USDA Natural Resources
Conservation Service

Ecological site R043AY509ID
Warm-Mesic Aquic-Xeric Loamy Flood Plains (riparian forest/shrub)

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, mountain slopes 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).

Classification relationships

This ES fits into the National Vegetation Standard's Rocky Mountain-Great Basin Riparian Shrubland Group (Compare to previous Idaho range sites: R009XY031ID, STONY RIPARIAN POBAT-ALNUS/ELYMU; R009XY032ID, RIPARIAN DECA5-CAREX; R009XY033ID, STONY BOTTOMLAND SYAL/PSSP6)

Ecological site concept

This ES is found on somewhat poorly drained to well drained, loamy sites on floodplains. A water table can be present but is usually not within 75 cm of the surface during the May-Oct period. They have mesic temperatures and a plant community that varies from riparian woody species to sedges and grasses. They are Riparian woodlands and shrublands found on canyon floors of the Ponderosa Pine Zone. These riparian areas are associated with all streams at and below lower treeline, including permanent, intermittent and ephemeral streams with woody riparian vegetation.

Table 1. Dominant plant species

Tree	(1) *Populus balsamifera ssp. trichocarpa* (2) *Crataegus douglasii*
Shrub	(1) *Salix* (2) *Philadelphus lewisii*

Herbaceous	(1) *Galium trifidum* (2) *Elymus glaucus*

Physiographic features

This ecological site occurs mainly on floodplains and stream terraces in canyons. Parent materials are alluvium from basalt.

Landscapes: Canyonlands, plateaus
Landforms: Floodplains, stream terraces

Elevation:
Total range = 265 to 840 m
(870 to 2,755 feet)
Central tendency = 350 to 575 m
(1,150 to 1,885 feet)

Slope (percent):
Total range = 0 to 4 percent
Central tendency = 0 to 2 percent

Water Table Depth: 53 - >200 cm
(21 - >80 inches)

Flooding:
Frequency: none - occasional
Duration: None - long

Ponding:
Frequency: None
Duration: None

Aspect: NA

Table 2. Representative physiographic features

Landforms	(1) Canyonlands > Flood plain (2) Canyonlands > Terrace--stream or lake
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional
Elevation	351–575 m
Slope	0–2%
Water table depth	119 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Flooding duration	Long (7 to 30 days)
Flooding frequency	None to occasional
Elevation	265–840 m
Slope	0–4%
Water table depth	53–0 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 = 100 to 175 days
Central tendency = 130 to 170 days

Mean annual precipitation (cm):
Total range = 400 to 720 mm
(16 to 28 inches)
Central tendency = 540 to 635 mm
(21 to 25 inches)
MAAT (C)
Total range = 7.9 to 11.6
(46 to 53 F)
Central tendency = 9.1 to 10.6
(48 to 51 F)

Climate stations: none

Table 4. Representative climatic features

Frost-free period (characteristic range)	103-130 days

Freeze-free period (characteristic range)	151-183 days
Precipitation total (characteristic range)	610-635 mm
Frost-free period (actual range)	96-137 days
Freeze-free period (actual range)	143-191 days
Precipitation total (actual range)	610-635 mm
Frost-free period (average)	117 days
Freeze-free period (average)	167 days
Precipitation total (average)	635 mm

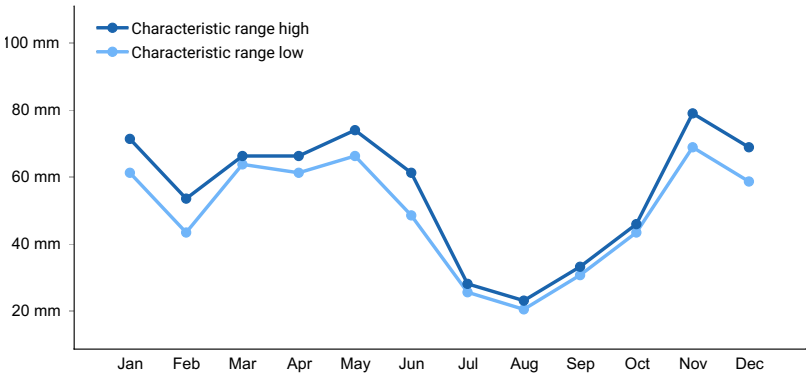


Figure 1. Monthly precipitation range

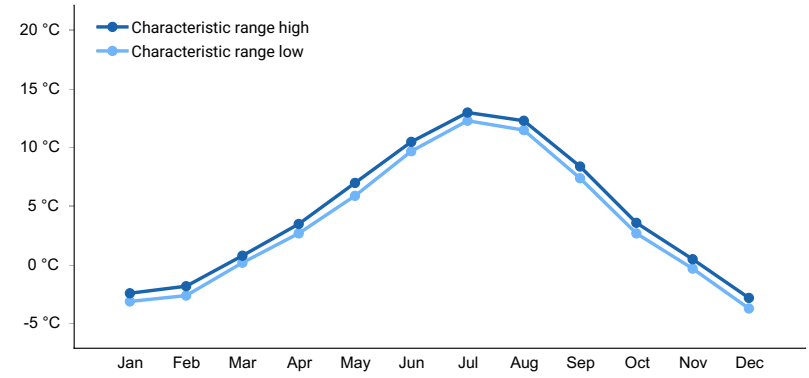


Figure 2. Monthly minimum temperature range

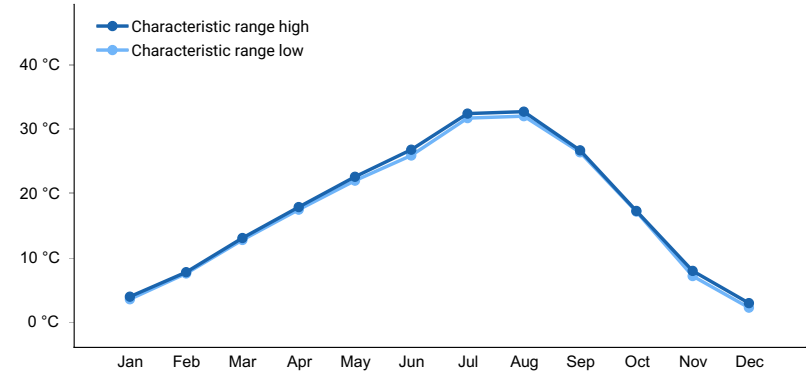


Figure 3. Monthly maximum temperature range

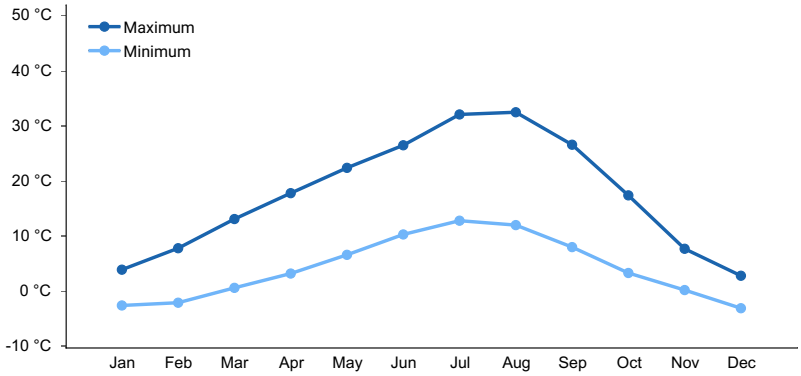


Figure 4. Monthly average minimum and maximum temperature

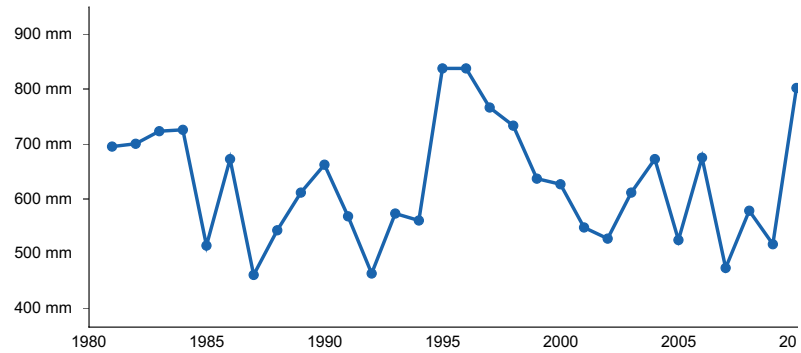


Figure 5. Annual precipitation pattern

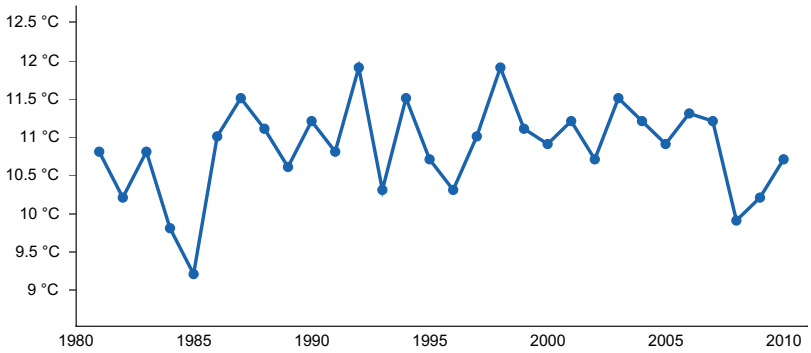


Figure 6. Annual average temperature pattern

Climate stations used

- (1) KAMIAH [USC00104793], Kamiah, ID
- (2) DWORSHAK FISH HATCH [USC00102845], Orofino, ID

Influencing water features

Water Table Depth: 53 - >200 cm
(21 - >80 inches)

Flooding:
Frequency: none - occasional
Duration: None - Long

Ponding:
Frequency: None
Duration: None

Soil features

This ecological site is associated with several soil components (Tombeall, Joseph, Bridgewater). These components can be grouped into the soil subgroups Cumulic Haploxerolls and Aquic Xerofluvents. These soils are often composed of gravelly alluvium derived from basalt.

Parent Materials:
Kind: alluvium
Origin: basalt

Surface Texture:
(1)Extremely Cobbly-Loamy Coarse Sand
(2) Extremely Gravelly-Silt Loam

Table 5. Representative soil features

Parent material	(1) Alluvium–basalt
Surface texture	(1) Extremely cobbly loamy coarse sand (2) Extremely gravelly silt loam
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	0 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.84 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)	7.2
Subsurface fragment volume <=3" (25.4-152.4cm)	40%
Subsurface fragment volume >3" (25.4-152.4cm)	35%

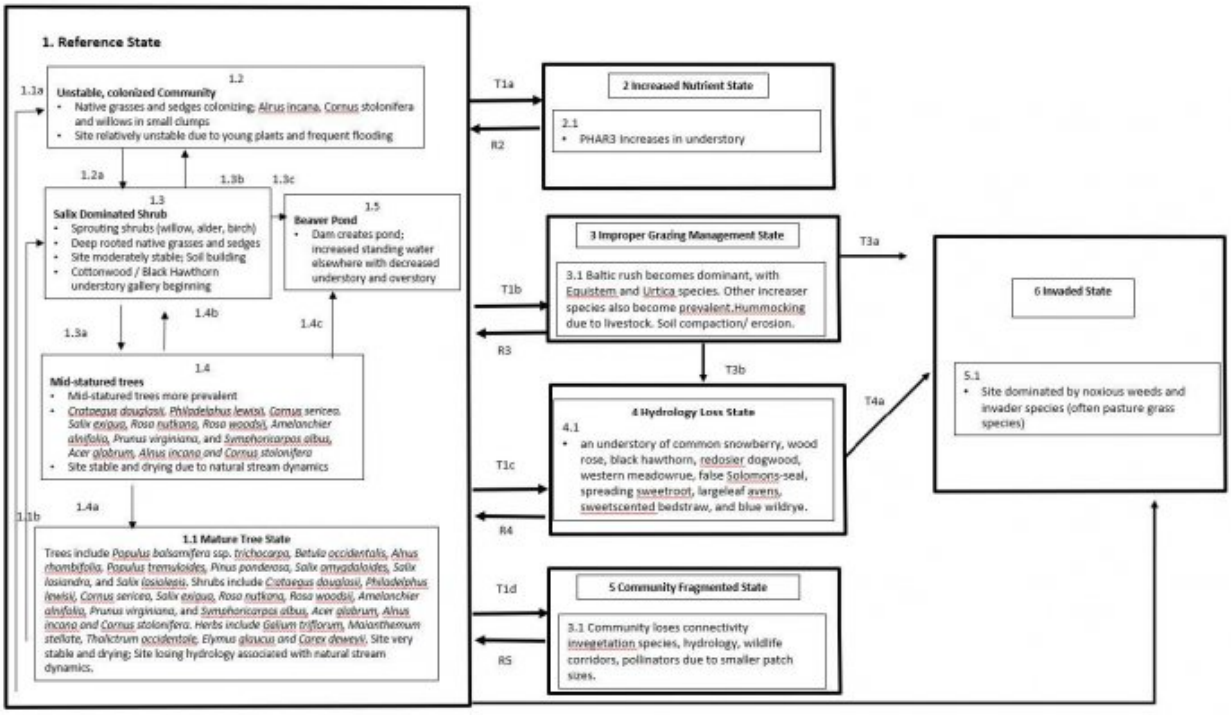
Table 6. Representative soil features (actual values)

Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderate to rapid
Depth to restrictive layer	0 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.05–11.94 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)	6.4–7.3
Subsurface fragment volume <=3" (25.4-152.4cm)	34–47%
Subsurface fragment volume >3" (25.4-152.4cm)	20–35%

Ecological dynamics

State and transition model



1 Reference State This state is represented by active floodplain progressing to a stabilized low terrace with soil development. The vegetation community progresses through seral phases of herbaceous to shrubland to deciduous tree development to a stable, reference mature mixed species-cottonwood forest on low terraces, in mesic areas with mineral soils.
1.1a, 1.3b Site experiences catastrophic flooding often associated with extreme weather event and/or ice jam. Site experience flooding that kills trees, shrubs and herbaceous understory to a large extent, leaving deposited mineral soil and a developing herbaceous vegetation community.
1.1b, 1.4b Site experiences flooding that kills trees but not the shrub species, which increase on-site to a shrubland. Fire that returns understory community to either the resprouting shrub community or if severe, the pioneering herbaceous community. During drought fire can occur on this site. Fire return interval for surface fires is 50 years, severe fires may be 100 years. Deciduous tree species such as cottonwood and aspen capable of resprouting after fire.
1.2 Colonizing grasses and sedge and is relatively unstable due to shallow rooted plants and frequent flooding. Willows may exist on site but are typically in small clumps or as single plants
1.2a, 1.3a, 1.4a With time, increased soil development, drying of site and less continuous flooding of site each earlier seral community transitions to the next maturing community. 1.2a-The short-lived, pioneering herbaceous community is replaced with longer living shrub species and deciduous tree species seeedlings.1.3a- Site changes to mid-statured tree dominant community with seedlings growing to pole-sized trees.1.4a-mid-sized trees develop to mature mixed-cottonwood gallery with an understory of aspen and Black Hawthorn, developed soil on a low terrace, disconnected from active stream channel flooding.
1.3 High diversity of young cottonwood and aspen trees, black Hawthorn, willows, alder, birch, sedges and grasses along with a variety of mesic forbs. Slight variations in climate and elevation may cause some minor shifting of the willow species. This site is moderately stable and typically can withstand occasional flooding
1.3c, 1.4c Beavers present on site, create dam that floods areas creating pond and lesser submerged areas.
1.4 Mid-statured trees become more prevalent with few interspersed coniferous trees possible. Site is very stable but drying due to natural stream dynamics. Cottonwood and aspen trees, black Hawthorn, willows, alder, birch, sedges and grasses along with a variety of mesic forbs.
1.5 Beaver Pond. Beavers present at site, build dam that floods areas to create a pond and inundates other areas within site.
State 2 Increased nutrient load State. On or off-site additions of nutrients to site via agricultural runoff that increases Phalaris aurandinacea cover.
T1a Increased nutrient flow to site either from agricultural run-off and/or intense livestock confinement or grazing without nutrient run-off practices in place.
R2 Decrease in nutrients due to cessation of off-site activities that cause increase nutrient load to site.
State 3 Improper Grazing Managenment State. Baltic rush and increaser species become prevalent. Site drying due to stream downcutting, hummocking by livestock possible
T1b Improper grazing (overgrazing or repeated spring grazing), that diminishes palatable native plants and increases Baltic rush and other increaser plants.
R3 Improved grazing practices (change of season of use, conservative stocking rates), tree/shrub establishment, water impoundments (beaver dams, log jams, or dam analogs)
State 4 Hydrology Loss State: Site loses hydrology due to downcutting of stream or stream meandering or off-site watershed effects (dams, clearcutting of trees, etc.).
T1c Reservoirs, water diversions, ditches, roads, and human land uses in the contributing watershed create loses to hydrologic inputs to site. Improper grazing creates accelerated stream downcutting and trampling of plants, pugging and dewatering of site.Contributing to an understory of common snowberry, wood rose, black hawthorn, redosier dogwood, western meadowrue, false Solomons-seal, spreading sweetroot, largeleaf avens, sweetscented bedstraw, and blue wildrye
R4 Grazing management (timing and amount to improve shrub and tree establishment), brush management to remove unwanted drier species
State 5 Fragmented State: Community divided into non-connected small patches due to road building, other development, loss in hydrology, plant/wildlife/pollinator connectiveness.
T1d Construction of roads, dams, housing or other means in which the community is divided into small non-connected patches.
R5 Removal and restoration of area including seeding with native plant species after roads closed and other man-made features removed.
State 6 Invaded State: This includes many non-native species that have come to dominate riparian areas. Some species may include: orchard grass, timothy, Kentucky bluegrass, non-native thistles, Russian olive, leafy spurge, spotted knapweed, houndstounge, foxtail barley, whitetop mustard. Often sites are a combination both pasture grasses and invading weeds. T4, T5 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 alluvium.

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.

Kovalchik, B.L. and R.R. Clausnitzer. 2004. Classification and Management of Aquatic, Riparian, and Wetland Sites on the National Forests of Eastern Washington: Series Description. General Technical Report PNW-GTR-593. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. 1–354.

Contributors

Stephanies Shoemaker
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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:**

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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):**

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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:

    Sub-dominant:

    Other:

    Additional:

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

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

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

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17. **Perennial plant reproductive capability:**
