USDA Natural Resources
Conservation Service

Ecological site R029XY017NV
LOAMY 5-8 P.Z.

Accessed: 05/10/2025

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.

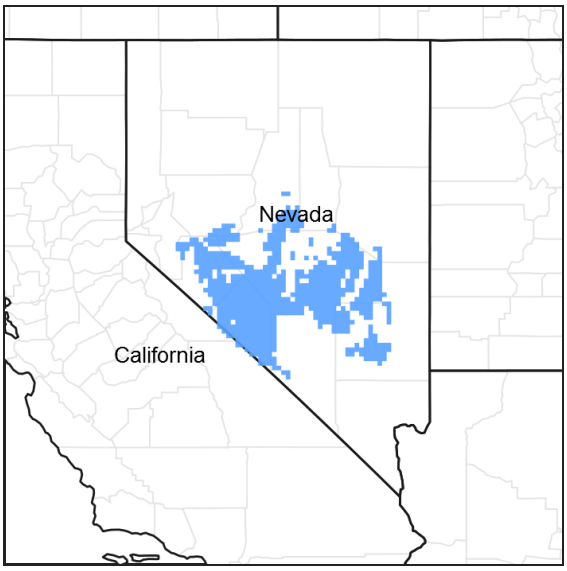

Figure 1. Mapped extent

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

R029XY006NV	**LOAMY 8-10 P.Z.**
R029XY008NV	**SHALLOW CALCAREOUS LOAM 8-12 P.Z.**
R029XY012NV	**SANDY 5-8 P.Z.**
R029XY016NV	**LOAMY UPLAND 5-8 P.Z.**
R029XY020NV	**SILTY 5-8 P.Z.**
R029XY024NV	**SODIC TERRACE 5-8 P.Z.**
R029XY046NV	**SANDY LOAM 5-8 P.Z.**

Similar sites

R029XY022NV	**LOAMY SLOPE 5-8 P.Z.** Less productive site
R029XY087NV	**GRAVELLY LOAM 5-8 P.Z.** SABA14 dominant shrub
R029XY059NV	**SHALLOW SILTY 5-8 P.Z.** Essentially a pure ATCO site

R029XY046NV	**SANDY LOAM 5-8 P.Z.** ATCA2-KRLA2 codominant shrubs; ATCO minor shrub
R029XY035NV	**LOAMY 3-5 P.Z.** Lycium spp. codominant
R029XY024NV	**SODIC TERRACE 5-8 P.Z.** SAVE4 dominant shrub
R029XY033NV	**LOAMY SLOPE 3-5 P.Z.** Less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex confertifolia* (2) *Picrothamnus desertorum*
Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

This site occurs on piedmont slopes, fan skirts, inset fans, fan remnants and alluvial plains on all exposures. Slopes range from 0 to 30 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 3100 to 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan skirt (2) Fan piedmont (3) Inset fan
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	3,100–7,000 ft
Slope	0–30%
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 5 to 8 inches. Mean annual air temperature is 43 to 49 degrees F. The average growing season is about 80 to 200 days.

Table 3. Representative climatic features

Frost-free period (average)	200 days
Freeze-free period (average)	0 days
Precipitation total (average)	8 in

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are typically very shallow to very deep and well drained. Some soils have a

restrictive layer below the main plant rooting depth (at soil depths greater than 14 inches). Surface layers are usually gravelly or very gravelly and have less than 20 percent clay. Surface soils are moderately to strongly alkaline, non-saline to slightly saline, and non-sodic to very slightly sodic. Water intake rates are moderate, available water capacity is very low to moderate, and runoff is negligible to very high. There may be a thin crusting of the soil surface layer. The penetration resistance of moist surface soils is expected to be extremely low to moderate. Soil stability values should be 2 to 4 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. Soil series associated with this site include: Advokay, Annaw, Ardivey, Aysees, Beano, Belted, Bluewing, Broe, Candelaria, Dobel, Domez, Fang, Fuegosta, Glotrain, Griffy, Hollywell, Itme, Izo, Jolan, Keefa, Koyen, Laxal, Lyda, Maggie, McCutchen, Met, Monte Cristo, Noyson, Nyala, Orphant, Osobb, Papoose, Roic, Silent, Silverbow, Specter, Stargo, Stonell, Terlco, Kickapoo, Timper, Tomel, Tybo, Unsel, Vigus, Wardenot, and Yomba.

Table 4. Representative soil features

Surface texture	(1) Gravelly sand (2) Gravelly fine sandy loam (3) Gravelly coarse sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Slow to moderately rapid
Soil depth	4–72 in
Surface fragment cover <=3"	19–56%
Surface fragment cover >3"	0–27%
Available water capacity (0-40in)	0.6–4 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–32 mmhos/cm
Sodium adsorption ratio (0-40in)	0–45
Soil reaction (1:1 water) (0-40in)	6.6–9.6
Subsurface fragment volume <=3" (Depth not specified)	3–62%
Subsurface fragment volume >3" (Depth not specified)	1–23%

Ecological dynamics

Where management results in abusive grazing use by cattle and/or feral horses, shadscale, Douglas' rabbitbrush, horsebrush, sand dropseed, and galleta increase, while Indian ricegrass, winterfat and bud sagebrush decrease. Following wildfire snakeweed and Douglas' rabbitbrush greatly increase and may dominate the site for a protracted period. Species likely to invade this site are horsebrush, burrobrush, snakeweed, halogeton, Russian thistle, cheatgrass and annual mustards.

Fire Ecology:
The mean fire return interval for shadscale communities range from 35 to 100 years. Shadscale communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. Increased presence of non-native annual grasses, such as cheatgrass, can alter fire regimes by increasing fire frequency under wet to near-normal summer moisture conditions. When fire does occur, the effect on the ecosystem may be extreme. Shadscale is generally killed by fire and does not readily recover from fire, except through seed. Budsage is killed by fire. Budsage communities rarely burn due to insufficient fire loads. 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. 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. Galleta is a rhizomatous perennial which can resprout after top-kill by fire. 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.

State and transition model

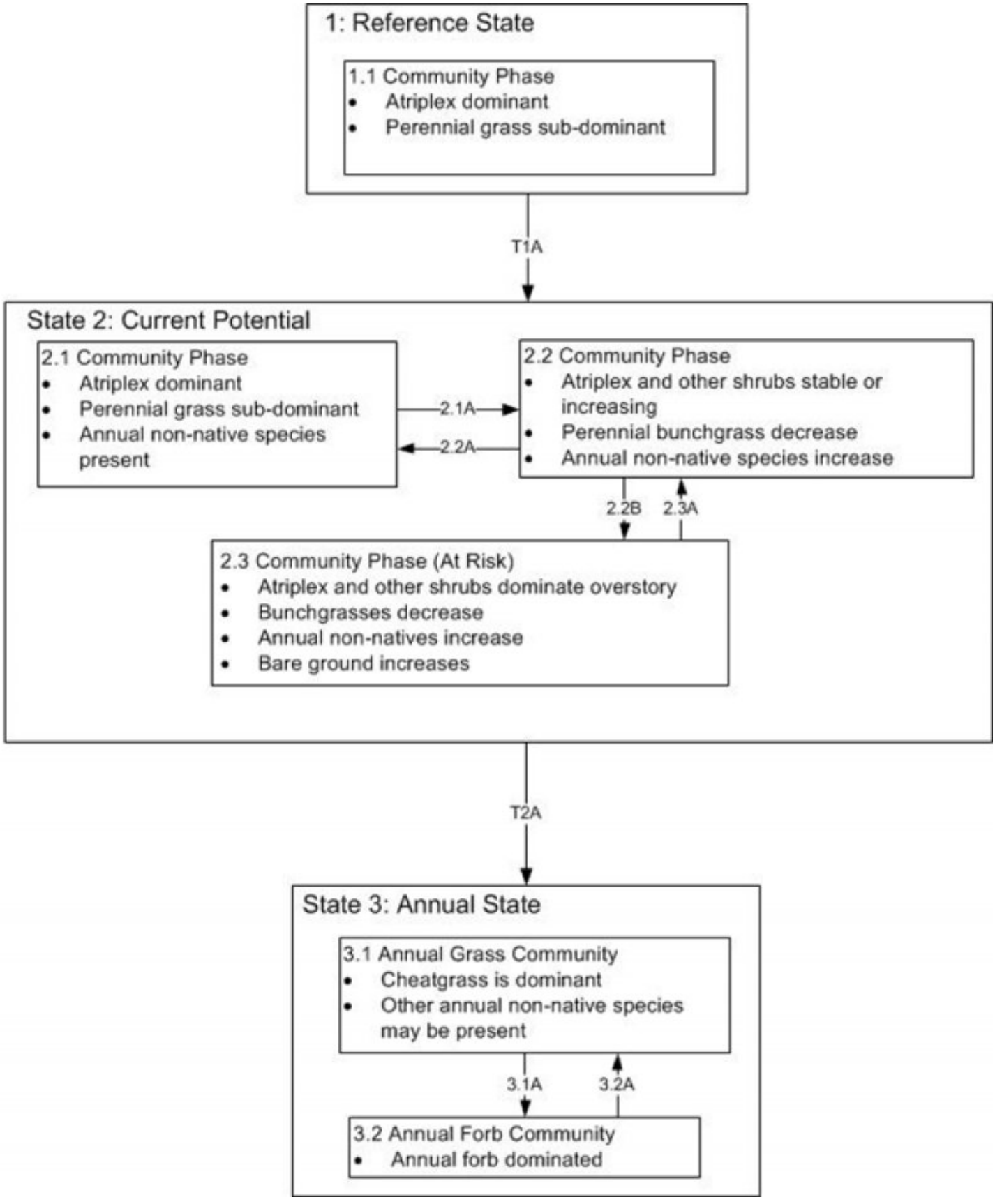

Figure 3. DRAFT STM

T1A: introduction of non-native species

2.1A: prolonged drought/ inadequate rest and recovery from defoliation
2.2A: rest and recovery
2.2B:prolonged drought/ inadequate rest and recovery from defoliation
2.3A: recovery or changes in management

T2A: Inadequate rest and recovery from defoliation and/or prolonged drought/Catastrophic wildfire.

3.1A: fire or cheatgrass die off
3.2A: time

Figure 4. DRAFT STM LEGEND

State 1
Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by shadscale, bud sagebrush and Indian ricegrass. Other important species are galleta, winterfat and bottlebrush squirreltail. Potential vegetative composition is about 45% grasses, 5% forbs, and 50% shrubs. Approximate ground cover (basal and crown) is 15 to 25 percent. Bare ground is approximately 50%, surface rock fragments are less than 25%, shrub canopy approximately 25%, and basal area for perennial herbaceous plants approximately 5%. Dead branches within individual shrubs are common and standing dead shrub canopy material may be as much as 35% of total woody canopy. Some of the mature bunchgrasses (approximately 25%) commonly have dead centers. Between plant interspaces litter is approximately 5% cover and the 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	100	225	350
Grass/Grasslike	90	203	315
Forb	10	22	35
Total	**200**	**450**	**700**

State 2
Current Potential

State 3
Annual State

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**			131–271	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	113–203	–
	James' galleta	PLJA	*Pleuraphis jamesii*	9–45	–
	squirreltail	ELEL5	*Elymus elymoides*	9–23	–
2	**Secondary Perennial Grasses**			9–45	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	2–14	–
	threeawn	ARIST	*Aristida*	2–14	–
	King's eyelashgrass	BLKI	*Blepharidachne kingii*	2–14	–
	needle and thread	HECO26	*Hesperostipa comata*	2–14	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–14	–
Forb					
3	**Perennial**			9–36	
	King's eyelashgrass	BLKI	*Blepharidachne kingii*	2–14	–
	globemallow	SPHAE	*Sphaeralcea*	2–9	–
4	**Annual**			0–23	
	James' galleta	PLJA	*Pleuraphis jamesii*	9–45	–
Shrub/Vine					
5	**Primary Shrubs**			136–271	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	90–158	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	23–68	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	23–45	–
	Forb, perennial	2FP	*Forb, perennial*	7–22	–
	globemallow	SPHAE	*Sphaeralcea*	2–9	–
6	**Secondary Shrubs**			23–68	
	fourwing saltbush	ATCA2	*Atriplex canescens*	2–14	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	2–14	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	2–14	–
	spiny hopsage	GRSP	*Grayia spinosa*	2–14	–
	water jacket	LYAN	*Lycium andersonii*	2–14	–
	spiny menodora	MESP2	*Menodora spinescens*	2–14	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	2–14	–

Animal community

Livestock Interpretations:
This site is suited for livestock grazing. Grazing management should be keyed to Indian ricegrass, perennial grass, and winterfat production. 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. 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. 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. Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of livestock. Shadscale provides good browse for domestic sheep. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets. Budsage is palatable and nutritious forage for domestic sheep in the winter and spring although it is known to cause mouth sores in lambs. Budsage can be poisonous or fatal to calves when eaten in quantity. Budsage, while desired by cattle in spring, is poisonous to cattle when consumed alone. 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.

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:
Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of wildlife. The fruits and leaves are a food source for deer, desert bighorn sheep, pronghorn antelope, small rodents, jackrabbits, game birds, and songbirds. Shadscale is good browse for mule deer, which feed upon shadscale during winter, spring, and fall. Shadscale is a minor component of desert bighorn sheep diets. Although it is not preferred, shadscale may provide winter forage for pronghorn antelope. Shadscale habitats of northeastern Nevada are important home ranges for small mammals. Chisel-toothed kangaroo rats feed on shadscale foliage and use shadscale habitats during the spring, summer, and fall. Deer mice use shadscale habitats all year. Shadscale leaves and seeds are preferred forage for jackrabbits. The Great Basin kangaroo rat also feeds on shadscale foliage. Budsage is palatable, nutritious forage for upland game birds, small game and big game in winter. Budsage is rated as "regularly, frequently, or moderately taken" by mule deer in Nevada in winter and is utilized by bighorn sheep in summer, but the importance of budsage in the diet of bighorns is not known. Bud sage comprises 18 – 35% of a Pronghorn’s diet during the spring where it is available. Chukar will utilize the leaves and seeds of bud sage. Budsage is highly susceptible to effects of browsing. It decreases under browsing due to year-long palatability of its buds and is particularly susceptible to browsing in the spring when it is physiologically most active. Winterfat is an important forage plant for Wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents. Winterfat is a staple food for black-tailed jackrabbit. 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. 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. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species. Bottlebrush squirreltail is a dietary component of several wildlife species. Bottlebrush squirreltail may provide forage for mule deer and pronghorn.

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 often numerous in areas subjected to summer convection storms and 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. 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. 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. Sparse shrub canopy and associated litter break raindrop impact. Medium to fine textured surface soils have moderate to slow infiltration and medium runoff.

Recreational uses

This site offers opportunities for photography and nature study. This site has potential for off-road vehicle use and hiking.

Other products

Shadscale seeds were used by Native Americans of Arizona, Utah and Nevada for bread and mush.
Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source.

Other information

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. Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation.

Type locality

Location 1: Esmeralda County, NV	
Township/Range/Section	T2N R41E S27
General legal description	About 8 miles southwest of Tonopah, Montezuma Valley, Esmeralda County, Nevada.
Location 2: White Pine County, NV	
Township/Range/Section	T11N R61E S31
General legal description	About 8 miles southwest of Lund, along White Pine and Nye County line, White River Valley, Nevada.
Location 3: Eureka County, NV	
Township/Range/Section	T15N R54E S3
General legal description	North end of Little Smokey Valley, along Eureka, White Pine, and Nye County lines, 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

HA/GD/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 are none to rare and may occur in areas subjected to summer convection storms. Flow patterns short (<1m) and stable.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare with occurrence typically limitec to areas within 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 ±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 2 to 4 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 fine to medium platy or prismatic. Soil surface colors are light browns and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse shrub canopy and associated litter provide some protection from raindrop impact.

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: Salt desert shrubs (shadscale, winterfat, & bud sagebrush) = deep-rooted, cool season, bunchgrasses

    Sub-dominant: warm season grasses > associated shrubs > deep-rooted, perennial forbs = fibrous, shallow-rooted, perennial forbs = annual forbs

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 35% of total woody canopy; mature bunchgrasses commonly (±25%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (15-25%) and depth (<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 (thru May) ± 450lbs/ac; Favorable years ±700 lbs/ac and unfavorable years ± 200 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 halogeton, Russian thistle, annual mustards, and cheatgrass.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Little growth or reproduction occurs during extended or severe drought.
