USDA Natural Resources
Conservation Service

Ecological site R023XY002NV
SALINE MEADOW

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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.

Ecological site concept

Currently there is only a draft of the initial concept for this ecological site. The initial concept for this site places it within the Seasonally Flooded Basin Wildrye Ecological Site Group. To view the General STM and other information available for this ESG please go to https://edit.jornada.nmsu.edu/catalogs/esg/023X/R023XY916NV

This site occurs on smooth, nearly level to concave, basin floors, lake terraces with slopes of less than 2 percent. This site is dominated by basin wildrye, Nevada bluegrass, inland saltgrass (Distichlis spicata) and black greasewood (Sarcobatus vermiculatus), shadscale (Atriplex confertifolia) may also be present. Sagebrush is not a significant component of this site.

This site is slightly less productive than the modal site with 500 to 1300 lb/ac. These soils are strongly salt and sodium affected in the upper profile with soil reaction and salt and sodium concentrations usually decreasing with depth. The seasonal depth to a water table is more shallow, at 18 to 60 inches. Wetting of these soil dilutes their salt/sodium concentrations and the degree of salinity and alkalinity fluctuates throughout the year. Seed viability, germination, and available water capacity is reduced due to the saline-alkaline condition of these soils. This site has the same STM as the group modal site with 3 stable states.

Associated sites

R024XY003NV	**SODIC TERRACE 6-8 P.Z.**
R024XY008NV	**SODIC FLAT 8-10 P.Z.**
R024XY010NV	**SODIC FLOODPLAIN**

R024XY011NV	**SODIC FLAT 6-8 P.Z.**
R024XY022NV	**SODIC TERRACE 8-10 P.Z.**

Similar sites

R023XY089NV	**WET MEADOW 10-14 P.Z.** soils non-saline/alkali; DISP & PULE absent; more productive site
R023XY025NV	**WET MEADOW 14+ P.Z.** DECE dominant grass; soils not saline-alkali affected; higher elevations

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Poa nevadensis* (2) *Puccinellia lemmonii*

Physiographic features

This site occurs on smooth, nearly level to concave basin floors. This site is often associated with seeps and springs at low elevations. Slopes range from 0 to 2 percent. Elevations range from 5500 to 5600 feet.

Table 2. Representative physiographic features

Landforms	(1) Basin floor
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Ponding frequency	None
Elevation	1,676–1,707 m
Slope	0–2%
Water table depth	69–213 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid and characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 6 to 10 inches. Mean annual air temperature is 45 to 53 degrees F. The average growing season is about 90 to 130 days.

Nevada’s climate is predominantly arid, with large daily ranges of temperature, infrequent

severe storms, heavy snowfall in the higher mountains, and great location variations with elevation. Three basic geographical factors largely influence Nevada's climate: continentality, latitude, and elevation. Continentality is the most important factor. 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, with the result that 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 mid-latitude 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 scattered thundershowers. The eastern portion of the state receives significant 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).

Average annual precipitation is 16 to over 20 inches. Mean annual air temperature is 41 to 44 degrees F. The average growing season is about 50 to 70 days.

Mean annual precipitaion at the Bear Creek, Nevada SNOTEL station (170501020301) is 37.69 inches.

monthly mean precipitation is:
January 3.84; February 3.75; March 4.38; April 4.9;
May 3.99; June 2.82; July .95; August 1.66;
September 1.22; October 2.12;
November 3.67; December 4.38.

Table 3. Representative climatic features

Frost-free period (average)	110 days
Freeze-free period (average)	
Precipitation total (average)	203 mm

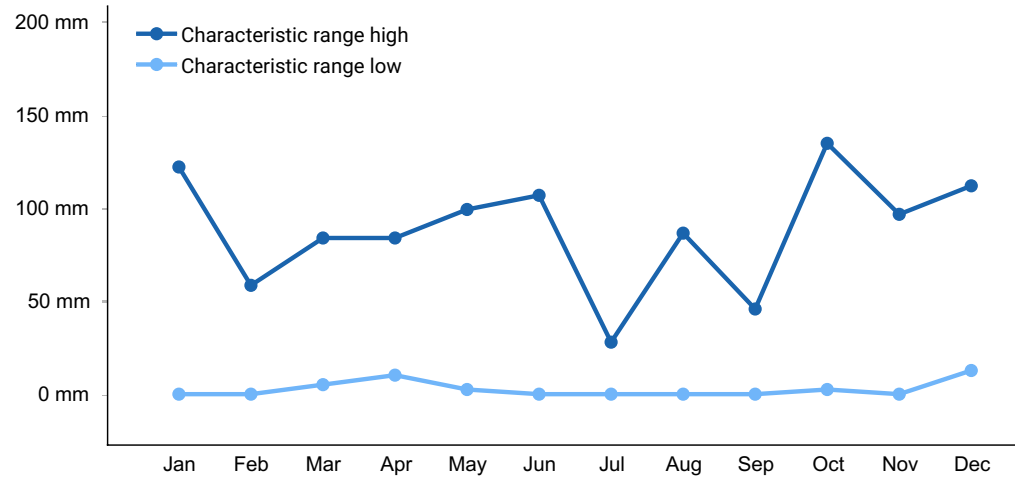

Figure 1. Monthly precipitation range

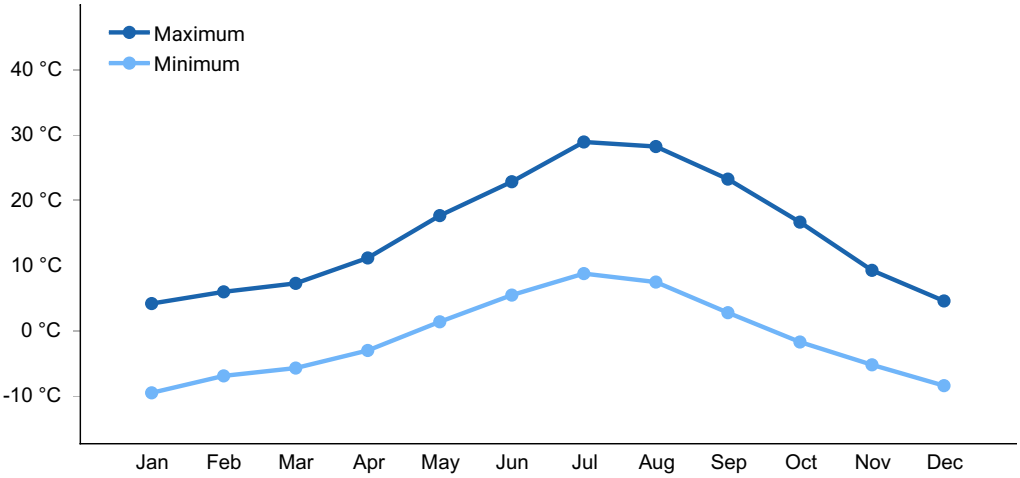

Figure 2. Monthly average minimum and maximum temperature

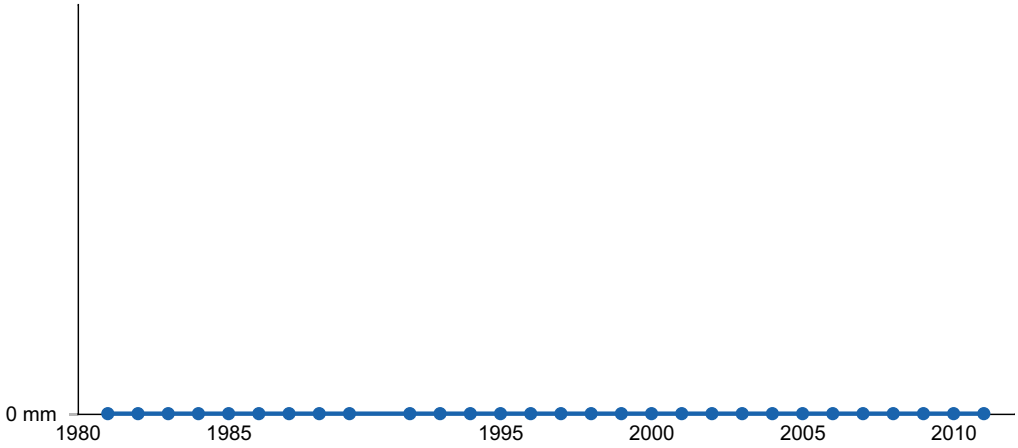

Figure 3. Annual precipitation pattern

Influencing water features

There is a water table near the surface for short periods in the early spring that typically stabilizes at depths below 30 inches during the summer. Capillary rise of this ground water enhances soil moisture during the growing season. Additional moisture is received on this

site as run-in from higher landscapes.

Soil features

The soils associated with this site are very deep and usually calcareous. Surface soils are more than ten inches thick and medium to fine-textured. These soils are moderately to strongly salt and sodium affected in the upper profile with soil reaction and salinity decreasing with depth. Soils are poorly drained. There is a water table near the surface for short periods in the early spring that typically stabilizes at depths below 30 inches during the summer. Capillary rise of this ground water enhances soil moisture during the growing season. Additional moisture is received on this site as run-in from higher landscapes. These soils are poorly aerated and very slowly permeable. Runoff is medium to very high and there may be brief ponding in depressional areas. Sheet and rill erosion potential is slight and overland flow patterns are typically not evident. Wind erosion potential is slight. The soil series associated with this site include: Skullwak.

Table 4. Representative soil features

Surface texture	(1) Silt loam
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Very slow
Soil depth	183–213 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	19.81–20.07 cm
Calcium carbonate equivalent (0-101.6cm)	1–15%
Electrical conductivity (0-101.6cm)	8–32 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	13–45
Soil reaction (1:1 water) (0-101.6cm)	7.9–9.6
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Where management results in abusive grazing use by livestock and/or feral horses, woody plants increase, particularly rabbitbrush species. Inland saltgrass and Baltic rush increase and may become dominant. Fivehook bassia, annual mustards, foxtail barley and other annual forbs and grasses are species likely to invade this site.

Fire Ecology:
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. Lemmon's alkaligrass has high fire tolerance due to the rhizomatous growth and infrequent fire. Saltgrass rhizomes occur deep in the soil where they are insulated from the heat of most fires. Saltgrass survives fire by sending up new growth from rhizomes. 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.

State and transition model

Ecosystem states

1. Reference Plant Community

State 1 submodel, plant communities

1.1. Reference Plant Community

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by Nevada bluegrass, alkaligrass, and inland saltgrass. Potential vegetative composition is about 80% grasses, 15% forbs, and 5% shrubs. Approximate ground cover (basal and crown) is about 40 to 50 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	628	897	1166
Forb	118	168	219
Shrub/Vine	39	56	73
Total	**785**	**1121**	**1458**

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**			751–1267	
	Lemmon's alkaligrass	PULE	*Puccinellia lemmonii*	224–392	–
	saltgrass	DISP	*Distichlis spicata*	56–224	–
	basin wildrye	LECI4	*Leymus cinereus*	22–90	–
2	**Secondary Perennial Grasses**			56–168	
	sedge	CAREX	*Carex*	6–34	–
	beardless wildrye	LETR5	*Leymus triticoides*	6–34	–
	western wheatgrass	PASM	*Pascopyrum smithii*	6–34	–
Forb					
3	**Perennial**			112–224	
	aster	ASTER	*Aster*	6–34	–
	King's mousetail	IVKI	*Ivesia kingii*	6–34	–
	cinquefoil	POTEN	*Potentilla*	6–34	–
Shrub/Vine					
4	**Primary Shrubs**			1–56	
	whiteflower rabbitbrush	CHAL9	*Chrysothamnus albidus*	6–11	–
	rubber rabbitbrush	ERNAO	*Ericameria nauseosa ssp. consimilis var. oreophila*	6–11	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	6–11	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production. 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. Lemmon’s alkaligrass has low palatability for livestock. 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. 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.

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:
Nevada bluegrass is desirable for pronghorn antelope and mule deer in the spring and preferable in the spring, summer, and fall for elk and desirable as part of their winter range. Lemmon’s alkaligrass has low palatability for wildlife. 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. 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.

Hydrological functions

Rills are none. Water flow patterns are none to rare. Pedestals are none. Gullies are none to rare. Perennial grasses (Nevada bluegrass, saltgrass, and alkaligrass] and associated litter slow runoff and increase infiltration.

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 hiking and has potential for upland and big game hunting.

Other products

Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

Other information

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. 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.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T44N R19E S16
Latitude	41° 44′ 4″
Longitude	119° 51′ 35″
General legal description	SW1/4NW1/4, Approximately 10 miles north of Vya, along east side of the main north-south road following west side of Long Valley, Washoe County, Nevada.

Other references

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

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

Contributors

GKB

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	02/05/2010
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.

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

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 ± 10-20%.

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 runoff from adjacent landscapes. Persistent litter (large woody material) will remain in place.

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 3 to 6. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is medium platy. Soil surface colors are light grays and soils are typified by an ochric epipedon. Organic matter can range from 1.5 to more than 3 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial grasses (Nevada bluegrass, saltgrass, and alkaligrass] and associated litter 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. Angular blocky or massive subsurface layers are not to be interpreted as soil 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: Deep-rooted, cool season, perennial bunchgrasses > short-statured rhizomatous grasses

    Sub-dominant: Associated perennial grasses and grass-like plants > deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, perennial and annual 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):** Bunchgrasses nearly always show some mortality and decadence.

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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (± 50%) and depth of litter ±1/2 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) ± 1000 lbs/ac; Favorable years± 1300 lbs/ac and unfavorable years ±700 lbs/ac.

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 annual mustards, annual kochia, pigweed, tall whitetop (perennial pepperweed), purslane, and salt cedar.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years.
