Ecological site R027XY077NV
MOIST SALINE FLAT

Last updated: 6/03/2024
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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): 027X–Fallon-Lovelock Area

Physiography
Found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus this area is characterized by isolated uplifted fault block mountain ranges trending north to south that are separated by broad, hydrologically closed basins. The entire area occurs in the rain-shadow of the Sierra Nevada mountains and is influenced by Pleistocene Lake Lahontan which reached its most recent high stand about 12,000 years ago. There is substantial evidence suggesting the western Great Basin has been the site of pluvial-interpluvial cycles for at least the past two million years.
The mountains and valleys are dissected by the Humboldt, Truckee, Carson, and Walker Rivers and their tributaries, all of which terminate within MLRA 27. Extensive playas can be found throughout this area and are the result of drying of ancient Lake Lahontan. Elevation generally ranges from 3,300 to 5,900 feet (1,005 to 1,800 meters) in valleys, but on some mountain peaks it is more than 7,870 feet (2,400 meters).

Geology
Landforms and soils of this MLRA have been heavily influenced by fluctuating lake level over the last 40,000 years. There is a level line evident on the higher slopes marking the former extent of glacial Lake Lahontan. Almost half of this area has surface deposits of alluvial valley fill influenced by lacustrine sediment. The rest has andesite and basalt rocks of different ages. Mesozoic and Tertiary intrusives are concentrated along the western border of the area, and Lower Volcanic Rocks (17 to 43 million years old) are common on the eastern side of the area. Also, some scattered outcrops of Mesozoic sedimentary and volcanic rocks and tuffaceous sedimentary rocks are in the mountains within the interior of this MLRA.

Climate
The average annual precipitation is 5 to 10 inches (125 to 255 millimeters) in most of the area but is as much as 19 inches (485 millimeters) on high mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The amount of precipitation is very low from summer to midautumn. The precipitation in winter occurs mainly as snow. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 155 days and ranges from 110 to 195 days, decreasing in length with elevation.

Water
The amount of precipitation is very low, and water for irrigation is obtained principally from diversions on the four large rivers in the area and from water stored in the Lahontan, Rye Patch, and Weber Reservoirs. Pyramid Lake and Walker Lakes are terminal lakes for the Truckee and Walker Rivers, respectively. Much of the annual flow of both rivers is diverted for irrigation, causing lake levels to fall and levels of dissolved salts to increase causing problems for the native Lahontan cutthroat trout.

Soils
The dominant soil orders are Aridisols and Entisols. The soils in the area are predominantly a mesic temperature

regime, aridic moisture regime, and have a mixed mineralogy. They are generally well drained, loamy or sandy, commonly skeletal, and shallow to very deep. Accumulation of salts, tufa deposits, and eolian sediments with soluble salts over lacustrine deposits influence most of the soils in the basin landforms of this MLRA. Soils on bedrock-controlled landforms are typically comprised of volcanic or tuffaceous sedimentary colluvium over residuum.

Biological Resources
This area supports extensive areas of salt-desert shrub vegetation. Shadscale and Bailey's greasewood are widespread, occurring both individually and together. Grasses are generally sparse, although Indian ricegrass is prominent, especially on the sandy soils. Fourwing saltbush, winterfat, spiny hopsage, wolfberry, ephedra, dalea, and bud sagebrush are common shrubs. Basin wildrye, creeping wildrye, alkali sacaton, saltgrass, black greasewood, rubber rabbitbrush, and big saltbush are important plants on saline bottom lands and terraces. A few marsh areas support cattail, bulrushes, sedges, and rushes. Big sagebrush, along with scattered Utah juniper and singleleaf pinyon, is associated with Thurber needlegrass, desert needlegrass, Sandberg bluegrass, and squirreltail on the higher elevation piedmont slopes and mountains.

Ecological site concept

The Moist Saline Flat site occurs on lake plains, flood plains, and lake terraces. Slope gradients of less than 2 percent are typical. Elevations are 3500 to 4000 feet. The soils are very deep and poorly to somewhat poorly drained. These soils are highly calcareous and strongly sodium affected in the upper profile. The surface layer of these soils is flocculated due to the extremely high salt concentrations. A water table occurs near the surface for short periods in the early spring of most years that usually stabilizes at depths below 60 inches during the early summer.

Associated sites

R027XY005NV	**SALINE MEADOW** SPAI dominant grass; more productive site

Similar sites

R027XY069NV	**WET MEADOW 4-8 P.Z.** POJU dominant grass; more productive site
R026XY002NV	**WET SODIC BOTTOM** DISP dominant plant; more productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Allenrolfea occidentalis*
Herbaceous	(1) *Distichlis spicata*

Physiographic features

The Moist Saline Flat site occurs on lake plains, flood plains, and lake terraces. Slope gradients of 0 to 2 percent are typical. Elevations are 3500 to 4000 feet.

Table 2. Representative physiographic features

Landforms	(1) Lake terrace (2) Flood plain (3) Lake plain
Runoff class	Negligible
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent

Elevation	1,067–1,219 m
Slope	0–2%
Water table depth	0–122 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid with cool, moist winters and hot, dry summers. Average annual precipitation is 3 to about 6 inches. Mean annual air temperature is 49 to about 60 degrees F. The average growing season is about 140 to 180 days.

Table 3. Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	
Precipitation total (average)	152 mm

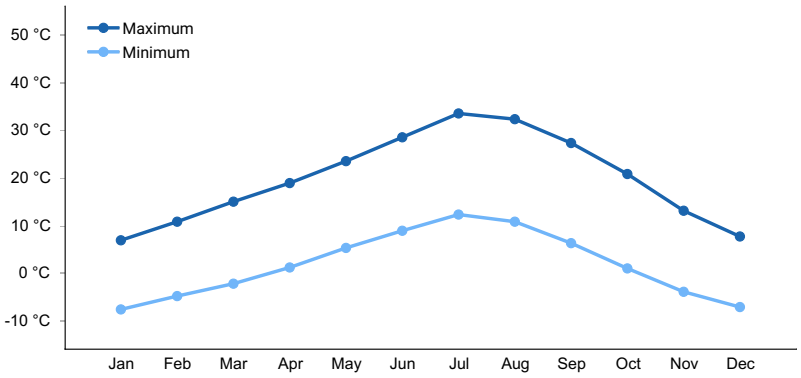


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

The Moist Saline Flat occurs on lake plains and receives additional water from higher landforms. The site also retains water because of its low landscape position.

Soil features

The soils associated with this site are very deep and poorly to somewhat poorly drained. These soils are highly calcareous and strongly sodium affected in the upper profile. The surface layer of these soils is flocculated due to the extremely high salt concentrations. A water table occurs near the surface for short periods in the early spring of most years that usually stabilizes at depths below 60 inches during the early summer. Capillary rise of this ground water enhances soil moisture in that part of the soil profile below the surface layer. Additional moisture is received on this site as run-in from higher landscapes or as overflow from adjacent streams. Runoff is negligible to very high and water may pond in some areas for long periods. These soils are poorly aerated and are very slowly to slowly permeable. The soil series associated with this site include: Stillwater and Umberland.

Table 4. Representative soil features

Parent material	(1) Lacustrine deposits
Surface texture	(1) Silt loam (2) Silty clay loam (3) Clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained to somewhat poorly drained

Permeability class	Very slow to slow
Soil depth	183–213 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	18.29–19.56 cm
Calcium carbonate equivalent (0-101.6cm)	1–25%
Electrical conductivity (0-101.6cm)	4–32 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)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

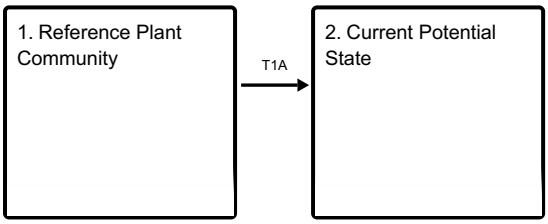
Ecological dynamics

Species likely to invade this site are thistles and halogeton.

Fire Ecology:
Iodinebush probably does not easily burn due to salt succulent stems.
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.

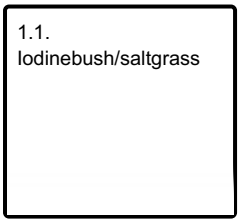
State and transition model

Ecosystem states



T1A - T1A- non-native species establishment

State 1 submodel, plant communities



State 2 submodel, plant communities

2.1. Iodinebush/saltgrass/non-native plants

State 1
Reference Plant Community

Community 1.1
Iodinebush/saltgrass

The reference plant community is dominated by iodinebush and inland saltgrass. Potential vegetative composition is about 30 percent grasses, 5 percent forbs and less than 65 percent shrubs. Approximate ground cover (basal and crown) is 3 to 8 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	37	55	73
Grass/Grasslike	17	25	34
Forb	2	4	6
Total	**56**	**84**	**113**

State 2
Current Potential State

Similar to the Reference State with the addition of non-native plant species.

Community 2.1
Iodinebush/saltgrass/non-native plants

Similar to Community Phase 1.1 with the addition of non-native plants.

Transition T1A
State 1 to 2

Introduction of non-native species.

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**			17–26	
	saltgrass	DISP	*Distichlis spicata*	17–26	–
2	**Secondary Perennial Grasses**			2–7	
	basin wildrye	LECI4	*Leymus cinereus*	0–2	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–2	–
	alkali sacaton	SPAI	*Sporobolus airoides*	0–2	–
Forb					
3	**Perennial Forbs**			2–9	
	milkvetch	ASTRA	*Astragalus*	0–2	–
	niterwort	NITRO	*Nitrophila*	0–2	–
	pickleweed	SALIC	*Salicornia*	0–2	–
	thelypody	THELY	*Thelypodium*	0–2	–
Shrub/Vine					
4	**Primary Shrubs**			38–55	
	iodinebush	ALOC2	*Allenrolfea occidentalis*	38–55	–
5	**Secondary Shrubs**			0–9	
	basin saltbush	ATTR3	*Atriplex tridentata*	0–2	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–2	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–2	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to the low forage production.
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.
Iodinebush has extremely salt-succulent stems, so few animals graze the plant directly, but many animals will eat the seeds of iodinebush.

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:
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.

Hydrological functions

Runoff is negligible to very high. Permeability is very slow to slow.

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.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Churchill County, NV	
General legal description	This site also occurs in Pershing and Washoe Counties, 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

DK/GED

Approval

Kendra Moseley, 6/03/2024

Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	11/21/2024
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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:

    Sub-dominant:

    Other:

    Additional:

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

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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

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17. **Perennial plant reproductive capability:**
