

Ecological site R023XY010NV SALINE BOTTOM

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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, lakeplains, and axial-stream floodplains 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*). Sagebrush is not a significant component of this site. Shadscale (*Atriplex confertifolia*), rubber rabbitbrush (*Ericameria nauseosa*), and Torrey's quailbush (*Atriplex torreyi*) may also be present. This site is slightly less productive than the modal site with 1000 to 2200 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 20 to 60 inches. Wetting of these soils 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

R023XY002NV	SALINE MEADOW
R023XY005NV	DRY FLOODPLAIN
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

R024XY022NV	SODIC TERRACE 8-10 P.Z. ARTR2-SAVE4 codominant; much less productive site
R023XY082NV	LOAMY FAN 10-12 P.Z. DISP & SAVE4 absent; less productive site
R023XY009NV	LOAMY BOTTOM 8-12 P.Z. soils non-saline/alkali; DISP & SAVE4 absent; more productive site
R024XY007NV	SALINE BOTTOM SPAI codominant grass; PONE3 rare to absent
R023XY005NV	DRY FLOODPLAIN DISP & SAVE4 minor species, if present; ARTRT dominant shrub
R024XY011NV	SODIC FLAT 6-8 P.Z. much less productive site
R024XY003NV	SODIC TERRACE 6-8 P.Z. SAVE4-ATCO codominant; less productive site
R024XY008NV	SODIC FLAT 8-10 P.Z. less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Sarcobatus vermiculatus</i>
Herbaceous	(1) <i>Leymus cinereus</i>

Physiographic features

This site occurs on smooth, nearly level to concave lake terraces. Slopes are 0 to 4 percent. Elevation ranges from 4500 to 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Lake terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Occasional
Ponding frequency	None
Elevation	1,370 – 1,830 m
Slope	0 %
Water table depth	60 – 210 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)	200 mm

Influencing water features

During the winter and early spring, additional moisture is received on this site as run-in from higher landscapes or as occasional, brief, overflow from adjacent streams.

Soil features

The soils associated with this site are moderately deep to very deep and usually calcareous. Surface soils are more than ten inches thick and medium to fine-textured. These soils are strongly salt and sodium affected in the upper profile with soil reaction and salt and sodium concentrations usually decreasing with depth. Soils are somewhat poorly to well drained and have a seasonally high water table at depths of 24 to 84 inches. During the winter and early spring, additional moisture is received on this site as run-in from higher landscapes or as occasional, brief, overflow from adjacent streams. Wetting of these soils dilutes their salt and sodium concentrations and the degree of salinity and alkalinity fluctuates widely through the year and from year to year. These soils are poorly aerated and have very slow to moderately rapid permeability. Seed viability, germination, and available water capacity is reduced due to the saline-alkaline condition of these soils. The surface layer of these soils will crust and bake upon drying, inhibiting water infiltration and seedling emergence. Runoff is very low to very high and there may be very 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: Lofftus, Mazuma, and Updike.

Table 4. Representative soil features

Surface texture	(1) Silty clay loam (2) Silt loam (3) Silty clay
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow to moderately rapid
Soil depth	50 – 210 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified

Available water capacity (0-101.6cm)	5.33 – 16.51 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 50
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 9.6
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

Where management results in abusive grazing use by livestock and/or feral horses, black greasewood and rabbitbrush increase and become dominant. Inland saltgrass increases with retrogression and often dominates the understory on sites in lower ecological condition. Fivehook bassia, annual mustards, foxtail barley and other annual forbs and grasses are species likely to invade this site.

Fire Ecology:

Black greasewood communities have been historically subject to stand-replacing fire regimes with intervals of

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			838-1867	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	572-953	–
	saltgrass	DISP	<i>Distichlis spicata</i>	38-381	–
	Lemmon's alkaligrass	PULE	<i>Puccinellia lemmonii</i>	38-152	–

2	Secondary Perennial Grasses			38-152	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	10-57	–
	beardless wildrye	LETR5	<i>Leymus triticoides</i>	10-57	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10-57	–
Forb					
3	Perennial			38-152	
	povertyweed	IVAX	<i>Iva axillaris</i>	10-38	–
	niterwort	NITRO	<i>Nitrophila</i>	10-38	–
	thelypody	THELY	<i>Thelypodium</i>	10-38	–
Shrub/Vine					
4	Primary Shrubs			133-286	
	greasewood	SAVE4	<i>Sarcobatus vermiculatus</i>	95-191	–
	rubber rabbitbrush	ERNAO	<i>Ericameria nauseosa</i> ssp. <i>consimilis</i> var. <i>oreophila</i>	38-95	–
5	Secondary Shrubs			38-191	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	19-38	–
	Torrey's saltbush	ATTO	<i>Atriplex torreyi</i>	19-38	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	19-38	–
	seepweed	SUAED	<i>Suaeda</i>	19-38	–

Animal community

Livestock Interpretations: This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production. The early growth and abundant production of basin wildrye make it a valuable source of forage for livestock. It is important forage for cattle and is readily grazed by cattle and horses in early spring and fall. Though coarse-textured during the winter, basin wildrye may be utilized more frequently by livestock and wildlife when snow has covered low shrubs and other grasses. 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. 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. Lemmon's alkaligrass has low palatability for livestock. Black greasewood is an important winter browse plant for domestic sheep and cattle. It also receives light to moderate use by domestic sheep and cattle during spring and summer months. Black greasewood contains soluble sodium and potassium oxalates that may cause poisoning and death in domestic sheep and cattle if large amounts are consumed in a short time. In general, livestock forage only lightly on threadleaf rubber rabbitbrush during the summer, but winter use can be heavy in some locations. Fall use is variable, but flowers are often used by livestock. A few leaves and the more tender stems may also be used. 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: Black greasewood is an important winter browse plant for big game animals and a food source for many other wildlife species. It also receives light to moderate use by mule deer and pronghorn during spring and summer months. Wildlife forage only lightly on threadleaf rubber rabbitbrush during the summer, but winter use can be heavy in some locations. Fall use is variable, but flowers are often used by wildlife. A few leaves and the more tender stems may also be used. The forage value of threadleaf rubber rabbitbrush varies greatly among subspecies and ecotypes. 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 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. 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. Lemmon's alkaligrass has low palatability for wildlife.

Hydrological functions

Permeability is very slow to moderately rapid. There are no rills or pedestals. Water flow patterns are rare to common. Runoff is very slow with ponding common over the area. Moderately fine to fine surface textures result in limited infiltration rates. Concentrations of surface salts and sodium result in chemical crusts which also impedes infiltration. Water flow patterns are typically short, ending in depressional areas. Gullies are none to common depending on landform. Gully formation is not characteristic of landscape positions where this site typically occurs. Where this site occurs within an active floodplain, gullies may be present. Gullies and associated head cuts should be

healing and stable. Deep-rooted perennial bunchgrasses (basin wildrye and Nevada bluegrass) slow runoff and increase infiltration. Shrubs and the tall stature and relatively coarse foliage of basin wildrye and associated litter break raindrop impact and provide opportunity for snow catch and moisture 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.

Other products

The leaves, seeds and stems of black greasewood are edible. Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

Other information

Black greasewood is useful for stabilizing soil on wind-blown areas. It successfully revegetates eroded areas and sites too saline for most plant species. 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. 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.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T42N R19E S3
Latitude	41° 35'23"
Longitude	119° 50'26"
General legal description	SW 1/4 SW 1/4, Approximately two miles east of Vya, along Road 8A, Long Valley area, Washoe County, Nevada. This site also occurs in Humboldt 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>).

Great Basin Ecological Site Development Project: State and Transition Models for Major Land Resource Area 23, Nevada and portions of California (Online; <https://naes.agnt.unr.edu/PMS/Pubs/2019-4060.pdf>)

Contributors

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Approval

Kendra Moseley, 4/10/2025

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	06/20/2006
Approved by	
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: Water flow patterns are rare to common. Runoff is very slow with ponding common over the area. Moderately fine to fine surface textures result in limited infiltration rates. Concentrations of surface salts and sodium result in chemical crusts which also impedes infiltration. Water flow patterns are typically short, ending in depressional areas.

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 $\pm$ 60%; surface rock fragments $\pm$ 5%; shrub canopy $\pm$ 15%; basal area for perennial herbaceous plants $\pm$ 20%.

5. Number of gullies and erosion associated with gullies: Gullies are none to rare depending on landform. Gully formation is not characteristic of landscape positions where this site typically occurs. Where this site occurs within an active floodplain, gullies may be present. Gullies and associated head cuts should be healing and stable.

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

7. Amount of litter movement (describe size and distance expected to travel): Fine litter (foliage of grasses and annual & perennial forbs) is only expected to move during periods of flooding by adjacent streams. Persistent litter (large woody material) will remain in place except during major 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 1 to 4. (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): Structure of soil surface will be very thin to thick platy or massive. Soil surface colors are light and the soils are typified by an ochric epipedon. Organic matter can range from 1.5 to 4.5 percent (OM values taken 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 bunchgrasses (basin wildrye and Nevada bluegrass) slow runoff and increase infiltration. Shrubs and the tall stature and relatively coarse foliage of basin wildrye and associated litter break raindrop impact and provide opportunity for snow catch and moisture accumulation on site.
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11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): Compacted layers are not typical. Subsoil argillic or natric horizons, or duripans are normal for this site and 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: Tall-statured, deep-rooted, cool season, perennial bunchgrasses > associated perennial grasses and grass-like plants > tall shrubs. (By above ground production)
- Sub-dominant: Deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, perennial and annual forbs. (By above ground production)
- 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 are common and standing dead shrub canopy material may be as much as 25% of total woody canopy.
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14. Average percent litter cover (%) and depth (in): Within plant interspaces ($\pm$ 50%) and depth of litter $\pm$ 1 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 end of May) $\pm$ 1700 lbs/ac; Winter moisture 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: Rubber rabbitbrush is an increaser on this site. Annual mustards, povertyweed, annual kochia, pigweed, tall whitetop, bassia, and foxtail barley are invaders on this site.
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17. Perennial plant reproductive capability: All functional groups should reproduce in average (or normal) and above average growing season years.
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