobbles on the surface which occupy plant growing space yet provide a stabilizing affect on surface erosion conditions. Pedestalling of plants is common due to the high shrink-swell characteristics of the clay soils. Wind erosion potential is slight. The soil series associated with this site include: Brubeck and Horsecamp.

Table 4. Representative soil features

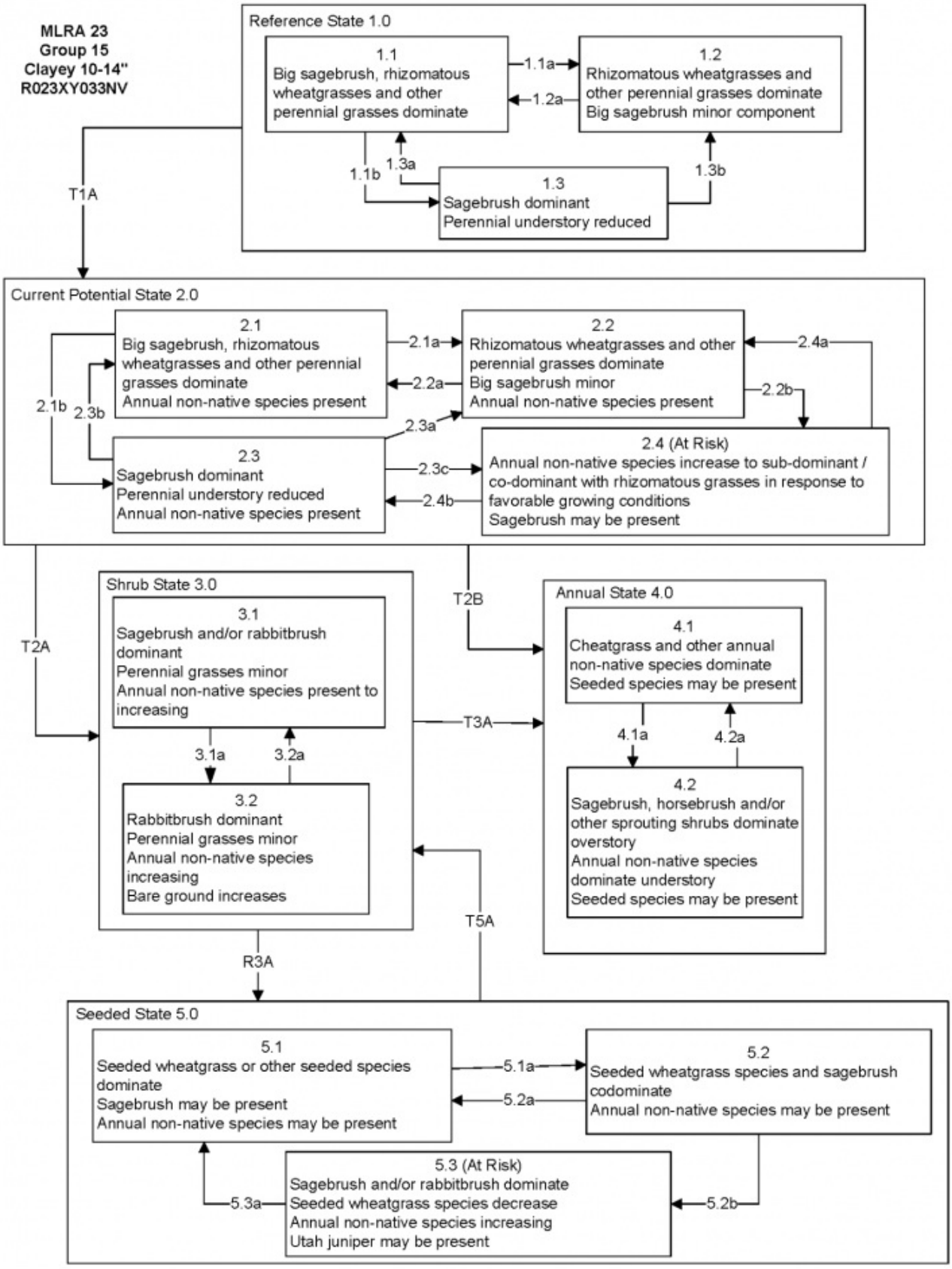
Surface texture	(1) Very cobbly clay (2) Very stony clay (3) Stony clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow
Soil depth	20–84 in
Surface fragment cover <=3"	5–13%
Surface fragment cover >3"	17–29%
Available water capacity (0-40in)	4.1–5.5 in
Calcium carbonate equivalent (0-40in)	0–8%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	1–16%
Subsurface fragment volume >3" (Depth not specified)	17–37%

Ecological dynamics

As ecological condition declines, palatable perennial grass and forb species will decrease while shrub species increase. Species likely to invade this site are cheatgrass, tansy mustard and other annual grasses and forbs. Littleleaf horsebrush and spiny hopsage are often the dominant shrub species following wildfire over this site. Fire on this site in fair to poor condition can produce cheatgrass and/or medusahead monocultures.

Fire Ecology:
Fire return intervals in basin big sagebrush are intermediate between mountain big sagebrush (15 to 25 years) and Wyoming big sagebrush (10 to 70 years). A naturally wide variation in fire frequency in this system is expected. Basin big sagebrush is readily killed when aboveground plant parts are charred by fire. Prolific seed production from nearby unburned plants coupled with high germination rates enables seedlings to establish rapidly following fire. 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 top-kills littleleaf horsebrush. Horsebrush species are rarely killed by fire. Littleleaf horsebrush is dormant in summer and fall, so fires in those seasons have almost no effect on established plants. When top-killed by fire, littleleaf horsebrush establishes by sprouting from the root crown. Spiny hopsage is considered to be somewhat fire tolerant and often survives fires that kill sagebrush. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy. Rubber rabbitbrush is often top-killed by fire. Rubber rabbitbrush is a fire-adapted species that is typically unharmed or enhanced by fire. Recovery time is often rapid to very rapid. Rubber rabbitbrush is often one of the first species to colonize burned areas by sprouting or from off-site seed. The major adaptation of western wheatgrass to fire is its rhizomatous growth form. During a fire the coarse culms usually burn fast with little or no heat transferred to the roots. Thickspike wheatgrass is quite tolerant of fire. Subsurface growing points and primarily rhizomatous reproduction may explain its ability to increase rapidly (within 2-5 years) following burning. 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. Creeping wildrye is top-killed by fire. Creeping wildrye is generally tolerant of fire but may be damaged by early season fire combined with dry soil conditions.

State and transition model


MLRA 23
Group 15
Clayey 10-14"
R023XY033NV
Reference State 1.0
1.1
Big sagebrush, rhizomatous wheatgrasses and other perennial grasses dominate
1.1a
1.2a
1.2
Rhizomatous wheatgrasses and other perennial grasses dominate
Big sagebrush minor component
1.1b
1.3a
1.3b
1.3
Sagebrush dominant
Perennial understory reduced
T1A
Current Potential State 2.0
2.1
Big sagebrush, rhizomatous wheatgrasses and other perennial grasses dominate
Annual non-native species present
2.1a
2.2a
2.2
Rhizomatous wheatgrasses and other perennial grasses dominate
Big sagebrush minor
Annual non-native species present
2.4a
2.2b
2.1b
2.3b
2.3a
2.3
Sagebrush dominant
Perennial understory reduced
Annual non-native species present
2.3c
2.4b
2.4 (At Risk)
Annual non-native species increase to sub-dominant / co-dominant with rhizomatous grasses in response to favorable growing conditions
Sagebrush may be present
T2A
T2B
Shrub State 3.0
3.1
Sagebrush and/or rabbitbrush dominant
Perennial grasses minor
Annual non-native species present to increasing
T3A
Annual State 4.0
4.1
Cheatgrass and other annual non-native species dominate
Seeded species may be present
3.1a
3.2a
4.1a
4.2a
3.2
Rabbitbrush dominant
Perennial grasses minor
Annual non-native species increasing
Bare ground increases
4.2
Sagebrush, horsebrush and/or other sprouting shrubs dominate overstory
Annual non-native species dominate understory
Seeded species may be present
T5A
R3A
Seeded State 5.0
5.1
Seeded wheatgrass or other seeded species dominate
Sagebrush may be present
Annual non-native species may be present
5.1a
5.2a
5.2
Seeded wheatgrass species and sagebrush codominate
Annual non-native species may be present
5.3a
5.2b
5.3 (At Risk)
Sagebrush and/or rabbitbrush dominate
Seeded wheatgrass species decrease
Annual non-native species increasing
Utah juniper may be present

MLRA 23
Group 15
Clayey 10-14"
R023XY033NV

Reference State 1.0 Community Phase Pathways
1.1a: Low severity fire creates grass/sagebrush 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 or drought. Excessive herbivory may also decrease perennial understory.
1.2a: Time and lack of disturbance allows for shrub regeneration.
1.3a: High severity fire significantly reduces sagebrush cover leading to early/mid-seral community.
1.3b: Low severity fire or Aroga moth infestation resulting in a mosaic pattern.

Transition T1A: Introduction of non-native species such as bulbous bluegrass, cheatgrass and thistles.

Current Potential State 2.0 Community Phase Pathways
2.1a: Low severity fire creates grass/sagebrush mosaic; high severity fire significantly reduces sagebrush cover 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 or drought. Inappropriate grazing management may also reduce perennial understory.
2.2a: Time and lack of disturbance allows for regeneration of sagebrush.
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 or Aroga moth infestation creates sagebrush/grass mosaic. Brush management with minimal soil disturbance; late-fall/winter grazing causing mechanical damage to sagebrush.
2.3b: High severity fire significantly reduces sagebrush cover leading to early mid-seral community.
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: Growing season conditions favoring perennial bunchgrass production and reduced cheatgrass production.
2.4b: Growing season conditions favoring perennial bunchgrass production and reduced cheatgrass production.

Transition T2A: Time and lack of disturbance and/or inappropriate grazing management (3.1).
Transition T2B: High severity fire and/or soil disturbance (4.1). Inappropriate grazing that favors shrubs in the presence of non-native annual species (4.2).

Shrub State 3.0 Community Phase Pathways
3.1a: Fire.
3.2a: Time and lack of disturbance.

Transition T3A: Catastrophic fire and/or soil disturbance (4.1). Inappropriate grazing management in the presence of non-native annual species (4.2).
Restoration R3A: Brush management, combined with seeding of desired species.

Annual State 4.0 Community Phase Pathways
4.1a: Time and lack of fire.
4.2a: Fire.

Seeded State 5.0 Community Phase Pathways
5.1a: Time and lack of disturbance may be coupled with inappropriate grazing management.
5.2a: Low severity fire.
5.2b: Inappropriate grazing management reduces bunchgrasses and increases density of sagebrush; usually a slow transition.
5.3a: Fire or brush treatment with minimal soil disturbance.

Transition T5A: Inappropriate grazing management favoring shrub dominance and reducing perennial bunchgrasses will lead to phase 3.1. Soil disturbing treatments and/or fire will lead to phase 3.2.

State 1
Reference Plant Community

Community 1.1
Community Phase

The reference plant community is dominated by big sagebrush, western wheatgrass, bottlebrush squirreltail, and creeping wildrye. Potential vegetative composition is about 50% grasses, 5% forbs and 45% shrubs. Approximate ground cover (basal and crown) is about 15 to 25 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	175	300	400
Shrub/Vine	158	270	360
Forb	17	30	40
Total	**350**	**600**	**800**

Community 1.2
Community Phase

Community 1.3
Community Phase

Pathway a
Community 1.1 to 1.2

Pathway b
Community 1.1 to 1.3

Pathway b
Community 1.3 to 1.1

Pathway a
Community 1.3 to 1.2

State 2
Current Potential State

Community 2.1
Community Phase

Community 2.2

Community Phase

Community 2.3
Community Phase

Pathway a
Community 2.1 to 2.2

Pathway b
Community 2.1 to 2.3

Pathway a
Community 2.2 to 2.1

Pathway b
Community 2.3 to 2.1

Pathway a
Community 2.3 to 2.2

State 3
Shrub State

Community 3.1
Community Phase

State 4
Annual State

Community 4.1
Community Phase

Community 4.2
Community Phase

Community 4.3
Community Phase

Pathway a
Community 4.1 to 4.2

Pathway a

Community 4.2 to 4.1

Pathway a
Community 4.3 to 4.1

Transition A
State 1 to 2

Transition A
State 2 to 3

Transition B
State 2 to 4

Transition A
State 3 to 4

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**			132–288	
	squirreltail	ELEL5	*Elymus elymoides*	30–90	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	45–75	–
	western wheatgrass	PASM	*Pascopyrum smithii*	45–75	–
	beardless wildrye	LETR5	*Leymus triticoides*	12–48	–
2	**Secondary Perennial Grasses**			30–60	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	3–30	–
	sedge	CAREX	*Carex*	3–30	–
	basin wildrye	LECI4	*Leymus cinereus*	3–30	–
	Sandberg bluegrass	POSE	*Poa secunda*	3–30	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	3–30	–
Forb					

Forb					
3	**Perennial**			30–60	
	oneflower helianthella	HEUN	*Helianthella uniflora*	3–12	–
	povertyweed	IVAX	*Iva axillaris*	3–12	–
	skeletonplant	LYGOD	*Lygodesmia*	3–12	–
	phlox	PHLOX	*Phlox*	3–12	–
Shrub/Vine					
4	**Primary Shrubs**			114–288	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	30–75	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	30–75	–
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	30–60	–
	spiny hopsage	GRSP	*Grayia spinosa*	12–48	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	12–30	–
5	**Secondary Shrubs**			30–60	
	fourwing saltbush	ATCA2	*Atriplex canescens*	30–60	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	30–60	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing managment should be keyed to perennial grass production. Western wheatgrass provides important forage for domestic sheep. Fall regrowth cures well on the stem, so western wheatgrass is good winter forage for domestic livestock. Thickspike wheatgrass is palatable to all classes of livestock and wildlife. It is a preferred feed for cattle, sheep, horses, and elk in spring and is considered a desirable feed for deer and antelope in spring. It is considered a desirable feed for cattle, sheep, and horses in summer, fall, and winter. Thickspike wheatgrass's extensive rhizome system allows established stands to withstand heavy grazing and trampling. 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. Creeping wildrye can be used for forage and is very palatable to all livestock. Once established it is very rhizomatous and maintains stands for many years. Basin big sagebrush may serve as emergency food during severe winter weather, but it is not usually sought out by livestock. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available.

Littleleaf horsebrush is poisonous; containing compounds that cause liver damage in domestic sheep. Domestic sheep consumption of littleleaf horsebrush is limited, but they may utilize littleleaf horsebrush heavily when other forage is scarce. Cattle are not affected by the toxins, but seldom browse the shrub. Spiny hopsage provides a palatable and nutritious food source for livestock, particularly during late winter through spring. Domestic sheep browse the succulent new growth of spiny hopsage in late winter and early spring. In general, livestock forage only lightly on rubber rabbitbrush during the summer, but winter use can be heavy in some locations. Fall use is variable, but flowers are often used by livestock. A few leaves and the more tender stems may also be used.

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 Interpertations:
Basin big sagebrush is the least palatable of all the subspecies of big sagebrush. Basin big sagebrush is browsed by mule deer from fall to early spring, but is not preferred. 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. Littleleaf horsebrush is an important forage species for many wildlife species. Spiny hopsage provides a palatable and nutritious food source for big game animals. Spiny hopsage is used as forage to at least some extent by domestic goats, deer, pronghorn, and rabbits. Wildlife forage only lightly on rubber rabbitbrush during the summer, but winter use can be heavy in some locations. Fall use is variable, but flowers are often used by wildlife. A few leaves and the more tender stems may also be used. The forage value of rubber rabbitbrush varies greatly among subspecies and ecotypes. Elk consume western wheatgrass during the fall, winter, spring, and summer. Western wheatgrass is used by various small mammals. In the spring, thickspike wheatgrass is a preferred feed for elk and is considered desirable feed for deer and antelope. It is desirable feed for elk during summer, fall, and winter. Thickspike wheatgrass is also a component of black-tailed jackrabbit diets. Thickspike wheatgrass provides some cover for small mammals and birds. Bottlebrush squirreltail is a dietary component of several wildlife species. Creeping wildrye is used for forage for many wildlife species and is often used for cover.

Hydrological functions

Runoff is medium to high. Permeability is slow. Hydrologic soil group is D. Rills, presence of waterflow patterns and pedestals formed due to erosion are rare. Frost heaving and shrink-swell soil activity that affects shallow rooted plants are not indicators of soil erosion.

Gullies are none to very rare. Ponding occurs in many areas. Shallow-rooted perennial grass plants [i.e., bottlebrush squirreltail & Sandberg's bluegrass] and perennial forbs having thick tap roots slow runoff. Infiltration is slow to very slow once the surface soil is wetted. 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

Some Native American peoples used the bark of big sagebrush to make rope and baskets. 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. Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour.

Other information

Basin big sagebrush shows high potential for range restoration and soil stabilization. Basin big sagebrush grows rapidly and spreads readily from seed. 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. Horsebrushes provide critically needed ground cover and protection from erosion on dry sites that are otherwise often sparsely vegetated. Spiny hopsage has moderate potential for erosion control and low to high potential for long-term revegetation projects. It can improve forage, control wind erosion, and increase soil stability on gentle to moderate slopes. Spiny hopsage is suitable for highway plantings on dry sites in Nevada. Western wheatgrass is a good soil binder and is well suited for reclamation of disturbed sites. Thickspike is a good revegetation species because it forms tight sod under dry rangeland conditions, has good seedling strength, and performs well in low fertility or eroded sites. It does not compete well with aggressive introduced grasses during the establishment period, but are very compatible with slower developing natives, bluebunch wheatgrass (Pseudoroegneria spicata), western wheatgrass (Pascopyrum smithii), and needlegrass (Achnatherum spp.) species. It’s drought tolerance combined with rhizomes, fibrous root systems, and good seedling vigor make these species ideal for reclamation in areas receiving 8 to 20 inches annual precipitation. Thickspike wheatgrass can be used for hay production and will make nutritious feed, but is more suited to pasture use. Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation. Creeping wildrye is primarily used for reclamation of wet, saline soils.

Type locality

Location 1: Lassen County, CA	
Township/Range/Section	T30N R16E S2
UTM zone	N
UTM northing	742516
UTM easting	4485817
Latitude	40° 29′ 15″
Longitude	120° 8′ 19″
General legal description	SW 1/4 NW 1/4, About 5.1 miles east of Big Mud Flat on Smoke Creek Road, Lassen 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

BH

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)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006

Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are rare.

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2. **Presence of water flow patterns:** Water flow patterns are rare.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals formed due to erosion are rare. Frost heaving and shrink-swell soil activity that affects shallow rooted plants are not indicators of soil erosion.

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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 ± 45%; surface rock fragments ±15 to 35%; shrub canopy 20 to 30%; basal area for perennial herbaceous plants =5%.

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5. **Number of gullies and erosion associated with gullies:** Gullies are none to very rare.

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) is expected to move the distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during catastrophic events.

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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 4 to 6 on the heavy clay surface 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 granular at the immediate surface grading to platy or massive below. Soil surface colors are light and the soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is typically less than 1.5 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Runoff is slow to very slow and ponding occurs in many areas. Shallow-rooted perennial grass plants [i.e., bottlebrush squirreltail & Sandberg"s bluegrass] and perennial forbs having thick tap roots slow runoff. Infiltration is slow to very slow once the surface soil is wetted. 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 not typical. Platy or massive sub-surface horizons and heavy clay surface soils 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: Reference Plant Community: Tall shrubs (big sagebrush) >> shallow-rooted or rhizomatous, cool season, perennial grasses. (By above ground production)

    Sub-dominant: Deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, annual and perennial forbs > deep-rooted, cool season, perennial bunchgrasses. (By above ground production)

    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 are

somewhat common and standing dead shrub canopy material may be as much as 25% of total woody canopy; many of the mature bunchgrasses (±25%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (±5%) 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 May) ± 600 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:** Cheatgrass, medusahead, Russian thistle, and annual mustards are all invaders on this site.(liitleleaf horsebrush & spiny hopsage aggressive increasers following wildfire)

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