USDA Natural Resources
Conservation Service

Ecological site R025XY001NV
MOIST FLOODPLAIN

Last updated: 4/24/2024
Accessed: 05/05/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 025X–Owyhee High Plateau

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

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

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

Ecological site concept

This site is on intermontane basins along flood plains and stream terraces of perennial streams. Slopes range from 0 to 8 percent with elevations of 4000 to 6300 feet (1219 to 1920 meters).

The soils associated with this site are very deep, poorly drained and fertile with a seasonal high water table between 6 to 24 inches (15 to 60cm) of the soil surface. Important abiotic factors contributing to the presence of this ecological site include a seasonally high water table and occasional to frequent, long duration, flooding from early spring to summer.

The representative plant community is dominated by creeping wildrye and basin wildrye. Other important perennial species include willows, Nevada bluegrass and various sedge species. Potential vegetative composition is approximately 75 percent grasses, 10 percent forbs and 15 percent shrubs. Approximate cover is 70 to 85 percent.

Associated sites

R025XY003NV	**LOAMY BOTTOM 8-14 P.Z.** LECI4 dominant grass; usually a more productive site; soil lacks a seasonal high water table.

R025XY006NV	**DRY MEADOW** PONE3 and PHAL2 dominant plants; less productive site; seasonal high water table below 50cm.
R025XY005NV	**WET MEADOW** DECE3 dominant grass and willow minor or absent; less productive site.

Similar sites

R025XY003NV	**LOAMY BOTTOM 8-14 P.Z.** LECI4 dominant grass; usually a more productive site; soil lacks a seasonal high water table.
R025XY006NV	**DRY MEADOW** PONE3 and PHAL2 dominant plants; less productive site; seasonal high water table below 50cm.
R025XY005NV	**WET MEADOW** DECE3 dominant grass and willow minor or absent; less productive site.
R025XY079NV	**STREAMBANK** PRIVM co-dominant; more productive site; soil moderately well drained with a cryic soil temperature regime.

Table 1. Dominant plant species

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

Physiographic features

This site is in intermontane basins and/or bolsons along flood plains and stream terraces of perennial streams. Slopes range from 0 to 8 percent. Elevations are typically between 4000 to 6300 feet (1219 to 1920 meters).

Table 2. Representative physiographic features

Landforms	(1) Bolson > Flood plain (2) Intermontane basin > Stream terrace
Runoff class	High
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Occasional to frequent
Elevation	4,000–6,300 ft
Slope	0–8%
Water table depth	6–20 in
Aspect	Aspect is not a significant factor

Climatic features

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

The average annual precipitation ranges from 8 to 10 inches (20 to 25 cm). Average annual air temperature is around 47 Degrees F.

The average frost free period for this site is 64 days while the freeze free period is 91 days. Temperatures can change by as much as 40-50 Degrees F in a 24 hour period.

*The above data is averaged from the ELKO RGNL and ELKO NWS Climate stations, NASIS and, Western Regional Climate Center.

Table 3. Representative climatic features

Frost-free period (characteristic range)	50-100 days
Freeze-free period (characteristic range)	60-140 days
Precipitation total (characteristic range)	10-11 in
Frost-free period (actual range)	50-100 days
Freeze-free period (actual range)	60-140 days
Precipitation total (actual range)	10-11 in
Frost-free period (average)	64 days
Freeze-free period (average)	91 days
Precipitation total (average)	10 in

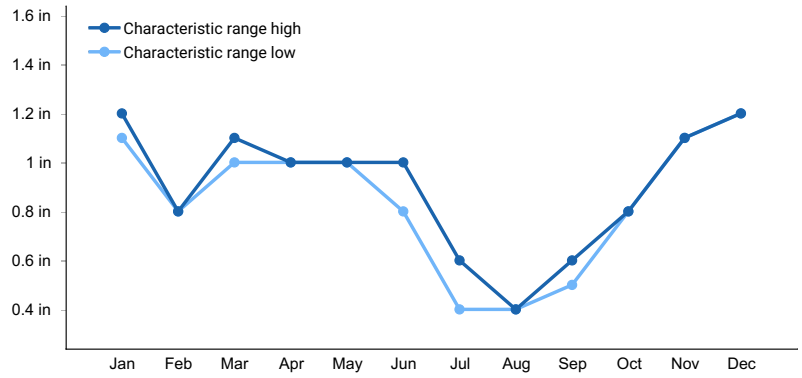


Figure 1. Monthly precipitation range

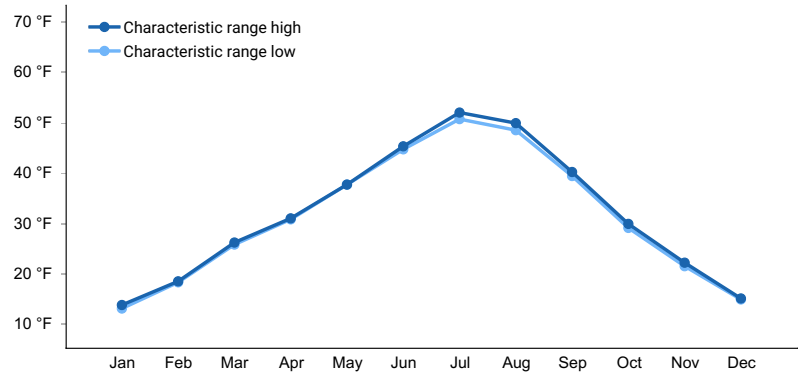


Figure 2. Monthly minimum temperature range

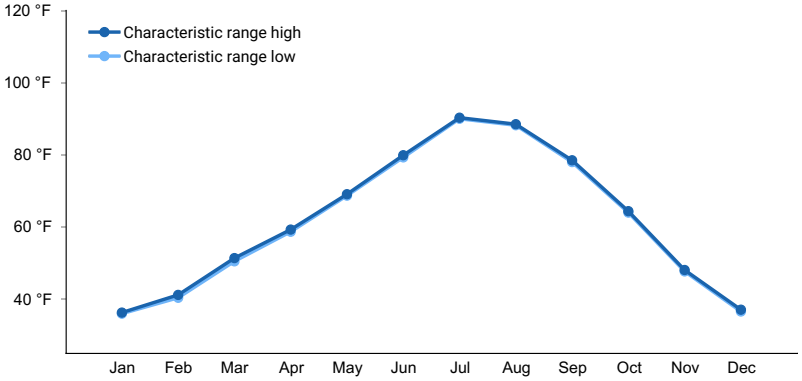


Figure 3. Monthly maximum temperature range

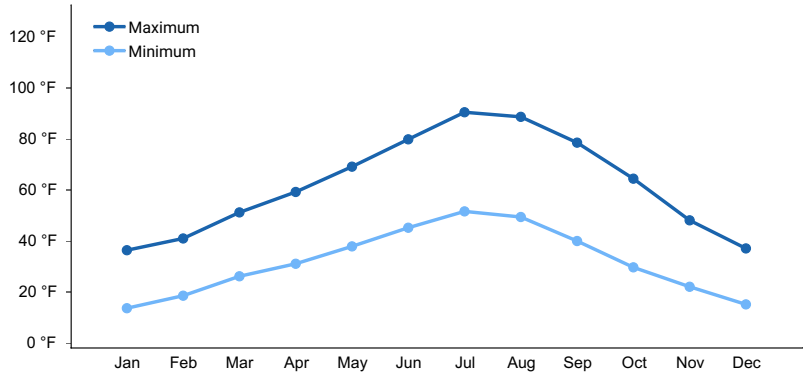


Figure 4. Monthly average minimum and maximum temperature

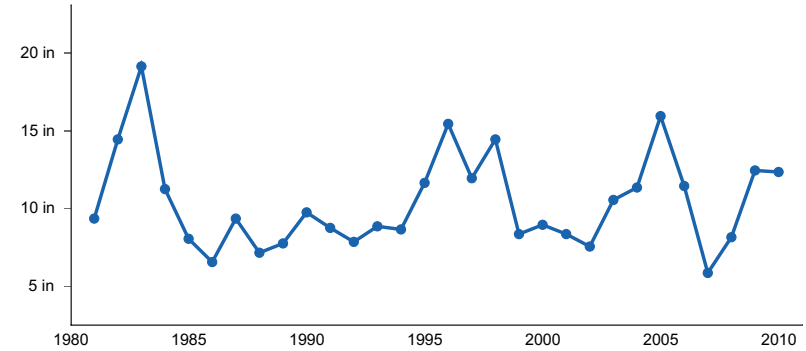


Figure 5. Annual precipitation pattern

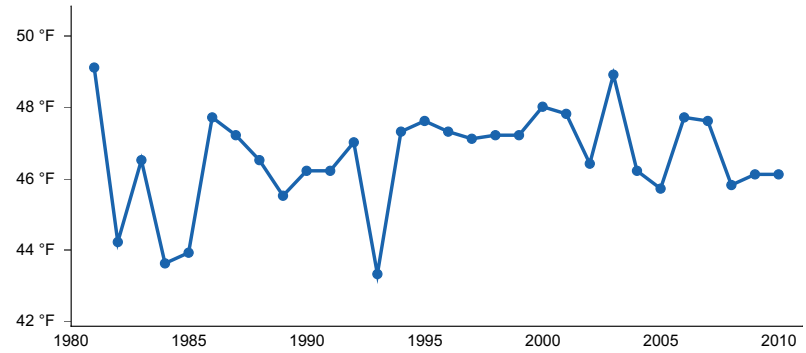


Figure 6. Annual average temperature pattern

Climate stations used

- (1) ELKO RGNL AP [USW00024121], Elko, NV
- (2) ELKO NWS OFFICE [USC00262570], Elko, NV

Influencing water features

This site is adjacent to and influenced by perennial streams. Important water features contributing to the presence of this ecological site include endosaturation and a seasonal high water table between 6 to 24 inches (15 to 60 cm) from the soil surface. Frequent flooding ranging from brief to long duration occurs in early spring, encouraging initiation of plant growth.

Wetland description

N/A

Soil features

The soils associated with this site are very deep, formed in alluvium derived from mixed parent material and range

from poorly to very poorly drained. Soils are characterized by a thick fertile surface horizon (mollic epipedon) and a seasonal high water table with 6 inches (15cm) of the soil surface. Soil are typically characterized by greater than 18 percent clay (fine or fine-silty in the particle size control section) and have a silt loam, loam or silty clay loam surface texture. These soils are susceptible to gullying and have the potential to degrade during large precipitation events.

Soil series associated with this site include: Humboldt, Devilsgait, Paranat, Sonoma, Delvada, Woofus, Crooked Creek, and Rose Creek.

Table 4. Representative soil features

Parent material	(1) Alluvium–volcanic rock
Surface texture	(1) Silt loam (2) Silty clay loam (3) Loam
Drainage class	Very poorly drained to poorly drained
Permeability class	Moderately slow to moderate
Soil depth	60 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (0-40in)	6–8 in
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

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

This ecological site is characteristic of an riparian area. 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 closely to hydrologic processes, geomorphology, and use history.

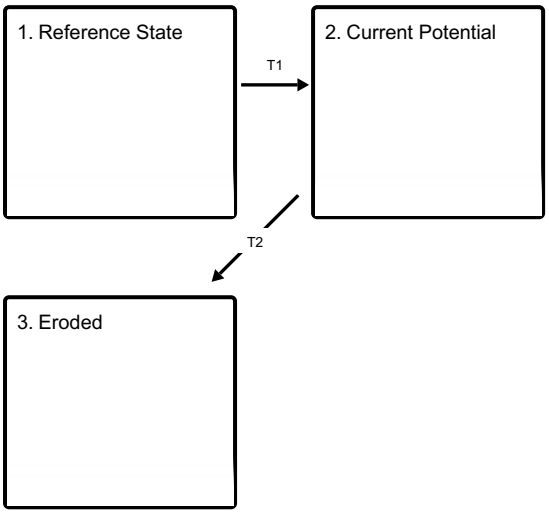
This ecological site is co-dominated by creeping wildrye and basin wildrye. Creeping wildrye is a strongly rhizomatous perennial grass and is commonly associated with riparian areas. This grass is frequently use for soil stabilization, as it readily established from seed or rhizomes and is fire tolerant. Basin wildrye is a large perennial bunchgrass known to be tolerant of a wide variety of soil conditions, but is generally common on deep, water receiving landscape positions (Anderson 2002).

Willows (Salix spp.) are a biotic component of this ecological site. Willow are both drought resistant and tolerant of saturated soil conditions. Willows reproduce by both seeds and root sprouts. Regeneration is limited by site availability and extent of regeneration can be an indicator of time since disturbance. Many willows are pioneer species and rapidly colonize fresh alluvial deposits (Anderson 2006).

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 fire and flooding. Fire regimes in riparian areas are related to the fire regime of the adjacent upland community, although its suggested that fire frequency and severity was generally lower and than adjacent communities (Dwire and Kauffman 2003). The presence of invasive species has the ability to significantly alter disturbance regimes from their natural range of variation. Precipitation patters are highly variable and unpredictable throughout this area. Dryland riparian areas are tolerant of prolonged drought conditions, however decline in overcall vegetative cover and production is expected during drought periods.

State and transition model

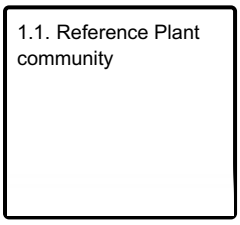
Ecosystem states



T1 - introduction of non-native species

T2 - road building, water diversions and/or up-stream channelization

State 1 submodel, plant communities



State 1
Reference State

This state is representative of the natural variability under pristine 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.

Dominant plant species

- willow (*Salix*), shrub
- beardless wildrye (*Leymus triticoides*), grass
- basin wildrye (*Leymus cinereus*), grass

Community 1.1
Reference Plant community

This community phase is characterized by a dense stand of perennial grasses dominated by creeping wildrye and basin wildrye. Willows are often prevalent enough to dominate the visual aspect of the plant community. Other

important perennial species include Nevada bluegrass and sedge species. Potential vegetative composition is approximately 75 percent grasses, 10 percent forbs and 15 percent shrubs. Approximate cover is 70 to 85 percent. Bare ground is approximately 20 percent. Litter cover occurs within plant interspaces at a depth of 1 to 3 inches.

Resilience management. Grasslands communities with basin wildrye historically experienced mostly infrequent stand replacing fires, intervals range from 35 to 100 years, depending on climate and ignition sources.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1350	1875	2625
Shrub/Vine	270	375	525
Forb	180	250	350
Total	**1800**	**2500**	**3500**

State 2
Current Potential

This state is similar to the Reference State 1.0. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. Non-natives may increase in abundance but will not become dominant within this State. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These feedbacks include the presence of all structural and functional groups, low fine fuel loads and retention of organic matter and nutrients. Positive feedbacks decrease ecosystem resilience and stability of the state. These include the non-natives' high seed output, persistent seed bank, rapid growth rate, ability to cross pollinate and adaptations for seed dispersal.

Dominant plant species

- willow (*Salix*), shrub
- basin wildrye (*Leymus cinereus*), grass
- beardless wildrye (*Leymus triticoides*), grass

State 3
Eroded

This state is characterized by lowering of the water table, extensive erosion 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, greasewood or rabbitbrush. Understory may include native perennial grasses/grasslikes. Non-native species may be stable to increasing. This state resembles another ecological site concept called Loamy bottom. An important distinction between a degraded moist floodplain and a loamy bottom is the proximity to a perennial stream. A true loamy bottom is not associated with a perennial stream.

Dominant plant species

- basin big sagebrush (*Artemisia tridentata ssp. tridentata*), shrub
- rubber rabbitbrush (*Ericameria nauseosa*), shrub

Transition T1
State 1 to 2

Trigger: This transition is caused by the introduction of non-native species. Slow variables: Over time the annual non-native plants will increase within the community. Threshold: Any amount of introduced non-native species causes an immediate decrease in the resilience of the site. Annual non-native species cannot be easily removed from the system and have the potential to significantly alter disturbance regimes from their historic range of variation. Perennial non-natives have the potential to offer significant competition to native vegetation causing a reduction in both vigor and reproductive capacity.

Transition T2
State 2 to 3

Trigger: significant anthropogenic disturbance such as road building, water diversions and up-stream channelization. Slow variables: Prolonged drought, inappropriate grazing management, and the presence of non-native species coupled with significant anthropogenic disturbance resulting in active soil erosion. Threshold: Disconnection from the floodplain, loss of seasonal flooding and lowering of the water table.

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**			1329–2153	
	basin wildrye	LECI4	*Leymus cinereus*	562–750	–
	beardless wildrye	LETR5	*Leymus triticoides*	562–750	–
	sedge	CAREX	*Carex*	37–185	–
	saltgrass	DISP	*Distichlis spicata*	37–94	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	37–94	–
2	**Secondary Perennial Grasses**			90–375	
	sloughgrass	BECKM	*Beckmannia*	13–125	–
	rush	JUNCU	*Juncus*	13–125	–
	western wheatgrass	PASM	*Pascopyrum smithii*	13–125	–
	alkali sacaton	SPAI	*Sporobolus airoides*	13–125	–
	alkali cordgrass	SPGR	*Spartina gracilis*	13–125	–
Forb					
3	**Perennial**			145–440	
	yarrow	ACHIL	*Achillea*	18–55	–
	aster	ASTER	*Aster*	18–55	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	18–55	–
	cinquefoil	POTEN	*Potentilla*	18–55	–
	dock	RUMEX	*Rumex*	18–55	–
	ragwort	SENEC	*Senecio*	18–55	–
	cows clover	TRWO	*Trifolium wormskioldii*	18–55	–
Shrub/Vine					
4	**Primary Shrubs**			93–187	
	willow	SALIX	*Salix*	93–187	–
5	**Secondary Shrubs**			108–330	
	silver sagebrush	ARCA13	*Artemisia cana*	18–55	–
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	18–55	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	18–55	–
	Woods' rose	ROWO	*Rosa woodsii*	18–55	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	18–55	–
	silver buffaloberry	SHAR	*Shepherdia argentea*	18–55	–

Animal community

Livestock Interpretations:
This site is suited for livestock grazing. grazing managment should be keyed to Creeping wildrye, Basin wildrye and perennial grass production. 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. 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. 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. Sedge provides good to fair forage for domestic grazing. Saltgrass's value as forage depends primarily on the relative availability of other grasses of higher nutritional value and palatability. It can be an especially important late summer grass in arid environments after other forage grasses have deceased. Saltgrass is rated as a fair to good forage species only because it stays green after most other grasses dry. Livestock generally avoid saltgrass due to its coarse foliage. Saltgrass is described as an “increaser” under grazing pressure. 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. In the West, willows are generally considered to be more palatable to sheep than to cattle, but cattle may make greater use of willow because they tend to frequent riparian areas.

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:
Willows provide food and cover for many wildlife species. Willows, in general, are a preferred food and building material of beaver. It is especially important for deer and nongame birds. Willow is moderately to highly palatable for mule deer and elk, and is an important browse during winter. Ducks, grouse, other birds, and small mammals eat willow shoots, catkins, buds, and leaves. Creeping wildrye is used for forage for many wildlife species and is often used for cover. 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. Nevada bluegrass is an 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. Saltgrass provides cover for a variety of bird species, small mammals, and arthropods and is on occasion used as forage for several big game wildlife species. The palatability of mat muhly for wildlife species has been rated as fair to poor.

Hydrological functions

These soils are susceptible to gullying which intercepts normal overflow patterns causing site degradation. Gullies are rare to common depending on severity of associated stream channel entrenchment. There are no rills or water flow patterns. Fine litter (foliage of grasses and annual and 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. Deep-rooted perennial grasses and grass-like plants slow runoff and increase infiltration. Tall stature and relatively coarse foliage of basin 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 upland and big game hunting.

Wood products

N/A

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. 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. Creeping wildrye is primarily used for reclamation of wet, saline soils. Given its extensive system of rhizomes and roots which form a dense sod, saltgrass is considered a suitable species for controlling wind and water erosion.

Inventory data references

This ESC is based on historic soil survey data and range site information. It was originally established in 1969.

Type locality

Location 1: Elko County, NV	
Township/Range/Section	T36N R38E S27
General legal description	Northeast of Halleck, on the Humboldt River floodplain, Elko County, Nevada

References

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Contributors

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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)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/22/2006
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 less than 5%; basal cover of perennial herbaceous plants ± 80%.

5. **Number of gullies and erosion associated with gullies:** None.

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.)

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 have mollic epipedons. Organic matter can range from 2 to 3.5 percent for much of the upper 20 inches. (OM values derived from lab characterization data.)

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.

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.

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: Tall-statured, deep-rooted, cool season, perennial bunchgrasses=rhizomatous, cool season, perennial grasses and grass-like plants

    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).

    Other:

    Additional:

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

14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (± 90%) and depth of litter is 1 to 3 inches

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

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 knapweed, quackgrass, foxtail barley, thistle, annual kochia, hoary cress, tall whitetop

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