USDA Natural Resources
Conservation Service

Ecological site R029XY002NV
SALINE MEADOW

Last updated: 2/20/2025
Accessed: 05/21/2025

General information

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

MLRA notes

Major Land Resource Area (MLRA): 029X–Southern Nevada Basin and Range

The Southern Nevada Basin and Range MLRA (29) represents the transition from the Mojave Desert to the Great Basin. It is cooler and wetter than the Mojave. It is warmer and typically receives more summer precipitation than the Great Basin. This area is in Nevada (73 percent), California (25 percent), and Utah (2 percent). It makes up about 26,295 square miles (68,140 square kilometers). Numerous national forests occur in the area, including the San Bernardino, Angeles, Sequoia, Inyo, Humboldt-Toiyabe, and Dixie National Forests. Portions of Death Valley National Monument, the Nuclear Regulatory Commission's Nevada Test Site, the Hawthorne Ammunition Depot, and the Nellis Air Force Range in Nevada and the China Lake Naval Weapons Center in California also are in this MLRA. The northeast part of the Paiute Indian Reservation and the southern third of the Walker River Indian Reservation are in the part of this MLRA in Nevada, and the Lone Pine, Fort Independence, and Big Pine Indian Reservations are in the part in California.
Physiography:
The entire area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The area of broad, nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by sloping fans and pluvial lake terraces. The mountains are uplifted fault blocks with steep side slopes and not well dissected due to limited annual precipitation. Most of the valleys in this MLRA are closed basins or bolsons containing sinks or playa lakes.
Geology:
The mountains are dominated by Pliocene and Miocene andesite and basalt rocks, Paleozoic and Precambrian carbonate rocks prominent in some areas. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments (Pliocene and Miocene)

are in the western and eastern thirds of this MLRA. The valleys consist mostly of alluvial fill and playa deposits at the lowest elevations in the closed basins.
Climate:
The average annual precipitation is 3 to 12 inches (75 to 305 millimeters) in most of this area. It may be as high as 29 inches (735 millimeters), on the higher mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Summers are dry, but sporadic storms are common in July and August.
Water Resources:
Water resources are scarce. Ground water and surface water sources are limited. Streams are small and intermittent. Quality of surface water in naturally degraded as streams cross area of valley fill effected by dissolved salts. Irrigation water may raise the levels of dissolved salts and suspended sediments causing contamination.
Soils:
Dominant soil orders include Entisols and Aridisols.

Ecological site concept

The Saline Meadow site occurs on alluvial flats, lake plains and terraces, and axial stream terraces. Slope gradients of 0 to 2 percent are typical. Elevations are 3000 to 6700 feet. The soils are deep to very deep and are usually calcareous. Surface soils are typically 10 inches, or more, 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. There is often a water table near the surface for short periods in the early spring that usually stabilizes at depths below 40 inches during the early summer.

Associated sites

R029XY001NV	**WET MEADOW 8-12 P.Z.** This site occurs on stream terraces and flood plains around localized seeps and springs. Slopes range from 0 to 2 percent. Elevations range from 3500 to 6700 feet. The soils are very deep and have a high available water capacity. These soils are poorly to very poorly drained and have a water table at or near the surface early in the spring that usually stabilizes to within 20 inches of the soil surface during the growing season. The soils are occasionally flooded for brief periods in the spring by stream overflow or unconfined runoff from surrounding areas.
R029XY004NV	**SALINE BOTTOM** Greasewood dominated. he soils that characterize this site have formed in mixed alluvium and are usually deep to very deep. Surface soils are less than 10 inches thick and are medium to moderately-fine textured. These soils are normally strongly salt and sodium-affected in their upper profile with soil reaction and salt and sodium usually decreasing with depth. The soils are mostly somewhat poorly to poorly drained and have a seasonally high water table at depths of 20 to 60 inches.

R029XY076NV	**SODIC FLAT** Greasewood dominated. The soils in this site are deep to very deep and are well to moderately well drained. Surface soils are medium to moderately fine textured and normally less than 10 inches thick to the subsoil or underlying material. The upper portion of most of these soils is strongly salt and sodium effected due to capillary movement of dissolved salts upward from a ground water table.

Similar sites

R029XY004NV	**SALINE BOTTOM** SAVE4 dominant shrub; LECI4-SPAI codominant grasses
R029XY094NV	**SODIC FLOODPLAIN** ALOC2 dominant shrub; less productive site
R029XY044NV	**PEATY WETLAND** TYPHA-ELPA3-SCRO major grasses; soils typically saturated through growing season; soils have histic epipedon
R029XY001NV	**WET MEADOW 8-12 P.Z.** SPAI and DISP are rare to absent

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Sporobolus airoides* (2) *Distichlis spicata*

Physiographic features

The Saline Meadow site occurs on alluvial flats, lake plains and terraces, and axial stream terraces. Slope gradients of 0 to 2 percent are typical. Elevations are 3000 to 6700 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Lake plain (3) Stream terrace (4) Lake terrace
Runoff class	Negligible to very high
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding frequency	None

Elevation	914–2,054 m
Slope	0–2%
Water table depth	0–152 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cold, moist winters and warm, somewhat dry summers. Average annual precipitation is (3)4 to about 8 inches. Mean annual air temperature is 50 to 63 degrees F. The average growing season is about 120 to 220 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	85 days
Freeze-free period (characteristic range)	131 days
Precipitation total (characteristic range)	152 mm
Frost-free period (actual range)	85 days
Freeze-free period (actual range)	131 days
Precipitation total (actual range)	152 mm
Frost-free period (average)	85 days
Freeze-free period (average)	131 days
Precipitation total (average)	152 mm

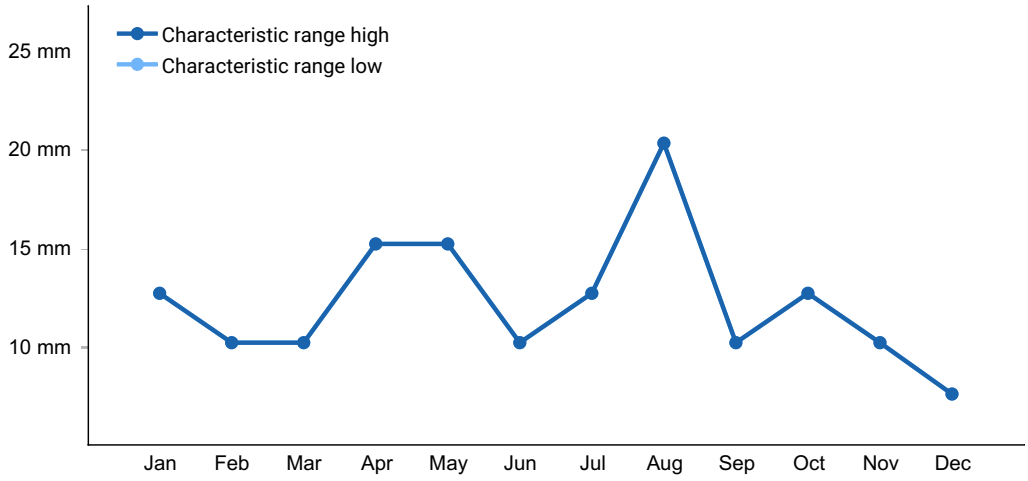


Figure 1. Monthly precipitation range

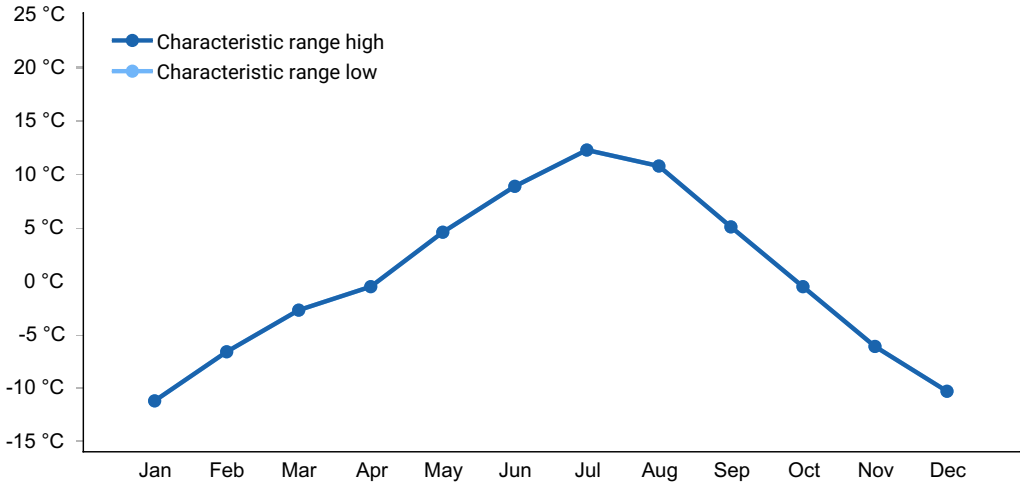


Figure 2. Monthly minimum temperature range

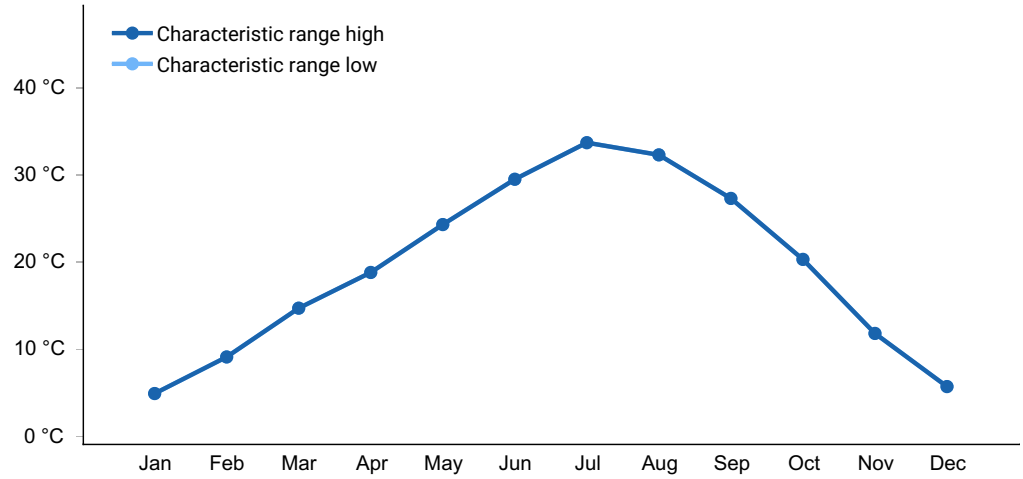


Figure 3. Monthly maximum temperature range

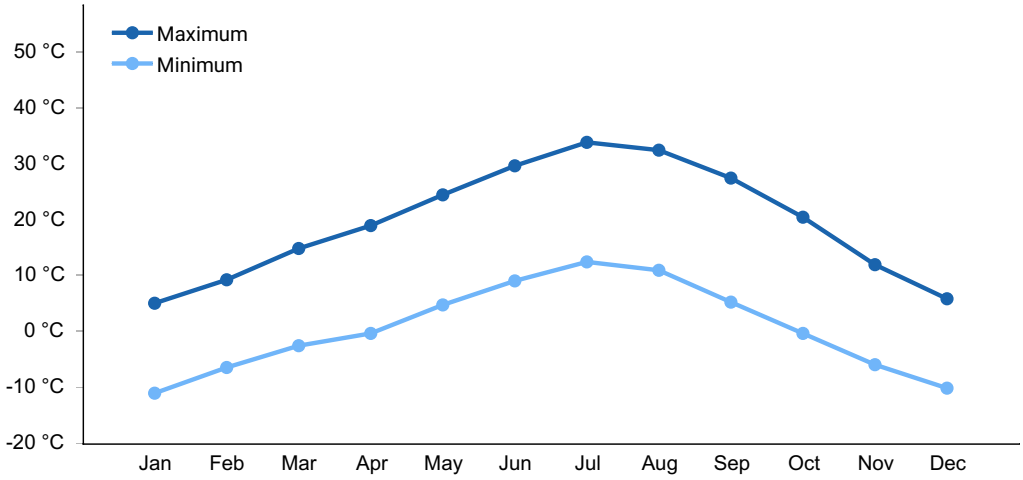


Figure 4. Monthly average minimum and maximum temperature

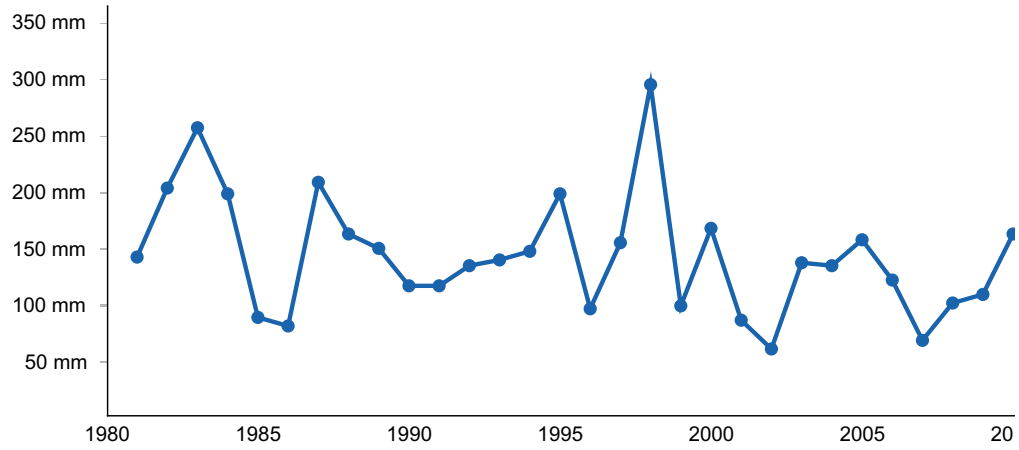


Figure 5. Annual precipitation pattern

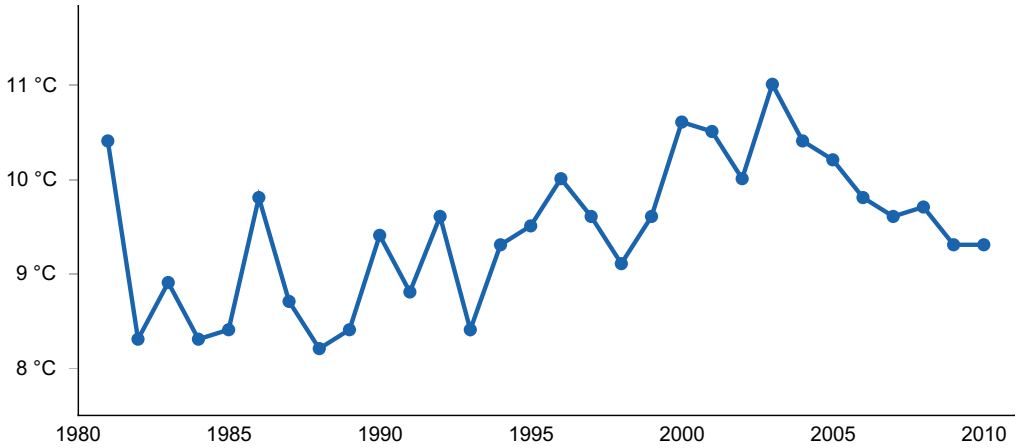


Figure 6. Annual average temperature pattern

Climate stations used

- (1) TWIN SPRING FALLINI [USC00268443], Tonopah, NV

Influencing water features

This site is influenced by perennial streams and is frequently flooded from run-off from snow melt and high rainfall events.

Soil features

The soils are deep to very deep and are usually calcareous. Surface soils are typically 10 inches, or more, 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. The soils are poorly to somewhat poorly drained and are normally poorly aerated. Permeability is slow to moderately slow. There is often a water table near the surface for short periods in the early spring that usually stabilizes at depths below 40 inches during the early summer. Capillary rise of groundwater enhances soil moisture during the growing season. Additional moisture is received on this site as run-in from higher landscapes or as

overflow from adjacent streams. Soil series associated with this site include: Adven, Aquolls, Ash Springs, Charnock, Geer, Lahontan, Louderack, Nuyobe, Orizada, Pahranagat, Rustigate, Settlement, Sonoma, and Yobe.

Table 4. Representative soil features

Parent material	(1) Lacustrine deposits (2) Alluvium
Surface texture	(1) Loam (2) Silty clay loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Very slow to rapid
Soil depth	51–183 cm
Surface fragment cover <=3"	0–4%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–21.08 cm
Electrical conductivity (0-101.6cm)	0–32 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	1–90
Soil reaction (1:1 water) (0-101.6cm)	7.9–9.6
Subsurface fragment volume <=3" (Depth not specified)	2–7%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

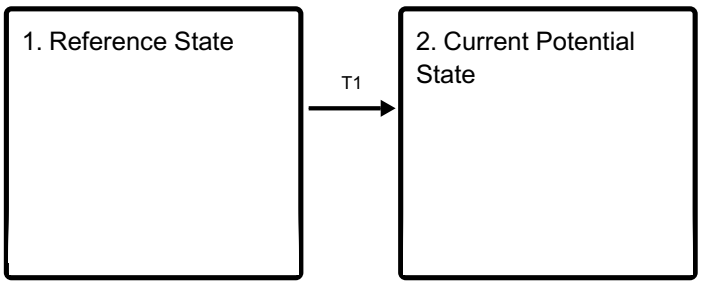
As ecological condition deteriorates, alkali sacaton and alkali cordgrass decrease as inland saltgrass and mountain rush become more dominant. Species likely to invade this site are thistles and annuals. Extreme deterioration may result in serious gully erosion.

Fire Ecology:
Records of fire occurrence in sacaton grasslands are rare. 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. Mountain rush is fire tolerant when dormant and top-killed by fire during the growing season. It establishes after fire through seed and/or lateral spread

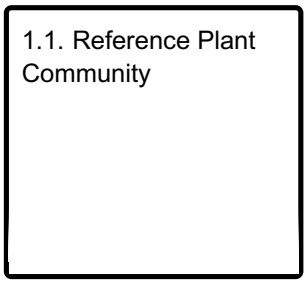
by rhizomes.
Saltgrass rhizomes occur deep in the soil where they are insulated from the heat of most fires. Saltgrass survives fire by sending up new growth from rhizomes. Basin wildrye is top-killed by fire. Older basin wildrye plants with large proportions of dead material within the perennial crown 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. Common reed stands are typically dense and contain much dead material. Standing dead canes and litter often constitute twice as much biomass as living shoots. This abundant dead fuel carries fire well, allowing stands to burn during midsummer when the current year's shoots are green. Common reed's rhizomes are deeply buried in soil and are often under water as well. The heat from most fires does not penetrate deep enough into the soil to injure these regenerative structures. When fire consumes the above ground foliage, new top growth is initiated from the surviving rhizomes. 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.

State and transition model

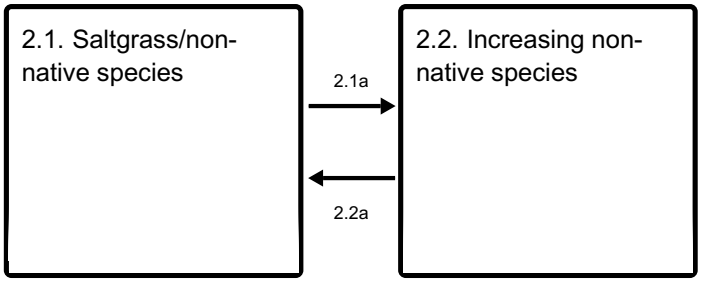
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference State

The Reference state represents the plant communities and ecological dynamics of the Saline Meadow site. This state includes the biotic communities that become established on the ecological site if all successional sequences are completed under the natural disturbance regime. The Reference State is generally dominated by saltgrass. The Reference State is self sustaining and resistant to change due to high resistance to natural disturbances and high resilience following natural disturbances. When natural disturbances occur, the rate of recovery is variable due to disturbance intensity. Once invasive plants establish, return to the Reference State may not be possible. Reference State: Saltgrass state with natural fluctuations that form either a mixed grass meadow or a saltgrass dominated meadow depending on the sites natural disturbance history. Indicators: A community dominated by saltgrass. Feedbacks: Improper livestock grazing of perennial grasses and/or other disturbances that may allow for the establishment of invasive species. At-risk Community Phase: This state is at risk when palatable native plants are stressed and nutrients become available for invasive plants to establish. Trigger: The establishment of invasive plant species.

Community 1.1
Reference Plant Community

The reference plant community is dominated by by alkali sacaton, inland saltgrass and mountain rush. Potential vegetative composition is about 85 percent grasses, 10 percent forbs, and 5 percent shrubs. Approximate ground cover (basal and crown) is 35 to 50 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	953	2096	3144
Forb	112	247	370
Shrub/Vine	56	123	185
Total	**1121**	**2466**	**3699**

State 2
Current Potential State

The Current Potential State is similar to the Reference State, however invasive grasses and/ or forbs are now present in all community phases. This state still has the visual aspect of a saltgrass meadow. Primary disturbance mechanisms include native herbivore and domestic livestock grazing. Timing of these disturbances dictates the ecological dynamics that occur. The current potential state is still self sustaining; but is losing resistance to change due to lower resilience following disturbances. When disturbances occur, the rate of recovery is variable depending on severity. Current Potential State: Saltgrass meadow state with various other native and non-native grasses and forbs

present. Indicators: A community dominated by saltgrass where other native perennial grasses and forbs are also present. Invasive grasses and/or forbs are present. Feedbacks: Frequent disturbances that may allow annual invasive species to dominate. At-risk Community Phase: As increased disturbance frequency allows for the increase and/or dominance of annual grasses and forbs, this community is at greater risk. Trigger: Reoccurring disturbance that results in a dominance of annual grasses and/or forbs in the herbaceous layer.

Community 2.1
Saltgrass/non-native species

This community is characterized by an open grassland aspect with saltgrass, mountain rush, and alkali sacaton still dominating the herbaceous layer. Non-native species are present.

Community 2.2
Increasing non-native species

This community is characterized by an open grassland aspect with non-natives species increasing.

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs when events favor a decrease in palatable perennial grasses and grasslikes and an increase in less palatable species such as saltgrass and baltic rush. Non-native annuals may eventually dominate the community. Events may include, improper livestock grazing, and a declining water table that may favor annuals and decrease desirable perennials.

Pathway 2.2a
Community 2.2 to 2.1

This pathway occurs when events favor a increase in palatable perennial grasses and grasslikes and a decrease in less palatable species such as saltgrass and baltic rush. Non-native annuals are reduced in the community. Events may include, carefully managed livestock grazing over long periods, and a stable water table that is within 20 inches of the soil surface. These conditions generally favor desirable perennials and decrease annual weeds.

Transition T1
State 1 to 2

This transition is from the native perennial grass and grasslike community in the Reference

State to a state that contains non-native, invasive species. Events typically include the establishment of invasive grasses and forbs, and an increase in saltgrass, arctic rush and other less palatable species. Factors that drive such events may include any combination of improper livestock grazing, a fluctuating water table, and the presence of a seed source for invasive species. Invasive species have been known to invade intact perennial plant communities with little to no disturbance. Once invasive species are found in the plant community a threshold has been crossed.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses/Grasslikes**			1011–2096	
	alkali sacaton	SPAI	*Sporobolus airoides*	616–986	–
	saltgrass	DISP	*Distichlis spicata*	123–370	–
	basin wildrye	LECI4	*Leymus cinereus*	49–123	–
	common reed	PHAU7	*Phragmites australis*	49–123	–
	alkali cordgrass	SPGR	*Spartina gracilis*	49–123	–
2	**Secondary Perennial Grasses/Grasslikes**			123–247	
	sedge	CAREX	*Carex*	12–74	–
Forb					
3	**Perennial**			123–370	
	sedge	CAREX	*Carex*	12–74	–
	King's mousetail	IVKI	*Ivesia kingii*	12–74	–
	arrowgrass	TRIGL	*Triglochin*	12–74	–
Shrub/Vine					
4	**Primary Shrubs**			49–197	
	basin wildrye	LECI4	*Leymus cinereus*	49–123	–
	iodinebush	ALOC2	*Allenrolfea occidentalis*	12–49	–
	Parry's saltbush	ATPA3	*Atriplex parryi*	12–49	–
	whiteflower rabbitbrush	CHAL9	*Chrysothamnus albidus*	12–49	–
	rubber rabbitbrush	ERNAO	*Ericameria nauseosa ssp. consimilis var. oreophila*	12–49	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	12–49	–
	seepweed	SUAED	*Suaeda*	12–49	–

Animal community

Livestock Interpretations:
This site is suited for grazing by cattle and sheep. Grazing management should be keyed to alkali sacaton and all other perennial grass production. 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. Baltic rush is described as a fair to

good forage species for cattle. On average, Baltic rush palatability is considered medium to moderately low. Baltic rush is considered palatable early in the growing season when plants are young and tender, but as stems mature and toughen palatability declines. 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. Common reed is moderately tolerant of grazing, but prolonged heavy grazing tends to reduce the extent and size of stands. Palatability for alkali cordgrass is low for 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:
This site provides habitat for small upland game and waterfowl. The western saltdesert shrub and grassland communities where alkali sacaton is common support an abundance of mule deer, pronghorn, carnivores, small mammals, birds, amphibians, and reptiles. Saltgrass seeds and rhizomes provide an important food source for waterfowl. Baltic rush also provides food for several wildlife species and waterfowl. Baltic rush is an important cover species for a variety of small birds, upland game birds, birds of prey, and waterfowl. 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. 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. Common reed provides shade, nesting, and cover habitat for mammals, waterfowl, song birds, and fishes. Common reed is not rated as a high-value wildlife food unless plants are young. Palatability for alkali cordgrass is low for wildlife.

Hydrological functions

The water table is near the surface for short periods in the early spring and will stabilize at depths below 40 inches in the early summer.

There are no rills, waterflow patterns, erosional pedestals, or terracettes. Gullies are rare to common depending on severity of entrenchment of associated stream channels. If observed, gullies and head cuts are healing or stable. Where this site is not associated with perennial or ephemeral channels gullies are none. Rhizomatous grasses (i.e., alkali sacaton & saltgrass) slow runoff and increase infiltration. Relatively dense foliar cover of perennial grasses and associated litter break raindrop impact and slow overland flow.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site has potential for wetland hunting and bird watching.

Other products

The stems of mountain rush were historically used by Native Americans as a foundation for coiled basketry. Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand. Common reed was utilized as a food source and as a medicine by Native Americans. Shoots were eaten raw or cooked. Flour was made from dried shoots and rhizomes. Common reed rhizomes provided a year-round food source. Seeds were harvested and ground into a high fiber meal. The plant material was used to construct pipestems, arrows, mats, nets, and prayer sticks.

Other information

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. Baltic rush's production of deep and fibrous roots originating from a mass of coarse and creeping rhizomes makes it a valuable species for stabilizing streambanks and protecting against soil erosion. 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. Ease of establishment, rapid vegetative spread, and high tolerance of disturbance make common reed an understandable choice for rehabilitation. However, these same traits make common reed a nuisance or weedy species in some areas. In natural or wild areas, the use of native common reed haplotypes may be required or preferred.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Esmeralda County, NV	
Township/Range/Section	T3N R39E S26
General legal description	South of US Highway 95, about 17 air miles west of Tonopah, Big Smokey Valley area, Esmeralda County, Nevada.
Location 2: Esmeralda County, NV	
Township/Range/Section	T3N R39E S35
General legal description	South of US Highway 95, about 17 air miles west of Tonopah, Big Smokey Valley area, Esmeralda County, Nevada.
Location 3: Nye County, NV	
Township/Range/Section	T11N R43E S16
General legal description	East side of NV Highway 370, about 8 air miles northwest of Round Mountain, Big Smokey Valley area, Nye County, Nevada. This site also occurs in Minera and Lincoln Counties, Nevada.
Location 4: Nye County, NV	
Township/Range/Section	T11N R43E S15
General legal description	East side of NV Highway 370, about 8 air miles northwest of Round Mountain, Big Smokey Valley area, Nye County, Nevada.

Other references

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

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

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

Contributors

HA/GD

Approval

Kendra Moseley, 2/20/2025

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to

determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

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2. **Presence of water flow patterns:** None

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3. **Number and height of erosional pedestals or terracettes:** None

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ± 30%; surface rock fragments minimal; shrub canopy less than 5%; foliar cover of perennial herbaceous plants ± 75%.

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5. **Number of gullies and erosion associated with gullies:** Gullies are rare to common depending on severity of entrenchment of associated stream channels. If observed, gullies and head cuts are healing or stable. Where this site is not associated with perennial or ephemeral channels gullies are none.

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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 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 2 to 4. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is platy or massive. Soil surface colors are light and have ochric epipedons. Organic carbon can range from 1 to 2 percent in the upper 10 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:** Rhizomatous grasses (i.e., alkali sacaton & saltgrass) slow runoff and increase infiltration. Relatively dense foliar cover of perennial grasses and associated litter break raindrop impact and slow overland flow.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None - Platy or massive 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: Reference Plant Community: Rhizomatous grasses >> shallow-rooted, cool season, perennial, grass-like plants. (By above ground production)

    Sub-dominant: Deep-rooted, cool season, perennial forbs > deep-rooted, cool season, bunchgrasses = fibrous, shallow-rooted, cool season, perennial forbs = annual forbs > shrubs. (By above ground production)

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Herbaceous plant mortality or decadence is uncommon

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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (± 80%) and depth (± 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 ± 2200 lbs/ac; Spring flooding 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:** Foxtail barley; black greasewood; rubber rabbitbrush; thistle; tall whitetop; salt cedar

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