

Ecological site R029XY075NV LOAMY SLOPE 10-12 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 is 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 Loamy Slope 10-12 P.Z. site is on summits and sideslopes of hills and mountains on all exposures. Slopes range from 2 to over 50 percent, but slope gradients of 30 to 50 percent are typical. Elevations are 4,100 to about 6,300 feet. The soils are shallow over bedrock. These soils have formed in residuum and colluvium from volcanic rocks on steep mountain or hill slopes.

Associated sites

R029XY009NV	UPLAND WASH This site is in drainageways on intermountain valley fans and active channels of hills and mountains and on inset fans of upper piedmont slopes. Slopes range from 2 to 15 percent, but slope gradients of 4 to 8 percent are most typical. Elevations are 3,800 to 6,200 feet. Flooding may occur occasionally and is very brief. The soils are deep alluvium from mixed sources. They are quite variable as they continue to be re-worked by water.
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Similar sites

R029XY073NV	BOULDERY SLOPE 8-12 P.Z. ACSP12 dominant grass; very stony/bouldery surface
R028BY006NV	SHALLOW CALCAREOUS LOAM 10-12 P.Z. BOGR2 & ARTRV absent; ACHY dominant grass
R029XY049NV	SANDY LOAM 8-12 P.Z. Slopes less steep; coarse textured soils

Table 1. Dominant plant species

Tree	Not specified
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Shrub	(1) <i>Artemisia tridentata</i>
Herbaceous	(1) <i>Hesperostipa comata</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

The Loamy Slope 10-12 P.Z. site is on summits and sideslopes of hills and mountains on all exposures. Slopes range from 2 to over 50 percent, but slope gradients of 30 to 50 percent are typical. Elevations are 4,100 to about 6,300 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill
Runoff class	High to very high
Elevation	1,250–1,920 m
Slope	2–50%
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 10 to 12 inches. Mean annual air temperature is 49 to 55 degrees F. The average growing season is about 90 to 120 days. No climate stations are associated with the site.

Table 3. Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	305 mm

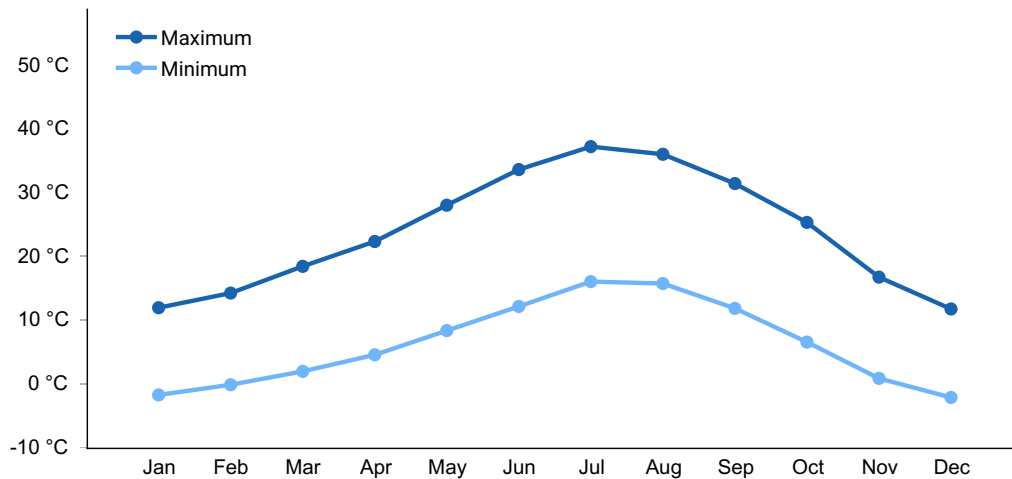


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils are shallow over bedrock. These soils formed in residuum and colluvium from volcanic rocks on steep mountain or hill slopes. Runoff is medium to very high, permeability is moderately slow to moderate and available water capacity is very low. The soils are well drained. Cracks and fractures in the bedrock underlying these shallow soils serve as moisture traps, enabling plant roots to extract and utilize deep moisture when the available moisture in the soil above is depleted. The steep slopes make these soils highly unstable and the potential for sheet and rill erosion is high. Soil series associated with this site include: Richinde and Wyva.

Table 4. Representative soil features

Parent material	(1) Residuum–volcanic rock (2) Colluvium–volcanic rock
Surface texture	(1) Very cobbly sandy loam
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	36–51 cm
Surface fragment cover <=3"	12–30%
Surface fragment cover >3"	10–15%
Available water capacity (0-101.6cm)	2.79–3.56 cm

Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	12–40%
Subsurface fragment volume >3" (Depth not specified)	5–40%

Ecological dynamics

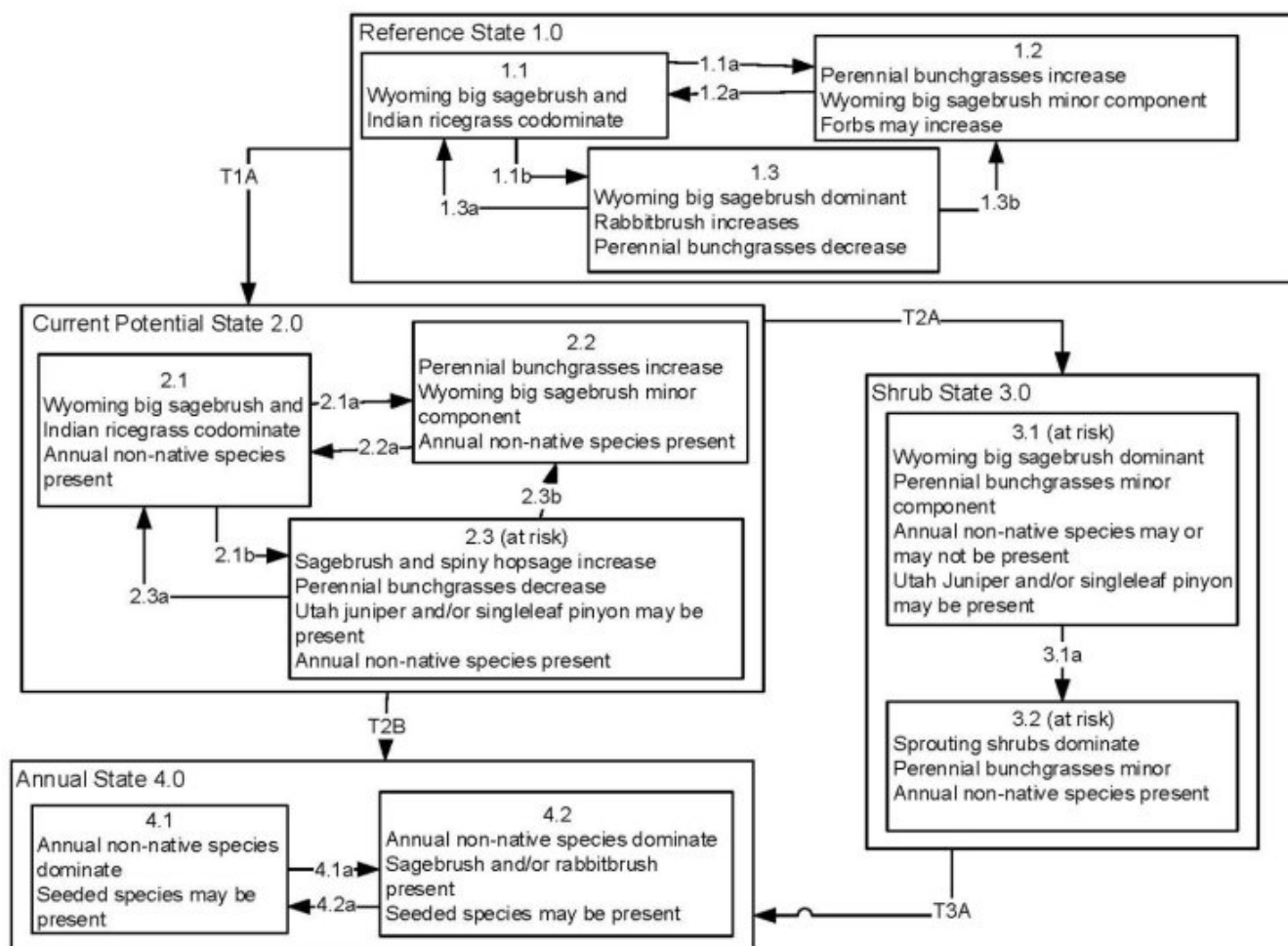
Where management results in abusive grazing use by livestock or feral horses, big sagebrush, rabbitbrush and horsebrush increase while Indian ricegrass and needle and thread decrease. There are sparse, scattered stands of singleleaf pinyon and Utah juniper that occur adjacent to this site and these trees readily increase on this site in the absence of natural fire. The shrub component of this site is very diverse. In areas of very shallow soil depth or droughty soils due to aspect, grass decreases, as does overall production.

Fire Ecology:

Sagebrush communities have historically been subjected to fires at varying intervals (20 to 70 years). Big sagebrush is killed by fire and establishes after fire from a seedbank; from seed produced by remnant plants that escaped fire; and from plants adjacent to the burn that seed in. Fire effects on Stansbury cliffrose are variable. Fire may kill or severely damage plants. Late-season fire also increases the risk of mortality. Stansbury cliffrose is a weak sprouter that is generally killed by severe fire. Green ephedra generally sprouts vigorously from the roots or woody root crown after fire and rapidly produces aboveground biomass from surviving meristematic tissue. 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. Needle and thread is top-killed by fire. It may be killed if the aboveground stems are completely consumed. Needle and thread is classified as slightly to severely damaged by fire. Needle and thread sprouts from the caudex following fire, if heat has not been sufficient to kill underground parts. Recovery usually takes 2 to 10 years.

The reference plant community is dominated by mountain or Wyoming big sagebrush, needle and thread and Indian ricegrass. Potential vegetative composition is about 40 percent grasses, 10 percent forbs, and 50 percent shrubs and trees. Approximate ground cover (basal and crown) is 20 to 30 percent.

State and transition model



Reference State 1.0 Community Phase Pathways

- 1.1a: Low severity fire creates grass/sagebrush mosaic; high severity fire significantly reduces sagebrush cover and leads to early/mid-seral community, dominated by grasses and forbs.
- 1.1b: Time and lack of disturbance such as fire or drought. Excessive herbivory may also decrease perennial understory.
- 1.2a: Time and lack of disturbance allows for shrub regeneration.
- 1.3a: Low severity fire or Aroga moth infestation resulting in a mosaic pattern.
- 1.3b: High severity fire significantly reduces sagebrush cover leading to early/mid-seral community.

Transition T1A: Introduction of non-native species such as bulbous bluegrass, cheatgrass and thistles.

Current Potential State 2.0 Community Phase Pathways

- 2.1a: Low severity fire creates grass/sagebrush mosaic; high severity fire significantly reduces sagebrush cover and leads to early/mid-seral community dominated by grasses and forbs; non-native annual species present.
- 2.1b: Time and lack of disturbance such as fire or drought. Inappropriate grazing management may also reduce perennial understory.
- 2.2a: Time and lack of disturbance allows for regeneration of sagebrush.
- 2.3a: Low severity fire or Aroga moth infestation creates sagebrush/grass mosaic. Brush management with minimal soil disturbance; late-fall/winter grazing causing mechanical damage to sagebrush.
- 2.3b: High severity fire significantly reduces sagebrush cover leading to early mid-seral community.

Transition T2A: Time and lack of disturbance and/or inappropriate grazing management (3.1).

Transition T2B: High severity fire and/or soil disturbance (4.1). Inappropriate grazing that favors shrubs in the presence of non-native annual species (4.2).

Shrub State 3.0 Community Phase Pathways

- 3.1a: Fire.

Transition T3A: Catastrophic fire and/or soil disturbance (4.1). Inappropriate grazing management in the presence of non-native annual species (4.2).

Annual State 4.0 Community Phase Pathways

- 4.1a: Time and lack of fire, unlikely to occur.
- 4.2a: Fire.

Animal community

Livestock Interpretations:

This site is suited for livestock grazing. Grazing management should be keyed to perennial grass production. Needle and thread is important to livestock, especially in the spring before fruits have developed. Needlegrasses are grazed in the fall only if the fruits are softened by rain. Indian ricegrass has good forage value for domestic sheep, cattle and horses. 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. Blue grama is valuable forage for all classes of domestic livestock, providing excellent forage for cattle and sheep. Blue grama tends to be most productive following summer rains, but it cures well and provides forage year round. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available. Mountain big sagebrush is eaten by domestic livestock but has long been considered to be of low palatability, and a competitor to more desirable species. Stansbury cliffrose is an important browse species for livestock, especially in the winter. Ephedra is important winter range browse for domestic cattle, sheep and goats. 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:

Wyoming big sagebrush is preferred browse for wild ungulates. Pronghorn usually browse Wyoming big sagebrush heavily. Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer and elk. 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. Lekks are often located on low sagebrush sites, grassy openings, dry meadows, ridgetops, and disturbed sites. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities. Stansbury cliffrose is an important browse species for mule deer, pronghorn, game birds, and songbirds. Wild ungulates use it heavily in winter. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. 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. Needle and thread is a moderately important spring forage for mule deer, but use declines considerably as more preferred forages become available. Indian ricegrass has good forage value for domestic sheep, cattle and horses. It supplies a source of green feed before most other native grasses have produced much new growth. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species. Blue grama also provides important forage for mule deer. Quail and some songbirds eat the seeds of blue grama. Small mammals also eat blue grama seeds and stems. Flower heads and seeds of blue grama are also consumed by grasshoppers, which can all but eliminate an annual seed crop.

Hydrological functions

Rills are few to common depending on steepness of slope; rills commonly observed in areas subjected to summer convection storms or rapid spring snowmelt. Water flow patterns are few but can be expected in areas recently subjected to summer convection storms or rapid snowmelt, usually on steeper slopes. Pedestals are few. Occurrence is usually limited to areas of water flow patterns. Frost heaving of shallow rooted plants should not be considered a "normal" condition. Perennial herbaceous plants (especially deep-rooted bunchgrasses 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 hiking and has potential for upland and big game hunting.

Other products

Native Americans made tea from big sagebrush leaves. They used the tea as a tonic, an antiseptic, for treating colds, diarrhea, and sore eyes and as a rinse to ward off ticks. Big sagebrush seeds were eaten raw or made into meal. Native peoples used big sagebrush leaves and branches for medicinal teas, and the leaves as a fumigant. Bark was woven into mats, bags and clothing. Triterpenoids extracted from Stansbury cliffrose have been shown to have inhibitory effects on HIV and Epstein-Barr virus. Native Americans used the inner bark for making clothing and ropes, and the branches for making arrows. Native Americans used 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 American peoples. The Paiutes used seed as a reserve food source.

Other information

Wyoming big sagebrush is used for stabilizing slopes and gullies and for restoring degraded wildlife habitat, rangelands, mine spoils and other disturbed sites. It is particularly recommended on dry upland sites where other shrubs are difficult to establish. Stansbury cliffrose is recommended for wildlife, roadside, construction, and mine spoils plantings; and for restoring pinyon-juniper woodland, mountain brushland, basin big sagebrush grassland, black sagebrush, and black greasewood communities. It can be established on disturbed seedbeds by broadcast seeding, drill seeding, or transplanting. Fall or winter seeding is recommended. 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 ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine. 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. Needle and thread grass is useful for stabilizing eroded or degraded sites. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Because of its wide adaptation, ease of establishment, and economic value, blue grama is used extensively for conservation purposes, rangeland seeding, and landscaping. Blue grama is useful for reclamation and for erosion control in arid and semiarid regions.

Inventory data references

NASIS data used for abiotic narratives and tables.

Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T4S R65E S19
Latitude	37° 35' 6"
Longitude	114° 44' 42"
General legal description	Section 19, T4S. R65E. MDBM. About ½ mile east of Seven Oaks Spring, Delamar Range, Lincoln County, Nevada. This site also occurs in Nye County, Nevada.

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

RRK/B'OD

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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	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are few to common depending on steepness of slope; rills commonly observed in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns are few but can be expected in areas recently subjected to summer convection storms or rapid snowmelt, usually on steeper slopes. Short (less than 3 m) and stable.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of water flow patterns.
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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 25 to 55 percent depending on amount of surface rock fragments.
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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 and 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.
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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 6. (To be field tested.)
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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 and 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.
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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., bluebunch wheatgrass] 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):** None. Platy or massive sub-surface horizons, subsoil argillic horizons or bedrock shallow to the surface 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: Tall shrubs (big sagebrush) >deep-rooted, cool season, perennial bunchgrasses

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

Other:

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 percent of total woody canopy; some of the mature bunchgrasses (<20 percent) have dead centers.
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14. **Average percent litter cover (%) and depth (in):** Under canopy and between plant interspaces 20 to 30 percent and litter depth is $\pm \frac{1}{4}$ 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 (through mid-June) ± 500 lbs/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: Potential invaders include cheatgrass, halogeton, Russian thistle, annual mustards, and knapweeds. Increasers include singleleaf pinyon and Utah juniper.

17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years
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