

## **Ecological site R025XY005NV WET MEADOW**

Last updated: 4/24/2024  
 Accessed: 04/26/2024

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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 along inset fans adjacent to perennial streams, around localized seeps and springs, and on floodplains of basin floors. This site experiences frequent flooding, for brief periods, from March through June. Slopes are typically less than 4 percent and elevations range from 4800 to 7000 feet (1463 to 2133 meters).

The soils associated with this site are very deep with a thick, dark, surface horizon. Soils are poorly drained and formed in alluvium. Soils have a seasonal high water table 5 to 23 inches (15-60cm) from the soil surface. The reference state is characterized by a dense stand of perennial grasses and grass-like plants. Important abiotic factors contributing to the presence of this site include a water table within 23 inches (60cm) from the soil surface during the growing season, low runoff, and seasonal flooding.

### Associated sites

R025XY003NV	<b>LOAMY BOTTOM 8-14 P.Z.</b> LEC14 dominant grass; usually a more productive site; soil lacks a seasonal high water table
R025XY006NV	<b>DRY MEADOW</b> PONE3 and PHAL2 dominant plants; less productive site; seasonal high water table below 50cm.

F025XY053NV	<b>Cottonwood Terrace</b> POAN2 dominant plant; soils are well drained and very deep.
R025XY001NV	<b>MOIST FLOODPLAIN</b> LETR5 and Salix are important species; soils with a seasonal high water table 15-60cm from the soil surface

### Similar sites

R025XY006NV	<b>DRY MEADOW</b> PONE3 and PHAL2 dominant plants; less productive site; seasonal high water table below 50cm.
R025XY001NV	<b>MOIST FLOODPLAIN</b> LETR5 and Salix are important species; soils with a seasonal high water table 15-60cm from the soil surface

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Salix</i>
Herbaceous	(1) <i>Deschampsia cespitosa</i>

### Physiographic features

This site is along inset fans adjacent to perennial streams, around localized seeps and springs, and on floodplains of basin floors. Slopes are typically less than 4 percent, but range from 0 to 15 percent, with gradients of 0 to 4 percent being the most common. Elevations are 4800 to 7000 feet (1463 to 2133 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Fan piedmont > Inset fan (2) Basin floor > Flood plain
Runoff class	High to very high
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Elevation	4,800–7,000 ft
Slope	0–15%
Water table depth	6–23 in
Aspect	Aspect is not a significant factor

### Climatic features

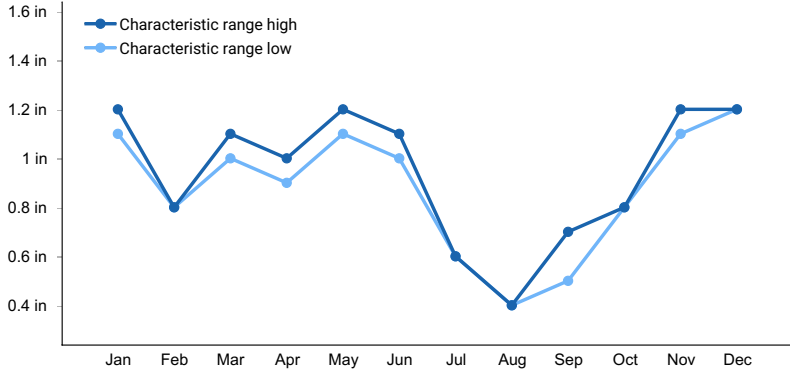
The climate associated with this site is defined by hot dry summers and cold snowy winters. There are typically less than 100 frost-free days and less than 135 freeze-free days. Mean annual precipitation is 10-12 inches, with the majority of precipitation coming as snow in the winter.

\*The above data is averaged from the GIBBS RCH, ELKO RGNL climate stations, NASIS and climate western Regional Climate Center.

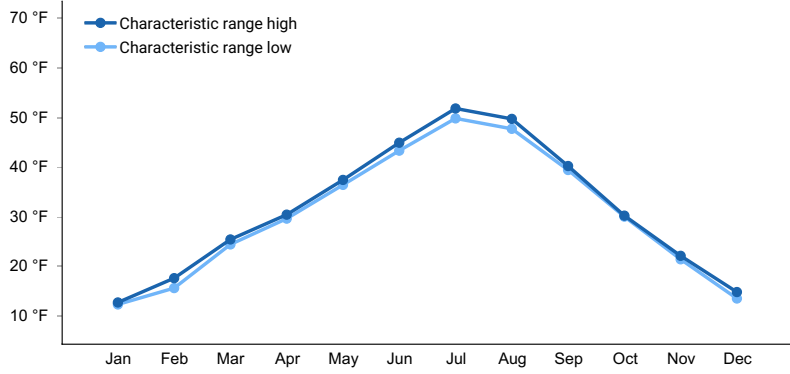
**Table 3. Representative climatic features**

Frost-free period (characteristic range)	52-107 days
Freeze-free period (characteristic range)	79-134 days
Precipitation total (characteristic range)	8-15 in
Frost-free period (actual range)	35-131 days

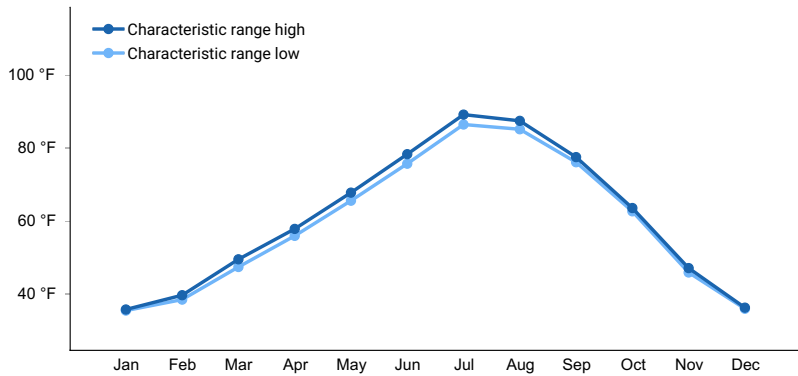
Freeze-free period (actual range)	57-166 days
Precipitation total (actual range)	5-17 in
Frost-free period (average)	74 days
Freeze-free period (average)	97 days
Precipitation total (average)	10 in



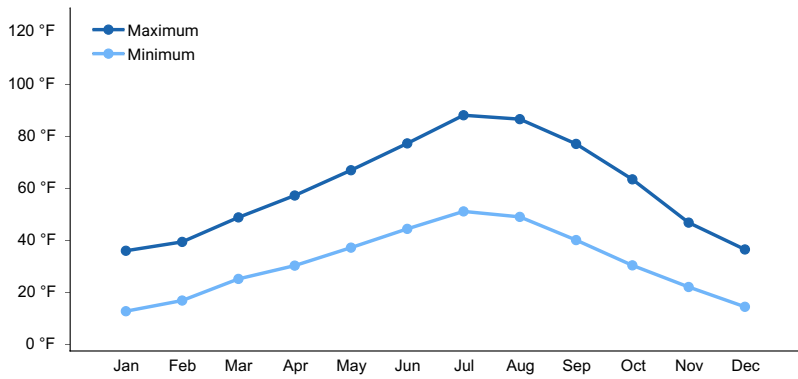
**Figure 1. Monthly precipitation range**



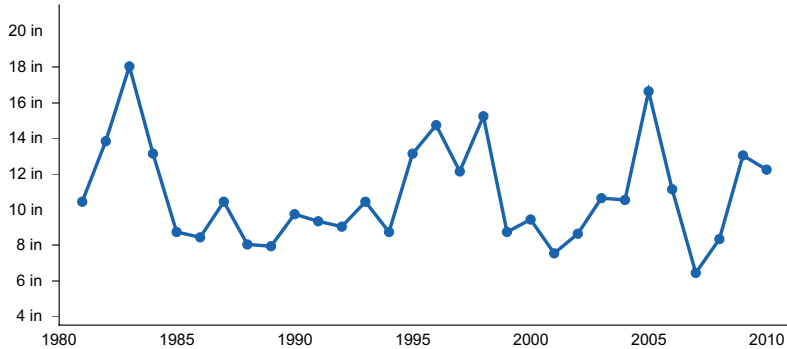
**Figure 2. Monthly minimum temperature range**



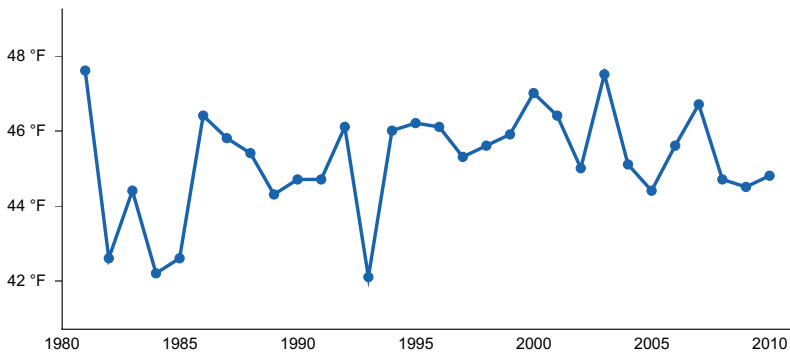
**Figure 3. Monthly maximum temperature range**



**Figure 4. Monthly average minimum and maximum temperature**



**Figure 5. Annual precipitation pattern**



**Figure 6. Annual average temperature pattern**

### Climate stations used

- (1) GIBBS RCH JARBIDGE24SE [USC00263114], Deeth, NV
- (2) ELKO RGNL AP [USW00024121], Elko, NV

### Influencing water features

This site occurs adjacent to low gradient perennial streams and the soils experience endosaturation, this is evidenced by a seasonal high water table within 23 inches (60cm) of the soil surface. This site is also subject to seasonal flooding. Flooding is characterized as frequent for brief periods in spring and early summer.

### Wetland description

N/A

### Soil features

The soils associated with this site are very deep, poorly drained and formed in alluvium derived from mixed parent materials. These soils are characterized by endosaturation and may have a water table 6 to 23 inches (15 to 60cm)

from soil surface during late winter and early spring. The typical soil profile is characterized by a very dark surface horizon (mollic epipedon) greater than 23 inches (60cm) thick and greater than 27 percent clay in the particle size control section (the zone from 25 to 100cm). Buried A horizons are common, some pedons have gravelly strata or strata of silty clay loam, silt loam, clay, loam, very fine sandy loam, or sandy loam.

Soil components associated with this site include: Crooked Creek, Welch, Halleck, Hussa, Clementine, Welsum and Alburz.

**Table 4. Representative soil features**

Parent material	(1) Alluvium–volcanic rock (2) Alluvium–shale (3) Alluvium–basalt
Surface texture	(1) Clay loam (2) Loam
Drainage class	Poorly drained to very poorly drained
Soil depth	72–84 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–5%
Available water capacity (0-72in)	5–8.1 in
Soil reaction (1:1 water) (Depth not specified)	6.1–9
Subsurface fragment volume <=3" (0-72in)	2–20%
Subsurface fragment volume >3" (0-72in)	0–5%

## 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. Dominant vegetation is tolerant of saturation in the soil profile and vegetative composition is complex and is tied to closely to hydrologic processes, geomorphology, and use history.

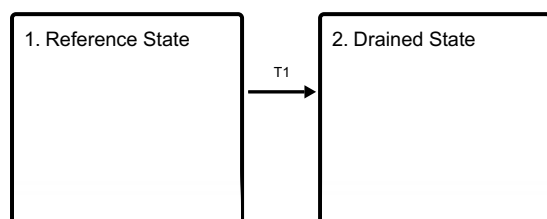
This ecological site is characterized by a dominance of perennial bunchgrasses. Tufted hairgrass (*Deschampsia cespitosa*) is the most common, other species include Nevada bluegrass (*Poa secunda*), alpine timothy (*Phleum alpinum*), sedges (*Carex* spp.), managrass (*Glyceria* spp.), meadow barely (*Hordeum brachyantherum*), rush (*Juncus* spp.) and arrowgrass (*Triglochin* spp.). 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.

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

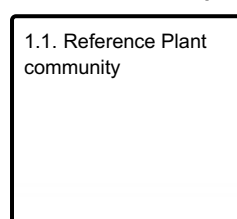
and Kauffman 2003). The presence of invasive species has the ability to significantly alter disturbance regimes from their natural range of variation. Precipitation patterns are highly variable and unpredictable throughout this area. Dryland riparian areas are tolerant of prolonged drought conditions, however decline in overall vegetative cover and production is expected during drought periods. Inappropriate management and upstream disturbance can lead to bank destabilization (Fleischner 1994). 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. 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. Community phase changes are primarily driven by drought, fire is not common.

### Dominant plant species

- tufted hairgrass (*Deschampsia cespitosa*), grass

## Community 1.1 Reference Plant community

The representative plant community is characterized by a dense stand of perennial grasses and grass-like plants. The plant community is dominated by tufted hairgrass. Nevada blugrass, alpine timothy, Sierra clover and meadow sedges are important plants associated with this site. Approximate ground cover (basal and crown) is 75 to 85 percent. Potential vegetation composition is about 80 to 85% grasses and grass-like plants, 15% forbs and up to 5% shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	845	1400	2450
Forb	150	250	450
Shrub/Vine	5	50	100
<b>Total</b>	<b>1000</b>	<b>1700</b>	<b>3000</b>

## State 2

### Drained 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. Vegetation is dominated by basin big sagebrush. Understory is typically native perennial grass including basin wildrye, bluegrass and other native perennial grasses. Non native species may be present, but are not dominant.

**Characteristics and indicators.** This state is characterized by bank destabilization and channelization. The vegetation of this state may resemble another ecological site concept called loamy bottom, R025XY003NV. An important distinction between a drained state of a wet meadow and a loamy bottom is the proximity to a perennial stream. A true loamy bottom is not associated with a perennial stream.

**Resilience management.** The drained state of the wet 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

- basin big sagebrush (*Artemisia tridentata ssp. tridentata*), shrub

## Transition T1

### 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 variable: 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 drought and/or inappropriate grazing management. Threshold: Seasonal flooding is spatially and temporally truncated. Seasonal high water table is below 60cm or completely absent. Soil moisture is not sufficient to support vegetation characteristic of the reference state.

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Primary Perennial Grasses</b>			765–1530	
	alpine timothy	PHAL2	<i>Phleum alpinum</i>	85–170	–
	sedge	CAREX	<i>Carex</i>	85–170	–
2	<b>Secondary Perennial Grasses</b>			85–255	
	mannagrass	GLYCE	<i>Glyceria</i>	9–51	–
	meadow barley	HOBR2	<i>Hordeum brachyantherum</i>	9–51	–
	rush	JUNCU	<i>Juncus</i>	9–51	–
	arrowgrass	TRIGL	<i>Triglochin</i>	9–51	–
<b>Forb</b>					
3	<b>Perennial</b>			238–510	
	cinquefoil	POTEN	<i>Potentilla</i>	34–85	–
	cows clover	TRWO	<i>Trifolium wormskioldii</i>	34–85	–
	ragwort	SENEC	<i>Senecio</i>	9–51	–
	blue-eyed grass	SISYR	<i>Sisyrinchium</i>	9–51	–
	goldenbanner	THERM	<i>Thermopsis</i>	9–51	–
	yarrow	ACHIL	<i>Achillea</i>	9–51	–
	aster	ASTER	<i>Aster</i>	9–51	–
	camas	CAMAS	<i>Camassia</i>	9–51	–
	western water hemlock	CIDO	<i>Cicuta douglasii</i>	9–51	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	9–51	–
<b>Shrub/Vine</b>					
4	<b>Secondary Shrubs</b>			5–85	
	Woods' rose	ROWO	<i>Rosa woodsii</i>	9–34	–
	willow	SALIX	<i>Salix</i>	9–34	–

## Animal community

### Livestock Interpretations:

This site provides important summer forage to all classes of livestock. Grazing management should be keyed to tufted hairgrass and other perennial grass production. Tufted hairgrass provides good to excellent forage for all classes of livestock and withstands grazing well because of its dense growth and stolon habit. It is often an abundant source of forage throughout its growing season. Tufted hairgrass is sometimes cut for hay on native meadows. Attentive grazing management is required due to the potential for gullying and channel entrenchment on this site. Nevada 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. Timothy is palatable and nutritious forage for domestic livestock. Timothy maintains itself well with proper management, but it is not resistant to heavy grazing. Sedge provides good to fair forage for domestic grazing.

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:

Tufted hairgrass forage value for wildlife has been rated fair to good. Sandberg bluegrass is a widespread and highly drought-resistant forage grass. It is one of the earliest grasses to green up in spring and is sought by all



classes of livestock and large mammals. Nevada bluegrass matures early and remains choice for a shorter time than other forage bunchgrasses. This site is used by deer, antelope and upland game animals such as rabbits, chukar, quail and sagegrouse. These meadows are critical for sage grouse brood rearing after the surrounding upland vegetation has dried out. Timothy provides important cover for a variety of game birds, small mammals, and waterfowl. 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.

## Hydrological functions

Runoff is very low to low. Permeability is slow to moderately slow. Rills are none. Water flow patterns are none. Pedestals are none. Gullies are none to rare. Deep-rooted perennial grasses and/or rhizomatous grass-likes (i.e. rush) slow runoff and increase infiltration.

## Recreational uses

This site has high recreational potential. This site, or adjacent areas, is used for picnicing and camping. Aesthetic value is derived from the lush verdure of native grasses and the colorful flowering of many and diverse forbs during the growing season. This site offers rewarding opportunities to photographers and for nature study. It has potential for deer and upland game hunting.

## Wood products

N/A

## Other products

N/A

## Other information

Tufted hairgrass has a broad ecological range and is useful for revegetation, particularly on disturbances at high elevation or high latitude. Nevada bluegrass is often included in native seed mixes and is valuable for restoration. Timothy is used for reseeding rangelands where the soil is moist and the growing season long enough for seed production.

## Inventory data references

Old SS Manuscripts, Range Site Descriptions, etc.

## Type locality

Location 1: Eureka County, NV	
Township/Range/Section	T30N R52E S16
General legal description	Rand Ranch, approximately 2 miles north of headquarters, Pine Valley, Eureka County, Nevada. This site also occurs in Lander and Humboldt counties, Nevada.
Location 2: Elko County, NV	
Township/Range/Section	T42N R59E S14
General legal description	Approximately 30 miles northwest of Wells, Elko County, Nevada.

## References

. 2021 (Date accessed). USDA PLANTS Database. <http://plants.usda.gov>.

## Other references

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

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>).

Ecological Costs of livestock Grazing in Western North America, Thomas L. Fleischner, September 1994, Conservation Biology

Effects of livestock management on southwestern riparian ecosystems, DJ Krueper, 1996

## Contributors

RK/GKB

Trevor Crandall/Erin Hourihan

## Approval

Kendra Moseley, 4/24/2024

## 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)	Patti Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	12/07/2009
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Rills are none.

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2. **Presence of water flow patterns:** Water flow patterns are none.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are none.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not**

**bare ground):** Bare Ground  $\pm$  5-15%.

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5. **Number of gullies and erosion associated with gullies:** 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) only expected to move during periods of flooding by adjacent streams. Persistent litter (large woody material) will remain in place except during flooding events.

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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 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 subangular blocky, medium platy, or granular. Soil surface colors are dark and the soils have thick mollic epipedons. Organic matter can range from 2 to 3 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/or rhizomatous grass-like (i.e. rush) slow runoff and increase infiltration.

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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):** Compacted layers are none. Subangular blocky 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: Deep-rooted, cool season, perennial grasses and grass-like plants > rhizomatous grasses

Sub-dominant: deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, annual and perennial forbs > tall shrubs

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Little to no decadence present.

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14. **Average percent litter cover (%) and depth ( in):** Between plant interspaces ( $\pm$  10-15%) and litter depth is  $>\frac{1}{4}$  inch.

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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 June)  $\pm$  1700 lbs/ac.

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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:** Increasers include rubber rabbitbrush. Invaders include thistle, knapweeds, tall whitetop (perennial pepperweed), and salt cedar.

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

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