Ecological site R028BY001NV
WET MEADOW 10-14 P.Z.

Last updated: 2/19/2025
Accessed: 05/11/2025

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): 028B–Central Nevada Basin and Range

MLRA 28B occurs entirely in Nevada and comprises about 23,555 square miles (61,035 square kilometers). More than nine-tenths of this MLRA is federally owned. This area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. It is an area of nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by long, gently sloping to strongly sloping alluvial fans. The mountains are uplifted fault blocks with steep sideslopes. Many of the valleys are closed basins containing sinks or playas. Elevation ranges from 4,900 to 6,550 feet (1,495 to 1,995 meters) in the valleys and basins and from 6,550 to 11,900 feet (1,995 to 3,630 meters) in the mountains.
The mountains in the southern half are dominated by andesite and basalt rocks that were formed in the Miocene and Oligocene. Paleozoic and older carbonate rocks are prominent in the mountains to the north. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments are throughout this area. The valleys consist mostly of alluvial fill, but lake deposits are at the lowest elevations in the closed basins. The alluvial valley fill consists of cobbles, gravel, and coarse sand near the mountains in the apex of the alluvial fans. Sands, silts, and clays are on the distal ends of the fans.
The average annual precipitation ranges from 4 to 12 inches (100 to 305 millimeters) in most areas on the valley floors. Average annual precipitation in the mountains ranges from 8 to 36 inches (205 to 915 millimeters) depending on elevation. The driest period is from midsummer to midautumn. The average annual temperature is 34 to 52 degrees F (1 to 11 degrees C). The freeze-free period averages 125 days and ranges from 80 to 170 days, decreasing in length with elevation.
The dominant soil orders in this MLRA are Aridisols, Entisols, and Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an aridic or xeric soil moisture regime, and mixed or carbonatic mineralogy. They generally are well drained, loamy or loamyskeletal, and shallow to very deep.
Nevada’s climate is predominantly arid, with large daily ranges of temperature, infrequent severe storms and heavy snowfall in the higher mountains. Three basic geographical factors largely influence Nevada’s climate: continentality, latitude, and elevation. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the West but throughout the state, as a result the lowlands of Nevada are largely desert or steppes.
The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with well-developed seasons and the terrain responds quickly to changes in solar heating. Nevada lies within the midlatitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in weather during the late fall, winter and spring months, when most of the precipitation occurs.
To the south of the mid-latitude westerlies, lies a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with

occasional thundershowers. The eastern portion of the state receives noteworthy summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Ecological site concept

This site occurs on floodplains, stream terraces, and lake plains. Slopes of 0 to 2 percent are typical. Elevations are 5100 to 7500 feet.
The soils associated with this site are very deep, poorly drained, and have high available water holding capacity. These soils are characterized by a mollic epipedon and a water table at or near the surface early in the spring that usually stabilizes at 10 to 30 inches during the growing season. This site experiences occasional, brief flooding in the spring by stream overflow or unconfined runoff from surrounding areas.
The reference plant community is characterized by a dense stand of perennial grasses, grass-like plants, and perenial forbs; dominated by Nevada bluegrass, alkali bluegrass, sedges, and rushes.

Associated sites

R028BY002NV	**SALINE MEADOW** This site occurs lake terraces. Slopes are less than 2 percent and elevations range from 4400 to 6800 feet. The soils associated with this site are very deep, poorly drained, and strongly salt and sodium affected. Soils are characterized by a ochric epipedon and decreasing salinity with depth. The water table is near the surface for short periods in the early spring, but usually stabilizes at depths below 40 inches during the growing season.
R028BY003NV	**LOAMY BOTTOM 10-14 P.Z.** This site occurs on drainageways and inset fans. Slope gradients of 0 to 2 percent are most typical and elevations range from 4500 to 7600 feet. Soils associated with this site are very deep, well drained and derived from mixed alluvium. They typically have a mollic epipedon and a mesic temperature regime.
R028BY044NV	**WETLAND** This site occurs on lake plains adjacent to springs, seeps, sloughs or ponds. Slope gradients of 0 to 8 percent but slopes of 0 to 2 percent are most typical. Elevations are 5500 to 6200 feet. The soils associated with this site are very deep and poorly to somewhat poorly drained. Soils are saturated during most of the year, with the water table above or very near the surface continuously. These soils have poor aeration and are high in organic matter. The soils have an aquic moisture regime that borders on xeric.
R028BY081NV	**MOIST FLOODPLAIN** This site occurs on flood plains and stream terrace. Slope gradients range from 0 to 15 percent, but slopes of 0 to 4 percent are most typical. Elevations are 4000 to 6800 feet. The soils associated with this site are typically very deep, fertile and have a very low to high available water capacity. The soils are poorly drained to excessively drained and runoff is medium to very high. Ponding occurs in some areas. Flooding, and a seasonally high water table at or near the soil surface, supply additional moisture for plant growth.

Similar sites

R028BY050NV	**WET SODIC BOTTOM** DISP dominant plant.
R028BY022NV	**WET MEADOW 14+ P.Z.** Dominated by DECE.
R028BY099NV	**WET ALKALI MEADOW** CACA4 dominant plant.
R028BY012NV	**WET SALINE MEADOW** Dominated by PSSM
R028BY095NV	**DRY MEADOW 12-16 P.Z.** PONE3-PHAL2 codominant grasses.
R028BY098NV	**WET CLAY BASIN** Not a stable plant community; intermittently ponded lake bed or basin landscape positions.

R028BY100NV	**DRY MEADOW 6-10 P.Z.** POA ssp. and MURI dominant grasses; basin floor landscape positions.
R028BY002NV	**SALINE MEADOW** Dominated by SPAI-SPGR; less productive site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Poa* (2) *Carex*

Physiographic features

This site occurs on floodplains, stream terraces, and lake plains. Slopes range from 0 to 15 percent, but slope gradients of 0 to 2 percent are most typical. Elevations are 5100 to 7500 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace (3) Lake plain
Runoff class	High to very high
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	None
Elevation	5,100–7,500 ft
Slope	0–15%
Ponding depth	0 in
Water table depth	6–60 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cold, moist winters and warm, dry summers.

Average annual precipitation ranges from 9 to 14 inches. The mean annual air temperature is about 45 to 50 degrees F. The average growing season is 100 to 120 days.

Table 3. Representative climatic features

Frost-free period (average)	110 days
Freeze-free period (average)	134 days
Precipitation total (average)	12 in

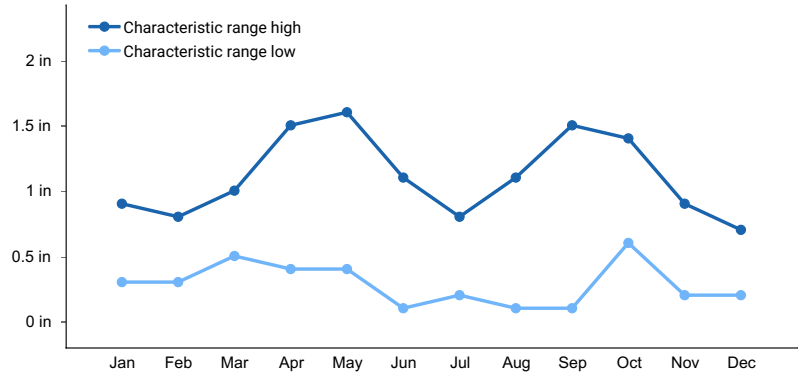


Figure 1. Monthly precipitation range

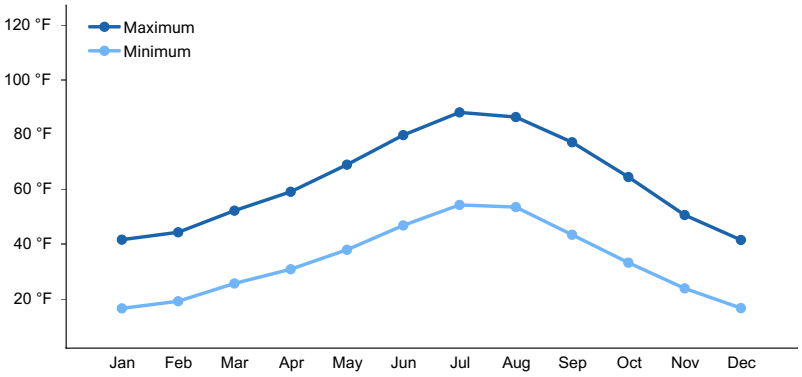


Figure 2. Monthly average minimum and maximum temperature

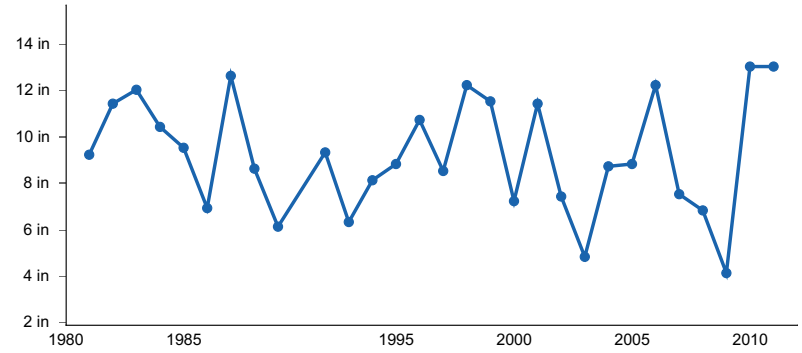


Figure 3. Annual precipitation pattern

Climate stations used

- (1) MCGILL [USC00264950], Ely, NV

Influencing water features

The water features influencing this site include springs, seeps, and perennial streams.

Soil features

The soils associated with this site are very deep, very poorly drained, and are derived from alluvium over lacustrine deposits. They have a moderate to high available water holding capacity and a water table at or near the surface early in the spring that usually stabilizes at 10 to 30 inches during the growing season. Soils are characterized by a mollic epipedon, an aquic moisture regime and a mesic temperature regime. The typical soil series assoicated with this site is Kolda, a fine, smectitic, calcareous, mesic Typic Endoaquolls. Other series associated with this site include Devilsgait, Equis, Humboldt, James Canyon, Orizaba, Settlemeyer, Welch, Rose Creek, Paranat, Lehmandow, and Umberland.
Runoff is high and ponding or brief flooding may occur in some areas due to stream overflow or unconfined runoff

from surrounding areas.

Table 4. Representative soil features

Parent material	(1) Alluvium–volcanic breccia
Surface texture	(1) Silt loam (2) Loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to very poorly drained
Permeability class	Very slow to moderately slow
Soil depth	72–84 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5.4–7.9 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	6.1–9.6
Subsurface fragment volume <=3" (Depth not specified)	0–13%
Subsurface fragment volume >3" (Depth not specified)	0%

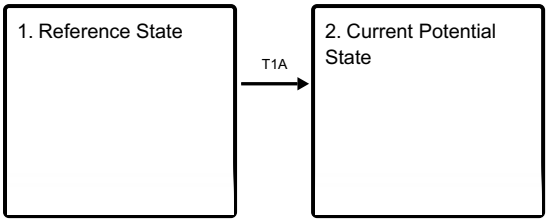
Ecological dynamics

As ecological condition declines, Nevada bluegrass and the more palatable grass-like plants decrease as Baltic rush and forbs such as dock and wild iris increase. With further degradation, woody species, such as rubber rabbitbrush and basin big sagebrush invade on this site. Where severe stream entrenchment occurs, the soil moisture balance of this site is altered resulting in a more drought tolerant potential plant community. Typically, this site is replaced by the plant community characterized in the Loamy Bottom 10-14" PZ (028BY003NV) site description where stream channel entrenchment has occurred.

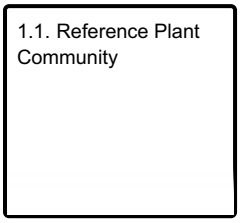
Fire Ecology:
Fire in wet meadow communities often only top-kills plants. Prescribed fires are most effective in late summer, early fall, or during dry years when the water is below the soil surface. The sedges have deep buried rhizomes which usually survive all but the most severe fires. Nevada bluegrass is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Alkali bluegrass is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Its rapid maturation in the spring also reduces fire damage, since it is dormant when most fires occur. Sedge is top-killed by fire, with rhizomes protected by insulating soil. The rhizomes of sedge species may be killed by high-severity fires that remove most of the soil organic layer. Reestablishment after fire occurs by seed establishment and/or rhizomatous spread. Baltic rush is fire tolerant when dormant and top-killed by fire during the growing season. It establishes after fire through seed and/or lateral spread by rhizomes. Creeping wildrye is top-killed by fire. Creeping wildrye is generally tolerant of fire but may be damaged by early season fire combined with dry soil conditions. Mat muhly is top killed be fire. Fire does not harm mat muhly to any great extent because the rhizome buds are insulated by the soil. There is a greater than 65% chance that at least 50% of the plants in a population will survive a fire.

State and transition model

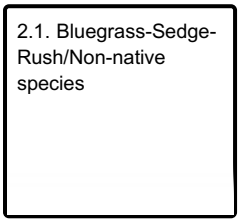
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference State

The Reference State represents the plant communities that are adapted to a high water table under a natural disturbance regime. Community Phase 1.1 is dominated by Nevada bluegrass, alkali bluegrass, sedges, and rushes.

Community 1.1
Reference Plant Community

Figure 5. Wet Meadow 10-14" (R028XY001)

The reference plant community is characterized by a dense stand of perennial grasses, grass-like plants, and perenial forbs. The representative plant community is dominated by Nevada bluegrass, alkali bluegrass, sedges, and rushes. Potential vegetative composition is about 85 percent grasses and grass-like plants, and 10 percent forbs. Approximate ground cover (basal and crown) is about 60 to 75 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	960	1600	3200
Forb	180	300	600
Shrub/Vine	60	100	200
Total	**1200**	**2000**	**4000**

State 2
Current Potential State

The Current Potential State is similar to the Reference State except the plant communities have non-native species present. The presence of non-native species, especially those that are invasive, lowers the resistance and resiliency of the state.

Community 2.1
Bluegrass-Sedge-Rush/Non-native species

Community phase 2.1 is similar to Community Phase 1.1 with the exception of non-native species present in the community.

Transition T1A
State 1 to 2

This transition occurs after the introduction of non-native species.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses/Grasslikes**			1080–1860	
	sedge	CAREX	*Carex*	400–600	–
	beardless wildrye	LETR5	*Leymus triticoides*	40–160	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	40–100	–
2	**Secondary Perennial Grasses**			40–200	
	thickspike wheatgrass	ELLA3	*Elymus lanceolatus*	10–60	–
	meadow barley	HOBR2	*Hordeum brachyantherum*	10–60	–
	foxtail barley	HOJU	*Hordeum jubatum*	10–60	–
	basin wildrye	LECI4	*Leymus cinereus*	10–60	–
Forb					
3	**Perennial Forbs**			120–400	
	ragwort	SENEC	*Senecio*	40–100	–
	cinquefoil	POTEN	*Potentilla*	40–100	–
	dock	RUMEX	*Rumex*	10–40	–
	blue-eyed grass	SISYR	*Sisyrinchium*	10–40	–
	clover	TRIFO	*Trifolium*	10–40	–
	arrowgrass	TRIGL	*Triglochin*	10–40	–
	yarrow	ACHIL	*Achillea*	10–40	–
	aster	ASTER	*Aster*	10–40	–
	spotted water hemlock	CIMA2	*Cicuta maculata*	10–40	–
	horsetail	EQUIS	*Equisetum*	10–40	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	10–40	–
	povertyweed	IVAX	*Iva axillaris*	10–40	–
Shrub/Vine					
4	**Primary Shrubs**			40–100	
	silver sagebrush	ARCA13	*Artemisia cana*	20–60	–
	currant	RIBES	*Ribes*	20–60	–
	Woods' rose	ROWO	*Rosa woodsii*	20–60	–
	willow	SALIX	*Salix*	20–60	–

Animal community

Livestock Interpretations:
This site is suited to livestock grazing. Grazing management should be keyed to perennial grass production. Bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Nevada bluegrass and alkali bluegrass are palatable species, but their production is closely tied to weather conditions. They produce little forage in drought years, making them a less dependable food source than other perennial bunchgrasses. Baltic rush is described as a fair to good forage species for cattle. On average, Baltic rush palatability is considered medium to moderately low. Baltic rush is considered palatable early in the growing season when plants are young and tender, but as stems mature and toughen palatability declines. Creeping wildrye can be used for forage and is very palatable to all livestock. Once established it is very rhizomatous and maintains stands for many years. Young mat muhly is readily eaten by livestock. Plants become less palatable as they mature. Mat muhly plants usually grow in scattered patches, so they are seldom sufficiently abundant to be of major importance to livestock. In the northern part of its range, mat muhly is rated as good to very good forage for cattle and horses and fairly good for domestic sheep.

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:
Wet meadows provide suitable habitat for many wildlife species. In late summer, small mammals may visit wet meadows that have dried. Mule deer feed on forbs and palatable grasses and grass-like plants in the summer and fall throughout their range. Yellow-headed and red-winged blackbirds occasionally nest in wet meadows where tall vegetation and adequate water discourage predators. Snakes and frogs may also frequent this habitat. Nevada bluegrass and alkali bluegrass are both important forage species for several wildlife species. Sedges have a high to moderate resource value for elk and a medium value for mule deer. Elk consume beaked sedge later in the growing season. Baltic rush also provides food for several wildlife species and waterfowl. Baltic rush is an important cover species for a variety of small birds, upland game birds, birds of prey, and waterfowl. Creeping wildrye is used for forage for many wildlife species and is often used for cover. The palatability of mat muhly for wildlife species has been rated as fair to poor.

Hydrological functions

Runoff is high to very high and ponding is very common. Potential for rill erosion and waterflow patterns is none. Gullies are rare to few depending on severity of associated stream channel entrenchment. Gullies and head cuts are healing or stable. Where this site is not associated with perennial or ephemeral channels (i.e., springs and seeps) gullies are none. Deep-rooted, cool-season, perennial bunchgrasses and rhizomatous grasses and grass-like plants slow runoff and increase infiltration. Relatively dense foliar cover of perennial grasses and grass-like plants and associated litter break raindrop impact and slow overland flow.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers 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 big game hunting.

Other products

The stems of Baltic rush were historically used by Native Americans as a foundation for coiled basketry.

Other information

Baltic rush's production of deep and fibrous roots originating from a mass of coarse and creeping rhizomes makes it a valuable species for stabilizing streambanks and protecting against soil erosion. Creeping wildrye is primarily used for reclamation of wet, saline soils.

Inventory data references

NASIS soil component data.

Type locality

Location 1: White Pine County, NV	
Township/Range/Section	T19 N R63 E S21
Latitude	39° 29′ 55″
Longitude	114° 53′ 21″
General legal description	NE¼NE¼ About 3 miles north of Bassett Lake, White Pine County, Nevada. This site also occurs in Elko, Eureka, Lander, and Churchill counties, Nevada.

Other references

Fire Effects Information System (Online; http://www.fs.fed.us/database/feis/plants/).

Houghton, J.G., C.M. Sakamoto, and R.O. Gifford. 1975. Nevada's Weather and Climate, Special Publication 2. Nevada Bureau of Mines and Geology, Mackay School of Mines, University of Nevada, Reno, NV.

National Oceanic and Atmospheric Administration. 2004. The North American Monsoon. Reports to the Nation. National Weather Service, Climate Prediction Center. Available online: http://www.weather.gov/

USDA-NRCS Plants Database (Online; http://www.plants.usda.gov).

Contributors

CP/HA/GKB/CW

Approval

Kendra Moseley, 2/19/2025

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:** None

2. **Presence of water flow patterns:** None

3. **Number and height of erosional pedestals or terracettes:** None

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ± 20%; surface rock fragments minimal; shrub canopy is minimal; foliar cover of perennial herbaceous plants ± 85%.

5. **Number of gullies and erosion associated with gullies:** Gullies are rare to few depending on severity of associated stream channel entrenchment. Gullies and head cuts are healing or stable. Where this site is not associated with perennial or ephemeral channels (i.e., springs and seeps) gullies are 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 of grasses and annual & perennial forbs) is only expected to move during periods of flooding by adjacent streams. Persistent litter (large woody material) will remain in place except during peak flooding periods.

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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 will range from 2 to 4. (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):** Soil surface structure is platy; fine, sub-angular blocky; or rarely massive. Soil surface colors are dark and the soils have mollic epipedons. Organic matter can range from 2.5 to over 5 percent in the upper 10 inches. (OM values derived from lab characterization data.)

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep-rooted, cool-season, perennial bunchgrasses and rhizomatous grasses and grass-like plants slow runoff and increase infiltration. Relatively dense foliar cover of perennial grasses and grass-like plants and associated litter break raindrop impact and slow overland flow.

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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 to slight - Platy or massive subsurface layers are not to be interpreted as compaction.

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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: Reference State: Deep-rooted, cool season, perennial bunchgrasses >> rhizomatous, cool season, perennial grass-like plants. (By above ground production)

    Sub-dominant: Deep-rooted, cool season, perennial forbs > rhizomatous, cool season, perennial grasses > shallow-rooted, cool season, perennial bunchgrasses and grass-like plants > fibrous, shallow-rooted, cool season, perennial forbs > tall shrubs. (By above ground production)

    Other:

    Additional:

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

decadence): Herbaceous plant mortality or decadence is uncommon.

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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (85+%) and depth of litter is 1 to 3 inches.

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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 (April thru July) ± 2000 lbs/ac; favorable years ± 4000 lbs/ac and unfavorable years ±1200 lbs/ac. Spring flooding 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: Foxtail barley, thistle, tall whitetop, hoarycress and saltcedar.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in most years.
