Ecological site R024XY063NV
SALINE FLOODPLAIN

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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): 024X–Humboldt Basin and Range Area

Major land resource area (MLRA) 24, the Humboldt Area, covers an area of approximately 8,115,200 acres (12,680 sq. mi.). It is found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. Elevations range from 3,950 to 5,900 feet (1,205 to 1,800 meters) in most of the area, some mountain peaks are more than 8,850 feet (2,700 meters). A series of widely spaced north-south trending mountain ranges are separated by broad valleys filled with alluvium washed in from adjacent mountain ranges. Most valleys are drained by tributaries to the Humboldt River. However, playas occur in lower elevation valleys with closed drainage systems. Isolated ranges are dissected, uplifted fault-block mountains. Geology is comprised of Mesozoic and Paleozoic volcanic rock and marine and continental sediments. Occasional young andesite and basalt flows (6 to 17 million years old) occur at the margins of the mountains. Dominant soil orders include Aridisols, Entisols, Inceptisols and Mollisols. Soils of the area are generally characterized by a mesic soil temperature regime, an aridic soil moisture regime and mixed geology. They are generally well drained, loamy and very deep. Approximately 75 percent of MLRA 24 is federally owned, the remainder is primarily used for farming, ranching and mining. Irrigated land makes up about 3 percent of the area; the majority of irrigation water is from surface water sources, such as the Humboldt River and Rye Patch Reservoir. Annual precipitation ranges from 6 to 12 inches (15 to 30 cm) for most of the area, but can be as much as 40 inches (101 cm) in the mountain ranges. The majority of annual precipitation occurs as snow in the winter. Rainfall occurs as high-intensity, convective thunderstorms in the spring and fall. 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 ascends the western slopes of the Sierra Range, the air cools, condensation takes place 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.

Ecological site concept

This ecological site is on alluvial flats, stream terraces and flood plains. Soils are very deep, somewhat poorly drained and formed in alluvium derived from mixed alluvium, loess and volcanic ash. The soil profile is characterized by an ochric epipedon, strong to moderate salinity throughout and a high-water table between 27 to 39 inches (70 to 100cm) at some time during the year. Sodicity (SAR) is 13-99 in the upper 19 inches (50cm) and decreases with depth. The soil temperature regime is mesic, and an aridic moisture regime exists during the growing season in normal years after ground water levels drop below the moisture control section.

Associated sites

R024XY007NV	**SALINE BOTTOM** This ecological site includes sodicity, high amounts of soluble salts in the profile, increased available soil moisture to landscape position and seasonally available ground water.
R024XY043NV	**WET MEADOW 6-8 P.Z.** This site includes the year-long water table within 59 inches (150cm), proximity to perennial stream or water source and a landscape position that concentrates run-in moisture.

R024XY006NV	**DRY FLOODPLAIN** This site includes silt loam soil textures resulting in increased water holding capacity, pH above 8.0 and a landform position that experiences rare flooding and concentrates run-in moisture.
R024XY009NV	**SALINE MEADOW** The soil profile is characterized by a fine sand surface texture, an ochric epipedon

Similar sites

R024XY064NV	**SODIC BOTTOM** Greasewood (SAVE4) and Shadscale saltbush (ATCO) major shrubs; less productive site.
R024XY006NV	**DRY FLOODPLAIN** The plant community is dominated by basin wildrye (LECI4). Big sagebrush (ARTR2) is an important associated species. Silver buffaloberry (SHAR) minor shrub, if present.
R024XY007NV	**SALINE BOTTOM** Greasewood (SAVE4) dominant shrub; Big sagebrush (ARTR2) rare to mostly absent; Silver buffaloberry (SHAR) minor shrub, if present.
R025XY003NV	**LOAMY BOTTOM 8-14 P.Z.** More productive site; Greasewood (SAVE4) & squireltail (ELEL5) absent; soils not saline-alkali affected.
R025XY001NV	**MOIST FLOODPLAIN** More productive site; Bearless wildrye (LETR5) dominant to codominant grass.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Shepherdia argentea*
Herbaceous	(1) *Leymus cinereus*

Physiographic features

This site is on the outer margins of axial-stream floodplains, stream terraces, and along perennial and intermittent drainageways. Slopes range from 0 to 2 percent. Elevations are 4,200 to 5,000 feet (1,280 to 1,524m).

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace
Runoff class	High
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	1,280 – 1,520 m
Slope	0 %
Water table depth	80 – 210 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is semiarid, characterized by cold, moist winters, and warm, somewhat dry summers. Average annual precipitation is 6 to 10 inches (15 to 25cm). Mean annual air temperature is 44 to 52 degrees F. The average growing season is about 90 to 130 days.

Table 3 Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	
Precipitation total (average)	250 mm

Influencing water features

This site is associated with perennial and intermittent streams.

Soil features

The soils associated with this site have formed in mixed alluvium of mainly volcanic origin. They are usually very deep and calcareous. Surface soils are less that 10 inches (25cm) thick and are medium to moderately fine textured. These soils are strongly salt and sodium affected in their upper profile with soil reaction and salt-sodium usually decreasing with depth. They are poorly drained and have a seasonally high-water table at depths of 30 to 84 inches (76 to 213cm). Wetting of these soils dilutes their salt and sodium concentrations and the degree of salinity and alkalinity may fluctuate widely through the year. Capillary recharge of salt and sodium from the water table is common. These strongly alkaline soils are poorly aerated and are moderately slowly permeable. Seed viability, germination, and

available water capacity is reduced due to the saline condition of these soils. The surface layer of these soils will crust and bake upon drying inhibiting water infiltration and seedling emergence. Soils series associated with this site includes: Paranat.

Table 4. Representative soil features

Parent material	(1) Alluvium – volcanic breccia
Surface texture	(1) Very fine sandy loam (2) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Moderately slow
Soil depth	180 – 210 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	18.54 – 21.08 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 10

Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

As ecological condition declines, silver buffaloberry, willow, rose, big sagebrush, black greasewood, and rubber rabbitbrush increase and become the dominant vegetation in lower condition classes. Inland saltgrass increases as conditions decline and usually dominates the understory. Fivehook bassia and annual mustards are species likely to invade this site.

Fire Ecology:
Grassland communities with a basin wildrye component historically experienced mostly infrequent to frequent stand replacing fires. Grassland vegetation types experienced both short fire intervals of less than 35 years as well as intervals ranging from 35 to 100 years, depending on climate and ignition sources. 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. Alkali sacaton is classified as tolerant of, but not resistant to, fire. Top-killing by fire is probably frequent, and the plants can be killed by severe fire. Alkali cordgrass has high fire tolerance. Alkali cordgrass grows in areas that do not burn regularly due to the high moisture content of the plant community. 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. Silver buffaloberry is probably killed by severe fires. Silver buffaloberry has fair tolerance to fire in the dormant state and sprouts from rootstocks following fire. Basin big sagebrush is readily killed when aboveground plant parts are charred by fire. Prolific seed production from nearby unburned plants coupled with high germination rates enables seedlings to establish rapidly following fire.

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**			596-1098	
	basin wildrye	LECI4	*Leymus cinereus*	471-628	–
	alkali sacaton	SPAI	*Sporobolus airoides*	31-157	–
	pineywoods dropseed	SPJU	*Sporobolus junceus*	31-157	–
	alkali cordgrass	SPGR	*Spartina gracilis*	31-78	–
	saltgrass	DISP	*Distichlis spicata*	31-78	–
2	**Secondary Perennial Grasses**			78-157	
	sedge	CAREX	*Carex*	8-78	–
	beardless wildrye	LETR5	*Leymus triticoides*	8-78	–
	western wheatgrass	PASM	*Pascopyrum smithii*	8-78	–
Forb					
3	**Perennial Forbs**			31-78	
	alkali cordgrass	SPGR	*Spartina gracilis*	31-78	–
	beardless wildrye	LETR5	*Leymus triticoides*	20-39	–
	western wheatgrass	PASM	*Pascopyrum smithii*	20-39	–

	povertyweed	IVAX	*Iva axillaris*	8-31	–
Shrub/Vine					
4	**Primary Shrubs**			345-675	
	silver buffaloberry	SHAR	*Shepherdia argentea*	314-549	–
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	31-126	–
	sedge	CAREX	*Carex*	19-39	–
5	**Secondary Shrubs**			31-157	
	alkali sacaton	SPAI	*Sporobolus airoides*	31-157	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	16-47	–
	sumac	RHUS	*Rhus*	16-47	–
	Woods' rose	ROWO	*Rosa woodsii*	16-47	–
	willow	SALIX	*Salix*	16-47	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	16-47	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 12. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Animal community

Livestock Interpretations: This site is suitable for livestock grazing. Grazing management should be keyed to dominant grasses and palatable shrubs 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. Alkali sacaton is a valuable forage species in arid and semiarid regions. Plants are tolerant to moderate grazing and can produce abundant herbage utilized by livestock. Palatability for alkali cordgrass is low 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 an increaser under heavy grazing pressure. Silver buffaloberry is nearly worthless as livestock forage due to its thornlike twigs. Silver buffaloberry is fair forage for sheep. Forage production under dense, thorny, monotypic stands of silver buffaloberry is low; as stands open up, forage production increases. Basin big sagebrush may serve as emergency food during severe winter weather, but it is not usually sought out by livestock. 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: 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. The western salt desert shrub and grassland communities where alkali sacaton is common support an abundance of mule deer, pronghorn, carnivores, small mammals, birds, amphibians, and reptiles. Palatability for alkali cordgrass is low 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. Silver buffaloberry is utilized by mule deer and pronghorn in the winter. Basin big sagebrush is the least palatable of all the subspecies of big sagebrush. Basin big sagebrush is browsed by mule deer from fall to early spring, but is not preferred.

Hydrological functions

Runoff is high and ponding occurs in some areas. Permeability is moderately slow. Hydrologic soil group is C. Rills are none. Water flow patterns are rare to common depending on site location relative to major inflow areas. Moderately fine to fine surface textures and physical crusts result in limited infiltration rates. The surface layer will normally crust and bake upon drying, inhibiting water infiltration and seedling emergence. Pedestals are none. There are typically no gullies associated with this site. Shrubs and deep-rooted perennial herbaceous bunchgrasses and/or rhizomatous grasses (western wheatgrass) aid in infiltration. Shrub canopy and associated litter break raindrop impact.

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. Pioneers preserved the fruit of silver buffaloberry and made a sauce from the berries. Today the fruit is used to make pies, jams, and jellies. Silver buffaloberry is planted as an ornamental. Some Native American peoples used the bark of big sagebrush to make rope and baskets.

Other information

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. Alkali sacaton is one of the most commonly used species for seeding and stabilizing disturbed lands. Due to alkali sacaton’s salt tolerance, is recommended for native grass seeding on subirrigated saline sites. 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. Silver buffaloberry adapts well to disturbed or degraded sites in the Intermountain region. It is used for multiple-row windbreaks, shelterbelts, erosion control, wildlife habitat enhancement, and land reclamation. Nursery-grown stock readily establishes on disturbed sites and once established, silver buffaloberry is a good soil stabilizer. Silver buffaloberry is used for erosion control in riparian areas in the Intermountain region. Basin big sagebrush shows high potential for range restoration and soil stabilization. Basin big sagebrush grows rapidly and spreads readily from seed.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Humboldt County, NV	
Township/Range/Section	T44 N R36 E S12
UTM zone	N
UTM northing	4617664
UTM easting	427212

Latitude	41° 42′ 26″
Longitude	117° 52′ 29″
General legal description	Quinn River floodplain about 3 miles north of Ellison Ranch, 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).

Contributors

CP
TK Stringham

Approval

Kendra Moseley, 3/06/2025

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)	Patti Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	03/19/2010
Approved by	
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 rare to common depending on site location relative to major inflow areas. Moderately fine to fine surface textures and physical crusts result in limited infiltration rates. The surface layer will normally crust and bake upon drying, inhibiting water infiltration and seedling emergence.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 30-50%.

5. **Number of gullies and erosion associated with gullies:** There are typically no gullies associated with this site.

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) expected to move distance of slope length during periods of intense summer convection storms or run in of early spring snow melt flows. Persistent litter (large woody material) will remain in place except during unusual flooding (ponding) events.

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.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Structure of soil surface is subangular blocky. Soil surface colors are dark and soils are typified by a mollic epipedon. Organic matter of the surface 2 to 3 inches is typically 3 to 5 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Shrubs and deep-rooted perennial herbaceous bunchgrasses and/or rhizomatous grasses (western wheatgrass) aid in infiltration. Shrub canopy and associated litter break raindrop impact.

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. Subangular blocky, prismatic, or massive subsurface layers are normal for this site and 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: Reference Plant Community: Deep-rooted, cool season, perennial bunchgrasses > tall shrubs (silver buffaloberry)

    Sub-dominant: Cool season, rhizomatous grasses > associated shrubs > deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, perennial and annual forbs

    Other:

    Additional:

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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 35% of total woody canopy.**

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14. **Average percent litter cover (%) and depth (in):** **Between plant interspaces (< 25-30%) and depth (± ¼ in.)**

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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 (March thru May) ± 1400 lbs/ac.**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** **Increasers include rubber rabbitbrush. Invaders include thistles, five-hook bassia, tall whitetop (perennial pepperweed), cheatgrass, 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.**
