

Ecological site R029XY164NV GRAVELLY CLAY SLOPE 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 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 Gravelly Clay Slope 12-14 P.Z. site is on mountain sideslopes on all exposures. Slopes range from 2 to 50 percent. Elevations are 4,800 to about 7,400 feet. The soils are shallow to lithic contact and well drained. Soils are formed in residuum and colluvium derived from volcanic rocks. Soils have an argillic horizon with an abrupt textural boundary at a depth of 2 to 4 inches.

Associated sites

F029XY078NV	Shallow Ashy Loam 12-16" P.Z. 12 to 16 The Shallow Ashy Loam 12-16" P.Z. is on mountain sideslopes of mostly northerly aspect at the lower elevations of its range and on all aspects at higher elevations. Slopes range from 15 to over 75 percent, but typically range from 30 to 70 percent. Elevations are 4,500 to about 7,000 feet. Soils are typically shallow, have rocks distributed throughout the profile, and are well drained. There are high amounts of rock fragments at the soil surface.
R029XY163NV	COBBLY CLAYPAN 12-14 P.Z. 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.

Similar sites

R029XY051NV	LOAMY SLOPE 16+ P.Z. ACLE9 dominant grass.
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Table 1. Dominant plant species

Tree	Not specified
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Shrub	(1) <i>Artemisia tridentata</i> var. <i>vaseyana</i> (2) <i>Amelanchier utahensis</i>
Herbaceous	(1) <i>Poa fendleriana</i>

Physiographic features

The Gravelly Clay Slope 12-14 P.Z. site is on mountain sideslopes on all exposures. Slopes range from 2 to 50 percent. Elevations are 4,800 to about 7,400 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain
Runoff class	Medium to very high
Elevation	1,463–2,256 m
Slope	2–50%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 12 to 16 inches. Moisture from intermittent convection storms provides an important source of precipitation from July through September. Mean annual air temperature is 45 to 50 degrees F. The average growing season is about 90 to 100 days. One climate station in Caliente is close to the site, but has lower precipitation.

Table 3. Representative climatic features

Frost-free period (characteristic range)	140 days
Freeze-free period (characteristic range)	166 days
Precipitation total (characteristic range)	229 mm
Frost-free period (actual range)	140 days
Freeze-free period (actual range)	166 days
Precipitation total (actual range)	229 mm
Frost-free period (average)	140 days
Freeze-free period (average)	166 days
Precipitation total (average)	229 mm

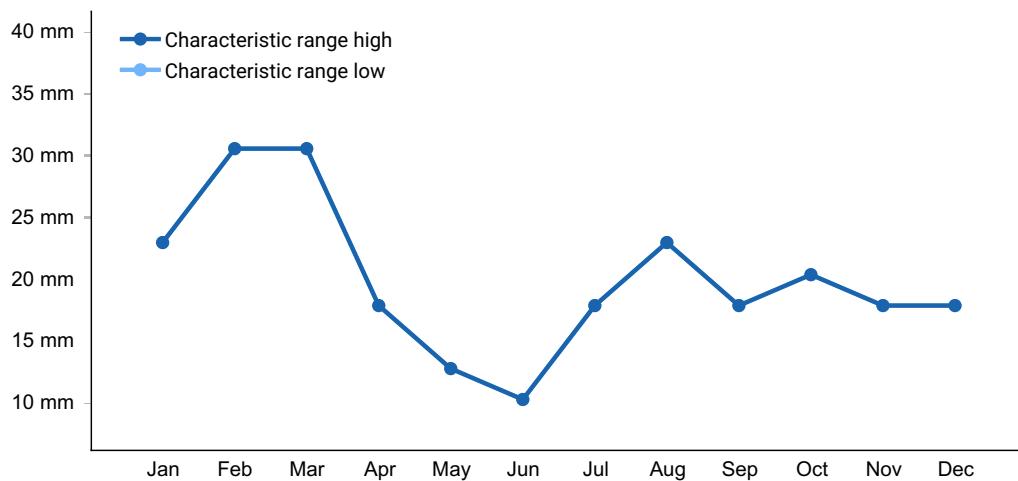


Figure 1. Monthly precipitation range

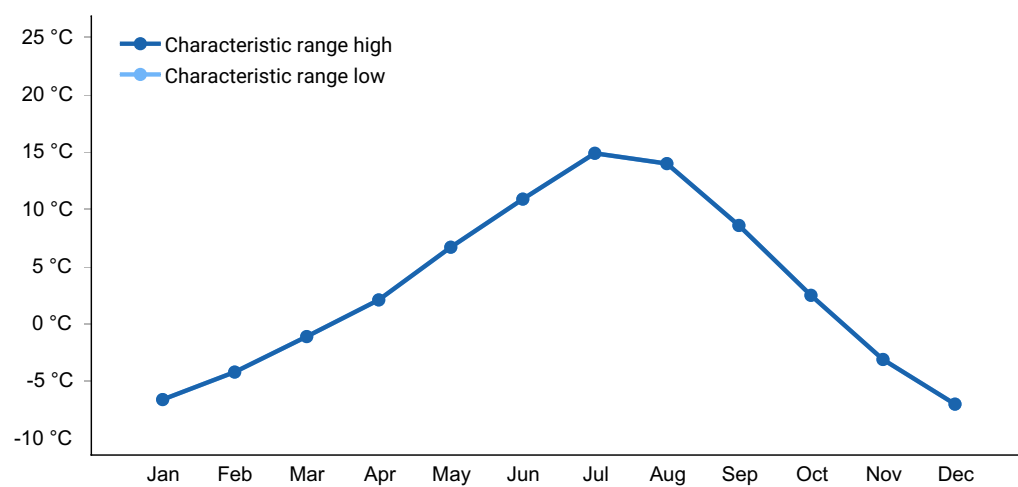


Figure 2. Monthly minimum temperature range

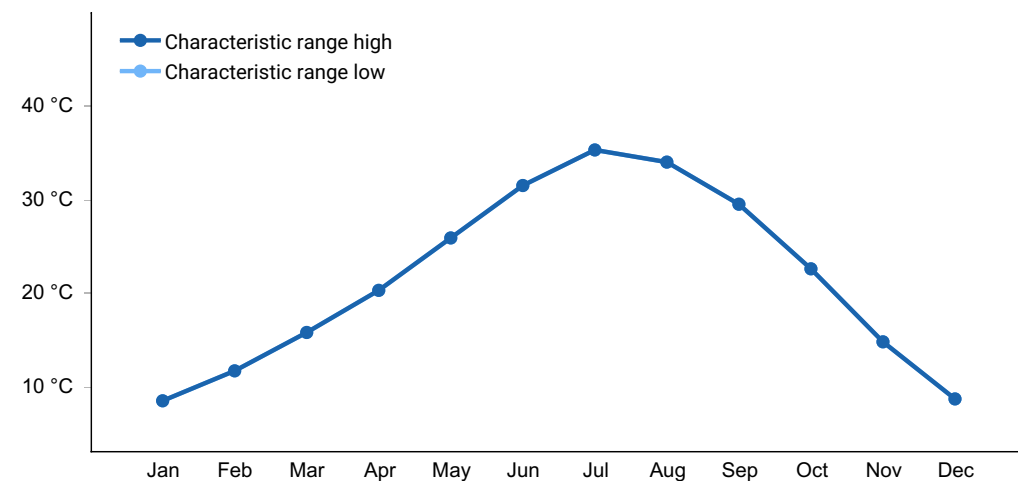


Figure 3. Monthly maximum temperature range

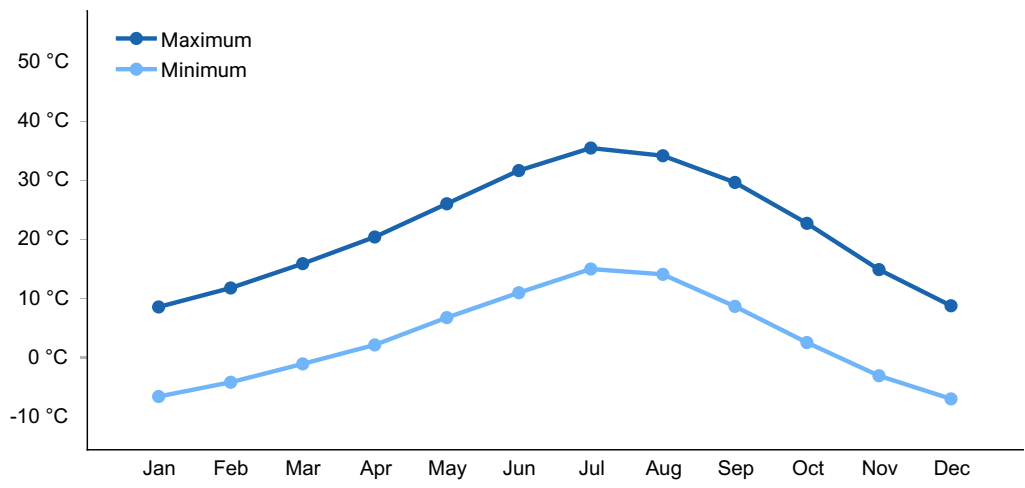


Figure 4. Monthly average minimum and maximum temperature

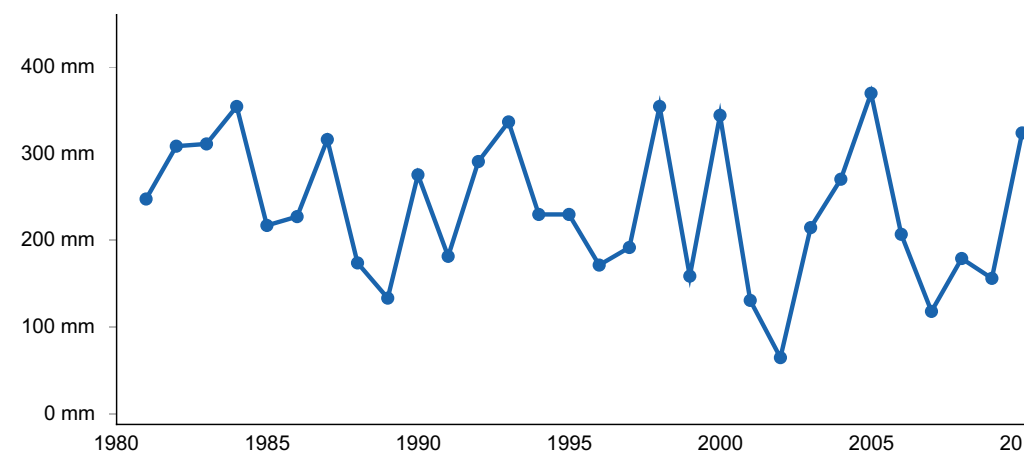


Figure 5. Annual precipitation pattern

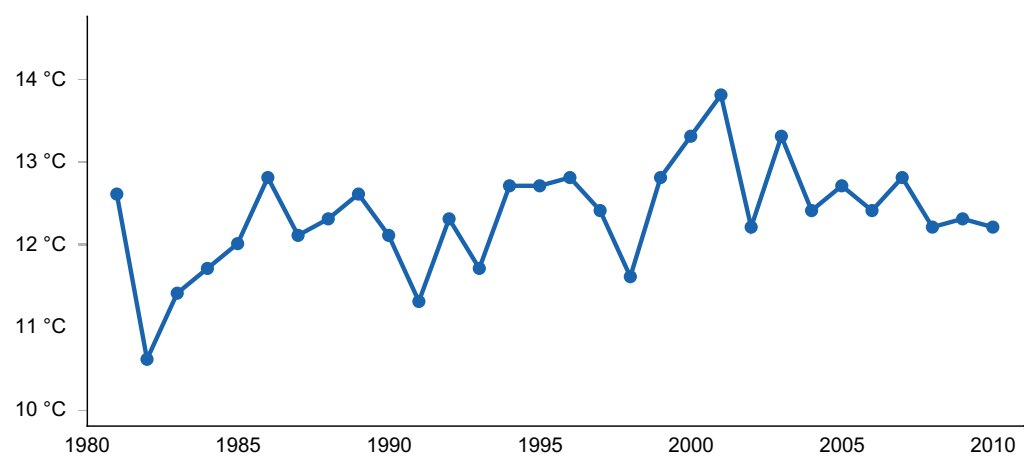


Figure 6. Annual average temperature pattern

Climate stations used

- (1) CALIENTE [USC00261358], Caliente, NV

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils are shallow to lithic contact and well drained. Soils are formed in residuum and colluvium derived from volcanic rocks. Soils are modified with up to 55 percent of cobbles and gravels on the soil surface and up to 60 in the profile. Soils have an argillic horizon with an abrupt textural boundary at a depth of 2 to 4 inches. Mollic epipedon approximately 14 to 20 inches in thickness. Runoff class is moderate to rapid. Soils have moderately slow permeability and moderately high saturated hydraulic conductivity. Soil series associated with this ecological site include: Acti and Wakansapa.

Table 4. Representative soil features

Parent material	(1) Colluvium–welded tuff (2) Residuum–welded tuff (3) Residuum–volcanic rock (4) Colluvium–volcanic rock
Surface texture	(1) Very gravelly loam (2) Very gravelly, ashy loam
Drainage class	Well drained
Permeability class	Very slow to slow
Depth to restrictive layer	36–51 cm
Soil depth	36–51 cm
Surface fragment cover ≤3"	0–46%
Surface fragment cover >3"	0–9%
Available water capacity (Depth not specified)	2.79–5.33 cm
Calcium carbonate equivalent (Depth not specified)	0%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	6.1–7.3
Subsurface fragment volume ≤3" (Depth not specified)	27–40%
Subsurface fragment volume >3" (Depth not specified)	10–22%

Ecological dynamics

As ecological condition declines muttongrass and other herbaceous vegetation decrease while mountain big sagebrush, Utah serviceberry, singleleaf pinyon and Utah juniper increase on the site.

In the absence of natural disturbance singleleaf pinyon and Utah juniper increase in canopy cover, eventually dominating the visual aspect of the site. An increase in tree canopy cover results in the reduction and eventual removal of the shrub and herbaceous component of this site. This loss in ground cover increases the hazard of soil erosion. Significant surface soil losses can have negative impacts on ecological site stability and increases the likelihood of undesirable species and noxious weeds. Utah serviceberry and Gambel oak readily increase on this site following wildfire.

Fire Ecology:

Presettlement fire return intervals in mountain big sagebrush communities varied from 15 to 25 years. Plants are readily killed in all seasons, even light severity fires. Mountain big sagebrush is highly susceptible to injury from fire. It is often top-killed by fire and will not resprout. 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 fires. Muttongrass appears to be harmed by and slow to recover from severe fire.

The Reference State 1 is representative of the natural range of variability under pristine conditions. The reference state has three general community phases: a shrub-grass dominant phase, a perennial grass dominant phase, and a shrub dominant phase. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Plant community phase changes are primarily driven by fire, periodic long term drought or insect or disease attack.

The reference plant community is dominated by mountain big sagebrush, Utah serviceberry and muttongrass. Potential vegetative composition is about 45 percent grasses, 5 percent forbs, 45 percent shrubs, and 5 percent trees. Approximate ground cover (basal and crown) is 45 to 50 percent.

State and transition model

State 1: Reference State

Community Phase 1.1

- Mountain big sagebrush dominant
- Perennial native bunchgrass sub-dominant
- Perennial native forbs and other native shrubs present

Community Phase 1.2

- Mountain big sagebrush and other shrubs decrease
- Perennial bunchgrasses increase

1.1B

1.1A

1.2A

1.3A

Community Phase 1.3

- Mountain big sagebrush increases
- Perennial bunchgrass decreases

T1A

State 2: Current Potential State

Community Phase 2.1

- Mountain big sagebrush dominant
- Perennial native bunchgrass sub-dominant
- Perennial native forbs and other native shrubs present
- Annual non-native species present

Community Phase 2.2

- Mountain big sagebrush and other shrubs decreases
- Perennial bunchgrasses increases
- Annual non-native species stable to increasing

2.1B

2.1A

2.2A

2.3A

Community Phase 2.3

- Mountain big sagebrush increases
- Perennial bunchgrass decreases
- Annual non-native species are stable to increasing

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

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 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

Animal community

Livestock Interpretations:

This site is suited to livestock grazing. Grazing management should be keyed to perennial grass 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. 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. 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:

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. 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. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities. 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. Deer and elk make heavy use of muttongrass, especially in early spring when other green forage is scarce. Depending upon availability of other nutritious forage, deer may use mutton grass in all seasons. Mutton grass cures well and is an important fall and winter deer food in some areas.

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

Native Americans used big sagebrush leaves and branches for medicinal teas, and the leaves as a fumigant. Bark was woven into mats, bags and clothing. 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.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T5S R71E S31
UTM zone	N
UTM northing	4151735n
UTM easting	756239e

Latitude	37° 28' 37"
Longitude	114° 6' 8"
General legal description	Docs Pass Quadrangle, 1,480 east and 12 feet south of the northwest corner of section. Approximately 0.25 miles southeast of Pine Ridge, Lincoln 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

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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)	
Contact for lead author	
Date	12/21/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. **Presence of water flow patterns:**

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

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

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

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence** (include which functional groups are expected to show mortality or decadence):
-

14. **Average percent litter cover (%) and depth (in):**
-

15. **Expected annual annual-production** (this is TOTAL above-ground annual-production, not just forage annual-production):
-

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:**
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17. **Perennial plant reproductive capability:**
-