

Ecological site R010XY117OR

Mountain Swale

12-16 PZ

Last updated: 4/10/2025
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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.

Associated sites

R010XC025OR	SR Sandy 9-12 PZ 12-16" Mountain Upland Group - Gravelly Fan 12-16" PZ, Loamy Bottom
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Similar sites

R010XC025OR	SR Sandy 9-12 PZ Gravelly Fan 12-16" PZ (coarser soil, deeper subsurface flows)/Loamy Bottom (perennial to near perennial subsurface flows)
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. vaseyana</i>
Herbaceous	(1) <i>Leymus cinereus</i> (2) <i>Festuca idahoensis</i>

Physiographic features

This site occurs adjacent to and on the floodplains of ephemeral drainages. It is at the upper end of drainages occupying broad to narrow swale areas. Slopes range from 2 to 12 percent. Elevations range from 3000 to 5700 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Drainageway (3) Swale
Elevation	910 – 1,740 m

Slope	0 – 10 %
Water table depth	150 cm
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 12 to 16 inches, most of which occurs in the form of snow during the months of November through March. 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. Temperature extremes range from 90 to -30 degrees F. The frost-free period ranges from 30 to 90 days. The optimum period for plant growth is from April through June.

Table 3 Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	
Precipitation total (average)	410 mm

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 silty clay loam over 40 inches thick. The substratum varies from alluvium to bedrock. Gravel content in the pedon ranges from 0 to 30 percent. Permeability is moderate. The available water holding capacity (AWC) is about 8 to 10 inches for the profile. Seasonal subsurface flows from adjacent slopes augment the available water. The potential for erosion is moderate.

Table 4. Representative soil features

Surface texture	(1) Silt loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderate
Soil depth	130 cm
Surface fragment cover <=3"	0 – 30 %

Available water capacity (0-101.6cm)	20.32 – 25.4 cm
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Ecological dynamics

Range in Characteristics:

The amount of basin wildrye is dependent on the extent and duration of lateral subsurface water flows. Basin wildrye increases and Idaho fescue decreases on swales receiving subsurface flows late into the growing season. This would be on swales with large drainage areas. Conversely, Idaho fescue would increase on swales with limited drainage areas. This would typically be at the upper ends of watersheds where drainage area is limited. Production follows a similar pattern increasing on swales with large drainage areas. As a site susceptible to fire, the amount of basin big sagebrush is influenced by fire frequency.

Response to Disturbance:

If the condition of the site deteriorates as a result of overgrazing, basin wildrye and Idaho fescue decrease. Bluegrasses invade and basin big sagebrush increase. With further deterioration, annuals invade and useable forage production decreases. Streambanks 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. Erosion from concentrated flows reduces the site productivity and contributes to downstream sedimentation.

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	Perennial, deep-rooted, domiant			1681-2522	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	1121-1681	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	1121-1681	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	560-841	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	560-841	–
2	Perennial, deep-rooted, sub-domiant			168-448	
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	56-140	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	56-140	–
	sedge	CAREX	<i>Carex</i>	28-84	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	28-84	–
4	Perennial, shallow-rooted, sub-dominant			28-84	
	bluegrass	POA	<i>Poa</i>	28-84	–
5	Other perennial grasses, all			84-336	
	western needlegrass	ACOC3	<i>Achnatherum occidentale</i>	0-67	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-67	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0-67	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-67	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-67	–
Forb					
7	Perennial, all, dominant			56-112	
	buckwheat	ERIOG	<i>Eriogonum</i>	28-56	–

	lupine	LUPIN	<i>Lupinus</i>	28-56	–
9	Other perennial forbs, all			28-112	
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0-9	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0-9	–
	milkvetch	ASTRA	<i>Astragalus</i>	0-9	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0-9	–
	fleabane	ERIGE2	<i>Erigeron</i>	0-9	–
	stoneseed	LITHO3	<i>Lithospermum</i>	0-9	–
	desertparsley	LOMAT	<i>Lomatium</i>	0-9	–
	bluebells	MERTE	<i>Mertensia</i>	0-9	–
	phlox	PHLOX	<i>Phlox</i>	0-9	–
	cinquefoil	POTEN	<i>Potentilla</i>	0-9	–
	buttercup	RANUN	<i>Ranunculus</i>	0-9	–
	deathcamas	ZIGAD	<i>Zigadenus</i>	0-9	–
Shrub/Vine					
11	Perennial, evergreen, dominant			84-224	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	84-224	–
12	Perennial, evergreen, sub-dominant			28-84	
	basin big sagebrush	ARTRT	<i>Artemisia tridentata ssp. tridentata</i>	28-84	–
14	Perennial, deciduous, dominant			28-84	
	wax currant	RICE	<i>Ribes cereum</i>	28-84	–
15	Other perennial shrubs, all			56-224	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0-56	–
	golden currant	RIAU	<i>Ribes aureum</i>	0-56	–
	common snowberry	SYAL	<i>Symphoricarpos albus</i>	0-56	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	0-56	–

Animal community

Livstock Grazing: This site is suited to use by cattle, sheep, and horses in late spring, summer, and fall under a planned grazing system. 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, yet while soil moisture is adequate to allow the completion of the plant growth cycle. Improvement and/or maintenance of herbaceous bank protection should be considered during all seasons, particularly going into the winter for spring high flow periods. Native Wildlife Associated with the Potential Climax Community: Deer Antelope Elk Hawks Songbirds Rodents This site will offer food and cover for mule deer, elk, antelope, rodents, and a variety of birds. It is an important wintering area for mule deer, elk, and antelope.

Hydrological functions

The soils are in hydrologic group B. The soils of this site have moderately low runoff potential. This site is potentially subject to three high flow periods: low elevation snowmelt, high elevation snowmelt, and summer cloudburst flow.

Other information

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

Contributors

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Approval

Kirt Walstad, 4/10/2025

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 NRCS Oregon
Date	11/21/2016
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. Presence of water flow patterns: None, except following extremely high intensity storms when short (less than 1 meter) flow patterns may appear on steeper slopes. Minimal evidence of past or current soil deposition or erosion.

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): 0 - 5% bare ground.

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

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

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.

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 3-6 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 moderate very fine granular to moderate thin platy. The A horizon has a dry color of 4 - 5 and is 3 - 15 inches thick. The Soil Organic Matter (SOM) content is low (0.2 to 2.0%).

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. High ground cover (70-80%) and gentle slopes (2-12%) limit 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.

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 > evergreen shrubs

Other: Perennial forbs = other shrubs

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 2000 lbs/acre, Representative Value 2500 lbs/acre, High 3000 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: Western Juniper readily invades the 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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