

Ecological site R025XY039ID DRY MEADOW

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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): 025X–Owyhee High Plateau

The Owyhee High Plateau, MLRA 25, lies within the Intermontane Plateaus physiographic province. The southern half is found in the Great Basin while the northern half is located in the Columbia Plateaus. The southern section of the Owyhee High Plateau is characterized by isolated, uplifted fault-block mountain ranges separated by narrow, aggraded desert plains. This geologically older terrain has been dissected by numerous streams draining to the Humboldt River. The northern section forms the southern boundary of the extensive Columbia Plateau basalt flows. Deep, narrow canyons drain to the Snake River across the broad volcanic plain.

This MLRA is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. Elevation ranges from 3,000 to 7,550 feet on rolling plateaus and in gently sloping basins. It is more than 9,840 feet on some steep mountains. The average annual precipitation in most of this area is typically 11 to 22 inches. It increases to as much as 49 inches at the higher elevations. Precipitation occurs mainly as snow in winter. The supply of water from precipitation and streamflow is small and unreliable, except along major rivers. Streamflow depends largely on accumulated snow in the mountains.

The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic or frigid temperature regime and an aridic, arid bordering on xeric, or xeric moisture regime. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam, and have ashy texture modifiers in some cases. Argillic horizons occur on the more stable landforms.

Ecological site concept

This site is on alluvial terraces and flood plains in high elevation plateaus and mountain valleys. Soils associated with this site formed in alluvium from volcanic rock. These soils are very deep and somewhat poorly to poorly drained.

Slopes are less than 4 percent and elevations range from 4,600 to 6,500 feet (1,402 to 1,982 meters). Important abiotic factors contributing to the presence of this ecological site include a seasonal water table greater 20 inches (50cm) below the soil surface and frequent flooding in spring and early summer. The reference plant community is dominated by Nevada bluegrass and alpine timothy.

Associated sites

R025XY011ID	LOAMY 13-16 LOAMY 13-16; ARTRV dominant shrub; dark surface horizon 35-50cm thick
R025XY028ID	LOAMY BOTTOM 12-16 ARTRT and LECI4 dominant vegetation; soils moderately well to well drained.
R025XY044ID	VERY SHALLOW STONY LOAM 10-14 VERY SHALLOW STONY LOAM 10-14; ARAR8 dominant shrub; >35% rock fragments by volume

R025XY046ID	MEADOW DECE and CANE2 dominant plants; very deep soils; poorly drained; water table 25-50cm
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Similar sites

R025XY046ID	MEADOW DECE and CANE2 dominant plants; very deep soils; poorly drained; water table 25-50cm
R025XY006NV	DRY MEADOW PONE3 and PHAL2 dominant plants; less productive site; seasonal high water table below 50cm. Occurs in the piedmont slope LRU.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Salix</i> (2) <i>Artemisia cana</i>
Herbaceous	(1) <i>Poa nevadensis</i> (2) <i>Phleum alpinum</i>

Physiographic features

This ecological site is associated with alluvial terraces and flood plains on high elevation plateaus and mountain valleys. Slopes range from 0 to 4 percent with elevations of 4,600 to 6,500 feet (1,402 to 1,982 meters). Runoff ranges from medium to high and this site experiences frequent flooding in the spring and early summer. A seasonal water table may occur below 20 inches (50 cm).

Table 2. Representative physiographic features

Landforms	(1) Mountain valleys or canyons > Stream terrace (2) Lava plateau > Flood plain (3) Alluvial flat
Runoff class	Medium to high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Frequent to occasional
Ponding frequency	None
Elevation	4,600–6,500 ft
Slope	0–4%
Water table depth	27–60 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is defined by hot dry summers and cold snowy winters.

Mean annual precipitation of this site is 15 inches (38 cm), with the highest rainfall occurring in April 2.3 inches (5.8cm) and the lowest in August 0.4 inches (1.0cm).

Average snowfall is typically 35 inches (89 cm) per year. Air temperatures average 26 degrees F in January (coldest) and 66 degrees F in July (warmest).

*The above and below data is averaged from the MTN CITY RS, Murphy Desert Hot Springs, Jackpot, Silver City 5W, and Jarbidge 7N climate stations, The National Soil Information System (NASIS), and The Western Regional Climate Center.

Table 3. Representative climatic features

Frost-free period (characteristic range)	28-60 days
Freeze-free period (characteristic range)	40-70 days
Precipitation total (characteristic range)	12-18 in
Frost-free period (actual range)	9-80 days
Freeze-free period (actual range)	20-90 days
Precipitation total (actual range)	11-20 in
Frost-free period (average)	50 days
Freeze-free period (average)	60 days
Precipitation total (average)	15 in

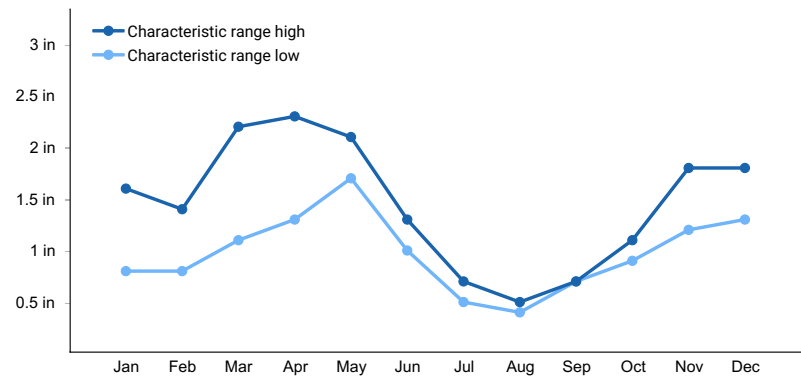


Figure 1. Monthly precipitation range

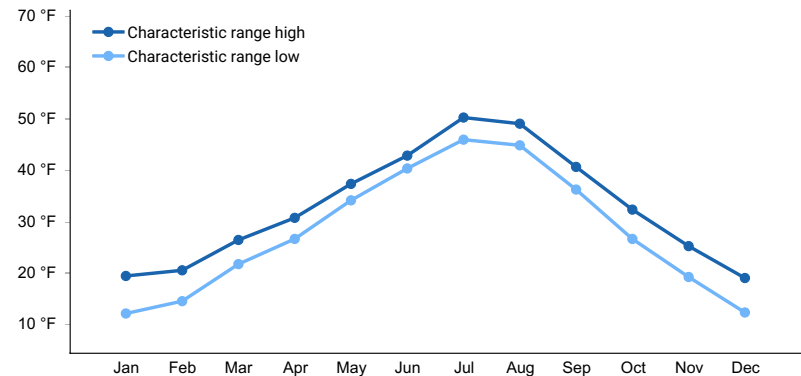


Figure 2. Monthly minimum temperature range

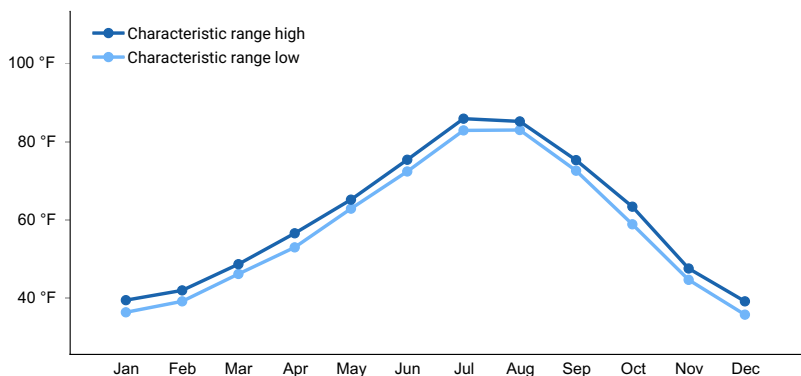


Figure 3. Monthly maximum temperature range

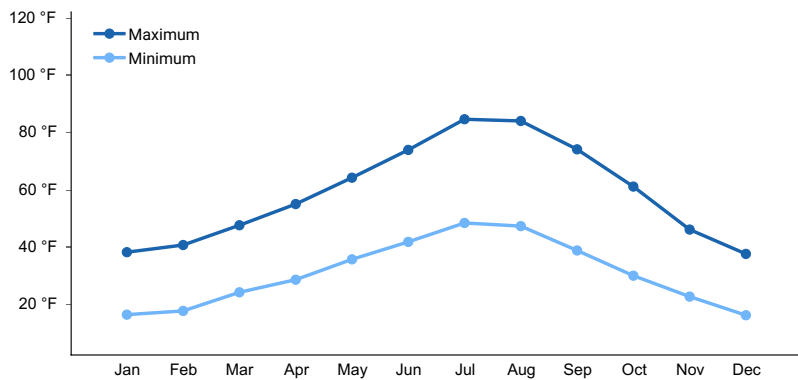


Figure 4. Monthly average minimum and maximum temperature

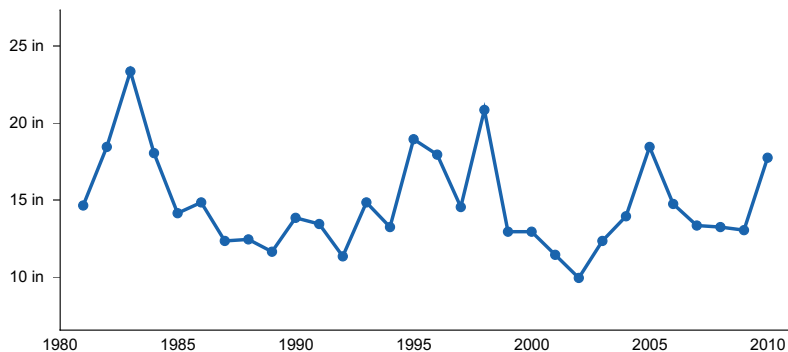


Figure 5. Annual precipitation pattern

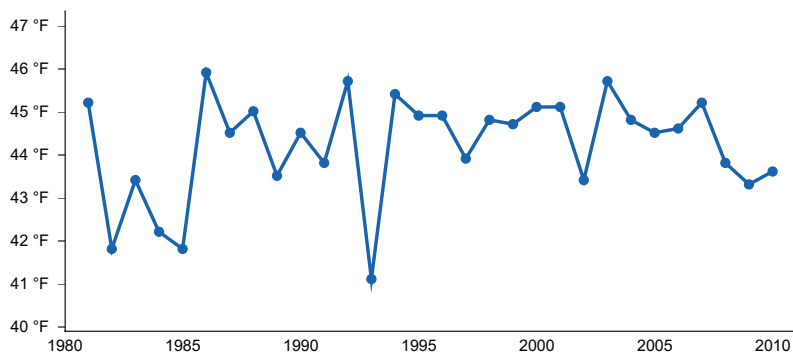


Figure 6. Annual average temperature pattern

Climate stations used

- (1) MTN CITY RS [USC00265392], Mountain City, NV
- (2) JACKPOT [USC00264016], Jackpot, NV
- (3) SILVER CITY 5 W [USC00108412], Murphy, ID
- (4) MURPHY DESERT HOT SPRG [USC00106250], Bruneau, ID
- (5) JARBIDGE 7 N [USC00264039], Jackpot, NV

Influencing water features

This site is influenced by adjacent streams and frequently flooding in the spring and early summer. The soil profile is characterized by a seasonal water table below 20 inches (50 cm) resulting from endosaturation.

Wetland description

N/A

Soil features

Soils associated with this site are very deep, somewhat poorly to poorly drained, and formed in alluvium from volcanic parent material (igneous rock, welded tuff or basalt). The soil profile is characterized by dark surface horizon (mollic epipedon).

Surface texture at this site is typically silt loam, silty clay loam or loam with an average clay content of 35 to 50 percent.

In the subsoil, greater than 18 percent clay is typical in the particle size control section. Redoximorphic features in the soil profile are typical below 10 to 20 inches (25 to 50cm).

A seasonal water table is typically present 20 inches (50 cm) or deeper below the soil surface. Frequent flooding is typical in spring and early summer.

Representative soil components associated this site include Blackwell, Tucker, Welch, and Hayspur.

Table 4. Representative soil features

Parent material	(1) Alluvium–basalt (2) Alluvium–welded tuff (3) Alluvium–igneous rock
Surface texture	(1) Silt loam (2) Loam (3) Silty clay loam
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Slow to moderately slow
Depth to restrictive layer	60–80 in
Soil depth	60–80 in
Surface fragment cover <=3"	2–6%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	5.4–7.9 in
Soil reaction (1:1 water) (0-40in)	6.1–8.4
Subsurface fragment volume <=3" (5-40in)	4–12%
Subsurface fragment volume >3" (5-40in)	0–2%

Ecological dynamics

An ecological site is the product of all the environmental factors responsible for its development and it has a set of key characteristics that influence a site's resilience to disturbance and resistance to invasives. Key characteristics include 1) climate (precipitation, temperature), 2) topography (aspect, slope, elevation, and landform), 3) hydrology (infiltration, runoff), 4) soils (depth, texture, structure, organic matter), 5) plant communities (functional groups, productivity), and 6) natural disturbance regime (fire, herbivory, etc.) (Caudle et al. 2013). Biotic factors that influence resilience include site productivity, species composition and structure, and population regulation and regeneration (Chambers et al 2013).

This ecological site is characteristics of an riparian area associated with the floodplain of a low gradient perennial stream. Riparian areas differ from adjacent uplands in vegetative composition and structure, geomorphology, hydrology, microclimate, and fuel characteristics. Composition is complex and is tied to closely to hydrologic processes, geomorphology, and use history. This site is highly productive and the vegetation is tolerant of saturation in the soil profile. Vegetation serves as an indicator of soil moisture gradient. Species classified as obligate or facultative wet occur closest to the perennial stream channel. Moving perpendicular to the stream channel vegetation become more tolerant of dry soil conditions.

The Dry Meadow ecological site is characterized by a dominance of perennial bunchgrasses or grasslikes. Nevada

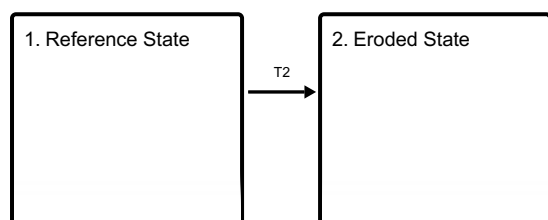
bluegrass (*Poa secunda*) and alpine timothy (*Phleum alpinum*) are the most common, other species include sedges (*Carex* spp.), meadow barely (*Hordeum brachyantherum*), rush (*Juncus* spp.), mat muhly (*Muhlenbergia richardsonis*) and rhizomatous wheatgrasses (*Elymus lanceolatus* and *Leymus triticoides*).

This ecological site occupies a small percentage of the landscape, but provides critical habitat for a variety of wildlife. Ecological diversity of this system is maintained by natural disturbance regimes, including flooding and drought periods. Fire regimes in riparian areas are related to the fire regime of the adjacent upland community, although its suggested that fire frequency and severity was generally lower and than adjacent communities (Dwire and Kauffman 2003).

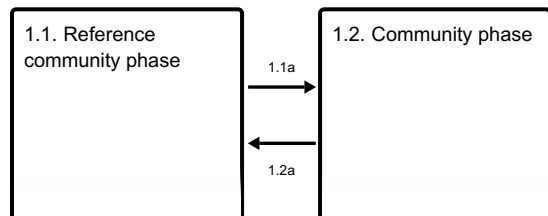
The presence of invasive species has the ability to significantly alter disturbance regimes from their natural range of variation. Precipitation patters are highly variable and unpredictable throughout this area. Dryland riparian areas are tolerant of prolonged drought conditions, however decline in overcall vegetative cover and production is expected during drought periods. Inappropriate management and upstream disturbance can lead to bank destabilization (Fleischner 1994) and soil erosion. Where stream channels become deeper and wider, causing water to flow faster (DJ Krueper, 1996), the water table is lowered, flooding is reduced, and a more drought tolerant plant community can invade.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1

Reference State

This state is representative of the natural variability under pre-Euro settlement conditions. This site is highly productive and vegetation is tolerant of saturation in the soil profile. Due to inherent soil fertility, high productivity, high percentage of rhizomatous plants and the relatively flat slopes, the state is fairly resistant following disturbance. Community phase changes are primarily driven by prolonged drought and periods of below normal temperatures. Fire has had little influence on the development of the site. This site normally burns in conjunction with an adjacent upland site. The estimate fire return intervals range from 20 to 40 years.

Characteristics and indicators. Depth to water table and species composition with any complex of meadow sites can be highly variable. Conditions may vary within the site at a given location due to a minor changes in soils, flooding frequency and duration, seasonal water table fluctuations, and competition between plants that are mostly rhizomatous.

Dominant plant species

- alpine timothy (*Phleum alpinum*), grass
- bluegrass (*Poa*), grass

Community 1.1

Reference community phase

This community phase is dominated by Nevada bluegrass and alpine timothy. Slender wheatgrass, streambank wheatgrass and carex species are also common. A variety of perennial forbs are present but do not account for a large part of the plant community by weight. Willows, woods rose, and silver sagebrush are present but are typically less than 5 percent by weight. Composition by weight is approximately 75 to 85 percent grass and grass-like, 10 to 20 percent forbs and 0 to 5 percent shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	700	1065	1650
Forb	130	200	300
Shrub/Vine	20	35	50
Total	850	1300	2000

Community 1.2

Community phase

This community phase is characterized by an increase in shrubs and other drought tolerant and/or disturbance tolerant plants. Species such as rocky mountain iris, Louisiana sagewort, basin wildrye, and juncus increase as Nevada bluegrass and alpine timothy decrease.

Resilience management. This community phase is at-risk of crossing an ecological threshold, if excessive utilization results in the complete removal of soil stabilizing herbaceous species the ability of the site to withstand seasonal flooding is reduced.

Pathway 1.1a

Community 1.1 to 1.2

Natural regeneration over time, absence of disturbance and prolonged drought favors shrubs and tap-rooted forbs over grasses.

Context dependence. Proper frequency, intensity and duration of herbivory may temporarily reduce herbaceous species, but if hydrology of the site is in-tack the community phase will recover without intervention.

Pathway 1.2a

Community 1.2 to 1.1

Release from drought and/or period wildfire reduce shrubs and long-lived forbs and favor dominance by deep-rooted perennial grasses.

State 2

Eroded State

This state is characterized by lowering of the water table and disconnection from the natural floodplain due to anthropogenic impacts such as road building, water diversion and up-stream channelization. Non native species are present and may be increasing or dominant. Seasonal water table is significantly lower than the reference state or absent. Season flooding frequency and duration is truncated spatially and temporally. Soil is active eroding.

Characteristics and indicators. If this site has experienced prolonged excessive utilization perennial grass will decline. Sedges, rushes and forbs increase due to lack of competition. Continued improper grazing management will result in dominance by Kentucky bluegrass, rushes, and Louisiana sagewort. Loss of deep-rooted and rhizomatous perennial grasses reduced the ability of the community to withstand seasonal flooding and results in down cutting of adjacent streams.

Resilience management. The drained state of the dry meadow is very stable. The ability to restore this state back to the reference state is dependent geomorphic characteristics and disturbance history. Resilience management

includes maintaining cover of perennial native species and preventing dominance by non-native annuals.

Dominant plant species

- white sagebrush (*Artemisia ludoviciana*), shrub
- Kentucky bluegrass (*Poa pratensis*), grass

Transition T2 State 1 to 2

Trigger: Significant anthropogenic disturbance (road building, water diversion and up-stream channelization) resulting in introduction of non-native species and loss of seasonal flooding. Slow variables: Lowering of the water table and loss of seasonal flooding allows dryland species to establish and out compete native species that prefer saturation in the soil profile. This transition may also be coupled with introduction of non-natives, prolonged drought and/or inappropriate grazing management. Threshold: Seasonal flooding is spatially and temporally truncated. Seasonal high water table is absent due to resulting from soil erosion and down cutting of the adjacent streams. Soil moisture is not sufficient to support vegetation characteristic of the reference state.

Constraints to recovery. Prolonged excessive utilization results in dominance by Kentucky bluegrass, sedges and rushes. Loss of deep-rooted perennial grasses reduced the ability of the community to withstand seasonal flooding, this results in active soil erosion and down cutting of adjacent streams. The drained state of the dry meadow is very stable.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
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Animal community

Animal Community – Wildlife Interpretations

This dry meadow ecological site provides diverse habitat for wetland and upland wildlife species. The characteristic seasonal hydrology results in abundant forage attracting invertebrate and vertebrate animals to this site. Habitat is provided for resident and migratory animals including western toad, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, grasshopper sparrow, horned lark, and western meadowlark. Large herbivore use of the ecological site is dominated by mule deer, pronghorn antelope, and elk. Native reptiles and amphibians are reliant on these dry meadow sites during the year. Species of concern that may frequent the site includes common sagebrush lizard, sharp-tailed grouse, and sage-grouse. Loss of site hydrology significantly reduces the habitat value of this site and also adjacent ecological sites. Area sensitive species include sage-grouse and sharp-tailed grouse. Open water is seasonal, only being provided by seasonal runoff, ponding, flooding, seasonal high water table, and natural springs.

Grazing Interpretations.

This site is suitable for grazing in late spring after soils have dried sufficiently to prevent trampling and in the summer and fall. Initial stocking rates should be determined with the landowner or decision-maker by utilizing forage analysis yearly in their specific allotment.

Hydrological functions

Soils on this site are in hydrologic groups B, C and D.

Recreational uses

This site has some value for aesthetics and natural beauty due to several spring and early summer blooming forbs and shrubs. Some hunting for sage grouse, rabbits, elk and deer occurs. Hikers and fishermen may traverse the edge of the site where it is adjacent to streams.

Inventory data references

Old SS Manuscripts, Range Site Descriptions, etc.

References

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Pilliod, D.S. and J.L. Welty. 2017. Refining the cheatgrass–fire cycle in the Great Basin: Precipitation timing and fine fuel composition predict wildfire trends. Ecology and Evolution. Wiley.

Williams, C.J. and F.B. Pierson. 2018. Effectiveness of prescribed fire to re-establish sagebrush steppe vegetation and ecohydrologic function on woodland-encroached sagebrush rangelands, Great Basin, USA: Part I: Vegetation, hydrology, and erosion responses.

Williamson, M.A. and E. Fleishman. 2019. Fire, livestock grazing, topography, and precipitation affect occurrence and prevalence of cheatgrass (*Bromus tectorum*) in the central Great Basin, USA.

Contributors

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Approval

Kendra Moseley, 4/25/2024

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	USDA/NRCS 9173 W. Barnes Drive, Suite C Boise, Idaho 83709 208-378-5722
Date	06/12/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are not common on this site. If the site is degrading due to gully down-cutting, rills may occur on the side slopes of the gully.

2. **Presence of water flow patterns:** This is common on this site. When they occur, they are long, often running the length of the site and disrupted by cool season grasses. Water flow patterns are also common from run-in from the adjacent uplands.

3. **Number and height of erosional pedestals or terracettes:** These are rare on this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Data is not available. On sites in mid-seral status, bare ground may range from 20-30 percent but more data is needed.

5. **Number of gullies and erosion associated with gullies:** Gullies do not occur in the HCPC on this site.

6. **Extent of wind scoured, blowouts and/or depositional areas:** This is usually not present.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move more than 6 feet or even off the site following a significant flooding or run-off event.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values should range from 4-6 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The A or A1 horizon is typically 4-9 inches thick. Structure ranges from moderate, medium subangular blocky to moderate fine granular. Soil organic matter (SOM) ranges from 1 to 7 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep-rooted perennial grasses and grass-like plants slow run-off and increase infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** This is normally not present. A compaction layer can develop if grazing occurs when the soils are wet.

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: Cool season deep-rooted perennial grasses and grass-like plants

Sub-dominant: Perennial forbs

Other: Shallow rooted bunchgrasses

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Most of the grasses and grass-like plants on this site will become decadent in the absence of fire and ungulate grazing. Decadence or low vigor is a result of litter buildup in the crowns of the plants.
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14. **Average percent litter cover (%) and depth (in):** Additional litter cover data is needed but is expected to be 35 to 50 percent to a depth of 0.2 inches. Under mature shrubs and basin wildrye, litter is >0.5 inches deep and is 90-100 percent ground cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1300 pounds per acre (1444 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 75-85 percent of the total production, forbs 10-20 percent and shrubs 0-5 percent.
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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:** These include cheatgrass, leafy spurge, whitetop, perennial pepperweed, rush skeletonweed, Canada, musk and scotch thistle and diffuse and spotted knapweed.
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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in most years.
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