USDA Natural Resources Conservation Service

Ecological site R029XY087NV
GRAVELLY LOAM 5-8 P.Z.

Last updated: 9/16/2021
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.

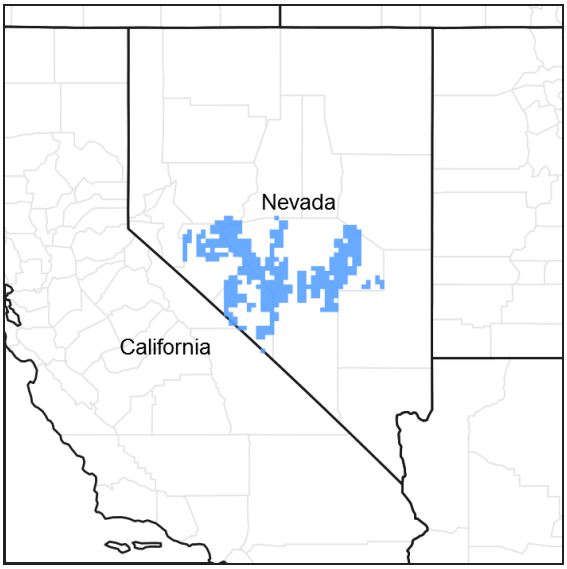

Figure 1. Mapped extent

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

R029XY016NV	**LOAMY UPLAND 5-8 P.Z.**
R029XY017NV	**LOAMY 5-8 P.Z.**
R029XY046NV	**SANDY LOAM 5-8 P.Z.**

Similar sites

R029XY039NV	**COARSE GRAVELLY LOAM 3-5 P.Z.** ATCO dominant shrub; LYCIU and AMDU2 important shrubs
R029XY033NV	**LOAMY SLOPE 3-5 P.Z.** Less productive site; ATCO dominant shrub
R029XY017NV	**LOAMY 5-8 P.Z.** ATCO dominant shrub
R029XY035NV	**LOAMY 3-5 P.Z.** Less productive site; SABA14-ATCO codominant
R029XY037NV	**COBBLY SLOPE 5-8 P.Z.** MESP2 dominant shrub

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus baileyi*
Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

This site occurs on piedmont slopes, inset fans, fan remnants, fan skirts, alluvial flats and hillsides. Slopes range from 0 to 30 percent, but slope gradients of 2 to 8 is most typical. Elevations are 4100 to 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Inset fan (3) Alluvial flat
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	1,250–2,134 m
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 5 to 8 inches. Mean annual air temperature is 47 to 57 degrees F. The average growing season is about 100 to 170 days.

Table 3. Representative climatic features

Frost-free period (average)	170 days
Freeze-free period (average)	
Precipitation total (average)	203 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are predominantly very deep. These soils are well drained and are formed in mixed alluvium. The soil surface is moderately coarse in texture and the soils are neutral to strongly alkaline. Available water capacity is low to moderate. Potential for sheet and rill erosion is light 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. Soils having thin surface sand sheet will have lower stability values. Soil series associated with this site include: Annaw, Hardhat, Hollywell, Keefa, Lyda, Minnye, Silverbow, Stargo, Stonell, Terlco, Unsel, Vigus, Wardenot, and Yomba.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly loamy sand (3) Very cobbly sandy loam

Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Slow to moderately rapid
Soil depth	183 cm
Surface fragment cover <=3"	33–59%
Surface fragment cover >3"	0–23%
Available water capacity (0-101.6cm)	2.54–9.65 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–3 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–45
Soil reaction (1:1 water) (0-101.6cm)	6.6–9.6
Subsurface fragment volume <=3" (Depth not specified)	6–57%
Subsurface fragment volume >3" (Depth not specified)	2–27%

Ecological dynamics

Where management results in abusive grazing use by cattle and/or feral horses, Bailey's greasewood, shadscale, and galleta increase, while Indian ricegrass, and other desirable grasses and shrubs decrease. With continued site degradation, Douglas' rabbitbrush dramatically increases. Following wildfire, Bailey's greasewood composition is greatly reduced as shadscale increases. Snakeweed and/or rabbitbrush typically dominate the site. Species likely to invade this site are burrobrush, snakeweed, halogeton, Russian thistle, cheatgrass and annual mustards.

Fire Ecology:
The mean fire return interval for shadscale-greasewood 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. Bailey's greasewood may be killed by severe fires, but it commonly sprouts soon after low to moderate-severity fire. Increased presence of non-native annual grasses, such as cheatgrass, can alter fire regimes in shadscale communities by increasing fire frequency under wet to near-normal summer moisture conditions. When fire does occur, the effect on the ecosystem may be extreme. Budsage is killed by fire. Budsage communities rarely burn due to insufficient fire loads. 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.
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

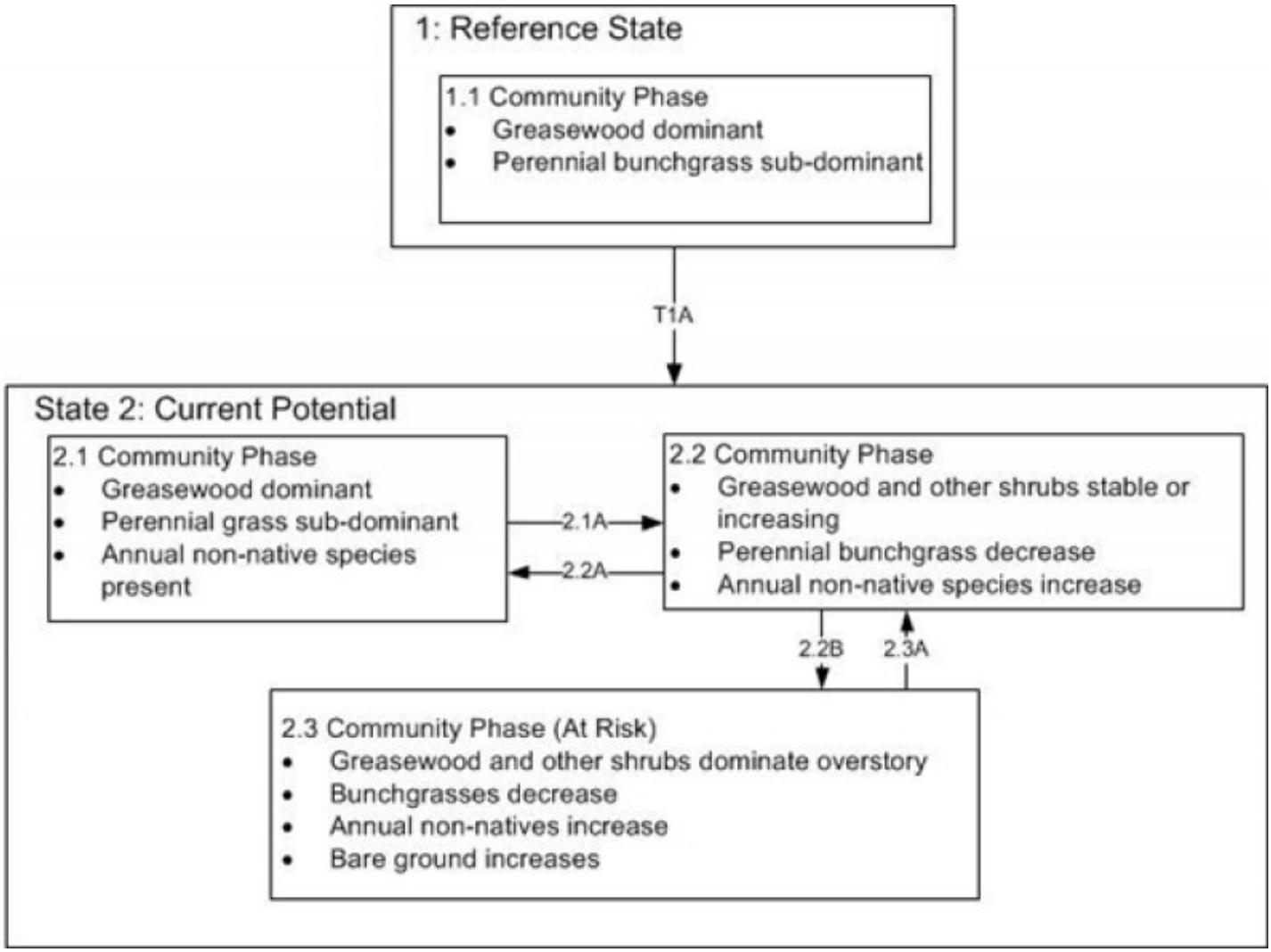

Figure 3. DRAFT STM

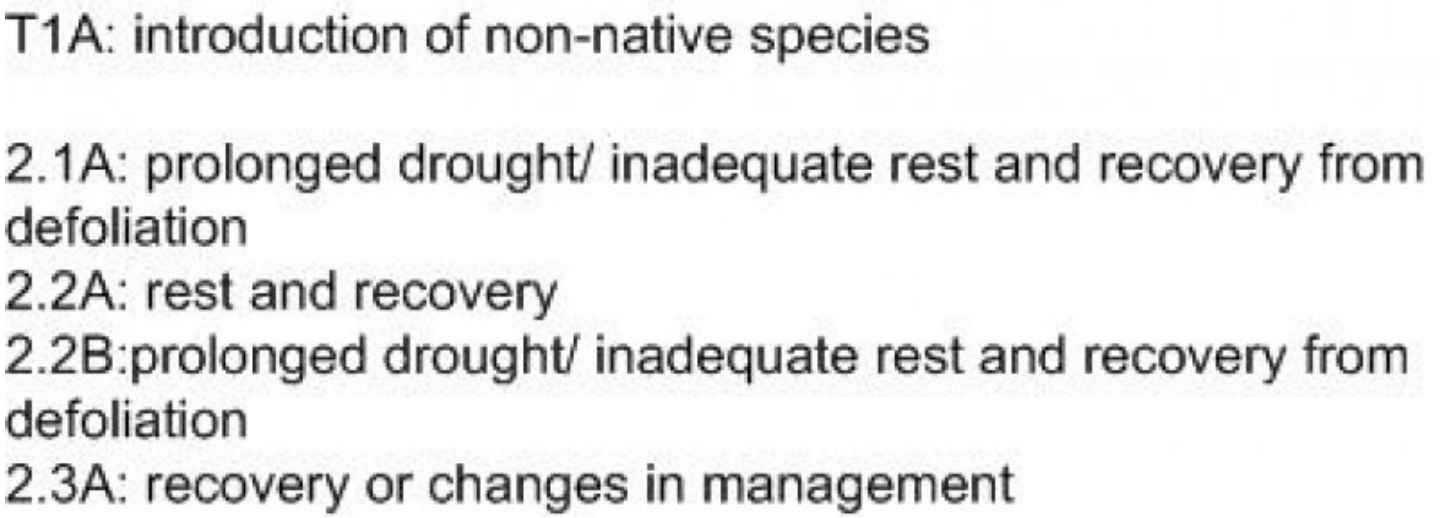

Figure 4. DRAFT STM LEGEND

State 1
Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by Bailey greasewood, shadscale and Indian ricegrass. Other important species associated with this site are galleta and bud sagebrush. 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 35 to 50%, surface rock fragments are less than 35%, shrub canopy 25% and basal area for perennial herbaceous plants is less than 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%) have dead centers. Within plant interspaces litter is less than 3% cover and the depth of litter is approximately one-fourth inch.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	112	252	392
Grass/Grasslike	101	226	353
Forb	11	26	39
Total	**224**	**504**	**784**

State 2
Current Potenital 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**			146–293	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	123–226	–
	James' galleta	PLJA	*Pleuraphis jamesii*	11–40	–
	squirreltail	ELEL5	*Elymus elymoides*	11–26	–
2	**Secondary Perennial Grasses**			11–40	
	purple threeawn	ARPU9	*Aristida purpurea*	2–10	–
	King's eyelashgrass	BLKI	*Blepharidachne kingii*	2–10	–
	needle and thread	HECO26	*Hesperostipa comata*	2–10	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–10	–
Forb					
3	**Perennial**			11–40	
	globemallow	SPHAE	*Sphaeralcea*	2–10	–
4	**Annual**			0–17	
	James' galleta	PLJA	*Pleuraphis jamesii*	11–40	–
Shrub/Vine					
5	**Primary Shrubs**			151–328	
	Bailey's greasewood	SABA14	*Sarcobatus baileyi*	123–176	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	11–76	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	11–50	–
	Forb, perennial	2FP	*Forb, perennial*	9–30	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	6–26	–
	globemallow	SPHAE	*Sphaeralcea*	2–10	–
6	**Secondary Shrubs**			11–50	
	fourwing saltbush	ATCA2	*Atriplex canescens*	2–16	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	2–16	–
	spiny hopsage	GRSP	*Grayia spinosa*	2–16	–
	snakeweed	GUTIE	*Gutierrezia*	2–16	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	2–16	–
	desert-thorn	LYCIU	*Lycium*	2–16	–

Animal community

Livestock Interpretations:
This site is suited for livestock grazing. Grazing management should be keyed to Indian ricegrass, galleta, and bottlebrush squirreltail 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. Bailey’s greasewood is an important winter browse plant for domestic sheep and cattle. It also receives light to moderate use by domestic sheep and cattle during spring and summer months. Greasewood contains soluble sodium and potassium oxalates that may cause poisoning and death in domestic sheep and cattle if large amounts are consumed in a short time. 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. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats.

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:
Bailey’s greasewood is an important winter browse plant for big game animals and a food source for many other wildlife species. It also receives light to moderate use by mule deer and pronghorn during spring and summer months. Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of wildlife particularly during spring and summer before the hardening of spiny twigs. It supplies browse, seed, and cover for birds, small mammals, rabbits, deer, and pronghorn antelope. 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. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. 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. 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. 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. 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 are 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) is expected to move the distance of the 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

The leaves, seeds and stems of greasewood are edible. Seeds of shadscale were used by Native Americans of Arizona, Utah and Nevada for bread and mush. Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source.

Other information

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

Type locality

Location 1: Mineral County, NV	
Township/Range/Section	T11N R31E S36
General legal description	Nugent Wash area, Gabbs Valley, Mineral County, Nevada.
Location 2: Nye County, NV	
Township/Range/Section	T3N R53E S11
General legal description	About 8 miles east of Echo Canyon Reservoir, south road to Nyala (Site), BLM exclosure, Railroad Valley, Nye County, Nevada. This site also occurs in Esmeralda County, Nevada.

Other references

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

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

Contributors

GKB/VWM

Approval

Curtis Talbot, 9/16/2021

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	Curtis Talbot
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are 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 often numerous in areas subjected to summer convection storms. Flow patterns short and stable.

3. **Number and height of erosional pedestals or terracettes:** 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.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ± 35 to 50%; surface rock fragments <35%; shrub canopy to 25%; basal area for perennial herbaceous plants <5%.

5. **Number of gullies and erosion associated with gullies:** 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.

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

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

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. Soils having thin surface sand sheet will have lower stability values. (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 and the soils are typified by an ochric epipedon. Organic carbon of the surface 2 to 3 inches is less than to 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 break raindrop impact. Medium to fine textured surface soils have moderate to slow infiltration and medium runoff.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compacted layers are not typical. Platy or massive sub-surface horizons, subsoil argillic horizons or hardpans shallow to the surface 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: Reference Plant Community: Low-statured salt desert shrubs (Bailey's greasewood, shadscale & bud sagebrush) > deep-rooted, cool season, perennial bunchgrasses. (By above ground production)

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

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs are 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 (<5%) 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 (February thru April [May]) ± 450bs/ac; Spring moisture significantly affects total production.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Cheatgrass, horsebrush, burrobrush, snakeweed, halogeton, Russian thistle, and annual mustards are invaders on this site. Galleta and Douglas' rabbitbrush are increasers on this site.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in above average growing season years.
