USDA Natural Resources
Conservation Service

Ecological site R029XY016NV
LOAMY UPLAND 5-8 P.Z.

Accessed: 05/11/2025

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.

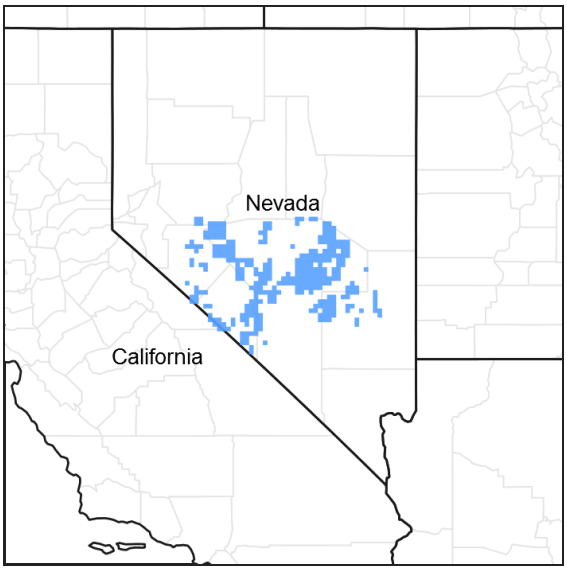

Figure 1. Mapped extent

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

R029XY017NV	**LOAMY 5-8 P.Z.**
R029XY046NV	**SANDY LOAM 5-8 P.Z.**

Similar sites

R029XY021NV	**LOAMY HILL 5-8 P.Z.** Less productive site; GRSP-LYAN codominant shrubs
R029XY079NV	**DROUGHTY LOAM 5-8 P.Z.** ACHY-ACSP12 codominant grasses; MUPO2 and YUBA common; eastern portion of MLRA 29
R029XY031NV	**SHALLOW DROUGHTY LOAM 5-8 P.Z.** GRSP-MESP2 codominant shrubs

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Grayia spinosa* (2) *Atriplex canescens*
Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

This site occurs on piedmont slopes, alluvial fans and alluvial plains of all exposures. Slopes range from 0 to 50 percent, but slope gradients of 2 to 15 percent are typical. Elevations are 4200 to about 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Pediment (2) Alluvial fan
Elevation	4,200–6,000 ft
Slope	0–50%
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 52 to 58 degrees F. The average growing season is about 140 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 of this site are moderately deep to deep and well drained. Some soils may have a restrictive layer below the main plant rooting depth. Water intake rates are moderate, available water capacity is very low to moderate, and runoff is medium.

Ecological dynamics

Where management results in abusive grazing use by cattle and /or feral horses, littleleaf horsebrush, Douglas rabbitbrush, Anderson wolfberry and galleta increase, while spiny hopsage, fourwing saltbush, Indian ricegrass and Nevada ephedra decrease. Species likely to invade this site are annuals such as brome grasses, Russian thistle and mustards. This site, when in deteriorated condition, subjected to wildfire, may become a nearly solid stand of horsebrush and rabbitbrush with annuals or galleta occurring in the shrub interspaces.

Fire Ecology:
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. 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. 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. Budsage is

killed by fire. Fire typically destroys aboveground parts of Anderson wolfberry, but the degree of damage to the plant depends on fire severity. 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.

State and transition model

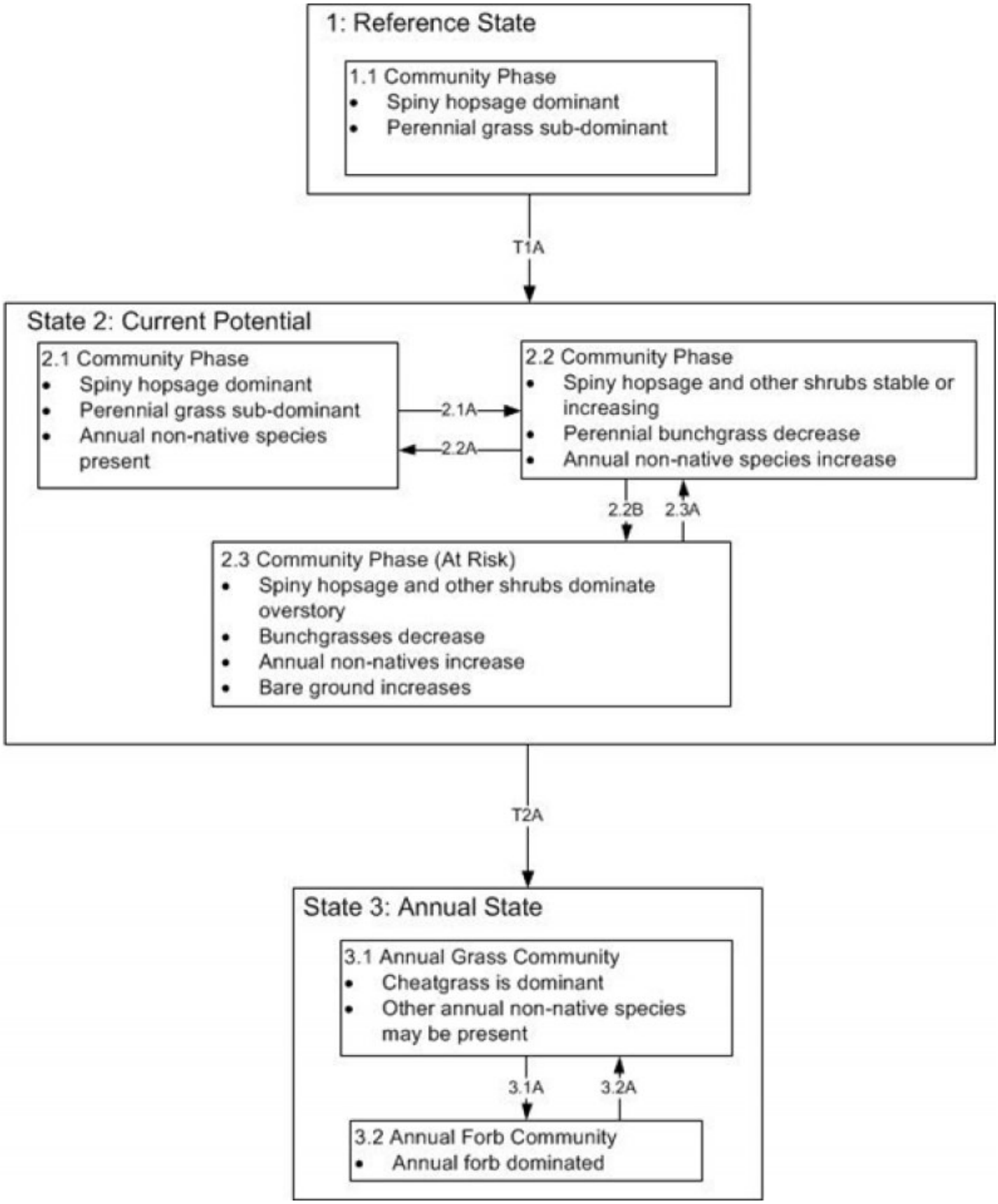

Figure 4. DRAFT STM

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 5. DRAFT STM LEGEND

State 1
Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by spiny hopsage, Nevada ephedra and Indian ricegrass. Other important species are fourwing saltbush and galleta. Potential vegetative composition is about 45% grasses, 5% forbs and 50% shrubs. Approximate ground cover (basal and crown) is 20 to 30 percent.

Table 4. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	250	350	500
Grass/Grasslike	225	315	450
Forb	25	35	50
Total	**500**	**700**	**1000**

State 2
Current Potential State

State 3
Annual State

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			176–371	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	175–315	–
	James' galleta	PLJA	*Pleuraphis jamesii*	1–56	–
2	**Secondary Perennial Grasses**			14–70	
	threeawn	ARIST	*Aristida*	4–21	–
	King's eyelashgrass	BLKI	*Blepharidachne kingii*	4–21	–
	squirreltail	ELEL5	*Elymus elymoides*	4–21	–
	needle and thread	HECO26	*Hesperostipa comata*	4–21	–
	Sandberg bluegrass	POSE	*Poa secunda*	4–21	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	4–21	–
Forb					
3	**Perennial**			14–56	
	globemallow	SPHAE	*Sphaeralcea*	4–14	–
	princesplume	STANL	*Stanleya*	4–14	–
	King's eyelashgrass	BLKI	*Blepharidachne kingii*	2–11	–
4	**Annual**			1–21	
	James' galleta	PLJA	*Pleuraphis jamesii*	0–56	–
Shrub/Vine					
5	**Primary Shrubs**			211–476	
	spiny hopsage	GRSP	*Grayia spinosa*	120–210	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	35–105	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	14–56	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	14–35	–
	water jacket	LYAN	*Lycium andersonii*	14–35	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	14–35	–
6	**Secondary Shrubs**			35–105	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	7–21	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	7–21	–
	spiny menodora	MESP2	*Menodora spinescens*	7–21	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to winterfat and perennial grass 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. 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. 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. 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. 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. Anderson wolfberry is sometimes used as forage by livestock. Palatability of Anderson wolfberry browse is presumably fair to low. This species is used as forage only when more desirable species are unavailable. The fruit, however, appears to be moderately palatable.

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:
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. 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. 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. 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. Palatability of Anderson wolfberry browse is presumably fair to low. This species is used as forage only when more desirable species are unavailable. The fruit, however, appears to be moderately palatable. Anderson wolfberry is sometimes used as forage by feral burros. The red berries are eaten by some birds and mammals. Berries of this plant constituted 2 percent of the diet of chukar partridges. In some areas of southern Nevada, the fleshy leaves and juicy berries provide part of the succulence permitting Gambel quail to occupy desert areas devoid of drinking water. In desert washes Anderson wolfberry grows in dense thorny thickets which provide good cover for quail and other small wildlife. Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. 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. 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.

Hydrological functions

Runoff is medium. Rills and the presence of Waterflow Patterns are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring 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 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 traditionally ground parched seeds of spiny hopsage to make pinole flour. 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. Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Native Americans used the fleshy berries of Anderson wolfberry either fresh or boiled and then dried them for later use. This shrub is also used as an ornamental valued chiefly for its showy red berries. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.

Other information

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. 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. 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.

Type locality

Location 1: Nye County, NV	
Township/Range/Section	T2S R53E S18
General legal description	Approximately 3 miles west of NvHwy 375. About 2 miles northwest of Queen City Summit, Railroad Valley, Nye County, Nevada.
Location 2: Nye County, NV	
Township/Range/Section	T2S R54E S34
General legal description	Approximately 4 miles east of Queen City Summit. About ½ mile north on dirt road. Nye 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/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 but 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 ± 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 massive. Soil surface colors are light browns 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.

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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 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, bunchgrasses = tall shrubs (fourwing saltbush & spiny hopsage)

    Sub-dominant: associated, low-statured, shrubs > rhizomatous grass = shallow-rooted, cool season, bunchgrasses = deep-rooted, cool season, perennial forbs > fibrous, shallow-rooted, cool season, 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 25% of total woody canopy; some of the mature bunchgrasses (<20%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (± 20%) and depth of litter 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 (end of June) ± 700lbs/ac; Favorable years ± 1000 lbs/ac and unfavorable years ± 500 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, bassia, 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. Little growth or reproduction occurs during extreme drought years.
