USDA Natural Resources
Conservation Service

Ecological site R043AY503ID
Warm-Mesic Dry-Xeric Loamy Hills and Canyons (PSSP/FEID/POSE)

Last updated: 10/15/2020
Accessed: 05/03/2024

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): 043A–Northern Rocky Mountains

Description of MLRAs can be found in: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook

LRU notes

Major land resource area (MLRA): 043A-Northern Rocky Mountains
Modal LRU – 43A08 Clearwater Canyons

This LRU is composed predominantly of low to mid elevation foothills, structural benches, valleys, flats, canyon walls and ridges. The soils tend to be loamy Argixerolls. Volcanics are the dominant parent materials, along with occasional granite and other intrusives. Soil climate is a mesic temperature regime and xeric moisture regime with average annual precipitation around 675 mm (27 inches).

Others where occurring – 43A07 – Eastern Columbia Plateau Embayments
43A09 – Western Bitterroot Foothills

Classification relationships

This ES group fits into the National Vegetation Standard's Central Rocky Mountain Foothill Grassland Group (Compare to previous Idaho range sites: R009XY002ID, NORTH SLOPE LOAMY 16-22; R009XY003ID, LOAMY 16-22; R009XY004ID, SOUTH SLOPE LOAMY 16-22 and R009XY009ID, NORTH SLOPE SCHIST 16-22 FEID-PSSPS)

Ecological site concept

This ES is found on well drained, loamy sites with mesic temperatures, and drier microclimates. Soils are generally moderately deep or deep to a lithic contact. They have adequate available water holding capacity and a plant community dominated by grass species such as bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass.

Table 1. Dominant plant species

Tree	Not specified

Shrub	(1) *Amelanchier alnifolia* (2) *Rosa woodsii*
Herbaceous	(1) *Pseudoroegneria spicata* (2) *Festuca idahoensis*

Physiographic features

This ecological site occurs mainly on range backslopes of mountain slopes, hills, ridges, rims, canyon walls, and structural benches. Parent materials are colluvium and residuum from basalt, granite, metamorphic, alluvium, and loess.

Landscapes: Mountains, foothills, hills, canyonlands, plateaus
Landforms: Mountain slopes, hillslopes, ridges, rims, canyon walls, structural benches, patterned ground, knobs

Elevation:
Total range = 246 to 1170 m
(805 to 3,840 feet)
Central tendency = 544 to 813 m
(1,785 to 2,665 feet)

Slope (percent):
Total range = 0 to 96 percent
Central tendency = 19 to 50 percent

Water Table Depth:
>200 cm
(>80 inches)

Flooding:
Frequency: None
Duration: None

Ponding:
Frequency: None
Duration: None

Aspect: 60-270-350
Central tendency: 160-270-290

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Foothills > Hillslope (3) Canyonlands > Canyon wall (4) Plateau > Structural bench
Elevation	544–812 m
Slope	20–50%
Water table depth	0 cm
Aspect	W, S, SW

Table 3. Representative physiographic features (actual ranges)

Elevation	245–1,170 m
Slope	0–95%
Water table depth	0 cm

Climatic features

The climate of this portion of the MLRA is controlled by a combination of large-scale and small-scale factors. The large-scale factors here include latitude, relative position on the North American continent, prevailing hemispheric wind patterns, and extensive mountain barriers. Small-scale or local factors include the topographic setting and position (valley, slope, or ridge location), as well as orientation or aspect, and vegetative cover. Elevation may cover various scales. Broadly, the climate is transitional between a northern Pacific coastal type and a continental type. The Pacific influence is noted particularly by the late autumn and winter maximum in cloudiness and precipitation; also in the relatively moderate average winter temperatures, compared with areas east of the Rocky Mountains. Summer is characteristically sunny and dry, though July and August are the only distinct summer months. July and August are thus also the peak fire-danger months. Annual precipitation (rain and melted snow) averages as little as 10 inches at the lowest canyon floors; over 100 inches at the highest elevations. Wettest months are normally November, December, and January. Close to 60 percent of the annual total occurs during the period November through March. A slight, secondary peak in precipitation normally appears in May and June, followed by a sharp decrease in July. Snowfall accounts for more than 50 percent of the total precipitation at elevations above 4,800 ft. Snow cover usually persists in the mid elevation valleys from early December through the end of March. High-elevation snowpack reaches a depth of 5 ft (1.5 m) or more in March and April and may linger into June. The main season of lightning (or thunderstorm) activity extends from late May through August. Storms occur on an average of 3 or 4 days each in June, July, and August. Monthly mean temperatures in populated valley locations range from 24 F (-4 C) in January to 65 F (18 C) in July; these are midpoint values between the average daily maximum and minimum temperatures. The annual mean is 43 F (6 C). A large diurnal range occurs in summer. Extreme temperatures have been as high as 103" to 105" F (about 40" C) and as low as -36" F (-38" C). Temperature inversions are commonplace, particularly on the clear summer and early autumn nights. The frost-free season, defined as the period with minimum temperatures staying above 32" F (0" C), varies widely with elevation and topographic position. The season is generally longer at lower elevation locations and on slope positions in the "thermal belt" around 3,500 ft. The season is shorter in positions affected by cold air drainage and slopes above the “thermal belt” at elevations >5,500 ft. Relative humidity is usually high throughout the day in late autumn and winter, averaging 70 to 80 percent or higher in midafternoon. In July and August, afternoon values average near 35 percent in the mid elevation valleys and 45 percent at 5,500 ft. Summer nighttime humidity in these valleys typically recovers to over 90 or 95 percent by dawn. On the slopes above the temperature inversion, at the same time, humidity may average only 50 to 60 percent. Winds have a prevailing (most frequent) direction from the southwest during all or most of the year. Local terrain effects modify the larger-scale wind that occurs in the adjacent free atmosphere. A nighttime drainage effect is common. Sunshine duration is at a minimum in December, when it may average only 20 percent of the maximum possible. July has close to 80 percent of the maximum possible.

(from Finklin, A. 1983. Climate of Priest River Experimental Forest, Northern Idaho.GTR-INT-159)

Frost-free period (days):
Total range = 92 to 180 days
Central tendency = 118 to 147 days

Mean annual precipitation (cm):
Total range = 435 to 910 mm
(17 to 36 inches)
Central tendency = 560 to 700 mm
(22 to 28 inches)
MAAT (C)
Total range = 6.8 to 12.0
(44 to 54 F)
Central tendency = 8.4 to 10.1
(47 to 50 F)

Climate stations: KAMIAH

Table 4. Representative climatic features

Frost-free period (characteristic range)	94 days

Freeze-free period (characteristic range)	140 days
Precipitation total (characteristic range)	610 mm
Frost-free period (actual range)	94 days
Freeze-free period (actual range)	140 days
Precipitation total (actual range)	610 mm
Frost-free period (average)	94 days
Freeze-free period (average)	140 days
Precipitation total (average)	610 mm

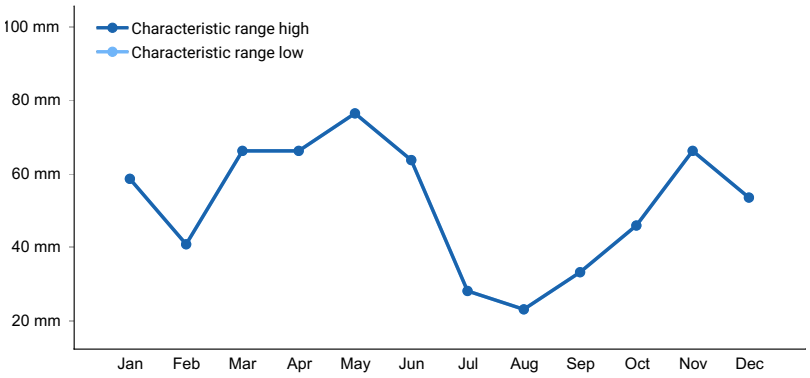


Figure 1. Monthly precipitation range

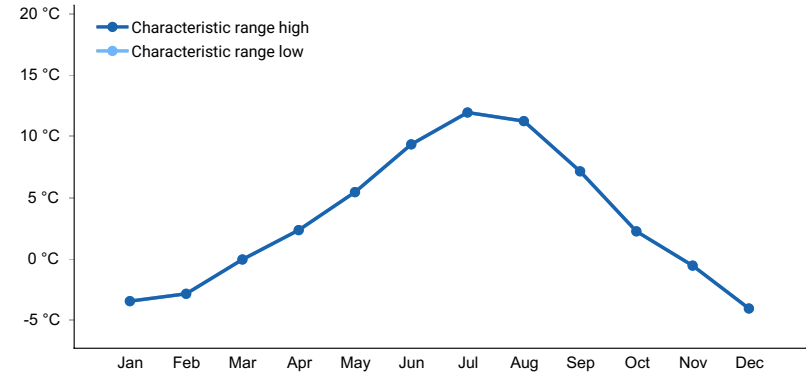


Figure 2. Monthly minimum temperature range

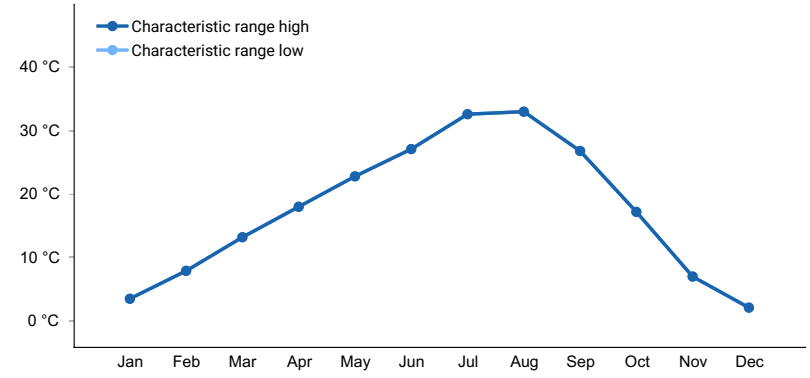


Figure 3. Monthly maximum temperature range

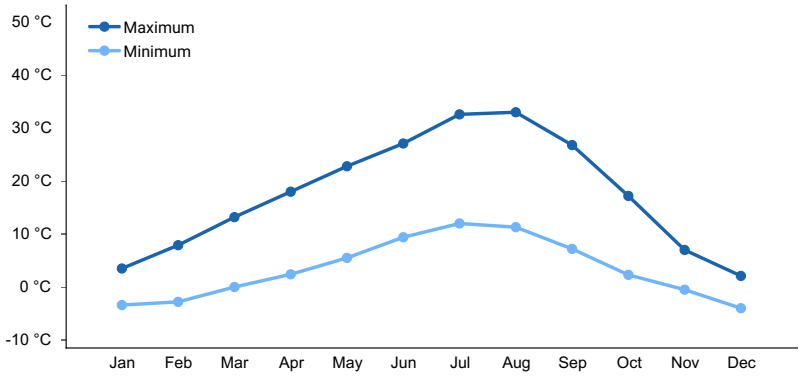


Figure 4. Monthly average minimum and maximum temperature

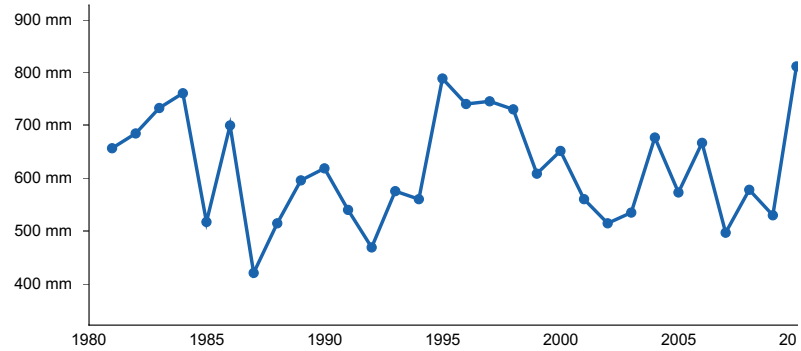


Figure 5. Annual precipitation pattern

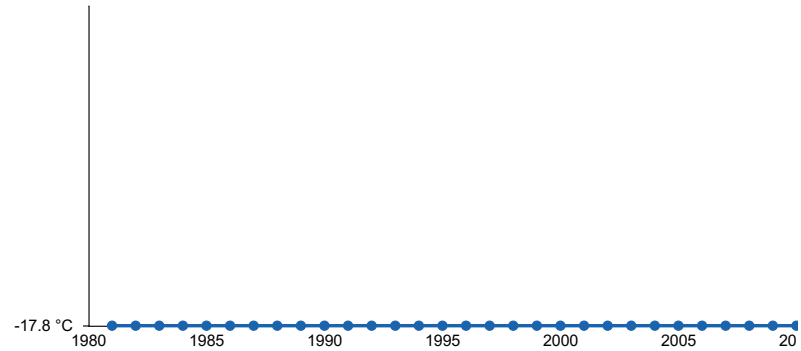


Figure 6. Annual average temperature pattern

Climate stations used

- (1) KAMIAH [USC00104793], Kamiah, ID

Influencing water features

Water Table Depth:
>200 cm
(>80 inches)

Flooding:
Frequency: None
Duration: None

Ponding:
Frequency: None
Duration: None

Soil features

This ecological site is associated with several soil components (Meland, Ferdinand, Bluesprin, Wellsbench, Kettenbach, Watama, Vollmer, Uhlig, Linville, Jacket, Schumacher). These components can be grouped into the soil subgroups: Ultic Argixerolls, Calcic Argixerolls, Pachic Argixerolls, Pachic Ultic Argixerolls, Pachic Haploxerolls, Typic Argixerolls. These soils are often influenced by Mazama tephra deposits (usually highly mixed with loess) over other parent materials. These parent materials are dominantly: basalt, andesite, or metamorphic rock.

Parent Materials:
Kind: Tephra (volcanic ash)
Origin: mixed
Kind: loess
Origin: mixed
Kind: alluvium
Origin: mixed
Kind: colluvium and residuum
Origin: basalt, andesite, metamorphic

Surface Texture:
(1) Gravelly-Silt Loam
(2) Ashy-Silt Loam
(3) Gravelly-Ashy-Silt Loam
(4) Very Cobbly-Loam
(5) Silt Loam

Table 5. Representative soil features

Parent material	(1) Volcanic ash (2) Loess (3) Alluvium (4) Colluvium–basalt (5) Residuum–basalt (6) Colluvium–igneous and metamorphic rock (7) Residuum–igneous and metamorphic rock
Surface texture	(1) Gravelly silt loam (2) Ashy silt loam (3) Gravelly, ashy silt loam (4) Very cobbly silt loam (5) Silt loam
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	61–119 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	17.27 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	0
Soil reaction (1:1 water) (0-152.4cm)	6.7

Subsurface fragment volume <=3" (25.4-152.4cm)	15%
Subsurface fragment volume >3" (25.4-152.4cm)	8%

Table 6. Representative soil features (actual values)

Drainage class	Well drained
Permeability class	Slow to moderately rapid
Depth to restrictive layer	51–0 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	8.89–19.05 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	0
Soil reaction (1:1 water) (0-152.4cm)	5.6–7.8
Subsurface fragment volume <=3" (25.4-152.4cm)	5–32%
Subsurface fragment volume >3" (25.4-152.4cm)	0–24%

Ecological dynamics

Idaho fescue and bluebunch wheatgrass are dominant. The site has a variety of forbs. The bluebunch wheatgrass on the site is usually rhizomatous. Composition is approximately 65-75 percent grass, 20-30 percent forbs, and 0-10 percent shrubs. This site has evolved in a semi-arid climate characterized by dry summers and cold, moist winters. Fire has historically occurred on the site at intervals of 20-40 years. In the absence of fire and/or grazing, bluebunch wheatgrass and Idaho fescue can become decadent due to build-up of old residues in the crown. In the absence of normal fire frequency, snowberry and Woods' rose, if present, can increase to the point of being co-dominant with bluebunch wheatgrass and Idaho fescue on the site. When present, rose and snowberry also will develop into patches on the site. Season-long grazing and/or excessive utilization leads to reduced vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in root-sprouting shrubs and noxious and invasive plants.

State and transition model

1 Reference State The reference community is a stabilized, persistent native, perennial bunchgrass dominated herbaceous community with loamy soils that withstands nature fire return interval.

1.1 This plant community dominated by cool season bunchgrasses and less shortgrass species with other grass and forb species. Fire Return Interval is 20-40 years.

1.1a Site experiences fire that top kills vegetation that returns the community to the pioneering herbaceous community. Shrubs on the periphery (few interior) and bunchgrasses resprout from large root masses and interspaces filled in with wind dispersed or stored seed of pioneering herbaceous species.

1.2a Site recovers from fire over time, deeper rooted plants increase and dominate over pioneering herbaceous species.

1.1b Shrub species increase due to lack of fire or increased grazing of palatable grasses.

1.3a Shrub cover decreases with fire or increased browsing by ungulates.

1.1c Improper grazing management causes a decrease in palatable species and an increase in Poa secunda.

1.4a Proper grazing management and potentially some seeding of native bunchgrasses return community to the reference community.

1.2 Pioneering herbaceous species establish on mineral soil between resprouting shrubs and bunchgrass and shortgrass species.

1.3 Shrub Encroached Community in which shrub species encroach from periphery to interior and increase in cover.

1.4 Improper Grazing Community in which palatable grass and forb species decrease with an increase in increaser species such as Poa secunda.

State 2 – Fire Suppression State

T1a Fire return Intervals significantly longer than the natural 20-40 year interval growth and a diversity of herbaceous species to populate interspaces.

State 3 Fragmentation of site resulting in patches of non-connected patches of shrubs with altered hydrology, nutrient flow and vegetation propagules and wildlife dispersal altered.

T1b Fragmentation of the intact community and its hydrology and nutrient flows to numerous disconnected patches due to development, extreme grazing practices or ungulate or recreation use.

R2 Improved grazing practices, altered ungulate use, development removal and seeding of bunchgrasses and shortgrass and shrub species and other restoration practices.

State 4 Improper Grazing State: Improper grazing practices have damaged soil physiology through compaction and increased which allows build-up of fine fuels and decadent growth in shrubs and bunchgrasses.

R1 Return of natural fire cycle to the community which allows for shrubs and bunchgrasses to resprout new soil erosion due to trampling and hoof action, change in plant cover and composition by weight to unpalatable, increaser species and possible introduction of weedy and/or noxious plant species through animal transport of seeds.

T1c Improper grazing practices such as continual year round use of area, intense use with large herds, with or without heavy native ungulate use.

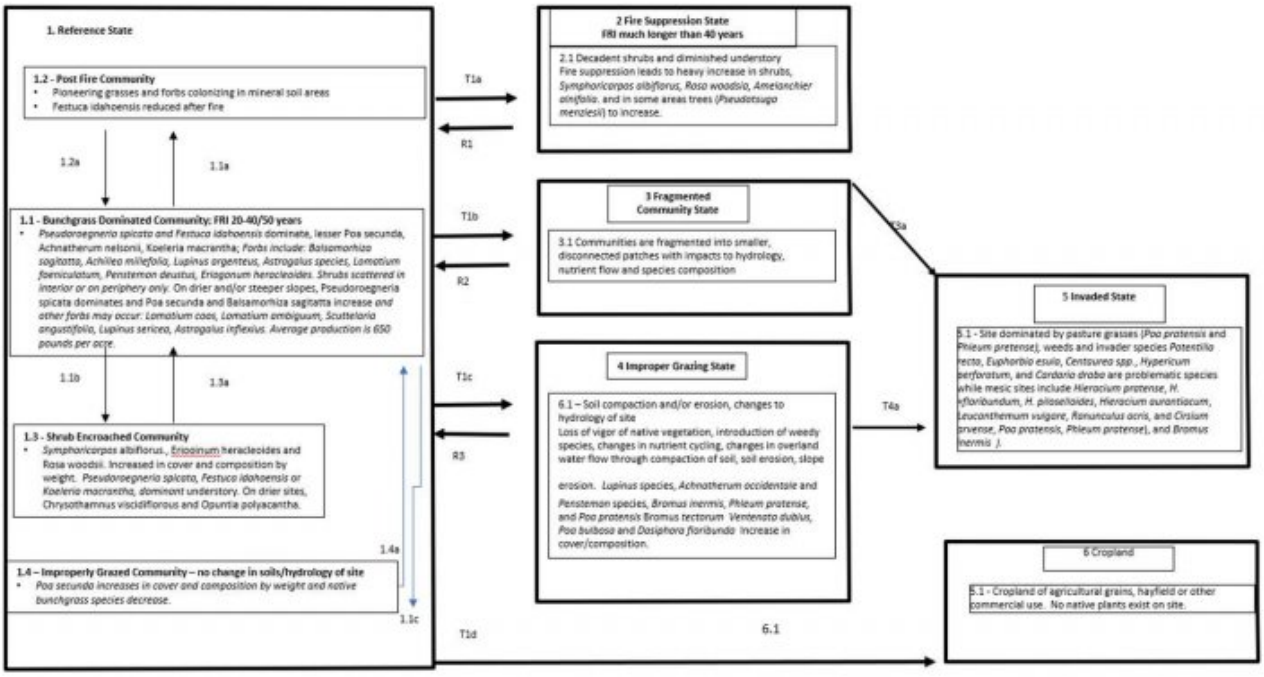
T1d Conversion of native vegetation community to cropland for agricultural use or hayfield.

R3 Prescribed grazing practices such as rotational grazing, fencing off of areas, lowered to manageable herd size.

T3a T4a Introduction and dominance of non-native species and invasive species. Sites are invaded by noxious weeds or introduced pasture grasses. Pasture grasses may be planted or a result of invasion from neighboring sites. Improper grazing may be a trigger for invasion however flooding may transport seeds to freshly deposited alluvia animal transport of seeds.

State 5 Invaded State: This includes many non-native species that have come to dominate riparian areas such as cheatgrass (Poa pratensis), timothy (Phleum pratensis) and some native increaser species may include: Site dominated by pasture grasses (*Poa pratensis* and *Phleum pretense),* weeds and invader species (*Hypericum perfoliatum, Potentilla recta, Euphorbia esula*, and knapweeds, especially *Centaurea biebersteinii (= Centaurea maculosa).*

State 6 Cropland State: This is a complete conversion to a cropland.



References

. USNVC [United States National Vegetation Classification]. 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.. USNVC: http://usnvc.org/.

Finklin, A.I. 1983. Climate of Priest River Experimental Forest, northern Idaho. Gen. Tech. Rep. INT-159. U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. 53.

Jim Cornwell. 2009. NRCS Idaho Draft Range Site Descriptions.

Approval

Curtis Talbot, 10/15/2020

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	05/03/2024
Approved by	Curtis Talbot
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:**

17. **Perennial plant reproductive capability:**