

Ecological site R024XY001OR

SODIC FLAT

Accessed: 05/02/2026

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

This ecological site occurs on alluvial flats. Soils are deep, poorly to somewhat poorly drained, and formed in alluvium derived from mixed rocks with a component of volcanic ash. The soil profile is characterized by an ochric epipedon, a pH greater than 8.0 throughout, sodicity (SAR) greater than 30 and a water table between 90 to 150cm at some point during the spring. Soil textures are fine sandy loam or silt clay loam. Important abiotic factors include crusting & baking of the surface layer upon drying, inhibiting water infiltration and seedling emergence. High salt concentrations reduce seed viability, germination and the available water capacity of these soils. Full consideration should be given to combining this ecological site concept with Sodic Flat 6-8" PZ (024XY011NV), Sodic Flat 8-10" (024XYXY008NVC) and Dry Sodic Flood Plane (024XY112OR). These site do not compete on soil characteristics, abiotic factors or species composition.

Associated sites

R024XY002OR	<p>SODIC MEADOW 6-10 PZ</p> <p>Sodic Meadow (higher sodic conditions, thin surface layer, longer seasonal surface moisture - located in ephemeral seepage areas along dry alkali lakebeds, higher production, different composition –SPAI & DISP dominant, SAVE4 & LECI4 minor)</p>
R024XY003OR	<p>SODIC BOTTOM</p> <p>Sodic Bottom (thicker surface, longer seasonal subsurface moisture, greater production, different composition - SAVE4 & LECI4 dominant, DISP common)</p>
R024XY005OR	<p>SODIC DUNES</p> <p>Sodic Dunes (very deep sandy soils, steeper short slopes, lower sodic conditions, higher production, different composition – ARTRT & SAVE4 dominant shrubs, LECI4 & ACHY common)</p>
R024XY013OR	<p>LOW SODIC TERRACE 6-10 PZ</p> <p>Low Sodic Terrace 6-10 PZ (deeper loamy sodic surface, higher position, different composition – SAVE4 dominant, ATCO, GRSP, PIDE4 & ELEL5 prominent, DISP & LECI4 minor)</p>
R024XY114OR	<p>SODIC LAKE TERRACE</p> <p>Sodic Lake Terrace (thicker loamy sodic surface, low terrace position, additional available subsurface moisture, higher production, different composition-SAVE4/DISP-PUCCI association, LECI4 minor)</p>

Similar sites

R024XY002OR	<p>SODIC MEADOW 6-10 PZ</p> <p>Sodic Meadow (higher sodic conditions, thin surface layer, longer seasonal surface moisture - located in ephemeral seepage areas along dry alkali lakebeds, higher production, different composition –SPAI & DISP dominant, SAVE4 & LECI4 minor)</p>
R024XY005OR	<p>SODIC DUNES</p> <p>Sodic Dunes (very deep sandy soils, steeper short slopes, lower sodic conditions, higher production, different composition – ARTRT & SAVE4 dominant shrubs, LECI4 & ACHY common)</p>
R024XY112OR	<p>DRY SODIC FLOODPLAIN</p> <p>Dry Sodic Floodplain (floodplain position, gravelly loamy surface over stratified heavier subsoil, lower sodic conditions, different composition – SAVE4 dominant, LECI4 and DISP prominent, ARTRT present)</p>
R024XY114OR	<p>SODIC LAKE TERRACE</p> <p>Sodic Lake Terrace (thicker loamy sodic surface, low terrace position, additional available subsurface moisture, higher production, different composition-SAVE4/DISP-PUCCI association, LECI4 minor)</p>

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Sarcobatus vermiculatus</i>
Herbaceous	(1) <i>Distichlis spicata</i>

Physiographic features

This site occurs on the floors of dry sodic lake basins. It is typically the first vegetated area with small scattered coppice dunes on sodic playas. Slopes typically range from 0 to 3 percent. Elevations vary from 4,000 to 4,600 feet.

Table 2. Representative physiographic features

Landforms	(1) Lake plain (2) Lakebed
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	1,220 – 1,400 m

Slope	0 %
Ponding depth	0 – 10 cm
Water table depth	0 – 120 cm
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 7 to 10 inches, most of which occurs in the form of rain and snow during the months of December through April. A supply of ephemeral ponded and subsurface moisture augments the precipitation. The soil temperature regime is mesic with a mean air temperature of 48 degrees F. Temperature extremes range from 100 to -20 degrees F. The frost-free period ranges from 90 to 120 days. The optimum period for plant growth is from April to early June.

Table 3 Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	0 days
Precipitation total (average)	250 mm

Influencing water features

Watershed- The soils of this site are typically in or near the lowest topographic position and when ponded have virtually no runoff potential. The hydrologic cover condition is fair when the ecological condition is high.

Soil features

The soils associated with this site are deep to very deep, poorly to somewhat poorly drained, and formed in alluvium derived from mixed rocks with a component of volcanic ash. The soil profile is characterized by an ochric epideon, a pH greater than 8.0 throughout and a water table between 90 to 150cm at some point during the spring. Sodicity (SAR) is greater than 30 and soil surface will crust on drying. Soil textures are fine sandy loam or silt clay loam.

The upper portion of these soils is strongly salt and sodium affected due to capillary movement of dissolved salts upward from the ground water. Effective rooting depths are limited by a fluctuating water table. Ponding from run-on water is common. Potential for sheet and rill erosion is slight to moderate.

Table 4. Representative soil features

Parent material	(1) Lacustrine deposits – basalt
Surface texture	(1) Silty clay loam (2) Fine sandy loam
Family particle size	(1) Clayey

Drainage class	Somewhat poorly drained
Permeability class	Slow to moderately slow
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	3.05 – 9.4 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	0 – 30 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	20 – 1,000
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 10
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The potential native plant community is dominated by greasewood on thicker surfaces and the small coppice dunes. Varying amounts of saltgrass is present on the bare playa areas. Basin wildrye is scattered in the stand. Alkali sacaton, Nutall's and other alkaligrasses and a variety of forbs are present. Vegetative composition of the community is approximately 50 percent grasses, 5 percent forbs and 45 percent shrubs. The approximate ground cover is 10 to 40 percent (basal and crown).

Range in Characteristics:

Soil surface characteristics and available subsurface moisture strongly influence the composition and production of the site. In areas of greater surface soil depth over the clay subsoil and decreasing alkalinity, production of basin wildrye will increase. With a decrease in soil surface depth and an increase in salts, greasewood, saltgrass and other salt tolerant species will increase. As salts increase to high levels, areas of salt incusted bare ground increase and saltgrass and greasewood decrease. At lower elevations with an increase of

surface sands, alkali sacaton will increase.

Response to Disturbance - States:

When the condition of the site deteriorates as a result of over grazing, basin wildrye (the preferred species) will decrease while saltgrass increases. With further deterioration saltgrass decreases, greasewood and seepweed increase slightly and areas of salt incusted bare ground increase significantly. As organic matter is depleted from loss of vegetation and root structure, sodic/saline conditions and surface sealing are accentuated. Wind erosion of the thin surface layer increases. Production decreases and site deterioration continues to occur in a cyclic pattern.

States: SAVE4/DISP- salt incusted bare ground (degraded areas where sodic/salinity conditions are increasing)

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	Moderately-deep rooted rhizomatous grass			22-45	
	saltgrass	DISP	<i>Distichlis spicata</i>	22-45	–
2	Deep rooted bunchgrass			11-34	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	11-34	–
3	Moderately-deep rooted bunchgrasses			13-36	
	bulrush	SCIRP	<i>Scirpus</i>	7-18	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	7-18	–
5	Other Perennial Grasses			2-11	
	scratchgrass	MUAS	<i>Muhlenbergia asperifolia</i>	0-2	–
	Lemmon's alkaligrass	PULE	<i>Puccinellia lemmonii</i>	0-2	–
Forb					
7	Perennial forbs			16-40	
	seepweed	SUAED	<i>Suaeda</i>	7-18	–
	iodinebush	ALOC2	<i>Allenrolfea occidentalis</i>	4-11	–
	pickleweed	SALIC	<i>Salicornia</i>	4-11	–
8	Other Forbs			2-13	
	woad	ISATI	<i>Isatis</i>	0-2	–
	povertyweed	IVAX	<i>Iva axillaris</i>	0-2	–
	small povertyweed	MOPU3	<i>Monolepis pusilla</i>	0-2	–
	boraxweed	NIOC2	<i>Nitrophila occidentalis</i>	0-2	–
	entireleaved thelypody	THIN	<i>Thelypodium integrifolium</i>	0-2	–
Shrub/Vine					
11	Deciduous, non-sprouting shrub			67-112	
	greasewood	SAVE4	<i>Sarcobatus vermiculatus</i>	67-112	–
15	Other Shrubs			2-9	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	0-2	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	0-2	–

Animal community

Livestock Grazing: This site is suitable for livestock grazing use in the late spring, fall and early winter under a planned grazing system. Use should be postponed until the soils are firm enough to prevent trampling damage and soil compaction. Grazing management should

be keyed for basin wildrye or saltgrass if basin wildrye is not present. The site can be easily damaged if heavily grazed during periods of basin wildrye flowering and seed formation when root reserves are low. Basin wildrye provides excellent standing dried forage during fall and early winter dormancy. Deferred grazing or rest is recommended at least once every three years. Wildlife: This site is used by mule deer, pronghorn antelope, rabbits, rodents, upland birds and various predators. It provides limited cover and winter spring forage for mule deer and antelope. Cover is fair when the ecological condition is high. Visibility is good for antelope.

Hydrological functions

The soils of this site are typically at the lowest topographic position. It accumulates some off-site surface flows and when ponded has virtually no runoff potential. The soils have low infiltration rates even when the vegetation cover is high. Hydrologic cover is high when the saltgrass and basin wildrye component is greater than 70 percent of potential. The soils are in hydrologic group D.

Other information

This site is not suitable for reseeding. Salt concentrations inhibit germination of presently available species. Soils are corrosive to steel.

Contributors

Bob Gillaspy
 J. Joye (OSU)
 NRCS/BLM Team - Vale (up-date)
 SCS/BLM Team - Burns
 SCS/BLM Team Burns (Original Authors)

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)	Bob Gillaspy
Contact for lead author	State Rangeland Management Specialist for Oregon NRCS.
Date	03/03/2017
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:** None to few. Frequent ponding with seasonal high water table.

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):**
60 - 90%

5. **Number of gullies and erosion associated with gullies:** None.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None to few. Wind erosion hazard is high.

7. **Amount of litter movement (describe size and distance expected to travel):** Litter size is Small/Fine. Litter movement is limited, minimal, and short, associated with intense wind storms.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Site is somewhat resistant to erosion. Stability class (Herrick et al. 2001) anticipated to be 2-5 at surface under perennial vegetation. Stability class at surface in the interspaces is anticipated to be less than or equal to that under perennial vegetation.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface layer structure is strong fine and medium angular blocky to weak fine and medium platy. The A horizon has a dry color of 6 to 7 and is 2 - 7 inches thick. The Soil Organic Matter (SOM) content is low (0.5 to 1.5%).

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Infiltration is limited by soil texture and depth. Run-off is limited by slope (0-3%). Plant foliar cover is limited (10-40%) with 3 to 6 foot gaps between plants. Increased rhizomatous plant cover may slow overland flow, providing increased time for infiltration to occur. Maintaining herbaceous vegetation on this site will retain more water from precipitation. Limited ground cover (10-40%) and flat slopes (0-3%) reduce rainfall impact and 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. Normal increase in clay at shallow depths (2 inches) may be mistaken for 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: Shrubs

Sub-dominant: Rhizomatous perennial grasses => bunchgrasses > forbs

Other:

Additional:

- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
Grasses will nearly always show some mortality and decadence. Normal decadence and mortality expected on other plants.
-

- 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):**
Low 100 lbs/acre, Representative Value 200 lbs/acre, High 300 lbs/acre
-

- 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: Invasive species are rare on this site.**
-

- 17. Perennial plant reproductive capability: All species should be capable of reproducing annually.**
-