

Ecological site R029XY008NV **SHALLOW CALCAREOUS LOAM 8-12 P.Z.**

Accessed: 05/13/2025

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.

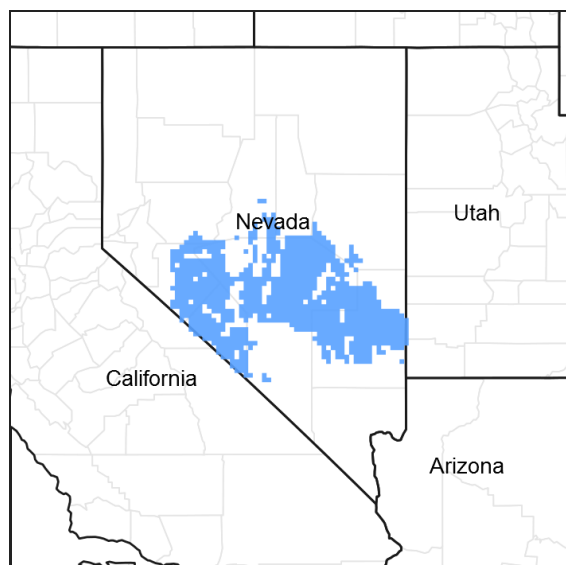


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

F029XY069NV	PIMO-JUOS WSG 0R0504 12 to 16
R029XY006NV	LOAMY 8-10 P.Z.
R029XY014NV	SHALLOW CALCAREOUS SLOPE 8-12 P.Z.

Similar sites

R029XY014NV	SHALLOW CALCAREOUS SLOPE 8-12 P.Z. PUST and JUOS minor species, if present
R029XY099NV	STONY CALCAREOUS HILL BEFR major shrub
R029XY028NV	SHALLOW CALCAREOUS SLOPE 12-14 P.Z. PSSPI dominant grass
R029XY081NV	SHALLOW CALCAREOUS HILL 10-14 P.Z. PUST-JUOS major species
R029XY104NV	SHALLOW CLAY LOAM 10-12 P.Z. ACHY-ACTH7 codominant grasses

R029XY045NV	STONY CALCAREOUS SLOPE 8-12 P.Z. ACSP12 codominant grass
R029XY015NV	SHALLOW CALCAREOUS HILL 8-10 P.Z. PUST-JUOS major species

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia nova</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i>

Physiographic features

This site occurs on fan remnants, inset fans, and mountains on all exposures. Slopes range from 0 to 75 percent, but slope gradients of 4 to 30 percent are most typical. Elevations are 4200 to 8000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Inset fan (3) Mountain
Flooding duration	Extremely brief (0.1 to 4 hours)
Flooding frequency	Very rare to rare
Ponding frequency	None
Elevation	1,280–2,438 m
Slope	0–75%
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cold, moist winters and warm, somewhat dry summers. Average annual precipitation is 8 to 12 inches. Mean annual air temperature is 49 to 55 degrees F. The average growing season is about 115 to 160 days.

Table 3. Representative climatic features

Frost-free period (average)	137 days
Freeze-free period (average)	0 days
Precipitation total (average)	254 mm

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 very deep or they have a restrictive layer within the main rooting depth. These soils are moderately to strongly calcareous and soil reaction increases with soil depth. Some soils will accumulate variable concentrations of salts and sodium in their lower substratum. The soils are often modified with high amounts of gravels, cobbles or stones on the surface. The available water capacity is very low to moderate and runoff is very low to very high depending on slope. Soil series associated with this site are Acana, Amtoft, Argalt, Armespan, Blackcan, Checkett, Chubard, Chuckridge, Deerlodge, Denmark, Eastmore, Haarvar, Harvan, Holsine, Indicove, Jericho, Kyler, Linco, Littleailie, Mijay, Minu, Molion, Nevoyer, Sieroclipf, Stewval, Timblin,

Ursine, Vinini, Whilphang, Wrango, Zadvar.

Table 4. Representative soil features

Surface texture	(1) Very gravelly coarse sand (2) Very gravelly sandy clay loam (3) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Rapid
Soil depth	10–213 cm
Surface fragment cover <=3"	5–70%
Surface fragment cover >3"	0–19%
Available water capacity (0-101.6cm)	0.76–13.46 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–30
Soil reaction (1:1 water) (0-101.6cm)	6.6–9.6
Subsurface fragment volume <=3" (Depth not specified)	3–72%
Subsurface fragment volume >3" (Depth not specified)	0–29%

Ecological dynamics

Black sagebrush and rabbitbrush increase while Indian ricegrass, needleandthread, and fourwing saltbush decrease with excessive use by cattle or horses. Galleta will initially increase but with continued abusive use, it also will also decrease. With excessive use by sheep, black sagebrush and forbs decrease as winterfat and rabbitbrush increase. Rodent activity is typically evidenced by small patches dominated by spiny hopsage. Shadscale is recognized as a seral community occurring following wildfire or other major disturbance to the black sagebrush community (particularly at the lower elevations of this site's occurrence). Cheatgrass and annual mustards are the species most likely to invade this site. Utah juniper readily increases on this site where it occurs adjacent to juniper woodland areas.

Fire Ecology:

Black sagebrush communities generally lack enough fine fuels to carry a fire. In addition to low fine fuel loading, wide shrub spacing makes fire infrequent or difficult to prescribe in black sagebrush types. Black sagebrush is highly susceptible to fire-caused mortality; plants are readily killed by all fire intensities. Following burning, reestablishment occurs through off-site sources. 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.

Winterfat is either killed or top-killed by fire, depending on fire severity. Severe fire can kill the perennating buds located several inches above the ground surface and thus kills the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the aboveground portions of winterfat and thus does not cause high mortality. 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 is classified as slightly to severely damaged by fire. 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. Galleta is a rhizomatous perennial which can resprout after top-kill by fire. 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.

State and transition model

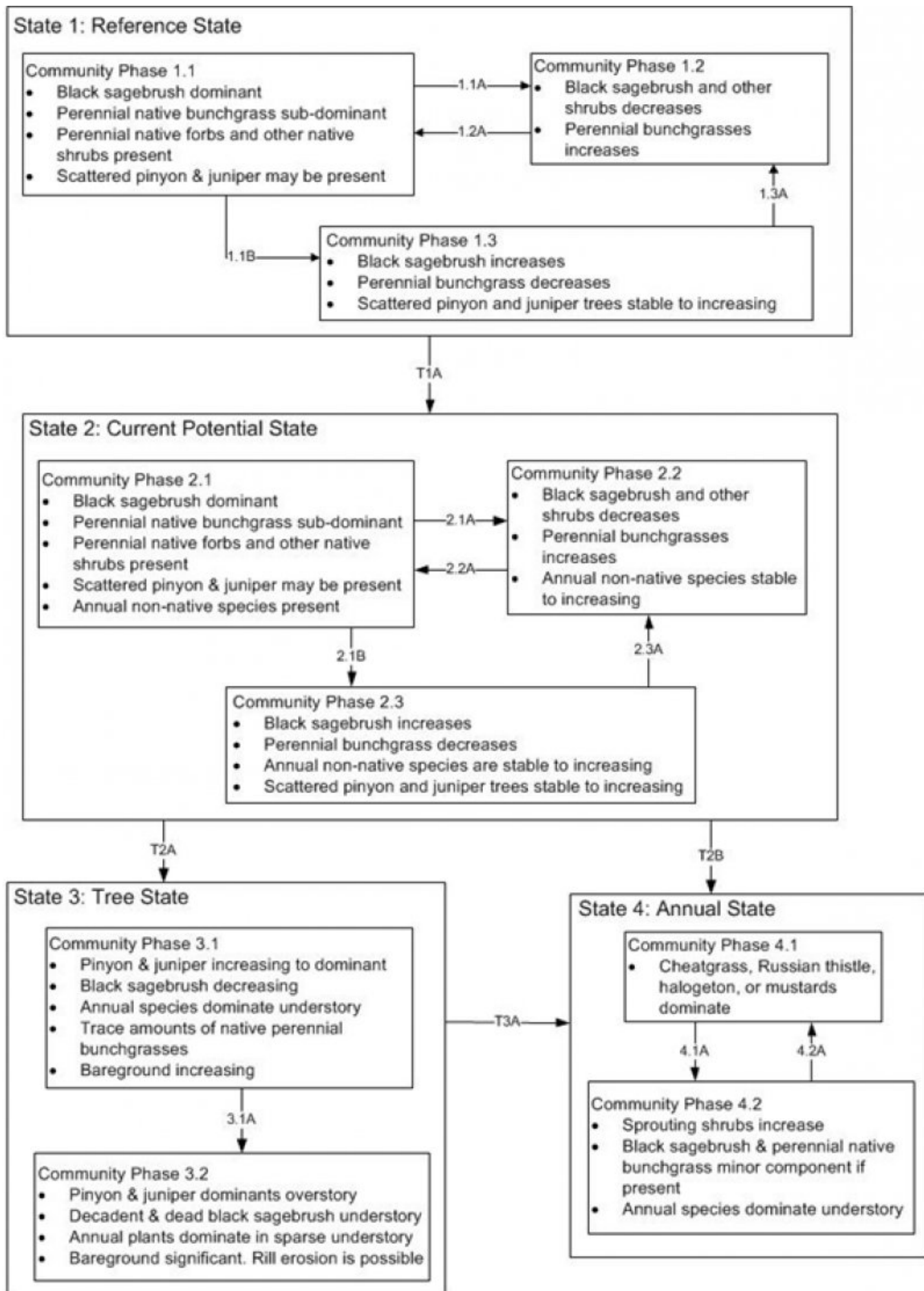


Figure 5. Draft STM

<p>State 1: Representative of the reference conditions prior to Euro-American settlement in the west.</p> <p>1.1A: fire or other disturbance that removes sagebrush canopy</p> <p>1.1B: absence of disturbance and natural regeneration over time</p> <p>1.2A: absence of disturbance and natural regeneration over time</p> <p>1.3A: fire or other disturbance that removes sagebrush canopy</p> <p>T1A: introduction of non-native species</p>	
<p>State 2: 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.</p> <p>2.1A: fire or other disturbance that removes sagebrush canopy</p> <p>2.1B: absence of disturbance and natural regeneration over time, may be coupled with inadequate rest and recovery from defoliation</p> <p>2.2A: absence of disturbance and natural regeneration over time</p> <p>2.3A: fire or other disturbance that removes sagebrush canopy</p> <p>T2A: long term absence of fire and natural regeneration of pinyon & juniper trees</p> <p>T2B: reoccurring severe fire</p>	
<p>State 3: 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.</p> <p>3.1A: absence of disturbance and natural regeneration over time</p> <p>T3A: reoccurring severe fire</p>	
<p>State 4: Dominated by non-native annuals. Changes in disturbance return intervals and nutrient dynamics creating a positive feedback loop.</p> <p>4.1A: absence of disturbance and natural regeneration over time</p> <p>4.2A: fire or other disturbance that removed shrub canopy</p>	

Figure 6. draft STM legend

State 1 Reference State

Community 1.1 Reference Plant Community

The reference plant community is dominated by black sagebrush, Indian ricegrass, and needleandthread. Galleta, winterfat, Nevada ephedra and fourwing saltbush are other important species associated with this site. Potential vegetative composition is about 50% grasses 5% forbs and 45% shrubs and trees. Approximate ground cover (basal and crown) is 20 to 30 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	140	280	392
Shrub/Vine	126	252	353
Forb	15	28	39
Total	281	560	784

State 2
Current Potenital State

State 3
Tree State

State 4
Annual State

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			163–353	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	112–196	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	28–84	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	11–45	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	11–28	–
2	Secondary Perennial Grasses			11–45	
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	3–17	–
	threeawn	ARIST	<i>Aristida</i>	3–17	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	3–17	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	3–17	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	3–17	–
Forb					
3	Perennial			11–45	
	globemallow	SPHAE	<i>Sphaeralcea</i>	3–11	–
	threeawn	ARIST	<i>Aristida</i>	2–9	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	2–9	–
4	Annual			0–17	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	2–9	–
Shrub/Vine					
5	Primary Shrubs			196–392	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	168–252	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	28–84	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–28	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–28	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	6–22	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	6–22	–
6	Secondary Shrubs			28–84	
	Forb, annual	2FA	<i>Forb, annual</i>	0–17	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	3–17	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	3–17	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	3–17	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	3–17	–
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	3–17	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	3–17	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	3–17	–
	banana yucca	YUBA	<i>Yucca baccata</i>	3–17	–

Animal community

Livestock Interpretations:

This site is suited to grazing by domestic cattle and sheep during the spring, early summer and fall. Grazing management should be keyed to Indian ricegrass and other perennial grass species. Indian ricegrass is highly palatable to all classes of livestock in both green and cured condition. It supplies a source of green feed before

most other native grasses have produced much new growth. Needleandthread provides highly palatable forage, especially in the spring before fruits have developed. Needlegrasses are grazed in the fall only if the fruits are softened by rain. 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. Sandberg 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. In winter, at lower elevations, black sagebrush is heavily utilized by domestic sheep. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Winterfat is an important forage plant for livestock, especially during winter when forage is scarce. Abusive grazing practices have reduced or eliminated winterfat on some areas even though it is fairly resistant to browsing. Effects depend on severity and season of grazing. 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:

Black sagebrush is a significant browse species within the Intermountain region. It is especially important on low elevation winter ranges in the southern Great Basin, where extended snow free periods allow animal's access to plants throughout most of the winter. In these areas it is heavily utilized by pronghorn and mule deer. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. 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. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Winterfat is an important forage plant for wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents and are a staple food for black-tailed jackrabbits. Mule deer and pronghorn antelope browse winterfat. Winterfat is used for cover by rodents. It is potential nesting cover for upland game birds, especially when grasses grow up through its crown. 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 spring forage for mule deer, but use declines considerably as more preferred forages become available. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species. Sandberg 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.

Hydrological functions

Runoff varies from very low to very high. Rills are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt. Water flow patterns are few and can be expected in areas subjected to summer convection storms or rapid snowmelt. Pedestals are rare. Occurrence is usually limited to areas of water flow patterns. Frost heaving of shallow rooted plants should not be considered a "normal" condition. Gullies are rare in areas of this site that occur on stable landforms. Where this site occurs on inset fans, gullies and head cuts associated with ephemeral channel entrenchment are common. Gullies and head cuts should be healing or stable. Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., Indian ricegrass] slow runoff and

increase infiltration. Shrub canopy and associated litter break raindrop impact.

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 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 Americans. The Paiutes used seed as a reserve food source.

Other information

Black sagebrush is an excellent species to establish on sites where management objectives include restoration or improvement of domestic sheep, pronghorn, or mule deer winter range. 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. Winterfat adapts well to most site conditions, and its extensive root system stabilizes soil. However, winterfat is intolerant of flooding, excess water, and acidic soils. 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. Needleandthread grass is useful for stabilizing eroded or degraded sites.

Type locality

Location 1: Nye County, NV	
Township/Range/Section	T4N R47E S3
General legal description	Stone Cabin Valley area, Nye County, Nevada.
Location 2: Esmeralda County, NV	
Township/Range/Section	T2S R43E S14
General legal description	About 7 miles northeast of Goldfield, Esmeralda County, Nevada.
Location 3: Lincoln County, NV	
Township/Range/Section	T4S R66E S11
General legal description	About 2 miles west of Caliente, Newman Canyon area, Lincoln County, Nevada.

Other references

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

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

Contributors

HA/GC/VWM

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	
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.

2. **Presence of water flow patterns:** Water flow patterns none to rare. A few (short (1m and stable) and can be expected in areas subjected to summer convection storms or rapid snowmelt.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 30 to 50% depending on amount of surface rock fragments.

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

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

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 3 to 6 on most soil textures found on this site. 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 thin to thick platy or subangular blocky. 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 for snow capture 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. Platy or massive sub-surface horizons, subsoil argillic horizons or duripans 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 = low shrubs (black sagebrush)

Sub-dominant: associated shrubs > shallow-rooted and/or rhizomatous grasses = deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, perennial forbs = annual forbs

Other: succulents, evergreen trees

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 25% of total woody canopy; some of the mature bunchgrasses (to 20%) have dead centers.
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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces 20-30% and depth of litter 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 (end of June) \pm 500lbs/ac; Favorable years \pm 700 lbs/ac and unfavorable years \pm 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 reproduction occur during drought years.
