Ecological site R028BY081NV
MOIST FLOODPLAIN

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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): 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 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.

Average annual precipitation is 6 to 12 inches. Mean annual air temperature is 45 to 50 degrees F. The average growing season is about 100 to 120 days.

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.

The reference state is dominated by creeping wildrye and basin wildrye.

Associated sites

R028BY028NV	**SODIC TERRACE 8-10 P.Z.** Greasewood and sagebrush codominant shrubs; less productive site.
R028BY001NV	**WET MEADOW 10-14 P.Z.** 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 perennial forbs; dominated by Nevada bluegrass, alkali bluegrass, sedges, and rushes.
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.
R028BY004NV	**SALINE BOTTOM** This site occurs on lake plains and flood plains. Slopes gradients of 0 to 2 percent are typical and elevations range from 3400 to 7000 feet. The soils associated with this site are very deep, poorly drained, and are derived from silty alluvium, loess or lacustrine deposits from mixed rock sources. They are strongly salt and sodium affected in their upper profile with soil reaction and salinity decreasing with depth. Seasonally high water table can be found between 20 to 60 inches. The reference state is dominated by basin wildrye and alkali sacaton, with a component of black greasewood. The plant community is characterized by an open stand of perennial grasses, grass-like plants, forbs, with few shrubs. Production ranges from 800 to 2200 pounds per acre.

R028BY041NV	**DRY FLOODPLAIN** This site occurs on drainageways, inset fans and alluvial fans. Slope gradients of 0 to 15 percent, but 0 to 2 percent are most typical. Elevations are 3900 to 6500 feet. The soils associated with this site are typically very deep and moderately well drained. The soils are subject to overflow in the spring on an average of one year in seven. Although run-in from higher landscapes can supply additional moisture for plant growth, there typically is insufficient moisture to leach salts and alkali from the upper soil profile. The surface soil tends to be moderately salt and sodium affected and a thick surface crust often forms as these soils dry.
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. The reference plant community is dominated by bulrush and cattail. Baltic rush, sedge and common reed are other commonly associated species. Potential vegetative composition is about 90 percent grasses and grass-likes, and 10 percent forbs. Approximate ground cover (basal and crown) is 40 to 70 percent.

Similar sites

R028BY012NV	**WET SALINE MEADOW** Dominated by PASM; DISP dominant shrub
R028BY004NV	**SALINE BOTTOM** SAVE4 dominant shrub; less productive site
R028BY041NV	**DRY FLOODPLAIN** Less productive site
R028BY003NV	**LOAMY BOTTOM 10-14 P.Z.** LECI4 dominant plant

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Leymus triticoides* (2) *Leymus cinereus*

Physiographic features

This site occurs on floodplains and stream terraces. Slope gradients range from 0 to 15 percent, but slopes of 0 to 4 percent are most typical. Elevations are 4000 to 6800 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace (3)
Runoff class	Medium to very high
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	1,219–2,073 m
Slope	0–4%
Water table depth	0–152 cm
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 6 to 12 inches. Mean annual air temperature is about 45 to 50 degrees F. The average growing season is about 100 to 120 days.

Table 3. Representative climatic features

Frost-free period (average)	110 days
Freeze-free period (average)	
Precipitation total (average)	229 mm

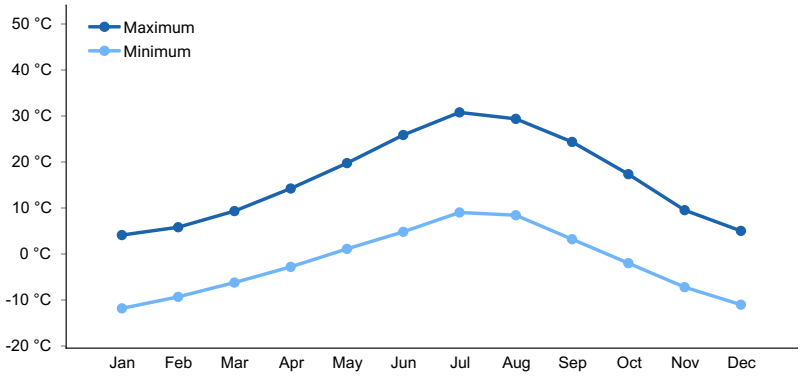


Figure 1. Monthly average minimum and maximum temperature

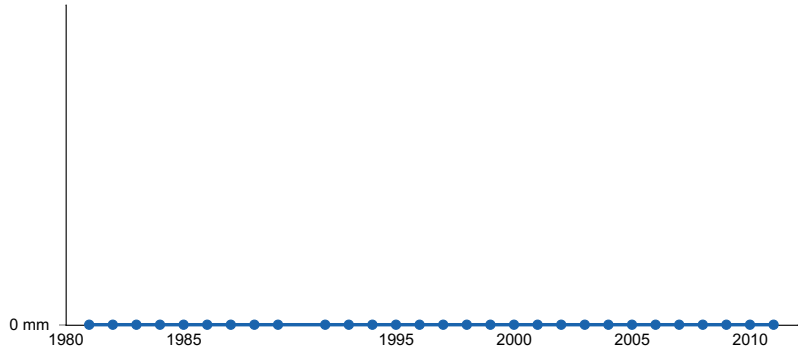


Figure 2. Annual precipitation pattern

Influencing water features

Because of its proximity to streams, this site is flooded occasionally to frequently and can last from very brief to long periods of time.

Soil features

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. Warm floodwaters in the spring enhance soil warming and encourage early initiation of plant growth. During the summer and fall months, when stream flows are at their lowest levels, the water table may drop below 60 inches. These soils are highly susceptible to gullying. Some soils are slightly salt and/or alkali affected. Soil series associated with this site include: Devilsgait and Rose Creek.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to excessively drained
Permeability class	Moderately slow to rapid
Soil depth	183–213 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.81–20.07 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	5–37%
Subsurface fragment volume >3" (Depth not specified)	2–7%

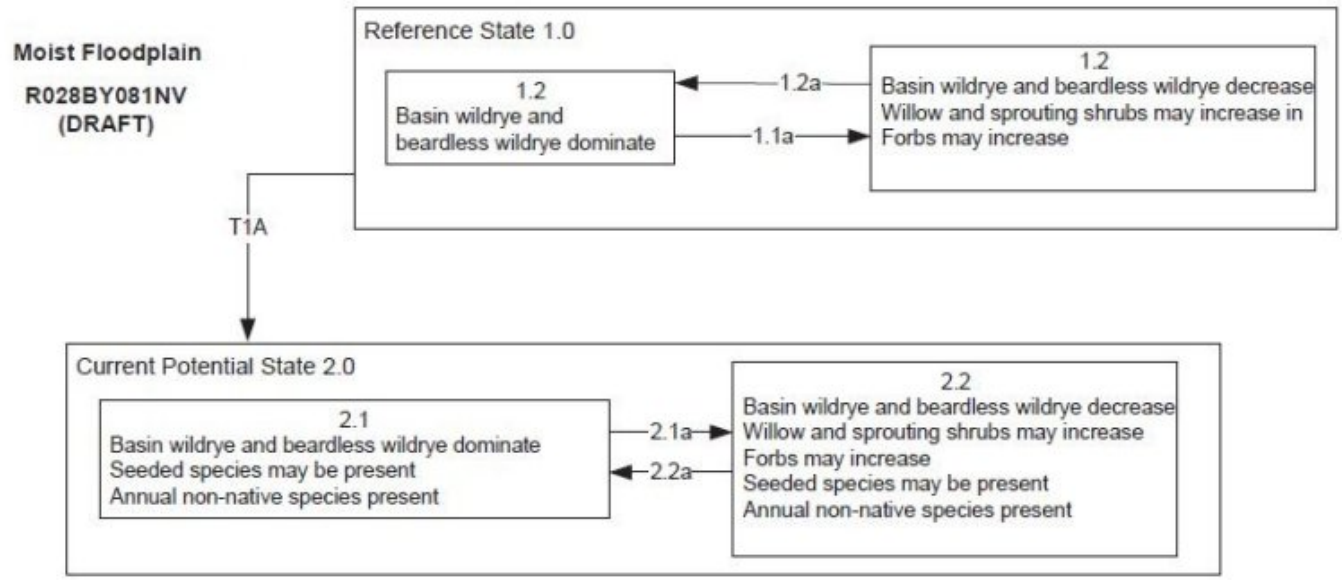
Ecological dynamics

With a decline in ecological condition, willows, rose, sagebrush and rubber rabbitbrush often dominate the visual aspect as wildiris, cinquefoil, povertyweed, foxtail barley and rush increase in the shrub understory. Annual mustards and thistles, quackgrass, redtop, and Kentucky bluegrass are plant species most likely to invade this site.

Where 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 Dry Floodplain (028BY041NV) site description following severe stream channel entrenchment.

Fire Ecology:
Grassland communities with a basin wildrye component historically experienced mostly infrequent to frequent stand replacing fires. Grassland vegetation types experienced both short fire intervals of less than 35 years as well as intervals ranging from 35 to 100 years, depending on climate and ignition sources. Basin wildrye is top-killed by fire. Older basin wildrye plants with large proportions of dead material within the perennial crown can be expected to show higher mortality due to fire than younger plants having little debris. Basin wildrye is generally tolerant of fire but may be damaged by early season fire combined with dry soil conditions. 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. Willow will generally sprout from its root crown or stem base following fire. However, severe fires can completely remove organic soil layers, leaving willow roots exposed and charred, thus eliminating basal sprouting. 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. 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.

State and transition model



Reference State 1.0 Community Phase Pathways
1.1a: Low severity fire creates grass/shrub mosaic
1.2a: Time and lack of disturbance such as fire or drought allows for grass regeneration.

Transition T1A: Introduction of annual non-native species.

Current Potential State 2.0 Community Phase Pathways
2.1a: Low severity fire creates grass/shrub mosaic; Non-native annual species present.
2.2a: Time and lack of disturbance such as fire or drought allows for grass regeneration.

Animal community

Livestock Interpretations
This site is suited to livestock grazing. Grazing management should be keyed to creeping wildrye, basin wildrye, and Nevada bluegrass production. The early growth and abundant production of basin wildrye make it a valuable source of forage for livestock. It is important forage for cattle and is readily grazed by cattle and horses in early spring and fall. Though coarse-textured during the winter, basin wildrye may be utilized more frequently by livestock and wildlife when snow has covered low shrubs and other grasses. 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. 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 is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial bunchgrasses.

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:
Basin wildrye provides winter forage for mule deer, though use is often low compared to other native grasses. Basin wildrye provides summer forage for black-tailed jackrabbits. Because basin wildrye remains green throughout early summer, it remains available for small mammal forage for longer time than other grasses. Basin wildrye is intolerant of heavy or repeated grazing, especially if grazed before reaching maturity. Creeping wildrye is used for forage for many wildlife species and is often used for cover.

Hydrological functions

Permeability is moderately slow to rapid. Runoff is medium to very high. Gullies are rare to common depending on

severity of associated stream channel entrenchment. Gullies and head cuts are healing or stable. Deep-rooted perennial grasses and grass-like plants slow runoff and increase infiltration. Tall stature and relatively coarse foliage of wildrye and associated litter break raindrop impact and provide opportunity for snow catch and snow accumulation on site.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site is used for camping and hiking and has potential for waterfowl and big game hunting.

Other products

Native Americans used the leaves of willows to treat mosquito bites, bee stings and stomach aches and used to stems for implements such as baskets, arrow shafts, scoops and fish traps. Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

Other information

Willow is useful in stabilizing streambanks and providing erosion control on severely disturbed sites. It is valuable in revegetating disturbed riparian sites having high water tables and low elevations. Creeping wildrye is primarily used for reclamation of wet, saline soils. Basin wildrye is useful in mine reclamation, fire rehabilitation and stabilizing disturbed areas. Its usefulness in range seeding, however, may be limited by initially weak stand establishment.

Inventory data references

NASIS soil component data.

Type locality

Location 1: White Pine County, NV	
Township/Range/Section	T13N R61E S31
Latitude	38° 56′ 49″
Longitude	115° 9′ 37″
General legal description	Southeast side of USHwy 6 along White River floodplain. About 3 miles south of junction of USHwy 6 and NVHwy 318, White Pine County, Nevada. This site also occurs in Elko, Eureka, Lander and eastern 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

RK

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	02/21/2007
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 less than 5%; basal cover of perennial herbaceous plants ± 80%.

5. **Number of gullies and erosion associated with gullies:** Gullies are rare to common depending on severity of associated stream channel entrenchment. Gullies and head cuts are healing or stable.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage of grasses and annual & perennial forbs) 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.

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 4 to 6. (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, subangular blocky or granular. Soil surface colors are very dark and soils typically have mollic epipedons. Organic carbon can range from 2 to 3.5 percent for much of the upper 20 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 perennial grasses and grass-like plants slow runoff and increase infiltration. Tall stature and relatively coarse foliage of wildrye and associated litter break raindrop impact and provide opportunity for snow catch and snow accumulation on site.

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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 - Platy 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: Tall-statured, deep-rooted, cool season, perennial bunchgrasses = rhizomatous, cool season, perennial grasses and grass-like plants. (By above ground production)

    Sub-dominant: Deep-rooted, cool season, perennial forbs > shallow-rooted, cool season, perennial grasses and grass-like plants > fibrous, shallow-rooted, cool season, perennial forbs>tall shrubs (willow). (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):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 15% of total woody canopy

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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (± 90%) 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 (through mid-July) ± 2500 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: Quackgrass, foxtail barley, rubber rabbitbrush, thistle, annual kochia, hoary cress, and tall whitetop are invaders on this site. Shrubby willows are increasers on this site.

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