USDA Natural Resources Conservation Service

Ecological site R023XY202OR
SWALE 10-14 PZ

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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.

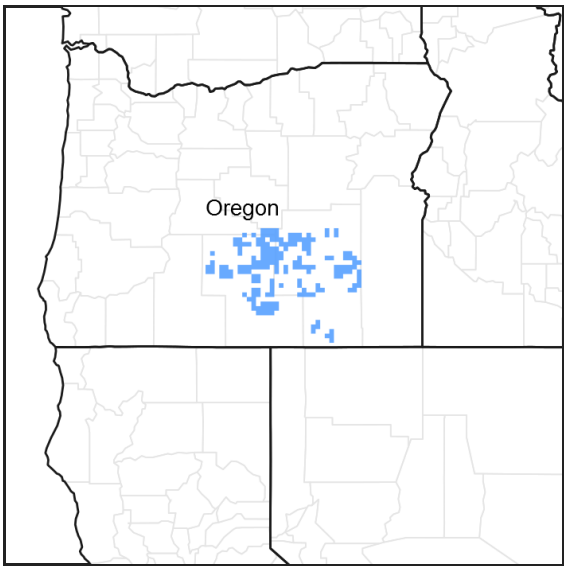


Figure 1. Mapped extent

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

R023XY104OR	**LOAMY BOTTOM** Loamy Bottom, 10-12" Upland Sites

Similar sites

R023XY104OR	**LOAMY BOTTOM** Loamy Bottom (perennial to near perennial subsurface flows)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. tridentata*
Herbaceous	(1) *Leymus cinereus* (2) *Pseudoroegneria spicata ssp. spicata*

Physiographic features

This site occurs adjacent to and on the floodplains of ephemeral streams. It is at the lower end of drainages occupying broad to narrow swale areas. Slopes range from 0 to 5 percent. Typical elevation ranges from 4500 to

5500 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Swale
Elevation	4,500–5,500 ft
Slope	0–5%
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 10 to 14 inches, most of which occurs in the form of snow during the months of December through February. Ephemeral subsurface moisture flow augments the precipitation. Localized convection storms occasionally occur during the summer. The soil temperature regime is frigid with a mean annual air temperature of 45 degrees F. The frost-free period ranges from 30 to 90 days. The optimum growth period for native plants is from April through June.

Table 3. Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	0 days
Precipitation total (average)	14 in

Influencing water features

Soil features

The soils of this site are recent, deep to very deep and well-drained. Typically the surface layer is a silt loam about 10 inches thick. The subsoil is a silt loam to silty clay loam over 40 inches. The substratum varies from alluvium to bedrock. Permeability is moderate. The available water holding capacity (AWC) is about 4 to 7 inches for the profile. Ephemeral subsurface flows from adjacent slopes augment the available water. The potential for water erosion is moderate.

Table 4. Representative soil features

Parent material	(1) Alluvium–volcanic breccia
Surface texture	(1) Silt loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderate
Soil depth	40–60 in
Surface fragment cover <=3"	5–13%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4.1–7.1 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm

Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	8–17%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Range in Characteristics:

Basin wildrye and bluebunch wheatgrass are dominant with the amount of basin wildrye dependent on the extent and duration of lateral subsurface water flows. Basin wildrye decreases and bluebunch wheatgrass increase on the upper ends of watersheds where drainage area is limited. Basin wildrye production increases on swales with large drainage areas. As a site susceptible to fire, the amount of basin big sagebrush is influenced by fire frequency.

Four states have been identified for this site: a reference state; a state with the presence of annuals; a state with a shrub/annual co-dominance; and a state with annual dominance. This site is dependent on extra moisture from adjacent upland sites.

Reference State: Community phase changes within the reference state are a function of fire and/or chronic drought. Fire playes a significant role in the community phase dynamics of this state; however, the time between fires is highly variable and dependent upon the location and productivity of the site. The introduction of invasive annual grasses and forbs transitions into state 2.

State 2: Compositionally similar to the reference state with the addition of a trace of annual weeds, primarily cheatgrass. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. The improper timing and/or intensity of grazing practices and/or chronic drought leads to a reduction in native grasses and an increase in sagebrush or greasewood dominance. Low-intensity fire combined with prescribed grazing can maintain the dynamics of this state. A lack of prescribed grazing or fire will lead to state 3.

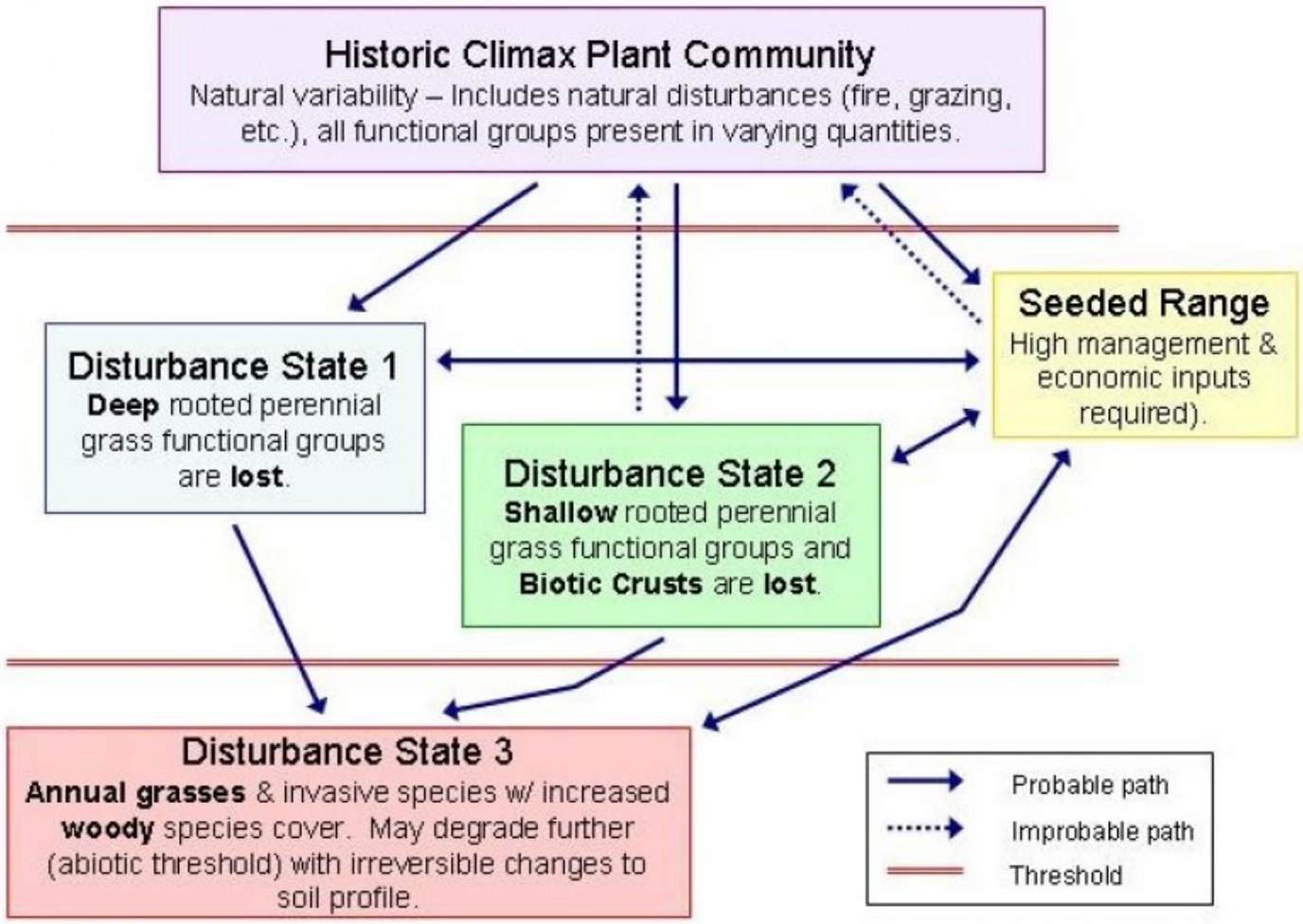
State 3: This site is co-dominated by decadent sagebrush and cheatgrass. A significant reduction/loss of basin wildrye and other native grasses is apparent. Bare ground is abundant. Spatial and temporal energy capture and nutrient cycling has been truncated. Infiltration may be reduced due to lack of ground cover. Frequent fires promote the transition to state 4 (cheatgrass dominated).

State 4: The site has crossed an abiotic threshold and ecological dynamics are determined by frequent fire, cheatgrass dominance, lack of shrubby plants, bare ground, and soil movement by wind and water erosion.

Response to Disturbance:

If the condition of the site deteriorates as a result of overgrazing, basin wildrye, bluebunch wheatgrass, and Idaho fescue decrease. Basin big sagebrush, Sandberg bluegrass, and squirreltail increase. With further deterioration, sagebrush continues to increase, annuals invade and areas of bareground increase. Any streambanks within the site become unstable from loss of vegetation and channels degrade, becoming deeper and wider in the process. Subsurface flows are affected. Peak discharges increase, the water table drops and storage of water for late season use is reduced. Plants well-adapted to a drier climatic regime increase or invade and production drops.

State and transition model



GENERAL MODEL FOR COOL-SEASON BUNCHGRASS RANGELANDS

State 1
Reference State

Community 1.1
Reference Plant Community

The potential native plant community is dominated by basin wildrye and bluebunch wheatgrass. Basin big sagebrush, Idaho fescue, and Thurber needlegrass are common. Prairie junegrass, Sandberg bluegrass, and a variety of forbs are present. The vegetative composition of the community is approximately 85 percent grass, 5 percent forbs, and 10 percent shrubs. Approximate ground cover is 70-80 percent (basal and crown).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1275	1530	1700
Shrub/Vine	150	180	200
Forb	75	90	100
Total	**1500**	**1800**	**2000**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Perennial, deep-rooted, dominant**			990–1260	
	basin wildrye	LECI4	*Leymus cinereus*	540–630	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	270–360	–
	Idaho fescue	FEID	*Festuca idahoensis*	180–270	–
2	**Perennial, deep-rooted, sub-dominant**			108–270	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	90–180	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	90–180	–
	western needlegrass	ACOC3	*Achnatherum occidentale*	36–90	–
	western needlegrass	ACOC3	*Achnatherum occidentale*	18–90	–
4	**Perennial, shallow-rooted, sub-dominant**			72–180	
	prairie Junegrass	KOMA	*Koeleria macrantha*	36–90	–
	Sandberg bluegrass	POSE	*Poa secunda*	36–90	–
5	**Other perennial grasses, all**			36–144	
	sedge	CAREX	*Carex*	0–36	–
	squirreltail	ELEL5	*Elymus elymoides*	0–36	–
	tufted wheatgrass	ELMA7	*Elymus macrourus*	0–36	–
Forb					
7	**Perennial, all, dominant**			54–108	
	fleabane	ERIGE2	*Erigeron*	18–36	–
	buckwheat	ERIOG	*Eriogonum*	18–36	–
	lupine	LUPIN	*Lupinus*	18–36	–
9	**Other perennial forbs, all**			18–72	
	common yarrow	ACMI2	*Achillea millefolium*	0–18	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–18	–
	milkvetch	ASTRA	*Astragalus*	0–18	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–18	–
	stoneseed	LITHO3	*Lithospermum*	0–18	–
	desertparsley	LOMAT	*Lomatium*	0–18	–
	locoweed	OXYTR	*Oxytropis*	0–18	–
	phlox	PHLOX	*Phlox*	0–18	–
	deathcamas	ZIGAD	*Zigadenus*	0–18	–
Shrub/Vine					
11	**Perennial, evergreen, dominant**			180–360	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	180–360	–
12	**Perennial, evergreen, sub-dominant**			18–36	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	18–36	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	18–36	–
15	**Other perennial shrubs, all**			18–54	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–18	–
	horsebrush	TETRA3	*Tetradymia*	0–18	–

Animal community

Livestock Grazing:

This site is suited to use by cattle, sheep, and horses in all seasons. Limitations in the spring are saturated wet soils and unstable banks. Use should be postponed until the soils are firm enough to prevent trampling damage and soil compaction. Improvement and/or maintenance of herbaceous bank protection should be considered during all seasons, particularly going into the winter for spring runoff protection.

Native Wildlife Associated with the Potentail Climax Community:

Mule deer
Antelope
Hawks
Songbirds
Rodents

This site will offer food and cover for mule deer, antelope, rodents, and a variety of birds. It is an important wintering area for mule deer and antelope.

Hydrological functions

The soils are in hydrologic group B. The soils of this site have moderately low runoff potential.

Other information

The soils in this site have excellent water holding capacities providing late season water for plant growth and slow water releases to streams. When incised channels are present, rehabilitation will markedly improve production and restore good hydrologic characteristics. On alterd sites, the reintroduction of desirable deep rooted forage plants may be needed to fully restore the site potential.

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)	Jeff Repp and Bruce Franssen
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Date	08/15/2012
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, Streambanks become unstable from loss of vegetation and channels degrade.

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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):** 0-5%

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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, slight wind erosion hazard

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

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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):** Moderately resistant to erosion: aggregate stability = 3-5

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Deep to very deep, well drained sandy loams and silt loams - ephemeral subsurface flows from adjacent slopes augment the available water: Moderate OM (1-3%)

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Significant ground cover (70-80%) and gentle slopes (0-5%) effectively 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: Basin wildrye > Bluebunch wheatgrass > Basin big sagebrush > Idaho fescue > other grasses > forbs > other shrubs

    Sub-dominant:

Other:

Additional:

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

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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):** Favorable: 2000, Normal: 1800, Unfavorable: 1500 lbs/acre/year at high RSI (RPC)

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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 Medusahead 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

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