USDA Natural Resources Conservation Service

Ecological site R029XY010NV
LOAMY SLOPE 8-10 P.Z.

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 029X–Southern Nevada Basin and Range

The Southern Nevada Basin and Range MLRA (29) represents the transition from the Mojave Desert to the Great Basin. It is cooler and wetter than the Mojave. It is warmer and typically receives more summer precipitation than the Great Basin. This area is in Nevada (73 percent), California (25 percent), and Utah (2 percent). It makes up about 26,295 square miles (68,140 square kilometers). Numerous national forests occur in the area, including the San Bernardino, Angeles, Sequoia, Inyo, Humboldt-Toiyabe, and Dixie National Forests. Portions of Death Valley National Monument, the Nuclear Regulatory Commission's Nevada Test Site, the Hawthorne Ammunition Depot, and the Nellis Air Force Range in Nevada and the China Lake Naval Weapons Center in California also are in this MLRA. The northeast part of the Paiute Indian Reservation and the southern third of the Walker River Indian Reservation are in the part of this MLRA in Nevada, and the Lone Pine, Fort Independence, and Big Pine Indian Reservations are in the part in California.
Physiography:
The entire area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The area of broad, nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by sloping fans and pluvial lake terraces. The mountains are uplifted fault blocks with steep side slopes and not well dissected due to limited annual precipitation. Most of the valleys in this MLRA are closed basins or bolsons containing sinks or playa lakes.
Geology:
The mountains are dominated by Pliocene and Miocene andesite and basalt rocks, Paleozoic and Precambrian carbonate rocks prominent in some areas. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments (Pliocene and Miocene) are in the western and eastern thirds of this MLRA. The valleys consist mostly of alluvial fill and playa deposits at the lowest elevations in the closed basins.
Climate:
The average annual precipitation is 3 to 12 inches (75 to 305 millimeters) in most of this area. It may be as high as 29 inches (735 millimeters), on the higher mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Summers are dry, but sporadic storms are common in July and August.
Water Resources:
Water resources are scarce. Ground water and surface water sources are limited. Streams are small and intermittent. Quality of surface water in naturally degraded as streams cross area of valley fill effected by dissolved salts. Irrigation water may raise the levels of dissolved salts and suspended sediments causing contamination.
Soils:
Dominant soil orders include Entisols and Aridisols.

Ecological site concept

The Loamy Slope 8-10 P.Z. site occurs on piedmont slopes, rock pediments, hills, and lower mountain sideslopes on all exposures. Slopes range from 4 to 75 percent, but slope gradients of 15 to 50 percent are typical. Elevations are 4400 to about 8200 feet. The soils are very shallow to moderately deep and are derived from a variety of parent materials. The surface may be stony, cobbly or gravelly.

Associated sites

R029XY008NV	**SHALLOW CALCAREOUS LOAM 8-12 P.Z.**
R029XY016NV	**LOAMY UPLAND 5-8 P.Z.**
R029XY049NV	**SANDY LOAM 8-12 P.Z.**
R029XY075NV	**LOAMY SLOPE 10-12 P.Z.**
R029XY077NV	**SHALLOW GRAVELLY LOAM 8-10 P.Z.**

Similar sites

R029XY029NV	**LOAMY 10-12 P.Z.** Slopes less steep; more productive site
R028BY006NV	**SHALLOW CALCAREOUS LOAM 10-12 P.Z.** Slopes more steep; more productive site
R029XY049NV	**SANDY LOAM 8-12 P.Z.** Slopes less steep; more productive site; coarse textured soils
R029XY075NV	**LOAMY SLOPE 10-12 P.Z.** ARTRV present; more productive site
R029XY073NV	**BOULDERY SLOPE 8-12 P.Z.** ACSP12 dominant grass; very stony/bouldery surface

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. wyomingensis*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Hesperostipa comata*

Physiographic features

The Loamy Slope 8-10 P.Z. site occurs on piedmont slopes, rock pediments, hills, and lower mountain sideslopes on all exposures. Slopes range from 4 to 75 percent, but slope gradients of 15 to 50 percent are typical. Elevations are 4400 to about 8200 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope (3) Pediment
Runoff class	Medium to very high
Elevation	4,400–8,200 ft
Slope	4–75%
Water table depth	72 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid with cool, moist winters and warm, dry summers. Average annual precipitation is 8 to 10(11) inches. Mean annual air temperature is 49 to 55 degrees F. The average growing season is about 130 to 150 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	94-118 days
Freeze-free period (characteristic range)	139-153 days
Precipitation total (characteristic range)	5-6 in
Frost-free period (actual range)	87-124 days
Freeze-free period (actual range)	133-155 days
Precipitation total (actual range)	5-7 in
Frost-free period (average)	106 days
Freeze-free period (average)	146 days
Precipitation total (average)	6 in

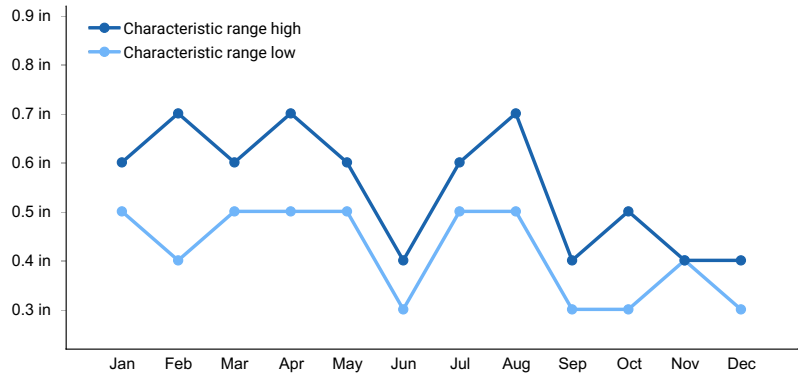


Figure 1. Monthly precipitation range

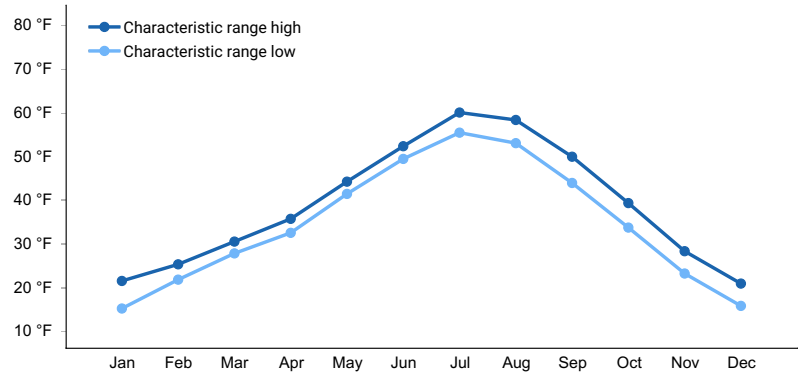


Figure 2. Monthly minimum temperature range

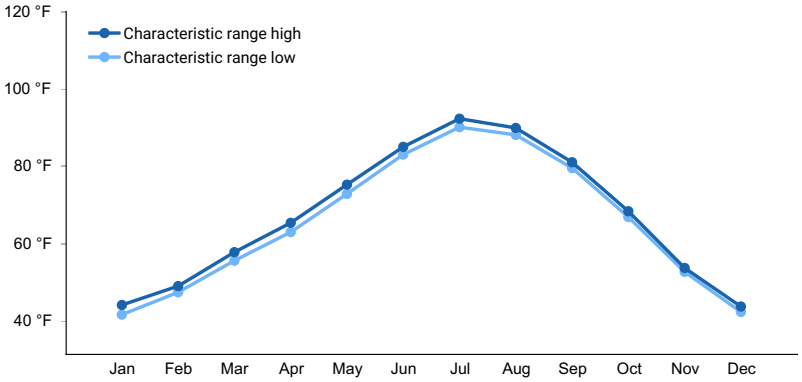


Figure 3. Monthly maximum temperature range

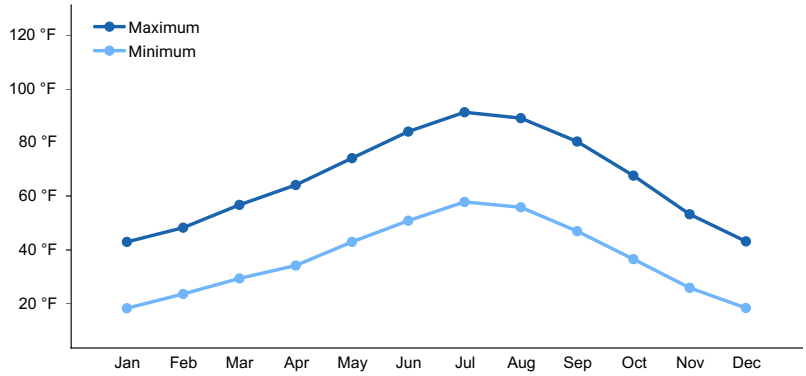


Figure 4. Monthly average minimum and maximum temperature

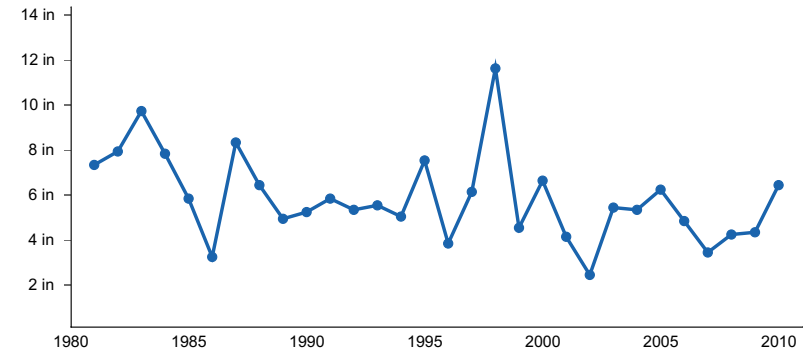


Figure 5. Annual precipitation pattern

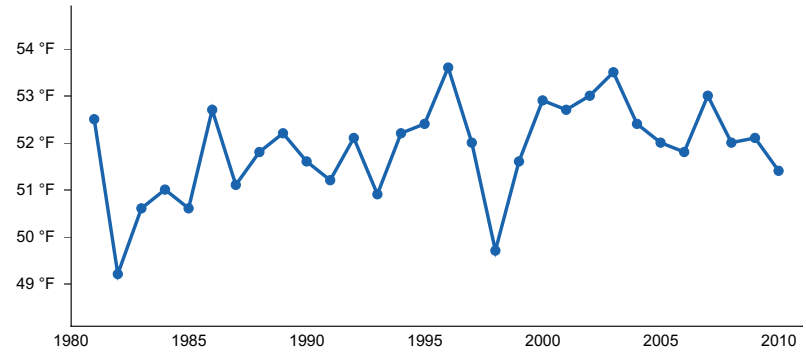


Figure 6. Annual average temperature pattern

Climate stations used

- (1) TWIN SPRING FALLINI [USC00268443], Tonopah, NV
- (2) TONOPAH [USW00023153], Tonopah, NV
- (3) GOLDFIELD [USC00263285], Goldfield, NV

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow to moderately deep and are derived from a variety of parent materials. The surface may be stony, cobbly or gravelly. Water intake rates are slow to moderately rapid, available water capacity is very low, runoff is low to very high and soils are well drained to somewhat excessively drained. Soil stability values should be 3 to 6 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. The soil moisture regime is aridic bordering on xeric and the temperature regime is mesic. These soils typically have an argillic horizon. The soil series associated with this site include: Calpeak, Entero, Espint, Gabbvally, Handpah, Jetcop, Malmesa, Mina, Richinde, Schader,

Thike, Wahguyhe, and Zoate.

Table 4. Representative soil features

Parent material	(1) Residuum–volcanic rock (2) Colluvium–welded tuff (3) Colluvium–volcanic rock
Surface texture	(1) Very stony loam (2) Extremely gravelly sandy loam (3) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Slow to moderately rapid
Soil depth	3–40 in
Surface fragment cover <=3"	23–69%
Surface fragment cover >3"	0–15%
Available water capacity (0-40in)	0.4–2.2 in
Calcium carbonate equivalent (0-40in)	0–20%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	17–60%
Subsurface fragment volume >3" (Depth not specified)	2–5%

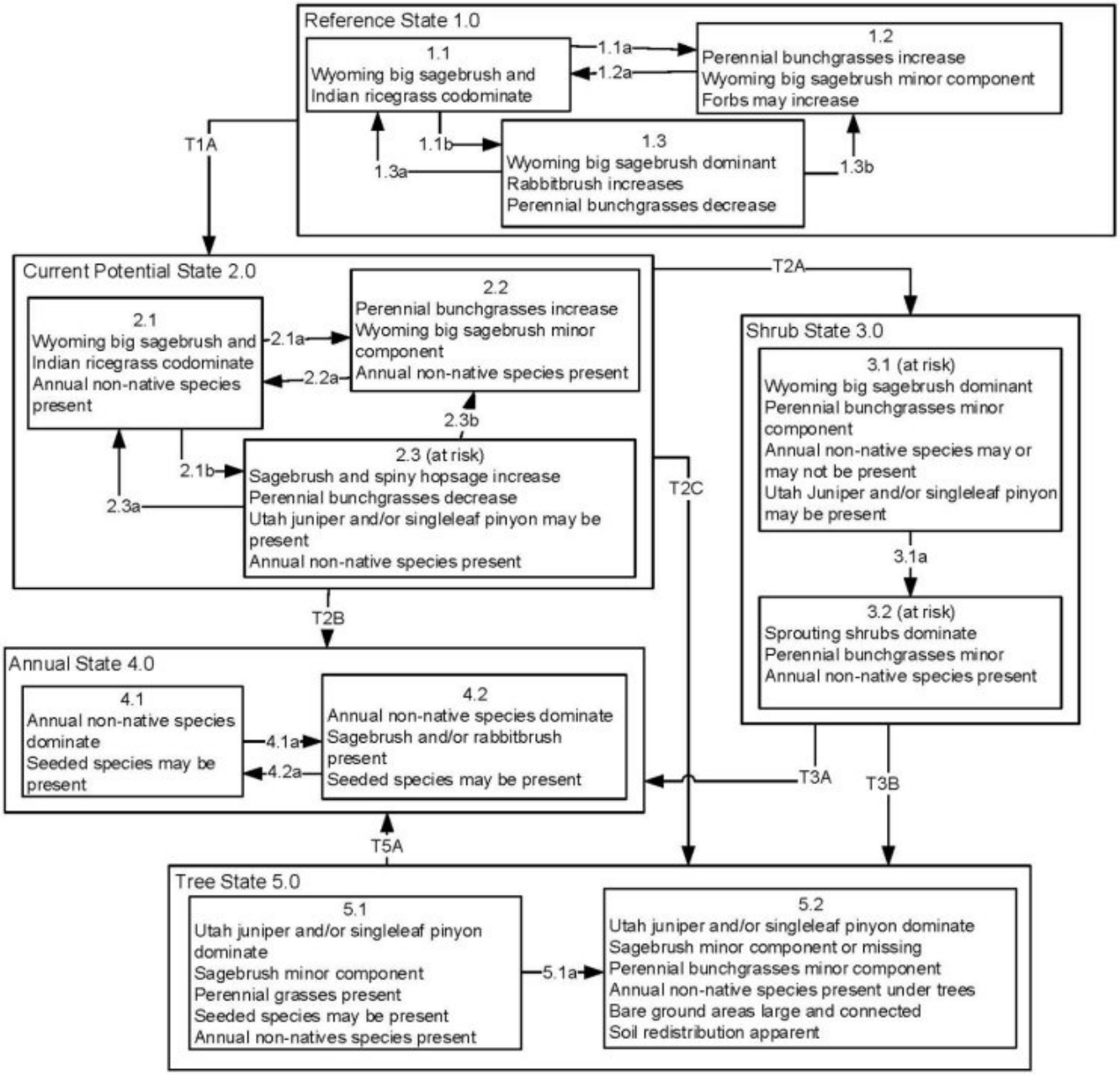
Ecological dynamics

Where management results in abusive livestock use, Wyoming big sagebrush and Douglas rabbitbrush will increase as Indian ricegrass, needleandthread, and fourwing saltbush decrease. Galleta will initially increase with wildfire. Species likely to invade this site are cheatgrass, Douglas' rabbitbrush, snakeweed, halogeton, Russian thistle, annual mustards, and bassia. Utah juniper increases on this site where it occurs adjacent to juniper woodland areas. Banana yucca typically occurs on this site in the eastern portion of MLRA 29.

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 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. Fires in Wyoming big sagebrush communities are usually not continuous, and remnant plants are the principal means of postfire reproduction. Nevada ephedra generally sprouts after fire damages aboveground vegetation. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. However, severe fires may kill shallowly buried regenerative structures. Green ephedra generally sprouts vigorously from the roots or woody root crown after fire and rapidly produces aboveground biomass from surviving meristematic tissue. Fire top-kills or kills fourwing saltbush, depending upon ecotype. Fourwing saltbush may sprout after top-kill. Fourwing saltbush probably establishes primarily from seed after fire, with some populations also regenerating vegetatively.
Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas. Needleandthread grass is top-killed by fire. It may be killed if the aboveground stems are completely consumed. Needleandthread grass in sagebrush

ecosystems is classified as slightly damaged by fire, and in intermountain rangelands, as severely damaged. Needleandthread grass sprouts from the caudex following fire, if heat has not been sufficient to kill underground parts. Recovery usually takes 2 to 10 years. Needlegrasses are damaged by burning due to the dense plant material that can burn slowly and long, charring to the growing points. Late summer and early fall fires are least harmful. Sandberg bluegrass is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Its rapid maturation in the spring also reduces fire damage, since it is dormant when most fires occur. Galleta is a rhizomatous perennial which can resprout after top-kill by fire.

State and transition model


Reference State 1.0
1.1
Wyoming big sagebrush and
Indian ricegrass codominate
1.1a
1.2a
1.2
Perennial bunchgrasses increase
Wyoming big sagebrush minor component
Forbs may increase
1.1b
1.3a
1.3
Wyoming big sagebrush dominant
Rabbitbrush increases
Perennial bunchgrasses decrease
1.3b
T1A
Current Potential State 2.0
2.1
Wyoming big sagebrush and
Indian ricegrass codominate
Annual non-native species
present
2.1a
2.2a
2.2
Perennial bunchgrasses increase
Wyoming big sagebrush minor
component
Annual non-native species present
2.3b
2.1b
2.3a
2.3 (at risk)
Sagebrush and spiny hopsage increase
Perennial bunchgrasses decrease
Utah juniper and/or singleleaf pinyon may be
present
Annual non-native species present
T2A
T2C
Shrub State 3.0
3.1 (at risk)
Wyoming big sagebrush dominant
Perennial bunchgrasses minor
component
Annual non-native species may or
may not be present
Utah Juniper and/or singleleaf pinyon
may be present
3.1a
3.2 (at risk)
Sprouting shrubs dominate
Perennial bunchgrasses minor
Annual non-native species present
T2B
Annual State 4.0
4.1
Annual non-native species
dominate
Seeded species may be
present
4.1a
4.2a
4.2
Annual non-native species dominate
Sagebrush and/or rabbitbrush
present
Seeded species may be present
T3A
T3B
T5A
Tree State 5.0
5.1
Utah juniper and/or singleleaf pinyon
dominate
Sagebrush minor component
Perennial grasses present
Seeded species may be present
Annual non-natives species present
5.1a
5.2
Utah juniper and/or singleleaf pinyon dominate
Sagebrush minor component or missing
Perennial bunchgrasses minor component
Annual non-native species present under trees
Bare ground areas large and connected
Soil redistribution apparent

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: Low severity fire or Aroga moth infestation resulting in a mosaic pattern.
1.3b: High severity fire significantly reduces sagebrush cover leading to early/mid-seral community.

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.
2.3a: 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.

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).
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.

Transition T3A: Catastrophic fire and/or soil disturbance (4.1). Inappropriate grazing management in the presence of non-native annual 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).

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

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

Transition T5A: Catastrophic fire, inappropriate tree removal practices (5.1).

State 1
Reference State

Representative of the reference conditions prior to Euro-American settlement in the west.

Community 1.1
Wyoming big sagebrush/Indian ricegrass

The reference plant community is dominated by Wyoming big sagebrush, needle and thread and Indian ricegrass. Other important species occurring on this site are fourwing saltbush and ephedra. Potential vegetative composition is about 45 percent grasses, 5 percent forbs and 50 percent shrubs and scattered trees. Approximate ground cover (basal and crown) is 15 to 20 percent. Bare ground is approximately 50 percent and basal area for perennial herbaceous plants <5 percent. Dead branches within individual shrubs are common and standing dead shrub canopy material may be as much as 35 percent of total woody canopy. Mature bunchgrasses (approximately 20 percent) commonly have dead centers. Litter occurs between plant interspaces (approximately 20 percent cover) and depth of litter is approximately one-fourth inch.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	120	168	240
Grass/Grasslike	112	157	225
Forb	13	18	25
Tree	5	7	10
Total	**250**	**350**	**500**

State 2
Current Potential State

Representative of the current potential with the presence of non-native annuals. Non-native annuals have the ability to significantly change disturbance regimes and nutrient cycling dynamics.

State 3
Shrub State

Shrubs dominate the plant community and non-native annual species are found in the understory.

State 4
Annual State

Dominated by non-native annuals. Changes in disturbance return intervals and nutrient dynamics creating a positive feedback loop.

State 5
Tree State

Dominated by pinyon and/or juniper trees. Changes in disturbance return intervals over the long term allows for pinyon and/or juniper to dominate the site by controlling site resources.

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**			88–205	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	53–88	–
	needle and thread	HECO26	*Hesperostipa comata*	35–53	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–28	–

	James' galleta	PLJA	*Pleuraphis jamesii*	0–18	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–18	–
2	**Secondary Perennial Grasses**			7–35	
	Mormon needlegrass	ACAR14	*Achnatherum aridum*	2–11	–
	threeawn	ARIST	*Aristida*	2–11	–
	slimstalk spiderling	BOGR	*Boerhavia gracillima*	2–11	–
	squirreltail	ELEL5	*Elymus elymoides*	2–11	–
Forb					
3	**Perennial**			7–28	
	threeawn	ARIST	*Aristida*	2–11	–
	lupine	LUPIN	*Lupinus*	2–7	–
	phlox	PHLOX	*Phlox*	2–7	–
	globemallow	SPHAE	*Sphaeralcea*	2–7	–
4	**Annual**			0–10	
	blue grama	BOGR2	*Bouteloua gracilis*	2–11	–
Shrub/Vine					
5	**Primary Shrubs**			119–169	
	fourwing saltbush	ATCA2	*Atriplex canescens*	7–18	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	3–14	–
	mormon tea	EPVI	*Ephedra viridis*	4–14	–
	Forb, perennial	2FP	*Forb, perennial*	1–7	–
	lupine	LUPIN	*Lupinus*	2–7	–
	phlox	PHLOX	*Phlox*	2–7	–
	globemallow	SPHAE	*Sphaeralcea*	2–7	–
6	**Secondary Shrubs**			18–53	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	2–11	–
	spiny hopsage	GRSP	*Grayia spinosa*	2–11	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	2–11	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	2–11	–
	desert snowberry	SYLO	*Symphoricarpos longiflorus*	2–11	–
	banana yucca	YUBA	*Yucca baccata*	2–11	–
Tree					
7	**Evergreen**			2–11	
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	105–123	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	2–11	–
	mormon tea	EPVI	*Ephedra viridis*	2–11	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	2–11	–
	Utah juniper	JUOS	*Juniperus osteosperma*	2–11	–

Animal community

Livestock Interpretations:
This site is suited to grazing by domestic livestock. Grazing management should be keyed to Indian ricegrass, needleandthread, desert needlegrass, nluegrass galleta grass, and fourwing saltgrass production. Indian ricegrass

has good forage value for domestic sheep, cattle and horses. Indian ricegrass is often used most heavily in the late winter, when succulent and nutritious new green leaves are produced. It supplies a source of green feed before most other native grasses have produced much new growth. Needleandthread is important, especially in the spring for domestic livestock. Desert needlegrass is palatable to livestock and is grazed during the spring. Bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Sandberg bluegrass is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial bunchgrasses. When actively growing, galleta provides good to excellent forage for cattle and horses and fair forage for domestic sheep. Although not preferred, all classes of livestock may use galleta when it is dry. Domestic sheep show greater use in winter than summer months and typically feed upon central portions of galleta tufts, leaving coarser growth around the edges. Galleta may prove somewhat coarse to domestic sheep. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Green ephedra is an important browse species for big game animals. Green ephedra is heavily used by wildlife on winter ranges. Fourwing saltbush is one of the most palatable shrubs in the West. Its protein, fat, and carbohydrate levels are comparable to alfalfa. It provides nutritious forage for all classes of livestock. Palatability is rated as good for domestic sheep and domestic goats; fair for cattle; fair to good for horses in winter, poor for horses in other seasons.

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, and Wyoming big sagebrush communities are important winter ranges for big game. Pronghorn usually browse Wyoming big sagebrush heavily. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Open Wyoming sagebrush communities are preferred nesting habitat. 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. Leks are often located on low sagebrush sites, grassy openings, dry meadows, ridgetops, and disturbed sites. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Green ephedra is an important browse species for big game animals. Green ephedra is heavily used by wildlife on winter ranges. Fourwing saltbush provides valuable habitat and year-round browse for wildlife. Fourwing saltbush also provides browse and shelter for small mammals. Additionally, the browse provides a source of water for black-tailed jackrabbits in arid environments. Granivorous birds consume the fruits. Wild ungulates, rodent and lagomorphs readily consume all aboveground portions of the plant. Palatability is rated good for deer, elk, pronghorn and bighorn sheep. Indian ricegrass is eaten by pronghorn in "moderate" amounts whenever available. In Nevada it is consumed by desert bighorns. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. In Nevada, Indian ricegrass may even dominate jackrabbit diets during the spring through early summer months. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat large amounts of shattered Indian ricegrass seed lying on the ground. Needleandthread is moderately important as spring forage for mule deer, but use declines considerably as more preferred forages become available. Scribner’s needlegrass and bluegrass is palatable to wildlife and is grazed during the spring. Desert bighorn sheep of the Mojave Desert utilize galleta as forage. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species.

Hydrological functions

Rills are rare on this site. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt. Water flow patterns are rare but can be expected on steeper slopes in areas subjected to summer convection storms. Flow patterns are short and stable. Pedestals are rare with occurrence typically limited to area within water flow patterns. Frost heaving of shallow rooted plants should not be considered as normal condition. Gullies are rare in areas of this site that occur on stable landforms. Fine litter (foliage from grasses and annual and perennial forbs) are 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. Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., Indian ricegrass] slow runoff and increase infiltration. The sparse shrub canopy and associated litter break raindrop impact and provide a limited opportunity for snow catch and accumulation on this 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 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. Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Fourwing saltbush is traditionally important to Native Americans. They ground the seeds for flour. The leaves, placed on coals, impart a salty flavor to corn and other roasted food. Top-growth produces a yellow dye. Young leaves and shoots were used to dye wool and other materials. The roots and flowers were ground to soothe insect bites.
Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used seed as a reserve food source.

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. Nevada ephedra is useful for erosion control, and seedlings have been successfully planted onto reclaimed strip mines, with survival ranging from 12 to 94%. Atrazine may be effective in controlling Nevada ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine.
Green ephedra is listed as a successful shrub for restoring western rangeland communities and can be used to rehabilitate disturbed lands. It also has value for reducing soil erosion on both clay and sandy soils. Green ephedra establishes readily through direct seeding, transplants, and stem cuttings. Fourwing saltbush is widely used in rangeland and riparian improvement and reclamation projects, including burned area recovery. It is probably the most widely used shrub for restoration of winter ranges and mined land reclamation. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Needleandthread grass is useful for stabilizing eroded or degraded sites.

Inventory data references

NASIS data used for abiotic narratives and tables.

Type locality

Location 1: Nye County, NV	
Township/Range/Section	T14N R48E S18
General legal description	Stone Cabin Valley, Nye County, Nevada. This site also occurs in Mineral, Esmeralda and Lincoln County, Nevada.

Other references

Fire Effects Information System (Online; http://www.fs.fed.us/database/feis/plants/).

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

USDA-NRCS Plants Database (Online; http://www.plants.usda.gov).

Contributors

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Approval

Kendra Moseley, 2/20/2025

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 none to rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

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2. **Presence of water flow patterns:** Water flow patterns are none to rare but can be expected on steeper slopes in areas subjected to summer convection storms.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of water flow patterns.

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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 ± 50%; surface rock fragments 35 to 50%; shrub canopy less than 20%; basal area for perennial herbaceous plants < 5%.

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

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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. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. (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 platy or fine granular. Soil surface colors are light browns or grays and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is typically 1 to 1.5 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., Indian ricegrass] 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. Massive sub-surface horizons, subsoil argillic horizons or duripans are not to be interpreted as compacted layers.

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) > associated shrubs > shallow-rooted and/or rhizomatous, perennial grasses > deep-rooted, perennial forbs = fibrous, shallow-rooted, annual and perennial forbs

    Other: evergreen trees, succulents

    Additional:

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 35% of total woody canopy; some of the mature bunchgrasses (<20%) have dead centers

14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (± 20%) and litter depth is< ¼-inch.

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) ± 350 lbs/ac; Favorable years ± 500 lbs/ac and unfavorable years ± 250 lbs/ac.

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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, halogeton, Russian thistle, and annual mustards.

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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 production occur during drought years.
