

Ecological site R024XY005OR **SODIC DUNES**

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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.

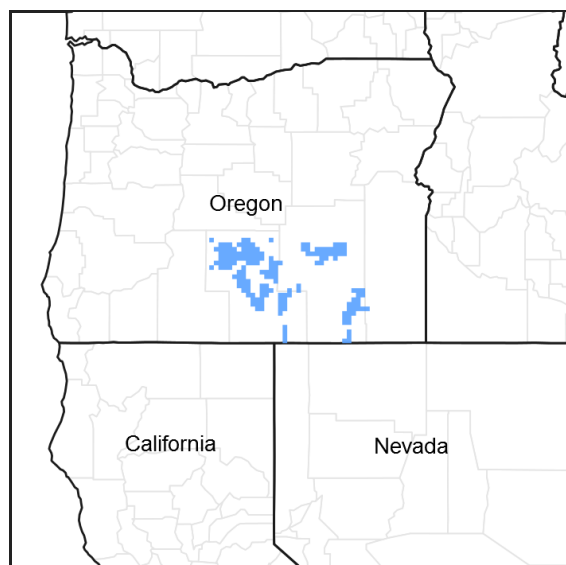


Figure 1. Mapped extent

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.

Associated sites

R024XY001OR	SODIC FLAT Sodic Flat (higher sodic conditions, finer textured 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, finer texture thin surface layer, located in ephemeral seepage areas along dry alkali lakebeds, higher production, different composition – SPAI & DISP dominant, SAVE4 & LECI4 minor)
R024XY003OR	SODIC BOTTOM Sodic Bottom (finer surface texture, additional available subsurface moisture, higher production, different composition - SAVE4/LECI4-DISP association, ARTRT minor)
R024XY012OR	SANDY 6-10 PZ Sandy 6-10 PZ (non-sodic low terrace sandy soil, higher production, different composition – ARTRT/HEC026-ACHY association, SAVE4 and DISP absent, LECI4 minor, ATCA2 variable)
R024XY013OR	LOW SODIC TERRACE 6-10 PZ Low Sodic Terrace 6-10 PZ (droughtier sodic soil, loamy to fine loamy surface texture, slightly higher position, less production, different composition – SAVE4 dominant, ATCO, GRSP, PIDE4 prominent, ARTRT & LECI4 minor)

Similar sites

R024XY012OR	SANDY 6-10 PZ Sandy 6-10 PZ (non-sodic low terrace sandy soil, higher production, different composition – ARTRT/HEC026-ACHY association, SAVE4 and DISP absent, LECI4 minor, ATCA2 variable)
R024XY110OR	DUNES Dunes (non-sodic sandy dunes, higher production, lower sodic conditions, higher production, different composition – ARTRT/HEC026-ACHY association, SAVE4 and DISP absent, LECI4 and LETR5 common)
R024XY644OR	SILTY DUNES Silty Dunes (silty to silty clay loam sodic dunes, higher production, different composition – SAVE4 and LETR5 dominant, ARTRT, LECI4 and DISP minor)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. tridentata</i> (2) <i>Sarcobatus vermiculatus</i>
Herbaceous	(1) <i>Leymus cinereus</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

This site typically occurs in windblown sands on the floors of dry sodic lake basins. The windblown sands have accumulated around the edges of old shorelines. Slopes typically range from 1 to 15 percent with short reaches up to 30 percent on leeward dune faces. Elevations vary from 4,000 to 4,600 feet.

Table 2. Representative physiographic features

Landforms	(1) Basin floor (2) Pluvial lake (relict) (3) Shoreline
Ponding frequency	None
Elevation	1,219–1,402 m
Slope	1–15%
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 8 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 subsurface moisture augments the precipitation. The soil temperature regime is mesic to frigid near mesic with a mean air temperature of 45-50 degrees F. Temperature extremes range from 100 to -20 degrees F. The frost-free period ranges from 50 to 110 days. The optimum period for plant growth is from April to early June.

Table 3. Representative climatic features

Frost-free period (average)	110 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, coarse textured and somewhat excessively drained. Typically they are salt

affected overblown loamy fine sands and sands. Substratums are fine to loamy textured old lakebed sediments. Reaction is variable from slightly alkaline to strongly alkaline. Depth to lacustrine sediment ranges from from six inches to over three feet. Permeability is moderately rapid to rapid. The available water holding capacity (AWC) is about 1 to 4.5 inches for the profile. The wind erosion potential is severe. The water erosion potential is low due to the high intake rate.

Table 4. Representative soil features

Parent material	(1) Eolian sands–rhyolite
Surface texture	(1) Loamy sand (2) Fine sand (3) Sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.03–11.43 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–12 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–30
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The potential native plant community is dominated by basin big sagebrush, greasewood and Indian ricegrass. Basin wildrye is common. Spiny hopsage, needle and thread, beardless (creeping) wildrye, alkali sacaton, and a variety of forbs are present. Vegetative composition of the community is approximately 60 percent grasses, 10 percent forbs, and 30 percent shrubs. The approximate ground cover is 50 to 60 percent (basal and crown).

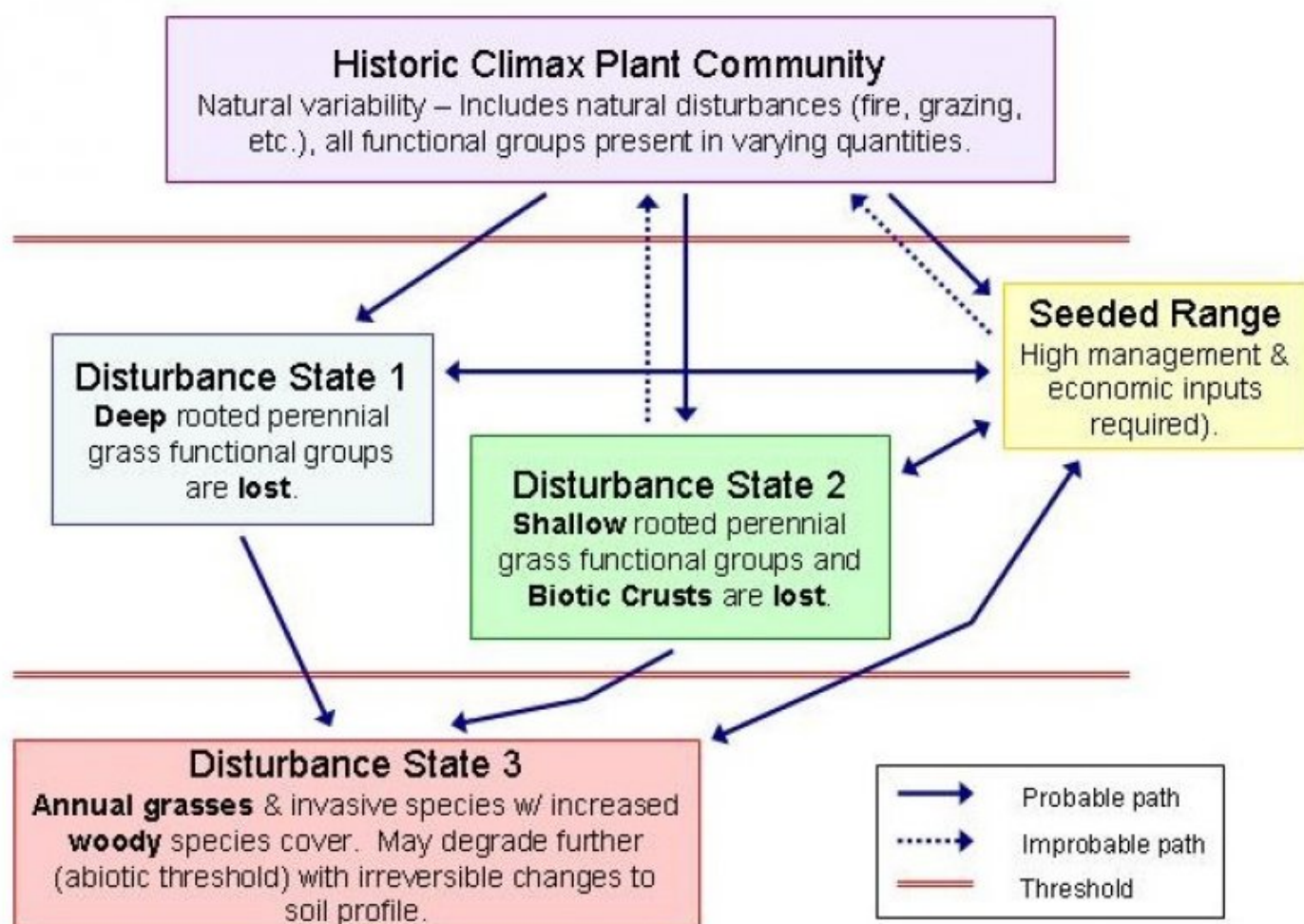
Range in Characteristics:

Soil surface characteristics and the availability of seasonal subsurface moisture influences the composition and production of the site. As available subsurface moisture increases and salts decrease basin wildrye and total production increases. With a decrease in salts and available subsurface moisture Indian ricegrass, needle and thread, and basin big sagebrush will increase. As salts increase greasewood, saltgrass, alkali sacaton and other salt tolerant species increase in the stand. Alkali sacaton, a warm season grass, increases at the southern end of the site range.

Response to Disturbance - States

When the condition of the site deteriorates as a result of over grazing, basin wildrye, Indian ricegrass and needle and thread decrease. Greasewood, alkali rabbitbrush, saltgrass and unpalatable forbs increase. Surface alkalinity increases and areas of bare ground increase. Localized dune wind erosion becomes severe. Production decreases and site deterioration continues to occur in a cyclic pattern.

State and transition model



GENERAL MODEL FOR COOL-SEASON BUNCHGRASS RANGELANDS

State 1 Reference State

Community 1.1 Reference Plant Community

The reference plant community is dominated by basin big sagebrush, greasewood, and Indian ricegrass. Basin wildrye is common. Spiny hopsage, needle and thread, beardless (creeping) wildrye, alkali sacaton, saltgrass, and a variety of forbs are present. Vegetative composition of the community is approximately 60 percent grasses, 10 percent forbs and 30 percent shrubs. The approximate ground cover is 50 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	202	336	471
Shrub/Vine	101	168	235
Forb	34	56	78
Total	337	560	784

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	Moderately-deep rooted bunchgrass			112–140	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	112–140	–
2	Deep rooted bunchgrass			56–168	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	56–168	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	28–56	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	28–56	–
	beardless wildrye	LETR5	<i>Leymus triticoides</i>	11–28	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	11–28	–
4	Perennial, moderately-deep rooted grasses			50–112	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	28–56	–
	beardless wildrye	LETR5	<i>Leymus triticoides</i>	11–28	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	11–28	–
5	Other perennial grasses			11–22	
	saltgrass	DISP	<i>Distichlis spicata</i>	0–11	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–11	–
	bluegrass	POA	<i>Poa</i>	0–11	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–11	–
Forb					
9	Perennial forbs			11–84	
	milkvetch	ASTRA	<i>Astragalus</i>	0–11	–
	yellow spiderflower	CLLU2	<i>Cleome lutea</i>	0–11	–
	sulphur-flower buckwheat	ERUM	<i>Eriogonum umbellatum</i>	0–11	–
	povertyweed	IVAX	<i>Iva axillaris</i>	0–11	–
	desertparsley	LOMAT	<i>Lomatium</i>	0–11	–
	lupine	LUPIN	<i>Lupinus</i>	0–11	–
	whitestem blazingstar	MEAL6	<i>Mentzelia albicaulis</i>	0–11	–
	hairy evening primrose	OEVI	<i>Oenothera villosa</i>	0–11	–
	sharpleaf penstemon	PEAC	<i>Penstemon acuminatus</i>	0–11	–
	scurfpea	PSORA2	<i>Psoralea</i>	0–11	–
	dock	RUMEX	<i>Rumex</i>	0–11	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–11	–
	seepweed	SUAED	<i>Suaeda</i>	0–11	–
	thelypod	THELY	<i>Thelypodium</i>	0–11	–
	deathcamas	ZIGAD	<i>Zigadenus</i>	0–11	–
Shrub/Vine					
10	Evergreen, non-sprouting shrub			28–84	
	basin big sagebrush	ARTRT	<i>Artemisia tridentata ssp. tridentata</i>	28–84	–

11	Deciduous, non-sprouting shrub			28–56	
	greasewood	SAVE4	<i>Sarcobatus vermiculatus</i>	28–56	–
12	Evergreen, non-sprouting shrub			11–28	
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	11–28	–
14	Deciduous, sprouting shrub			0–28	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–28	–
15	Other shrubs			11–56	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	0–11	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–11	–
	rubber rabbitbrush	ERNAO	<i>Ericameria nauseosa</i> ssp. <i>consimilis</i> var. <i>oreophila</i>	0–11	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–11	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	0–11	–
	littleleaf horsebrush	TEGL	<i>Tetradymia glabrata</i>	0–11	–
	shortspine horsebrush	TESP2	<i>Tetradymia spinosa</i>	0–11	–

Animal community

Livestock Grazing:

This sandy site is subject to severe wind erosion and can be severely damaged by heavy grazing. Limited shorter duration livestock grazing use is suitable during 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 Indian ricegrass and basin wildrye. The site can be damaged if heavily grazed during periods of Indian ricegrass and basin wildrye flowering and seed formation. Both these species provide 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, antelope and upland birds. Cover is excellent when ecological condition is high.

Hydrological functions

The soils of this site are typically near the lowest topographic position of dry sodic lake basins. They have low runoff potential due to the rapid infiltration rate of the sands. The soils are in hydrologic group A.

The potential for wind erosion is severe. Localized severe wind erosion occurs when the potential vegetation is less than 70 percent of potential and bare soil surface increases.

Other information

Any type of prescribed grazing and other land treatment should be designed to protect the soil from wind erosion. The potential for range seeding is low due to the site's susceptibility to wind erosion, the droughty nature of the site and salt concentrations. Soils are corrosive to steel.

Contributors

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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 NRCS Oregon
Date	11/10/2016
Approved by	Bob Gillaspy
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.

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):** 40 - 50%

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** None to some. Significant wind erosion hazard.

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Site is slightly resistant to erosion. Stability class (Herrick et al. 2001) anticipated to be 2-3 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 single grain to moderate medium platy structure. The A horizon has a dry color of 6 - 7 and is 3 - 5 inches thick. The Soil Organic Matter (SOM) content is low (0 to 1%).

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Infiltration and runoff is dominantly controlled by the high water intake rate of the soils. Plant foliar cover and basal cover with small (1 - 2 foot) 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 (50 - 60%) with moderate slopes (1-15%) 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 bunchgrass > Rhizomatous grass

Sub-dominant: Shrubs > Other Perennial Grasses = 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):**
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Low 300 lbs/acre, Representative Value 500 lbs/acre, High 700 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:** Cheatgrass and mustard may invade this site.
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17. **Perennial plant reproductive capability:** All species should be capable of reproducing annually.
