

Ecological site R029XY001NV WET MEADOW 8-12 P.Z.

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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): 029X–Southern Nevada Basin and Range

The Southern Nevada Basin and Range MLRA (29) represents the transition from the Mojave Desert to the Great Basin. It is cooler and wetter than the Mojave. It is warmer and typically receives more summer precipitation than the Great Basin. This area is in Nevada (73 percent), California (25 percent), and Utah (2 percent). It makes up about 26,295 square miles (68,140 square kilometers). Numerous national forests occur in the area, including the San Bernardino, Angeles, Sequoia, Inyo, Humboldt-Toiyabe, and Dixie National Forests. Portions of Death Valley National Monument, the Nuclear Regulatory Commission's Nevada Test Site, the Hawthorne Ammunition Depot, and the Nellis Air Force Range in Nevada and the China Lake Naval Weapons Center in California also are in this MLRA. The northeast part of the Paiute Indian Reservation and the southern third of the Walker River Indian Reservation are in the part of this MLRA in Nevada, and the Lone Pine, Fort Independence, and Big Pine Indian Reservations are in the part in California.

Physiography:

The entire area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The area of broad, nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by sloping fans and pluvial lake terraces. The mountains are uplifted fault blocks with steep side slopes and not well dissected due to limited annual precipitation. Most of the valleys in this MLRA are closed basins or bolsons containing sinks or playa lakes.

Geology:

The mountains are dominated by Pliocene and Miocene andesite and basalt rocks, Paleozoic and Precambrian carbonate rocks prominent in some areas. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments (Pliocene and Miocene) are in the western and eastern thirds of this MLRA. The valleys consist mostly of alluvial fill and playa deposits at the lowest elevations in the closed basins.

Climate:

The average annual precipitation is 3 to 12 inches (75 to 305 millimeters) in most of this area. It may be as high as 29 inches (735 millimeters), on the higher mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Summers are dry, but sporadic storms are common in July and August.

Water Resources:

Water resources are scarce. Ground water and surface water sources are limited. Streams are small and intermittent. Quality of surface water is naturally degraded as streams cross area of valley fill effected by dissolved salts. Irrigation water may raise the levels of dissolved salts and suspended sediments causing contamination.

Soils:

Dominant soil orders include Entisols and Aridisols.

Ecological site concept

The Wet Meadow 8-12 P.Z. site occurs on stream terraces and flood plains around localized seeps and springs. Slopes range from 0 to 2 percent. Elevations range from 3500 to 6700 feet. The soils are very deep and have a high available water capacity. These soils are poorly to very poorly drained and have a water table at or near the surface early in the spring that usually stabilizes to within 20 inches of the soil surface during the growing season.

The soils are occasionally flooded for brief periods in the spring by stream overflow or unconfined runoff from surrounding areas.

Associated sites

R029XY002NV	SALINE MEADOW Alkali sacaton dominant grass; soils saline/alkali
R029XY044NV	PEATY WETLAND This site occurs along axial-stream floodplains, on alluvial flats and adjacent to springs, seeps, sloughs or ponds. Slope gradients of less than 2 percent are most typical. Elevations are 4600 to about 6700 feet. The water table is typically at the soil surface for most of the year. The soils are very deep and very poorly drained. These soils are generally organic material and alluvium from mixed rocks.

Similar sites

R029XY044NV	PEATY WETLAND TYPHA-ELPA3-SCRO major grasses; soils typically saturated through growing season; soils have histic epipedon
R029XY060NV	WET MEADOW 16+ P.Z. DECE dominant grass; frigid soil temperature regime
R029XY002NV	SALINE MEADOW SPAI dominant grass; soils saline/alkali
R029XY054NV	DRY MEADOW Less productive site; PONE3 dominant grass or grass-like

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Carex</i> (2) <i>Juncus</i>

Physiographic features

The Wet Meadow 8-12 P.Z. site occurs on stream terraces and flood plains around localized seeps and springs. Slopes range from 0 to 2 percent. Elevations range from 3500 to 6700 feet.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace (2) Flood plain (3) Seep
Runoff class	Low to high
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	1,067–2,054 m
Slope	0–2%
Water table depth	0–91 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, somewhat dry

summers. Average annual precipitation is (7)8 to about 12 inches. Mean annual air temperature is 49 to 60 degrees F. The average growing season is about 120 to 220 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	146-163 days
Freeze-free period (characteristic range)	171-188 days
Precipitation total (characteristic range)	178-229 mm
Frost-free period (actual range)	141-168 days
Freeze-free period (actual range)	167-192 days
Precipitation total (actual range)	152-229 mm
Frost-free period (average)	155 days
Freeze-free period (average)	180 days
Precipitation total (average)	203 mm

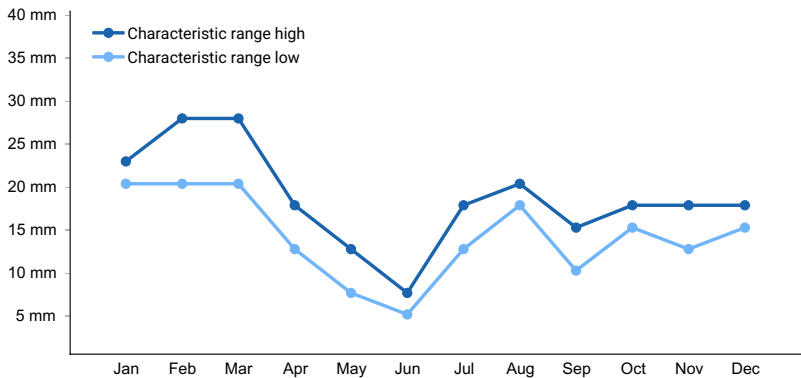


Figure 1. Monthly precipitation range

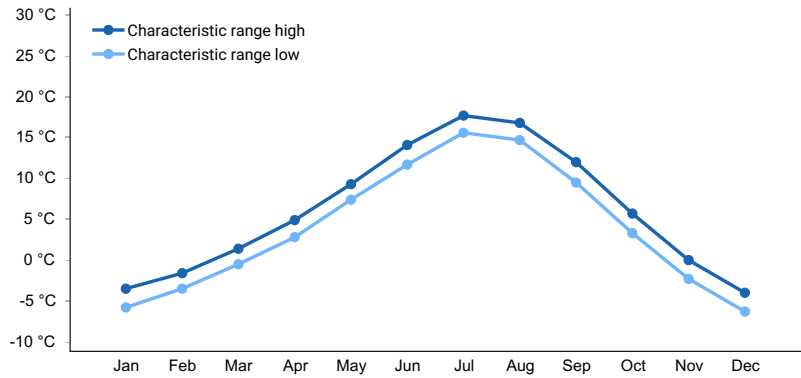


Figure 2. Monthly minimum temperature range

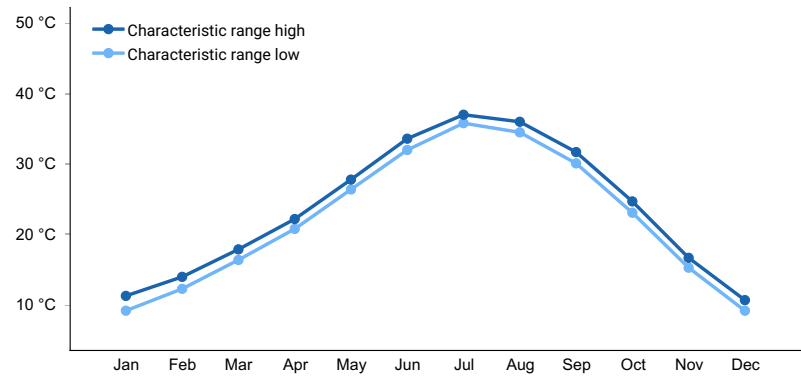


Figure 3. Monthly maximum temperature range

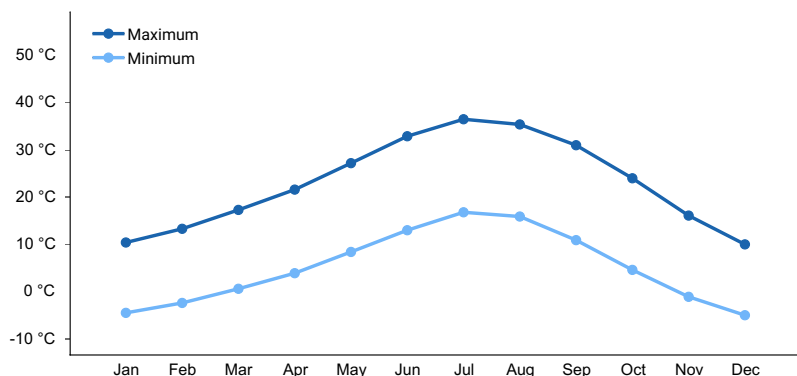


Figure 4. Monthly average minimum and maximum temperature

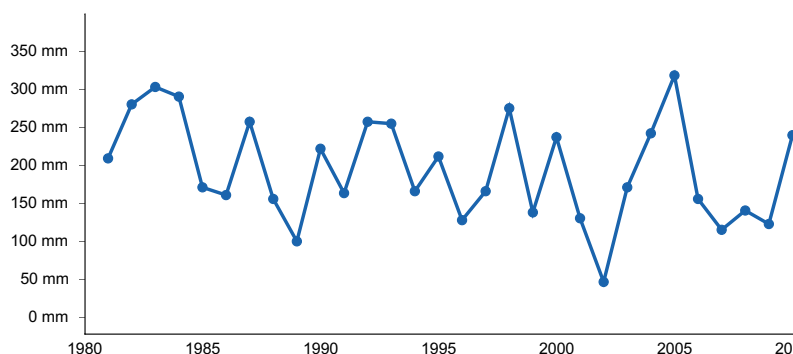


Figure 5. Annual precipitation pattern

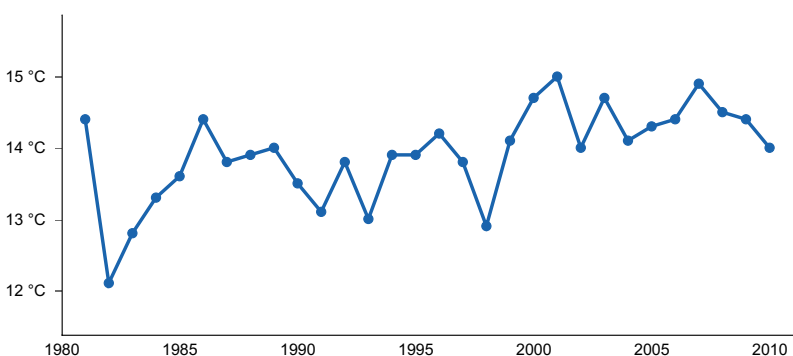


Figure 6. Annual average temperature pattern

Climate stations used

- (1) PAHRANAGAT WR [USC00265880], Alamo, NV
- (2) CALIENTE [USC00261358], Caliente, NV

Influencing water features

This site is associated with perennial streams, springs and seeps.

Soil features

The soils are very deep and have a high available water capacity. These soils are poorly to very poorly drained and have a water table at or near the surface early in the spring that usually stabilizes to within 20 inches of the soil surface during the growing season. The soils are occasionally flooded for brief periods in the spring by stream overflow or unconfined runoff from surrounding areas. Some soils are kept moist through the growing season by springs and seeps. These soils are susceptible to gullyng which intercepts normal overflow patterns and results in site degradation. Soil temperature regime is mesic. Soil series associated with this site include Adaven, Aquolls, Ash Springs, Haplaquolls, Lahontan variant, Lehmandow, Pahrnagat, Typic Endoaquolls and Typic Halaquepts.

Table 4. Representative soil features

Parent material	(1) Lacustrine deposits (2) Alluvium
Surface texture	(1) Silt loam
Drainage class	Poorly drained
Permeability class	Very slow to moderately slow
Soil depth	183–213 cm
Surface fragment cover ≤3"	0–4%
Surface fragment cover >3"	0%
Available water capacity (0–101.6cm)	14.22–21.08 cm
Calcium carbonate equivalent (0–101.6cm)	0–15%
Electrical conductivity (0–101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0–101.6cm)	1–12
Soil reaction (1:1 water) (0–101.6cm)	6.1–9
Subsurface fragment volume ≤3" (Depth not specified)	0–13%
Subsurface fragment volume >3" (Depth not specified)	0–12%

Ecological dynamics

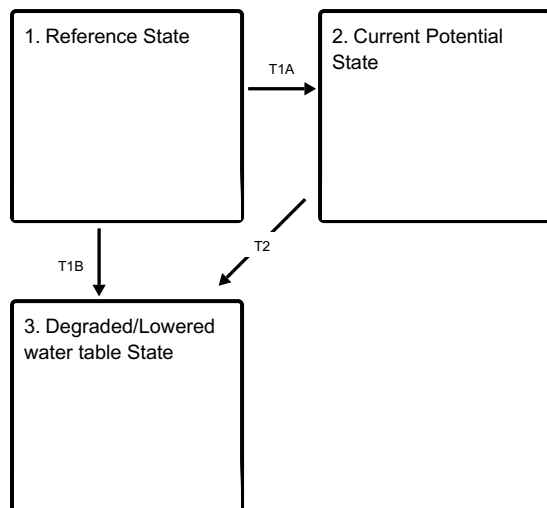
Where management results in abusive livestock use, palatable sedges and Nevada bluegrass decrease while Baltic rush, foxtail barley, wild iris, cinquefoil and western yarrow become dominant. Species likely to invade this site include thistles, reedtop and quackgrass. This site is susceptible to gully erosion. As a stream channel becomes entrenched, the water table is lowered and a more drought tolerant vegetation succeeds on the site.

Fire Ecology:

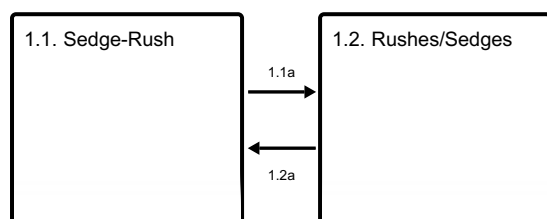
Fire in wet meadow communities often only top-kill plants. Prescribed fires, to reduce litter cover, are most effective in late summer, early fall or during years when the water is below the soil surface. Sedge is top-killed by fire, with rhizomes protected by insulating soil. The rhizomes of sedge species 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. 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. 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. Meadow barley has high fire tolerance. Meadow barley grows in moist habitats that experience infrequent fire.

State and transition model

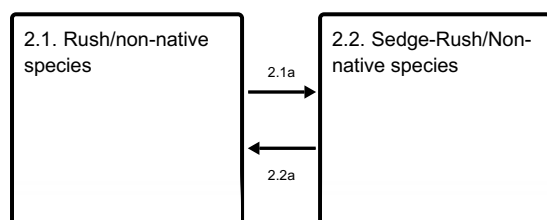
Ecosystem states



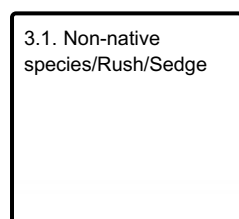
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 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. There are two community phases in this state. Community Phase 1.1 is dominated by rhizomatous sedges, like Nebraska sedge (*Carex nebracensis*) or northwest territory sedge (*Carex utriculata*) and rushes, like Baltic rush (*Juncus arcticus*). The sedges in this community are tolerant to saturated soil conditions. Community Phase 1.2 is still dominated by sedges and rushes, but the species of sedge is shifted to a more grazing tolerant sedge, like Nebraska sedge. Northwest territory sedge is less tolerant to grazing pressure and Nebraska sedge often becomes dominant when wet meadows are grazed.

Community 1.1 Sedge-Rush



Figure 7. Wet meadow

The reference plant community is characterized as a dense stand of grasses and grass-like plants and is dominated by sedges, rushes and Nevada bluegrass. Shrubs may be present in minor amounts. Potential vegetative composition is approximately 85 percent grasses and grass-like plants, and 15 percent forbs. Approximate ground cover (basal and crown) is 75 to 90 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1143	2858	3811
Forb	202	504	673
Total	1345	3362	4484

Community 1.2
Rushes/Sedges

As the sedge community is disturbed, either through grazing or a lower water table, Nebraska sedge and Baltic rush dominate the site while Northwest territory sedge decreases. Baltic rush is adapted to both flooding and drought and is also tolerant of a range of soil conditions, including mild to moderate salinity and alkaline to calcareous soils.

Pathway 1.1a
Community 1.1 to 1.2

Develops with improper grazing management.

Pathway 1.2a
Community 1.2 to 1.1

Results from prescribed grazing or no grazing.

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. Invasive/non-native plants that can come in with a high water table are meadow foxtail (*Alopecurus arundinaceus*), quackgrass (*Elymus repens*), reed canarygrass (*Phalaris arundinacea*), and Kentucky bluegrass (*Poa pratensis*). These species are also more tolerant of grazing and can increase and may become dominant.

Community 2.1

Rush/non-native species

Community phase 2.2 is similar to Community Phase 1.2 with the exception of non-native plant species present.

Community 2.2

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.

Pathway 2.1a

Community 2.1 to 2.2

Improper grazing decreases Northwest territory sedge, while non-native plants, Nebraska sedge, and Baltic rush increase.

Pathway 2.2a

Community 2.2 to 2.1

Lack of disturbance, such as grazing, or prescribed grazing applied. May be unlikely to occur if rhizomatous grasses have increased.

State 3

Degraded/Lowered water table State

The Degraded/Lower water table State develops after a permanent lowering of the water table. This can occur from excessive grazing that can cause meadow downcutting or through artificial meadow drainage to decrease soil saturation. State 1 and State 2 can transition to this state, however State 2 is more likely to transition to State 3 through improper grazing management. This state can be similar to drier meadow sites in early seral status. The site has crossed the threshold. This state cannot be returned to State 1 without raising the water table.

Community 3.1

Non-native species/Rush/Sedge

The plant community is dominated by Nebraska sedge and Baltic rush, but the overall production potential of the site is much lower than State 1. There is an increase in forbs and grasses that require less soil moisture. Quackgrass, Kentucky bluegrass, redtop bentgrass and meadow foxtail may have invaded the community.

Transition T1A

State 1 to 2

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

Transition T1B

State 1 to 3

This transition can occur with drainage of the site and lowering the water table.

Transition T2

State 2 to 3

This transition develops through permanently lowering the late growing season water table to 20-40 inches. This can occur with continued improper grazing management. It may also occur with proper grazing on the site, but channel erosion may continue if poor off-site conditions cause more frequent and/or severe flooding.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses/Grasslikes			1513–2858	
	sedge	CAREX	<i>Carex</i>	673–1177	–
	rush	JUNCU	<i>Juncus</i>	336–673	–
	meadow barley	HOBR2	<i>Hordeum brachyantherum</i>	168–336	–
2	Secondary Perennial Grasses			168–336	
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	17–67	–
	common reed	PHAU7	<i>Phragmites australis</i>	17–67	–
Forb					
3	Perennial			336–673	
	horsetail	EQUIS	<i>Equisetum</i>	17–101	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	17–101	–
	pea	LATHY	<i>Lathyrus</i>	17–101	–
	clover	TRIFO	<i>Trifolium</i>	17–101	–
	common reed	PHAU7	<i>Phragmites australis</i>	28–90	–
Shrub/Vine					
4	Primary Shrubs			1–56	
	clover	TRIFO	<i>Trifolium</i>	40–135	–
	Woods' rose	ROWO	<i>Rosa woodsii</i>	17–67	–
	willow	SALIX	<i>Salix</i>	17–67	–
	horsetail	EQUIS	<i>Equisetum</i>	6–28	–
	pea	LATHY	<i>Lathyrus</i>	6–28	–
	dock	RUMEX	<i>Rumex</i>	6–28	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	0–22	–

Animal community

Livestock Interpretations:

This site is suited to grazing by cattle and sheep during the summer. Grazing management should be keyed to sedge, rush and Nevada bluegrass production. Sedge provides good to fair forage for domestic grazing. Rush's are described as a fair to good forage species for cattle. On average, rush palatability is considered medium to moderately low. Rush's are considered palatable early in the growing season when plants are young and tender, but as stems mature and toughen palatability declines. 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. Meadow barley tends to increase and replace the more palatable plants in moist meadows and in other sites favorable to growth, especially if such areas are somewhat overgrazed.

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:

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 provides food for several wildlife species and waterfowl. Rush's are an important cover species for a variety of small birds, upland game birds, birds of prey, and waterfowl. Meadow

barley is an important forage species for many wildlife species.

Hydrological functions

Runoff is low to very low and ponding occurs in some areas. There are no rills, waterflow patterns, erosional pedestals, or terracettes. Gullies are rare to common 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, gullies are none (i.e., site supported by springs and seeps). 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 and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T8S R61E S11
General legal description	Pahranagat Valley, Lincoln County, Nevada. This site also occurs in Mineral and Nye counties, Nevada.
Location 2: Esmeralda County, NV	
Township/Range/Section	T2S R35E S13
General legal description	Fish Lake Valley, Esmeralda County, Nevada

Other references

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

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

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

Contributors

HA/GD

Approval

Kendra Moseley, 2/20/2025

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
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2. **Presence of water flow patterns:** None
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3. **Number and height of erosional pedestals or terracettes:** 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 20%; surface rock fragments rare to few (<1%); shrub canopy is minimal; foliar cover of perennial herbaceous plants \pm 85%.
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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. Where this site is not associated with perennial or ephemeral channels, gullies are none (i.e., site supported by springs and seeps).
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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.)
-

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is platy, sub-angular blocky, or massive. Soil surface colors are dark and the soils have mollic epipedons. Organic carbon 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 Plant Community: Rhizomatous, cool season, grass-like plants > deep-rooted, cool season, perennial bunchgrasses > deep-rooted, cool season, perennial forbs > rhizomatous, cool season, perennial grasses. (By above ground production)
- Sub-dominant: Shallow-rooted, cool season, perennial bunchgrasses and grass-like plants = fibrous, shallow-rooted, cool season, perennial forbs > shrubs. (By above ground production)
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Herbaceous plant mortality or decadence uncommon. Shrubs occurring within the meadow plant community matrix (not in streambed or adjacent streambanks) are decadent, visibly stressed, or dead.
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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) \pm 3000 lbs/ac; Spring flooding/ponding 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:** Willow, rose, rabbitbrush, wildiris, thistle; quackgrass, and hoarycress. Baltic rush and foxtail barley are aggressive increaser plants.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in most years.
