Ecological site R024XY003OR
SODIC BOTTOM

Accessed: 05/17/2024

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.

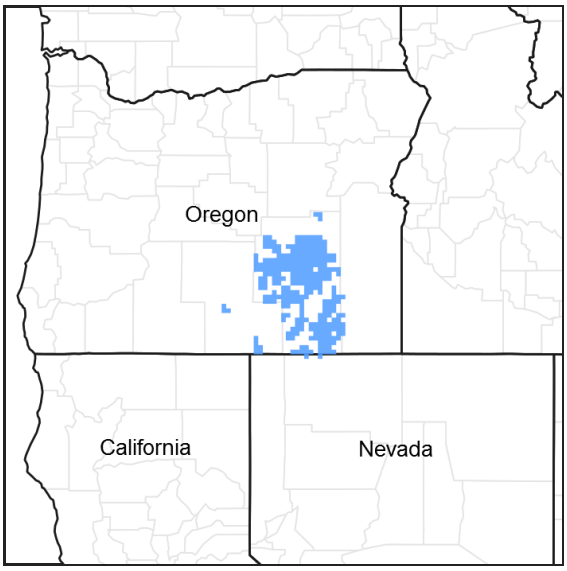


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Ecological site concept

This ecological site has been extensively mapped within MLRA 23. Soil characteristics are similar to 024XY007NV.

Associated sites

R024XY001OR	**SODIC FLAT** Sodic Flat (higher sodic conditions, thin surface layer, scattered small coppice mounds dominated by SAVE4, lower production, different composition –SAVE4/ DISP dominant, LECI4 scattered)
R024XY002OR	**SODIC MEADOW 6-10 PZ** Sodic Meadow (higher sodic conditions, thin surface layer, located in ephemeral seepage areas along dry alkali lakebeds, lower production, different composition –SPAI-DISP dominant, SAVE4 & LECI4 minor)
R024XY005OR	**SODIC DUNES** Sodic Dunes (very deep sandy soils, steeper short slopes, lower sodic conditions, less available subsurface moisture, lower production, different composition – ARTRT-SAVE4 dominant shrubs, LECI4-ACHY common)
R024XY009OR	**DRY BASIN** Dry Basin (lower salts and carbonates, less available subsurface moisture, different composition-ARTRT dominant shrub, SAVE4 common, DISP minor)

R024XY013OR	**LOW SODIC TERRACE 6-10 PZ** Low Sodic Terrace 6-10 PZ (droughtier sodic soil, lower position, less production, different composition – SAVE4 dominant, ATCO, GRSP,PIDE4 prominent, LECI4 minor)
R024XY114OR	**SODIC LAKE TERRACE** Sodic Lake Terrace (higher sodic conditions, lower position, additional available subsurface moisture, lower production, different composition-SAVE4/DISP-PUCCI association, LECI4 minor, ARTRT absent)

Similar sites

R024XY625OR	**ALKALINE BASIN 8-10 PZ** Alkaline Basin 8-10 PZ (lower sodic conditions, silt loam over clayey subsoil, lower available sub-surface moisture, lower production, different composition – SAVE4 and LECI4 dominant, ARTRT and DISP prominent)
R024XY009OR	**DRY BASIN** Dry Basin (lower salts and carbonates, less available subsurface moisture, different composition-ARTRT dominant shrub, SAVE4 common, DISP minor)
R024XY112OR	**DRY SODIC FLOODPLAIN** Dry Sodic Floodplain (higher sodic conditions, gravelly loamy surface over stratified heavier subsoil, lower available sub-surface moisture, lower production, different composition – SAVE4 dominant, LECI4 and DISP prominent)
R024XY114OR	**SODIC LAKE TERRACE** Sodic Lake Terrace (higher sodic conditions, lower position, additional available subsurface moisture, lower production, different composition-SAVE4/DISP-PUCCI association, LECI4 minor, ARTRT absent)
R024XY645OR	**SILTY ALKALINE BOTTOM 8-10 PZ** Silty Alkaline Bottom 8-10 PZ (lower sodic conditions, deep ashy fine loamy often over diatomaceous earth, lower available subsurface moisture, lower production, different composition – LETR5 dominant, SAVE4. ARTRT and LECI4 prominent, DISP minor to absent)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus*
Herbaceous	(1) *Leymus cinereus* (2) *Distichlis spicata*

Physiographic features

This site typically occurs on the floors of dry sodic lake basins and valleys. It is formed in eolian, lacustrine and alluvial deposits. Slopes typically range from 0 to 3 percent. Elevations vary from 4,000 to 4,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Lake plain (2) Lake terrace
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	1,219–1,372 m
Slope	0–3%
Ponding depth	0–15 cm
Water table depth	0–122 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 short duration supply of ephemeral ponded and subsurface moisture augments the precipitation. The soil temperature regime is mesic to frigid near mesic with a mean air temperature of 43 to 48 degrees F. Temperature extremes range from 100 to -20 degrees F. The frost-free period ranges from 50 to 100 days. The optimum period for plant growth is from April to early June.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	0 days
Precipitation total (average)	254 mm

Influencing water features

Soil features

The soils of this site are very deep, medium to fine textured and somewhat poorly to moderately well drained. The surface layer is typically a sandy loam to loam over a clayey subsoil. Substratums are lacustrine and alluvial sediments. Soils are sodic throughout. Ponding in the late winter to early spring for a long duration is frequent. Permeability is slow to moderately rapid. The available water holding capacity (AWC) is about 1 to 3 inches (up to 7.5 inches) for the profile. A seasonal water table is frequently present at 0 to 48 inches. The water erosion potential is slight due to the low elevation flat position of the site. Wind erosion potential is moderate.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–basalt (2) Lacustrine deposits–tuff
Surface texture	(1) Sandy loam (2) Loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Slow to moderately rapid
Soil depth	183 cm
Surface fragment cover <=3"	0–8%
Surface fragment cover >3"	0–2%
Available water capacity (0-101.6cm)	1.78–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	1–15%
Electrical conductivity (0-101.6cm)	1–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	10–120
Soil reaction (1:1 water) (0-101.6cm)	8.5–11
Subsurface fragment volume <=3" (Depth not specified)	0–8%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

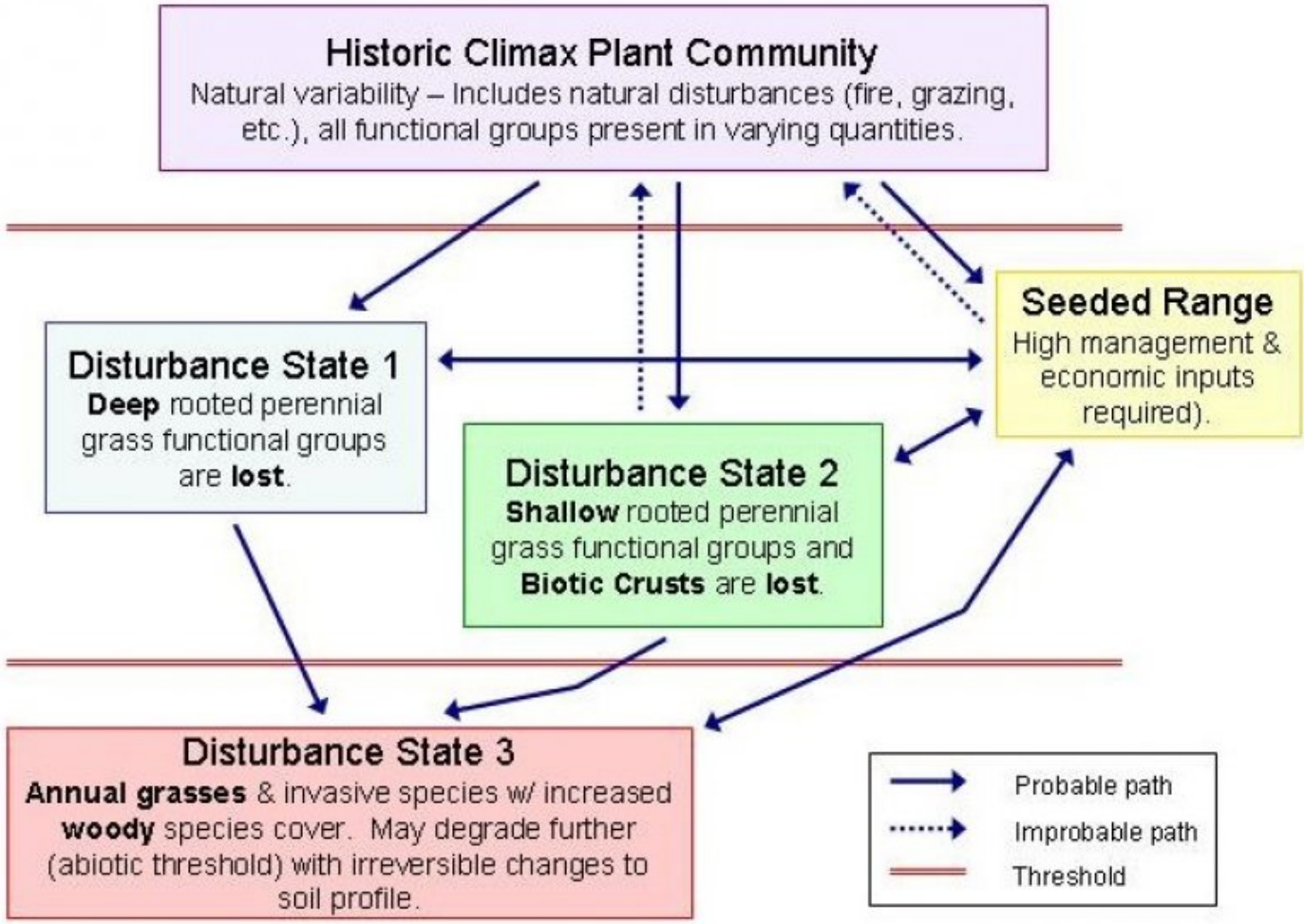
The potential native plant community is dominated by basin wildrye and greasewood. Saltgrass and rubber (alkali) rabbitbrush are prominent. Spiny hopsage, Lemmon's alkaligrass, beardless wildrye and a variety of forbs are present. Vegetative composition of the community is approximately 70 percent grasses, 5 percent forbs, and 25 percent shrubs. The approximate ground cover is 40 to 60 percent (basal and crown).

Range in Characteristics-
Soil surface characteristics strongly influence the composition and production of the site. As soil surface depth increases and salts decrease, basin wildrye makes up a higher percentage of the stand. With an increase in salts and a decrease in soil surface depth, greasewood, saltgrass, and other salt tolerant species increase in the stand. Production increases with available subsurface moisture and decreasing alkalinity.

Response to Disturbance - States
When the condition of the site deteriorates as a result of improper grazing, basin wildrye decreases while greasewood and saltgrass increase. With further deterioration soil organic matter decreases and alkalinity increases. Areas of bare ground increase. As bare soil increases, soil surface alkalinity continues to increase and salt grass decreases. Production decreases and site deterioration continues to occur in a cyclic pattern.

States: SAVE4/DISP-bare ground;

State and transition model



GENERAL MODEL FOR COOL-SEASON BUNCHGRASS RANGELANDS

State 1

Reference State

Community 1.1
Reference Plant Community

The reference native plant community is dominated by basin wildrye and greasewood. Saltgrass and rubber (alkali) rabbitbrush are prominent. Spiny hopsage, Lemmon's alkaligrass, beardless wildrye and a variety of forbs are present. Vegetative composition of the community is approximately 70 percent grasses, 5 percent forbs, and 25 percent shrubs. The approximate ground cover is 40 to 60 percent (basal and crown).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1334	1569	2354
Shrub/Vine	476	560	841
Forb	95	112	168
Total	**1905**	**2241**	**3363**

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	**Deep-rooted bunchgrass**			897–1345	
	basin wildrye	LECI4	*Leymus cinereus*	897–1345	–
2	**Moderately-deep rooted rhizomatous grass**			112–336	
	saltgrass	DISP	*Distichlis spicata*	112–336	–
3	**Moderately-deep rooted bunchgrass**			45–112	
	Lemmon's alkaligrass	PULE	*Puccinellia lemmonii*	45–112	–
5	**Other grasses**			112–336	
	teal lovegrass	ERHY	*Eragrostis hypnoides*	0–112	–
	beardless wildrye	LETR5	*Leymus triticoides*	0–112	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–112	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	0–112	–
	alkali sacaton	SPAI	*Sporobolus airoides*	0–112	–
Forb					
9	**Perennial forbs**			45–224	
	iodinebush	ALOC2	*Allenrolfea occidentalis*	0–45	–
	milkvetch	ASTRA	*Astragalus*	0–45	–
	woollystar	ERIAS	*Eriastrum*	0–45	–
	povertyweed	IVAX	*Iva axillaris*	0–45	–
	silverpuffs	MICRO6	*Microseris*	0–45	–
	dock	RUMEX	*Rumex*	0–45	–
	seepweed	SUAED	*Suaeda*	0–45	–
	short-rayed alkali aster	SYFR2	*Symphyotrichum frondosum*	0–45	–
	thelypody	THELY	*Thelypodium*	0–45	–
	arrowgrass	TRIGL	*Triglochin*	0–45	–
Shrub/Vine					
10	**Deciduous, non-sprouting shrub**			224–448	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	224–448	–
11	**Deciduous, sprouting shrub**			45–112	
	rubber rabbitbrush	ERNAO	*Ericameria nauseosa ssp. consimilis var. oreophila*	45–112	–
12	**Evergreen, non-sprouting shrub**			22–45	
	spiny hopsage	GRSP	*Grayia spinosa*	22–45	–
15	**Other Shrubs**			22–112	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	0–45	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	0–45	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	0–45	–
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	0–45	–
	silver buffaloberry	SHAR	*Shepherdia argentea*	0–34	–

Animal community

Livestock Grazing:
This site is suitable for livestock grazing use in the late spring, fall, and 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 . The site can be damaged if heavily grazed during periods of basin wildrye flowering and seed formation or when root reserves are low. Basin wildrye provides excellent standing dried forage during 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 excellent cover and winter spring forage for mule deer and antelope. Cover is excellent when ecological condition is high. Good nesting cover is provided for upland birds and, when near water, is excellent for ducks such as mallards and gadwall.

Hydrological functions

The soils of this site are typically on terraces near the lowest topographic position of basins. It accumulates some off-site surface flows and when ponded has low runoff potential. The soils have medium infiltration rates when vegetation cover is high. Hydrologic cover is high when the basin wildrye component is greater than 70 percent of potential. The soils are in hydrologic group C.

Other information

In fair condition this site rapidly responds to good management. Fire is an excellent tool for the control of greasewood and the improvement in vigor and seed production of basin wildrye. In poor condition where salt concentrations have not accumulated to a high degree, this site has fair potential for reseeding. Salt concentrations reduce the germination of basin wildrye and adapted introduced species. Soils are corrosive to steel.

Contributors

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NRCS/BLM Team - Vale (up-date)
SCS/BLM Team- Burns (1985 & 1994)
SCS/BLM Team, Burns
Vale Team

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)	Jeff Repp
Contact for lead author	State Rangeland Management Specialist for Oregon NRCS.
Date	11/16/2016
Approved by	Bob Gillaspy
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None, moderate sheet & rill erosion hazard.

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2. **Presence of water flow patterns:** None to some. Frequent flooding with seasonal high water table and ponding.

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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):** 10 - 25%

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

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

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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 water flow patterns following extremely high intensity storms. Litter also may be moved during intense wind storms.

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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):** Site is Moderately 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.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface layer structure is weak thin and medium platy to weak fine subangular blocky. The A horizon has a dry color of 6 and is 2 - 11 inches thick. The Soil Organic Matter (SOM) content is low (0.5 to 3.0%).

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant foliar cover and basal cover with small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. High herbaceous vegetation on this site will retain more water from precipitation. Moderate ground cover (40-60%) and flat slopes (0-3%) moderately limit rainfall impact and overland flow.

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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):** None.

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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: Deep rooted bunchgrasses

Sub-dominant: Other perennial grasses => shrubs > 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):** Grasses will nearly always show some
mortality and decadence. Normal decadence and mortality expected on other plants.

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Low 1100 lbs/acre, Representative Value 1400 lbs/acre, High 1700 lbs/acre

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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:** Kochia, Brassica, and Foxtail Barley invade sites that have lost deep rooted perennial grass functional groups.

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