USDA Natural Resources
Conservation Service

Ecological site R029XY163NV
COBBLY CLAYPAN 12-14 P.Z.

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General information

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

MLRA notes

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

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

Ecological site concept

The Cobbly Claypan 12-14 P.Z. site is on sideslopes of hills and mountains on all exposures. Slopes range from 2 to 30 percent. Elevations are 5,500 to about 7,200 feet. Soils are shallow to lithic contact and well drained.

Associated sites

R029XY165NV	**ERODED NORTH SLOPE 12-14 P.Z.** This site is on eroded fan remnants on northerly exposures. Slopes range from 15 to 30 percent. Elevations are 5,000 to about 6,000 feet. Soils are shallow to moderately deep and well drained. Surface soils are medium textured and normally less than 6 to 10 inches thick to underlying material, commonly lacustrine or tuffaceous deposits. Because of steep slopes and sparse vegetation, the soils of this site are subject to sheet and rill erosion.
R029XY172NV	**NORTH SLOPE 12-14** This site is on mountain sideslopes on generally north and east exposures. Slopes range from 8 to 50 percent. Elevations are 4,500 to about 6,000 feet. The soils are shallow to bedrock and well drained. They are formed in residuum and colluvium derived from volcanic rock. The soil profile is modified with up to 80 percent cobbles and gravels. The soils have an argillic horizon with an abrupt textural boundary at a depth of about 8 inches.

Similar sites

R029XY053NV	**MOUNTAIN RIDGE 16+ P.Z.** Less productive site; ACHNA codominant grass.
R029XY052NV	**CLAYPAN 16+ P.Z.** More productive site; ACLE9 codominant grass.
R029XY055NV	**CLAYPAN 12-16 P.Z.** ACTH7 codominant grass.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia arbuscula* (2) *Amelanchier utahensis*
Herbaceous	(1) *Poa fendleriana*

Physiographic features

The Cobbly Claypan 12-14 P.Z. site is on sideslopes of hills and mountains on all exposures. Slopes range from 2 to 30 percent. Elevations are 5,500 to about 7,200 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain
Runoff class	Medium
Elevation	1,649–2,195 m
Slope	2–30%
Water table depth	183 cm
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 12 to 16 inches mostly occurring during the winter and spring months. Additional moisture occurs in the form of intermittent convection storms July through September. Mean annual air temperature is 45 to 50 degrees F. The average growing season is about 90 to 110 days. There are no climate stations associated with this site.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	
Precipitation total (average)	356 mm

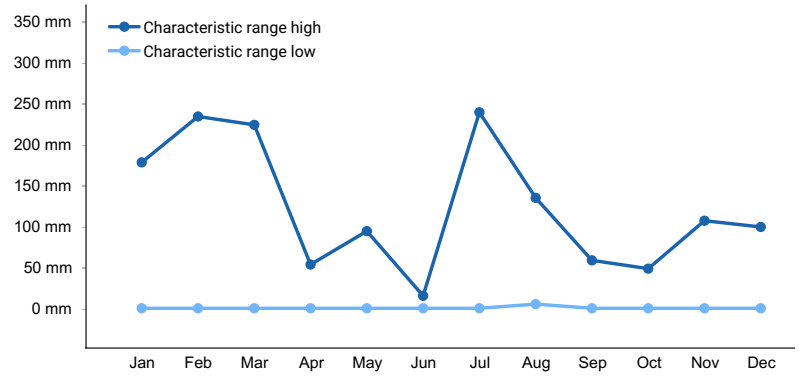

Figure 1. Monthly precipitation range

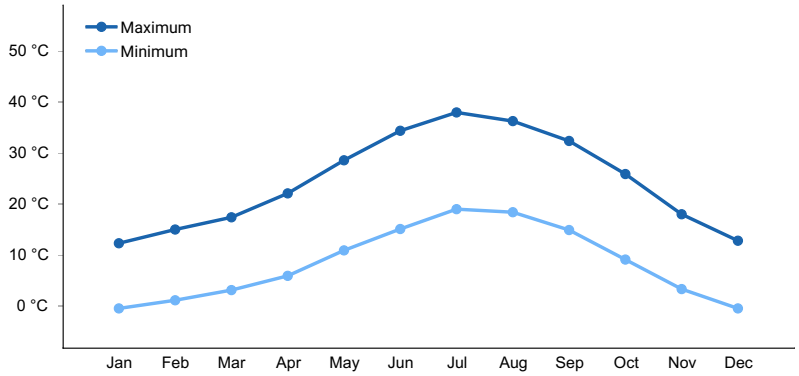

Figure 2. Monthly average minimum and maximum temperature

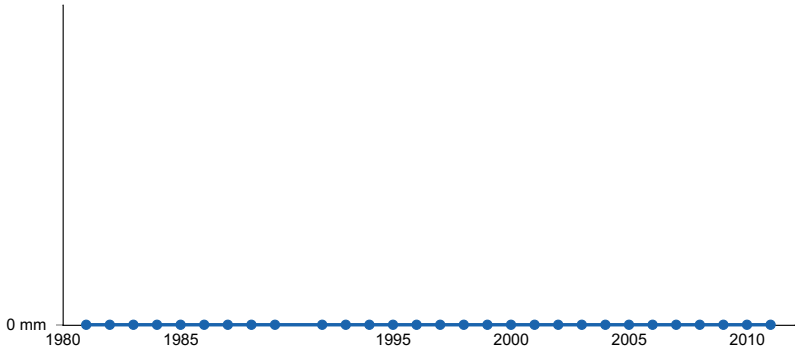

Figure 3. Annual precipitation pattern

Influencing water features

Influencing water features are not associated with this site.

Soil features

Soils are shallow to lithic contact and well drained. Surface soils have a high percentage of exposed rock fragments and rock outcrop which limit area suitable for plant germination and survival. Soils have an argillic horizon with an abrupt textural boundary at a depth of 3 to 8 inches. Runoff class is moderate. Soils have very slow permeability and low to moderately low saturated hydraulic conductivity. Soil series associated with this ecological site include: Cedaran.

Table 4. Representative soil features

Parent material	(1) Colluvium–welded tuff (2) Residuum–welded tuff
Surface texture	(1) Gravelly, ashy loam
Drainage class	Moderately well drained
Permeability class	Very slow
Soil depth	36–51 cm
Surface fragment cover <=3"	15%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	2.79–5.33 cm
Calcium carbonate equivalent (Depth not specified)	0%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–1
Subsurface fragment volume <=3" (Depth not specified)	46%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

With ecological decline, low sagebrush, and Utah serviceberry increase while muttongrass decreases. Utah juniper and singleleaf pinyon readily increase on this site where it occurs adjacent to forested areas. If tree canopies are allowed to close, they can reduce or eliminate understory vegetation. Following wildfire Utah serviceberry and Gambel oak may increase substantially over pre-fire levels.

Fire Ecology:
Prior to 1897, mean fire return intervals for low sagebrush communities have been estimated to be from 35 to over 100 years. Fire most often occurs during wet years with high forage production. Low sagebrush is very susceptible to fire damage. Low sagebrush is usually killed by fire and does not re-sprout. The recovery in burned areas is usually via small, light, wind-dispersed seed for all low sagebrush subspecies. Partially injured low sagebrush may re-grow from living branches, but sprouting does not occur. Aboveground parts of Utah serviceberry may be killed or consumed under fire conditions with sufficient flame lengths. Utah serviceberry may be slightly harmed by fire, depending on moisture conditions, but is generally considered to be fire tolerant. Utah serviceberry sprouts from the root crown following fire. Soil moisture is important to aid sprouting. Muttongrass is unharmed to slightly harmed by light-severity fall fire. Muttongrass appears to be harmed by and slow to recover from severe fire.
Where management results in abusive livestock use, low sagebrush, and Utah serviceberry increase while muttongrass decreases. Utah juniper and singleleaf pinyon readily increase on this site where it occurs adjacent to woodland areas. If tree canopies are allowed to close, they can reduce or eliminate understory vegetation. Following wildfire Utah serviceberry and Gambel oak may increase substantially over pre-fire levels.

The reference plant community is dominated by low sagebrush, Utah serviceberry, and muttongrass. Potential vegetative composition is about 40 percent grasses, 10 percent forbs, and 50 percent shrubs and trees. Approximate ground cover (basal and crown) is 35 to 40 percent.

State and transition model

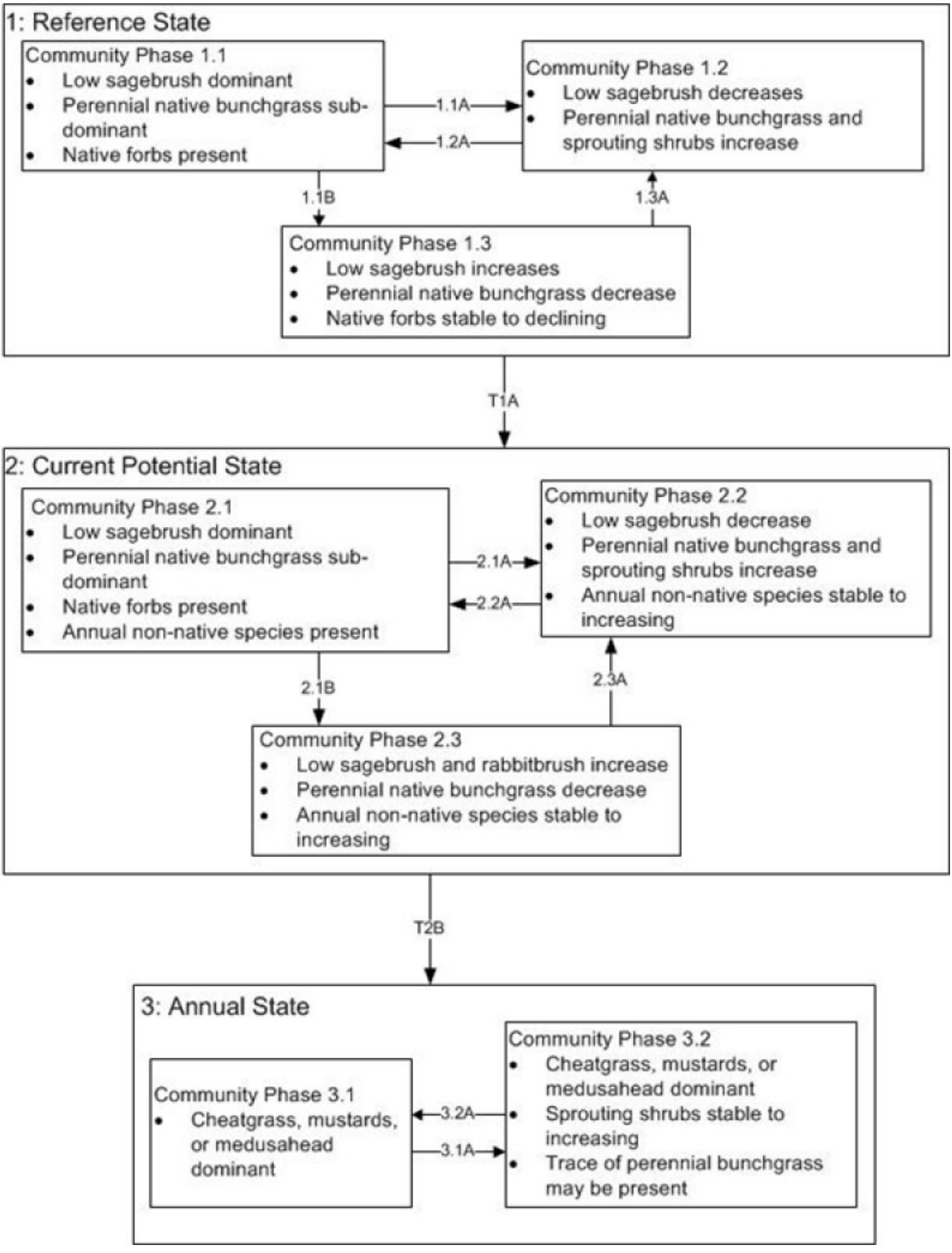

Figure 5. DRAFT STM

State 1: Representative of the reference conditions prior to Euro-American settlement in the west.
1.1A: fire or other disturbance that removes sagebrush canopy
1.1B: absence of disturbance and natural regeneration over time. may be coupled with drought

1.2A: absence of disturbance and natural regeneration over time

1.3A: fire or other disturbance that removes sagebrush canopy

T1A: introduction of non-native species

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.
2.1A: fire or other disturbance that removes sagebrush canopy
2.1B: absence of disturbance and natural regeneration over time, may be coupled with drought and inadequate rest and recovery from defoliation

2.2A: absence of disturbance and natural regeneration over time

2.3A: fire or other disturbance that removes sagebrush canopy
T3A: reoccurring severe fire

State 3: Dominated by non-native annuals. Changes in disturbance return interval and nutrient cycling dynamics create a positive feedback loop preventing recovery of long-lived native perennials .
3.1A: absence of disturbance and natural regeneration over time
3.2A: fire or other disturbance that removes shrub canopy

Figure 6. DRAFT STM LEGEND

Animal community

This site is suited to livestock grazing. Grazing management should be keyed to Muttongrass production. Muttongrass is excellent forage for domestic livestock especially in the early spring. Muttongrass begins growth in late winter and early spring, which makes it available before many other forage plants. Domestic sheep and to a much lesser degree cattle consume low sagebrush, particularly during the spring, fall and winter. Utah serviceberry provides good browse for domestic sheep and domestic goats. In the spring, Utah serviceberry provides fair forage for cattle and good to excellent browse for domestic sheep and goats. Utah serviceberry provides good forage late in winter and in early spring, because it leafs out and blooms earlier than associated species.

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
Muttongrass is an important forage species for several wildlife species. Low sagebrush is considered a valuable browse plant during the spring, fall and winter months. In some areas it is of little value in winter due to heavy snow. Mule deer utilize and sometimes prefer low sagebrush, particularly in winter and early spring. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Open Wyoming sagebrush communities are preferred nesting habitat. Meadows surrounded by sagebrush may be used as feeding and strutting grounds. Sagebrush is a crucial component of their diet year-round, and sage-grouse select sagebrush almost exclusively for cover. Leks are often located on low sagebrush sites, grassy openings, dry meadows, ridgetops, and disturbed sites. Utah serviceberry is a very important species for mule deer in the Great Basin. Porcupines and desert bighorn sheep also use Utah serviceberry. Utah serviceberry fruit is preferred by many birds. It can be an important winter food for birds since berries stay on the shrub throughout the winter. In Nevada, sage grouse eat the fruit of Utah serviceberry.

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

Utah serviceberry fruits were used by Native Americans and early European explorers in North America for food and medicine.

Other information

Utah serviceberry has been used to revegetate big game winter range and for surface stabilization. It grows slowly from seed and therefore transplanting may be more successful than seeding for revegetation projects. Low sagebrush can be successfully transplanted or seeded in restoration.

Inventory data references

NASIS data used for abiotic narratives and tables.

Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T5s R71e S31
UTM zone	N
UTM northing	0756070e
UTM easting	4151750n
General legal description	Northwest slope of Pine Mountain

Other references

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

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

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

Contributors

CJ ANDERSON

Approval

Kendra Moseley, 2/20/2025

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	PATTI NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist.
Date	04/02/2014
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none. Rock fragments armor the surface.

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

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of water flow patterns. Frost heaving of shallow rooted plants should not be considered an indicator of soil erosion.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ± 5-20%.

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

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

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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. (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 moderate fine subangular blocky or weak thin platy. Soil surface colors are dark and soils have a mollic epipedon. Organic matter of the surface 2 to 4 inches is typically 1.25 to 3 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 slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compacted layers are none. Subsoil argillic or massive horizons are not to be interpreted as compacted.

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: low sagebrush > deep-rooted, cool season, perennial bunchgrasses (e.g., muttongrass)

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

    Other: cool season rhizomatous grasses, evergreen trees, annual grasses

    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 20% of total woody canopy; some of the mature bunchgrasses (<10%) have dead centers.

14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (25-35%) and litter depth is ±¼ inch.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (thruJune) ±400 lbs/ac; Favorable years ±600 lbs/ac and unfavorable years ±300 lbs/ac.

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 and annual mustards. Singleleaf pinyon and Utah juniper can increase and eventually dominate this site.

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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.
