

Ecological site R025XY020OR

SOUTH SLOPES

11-13 PZ

Last updated: 4/25/2024
Accessed: 08/31/2026

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.

MLRA notes

Major Land Resource Area (MLRA): 025X–Owyhee High Plateau

The Owyhee High Plateau, MLRA 25, lies within the Intermontane Plateaus physiographic province. The southern half is found in the Great Basin while the northern half is located in the Columbia Plateaus. The southern section of the Owyhee High Plateau is characterized by isolated, uplifted fault-block mountain ranges separated by narrow, aggraded desert plains. This geologically older terrain has been dissected by numerous streams draining to the Humboldt River. The northern section forms the southern boundary of the extensive Columbia Plateau basalt flows. Deep, narrow canyons drain to the Snake River across the broad volcanic plain. This MLRA is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. Elevation ranges from 3,000 to 7,550 feet on rolling plateaus and in gently sloping basins. It is more than 9,840 feet on some steep mountains. The average annual precipitation in most of this area is typically 11 to 22 inches. It increases to as much as 49 inches at the higher elevations. Precipitation occurs mainly as snow in winter. The supply of water from precipitation and streamflow is small and unreliable, except along major rivers. Streamflow depends largely on accumulated snow in the mountains. The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic or frigid temperature regime and an aridic, arid bordering on xeric, or xeric moisture regime. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam, and have ashy texture modifiers in some cases. Argillic horizons occur on the more stable landforms.

Ecological site concept

This ecological site is on south facing side slopes of plateaus, tablelands, and canyonlands associated with volcanic plateau landscapes. Elevations range from 2,700 to 5,000 feet (823 to 1,524 meters) and slopes range from 12 to 70 percent. The soils associated with this site are moderately deep to bedrock. The soil climate is mesic to mesic near frigid (soil temperature regime) and aridic to aridic bordering xeric (soil moisture regime). This site is on south aspects and therefore receives more solar insolation and thus is slightly drier and warmer than its non-aspect counterpart, resulting in reduced resistance and resilience and annual production. The reference plant community is characterized by basin big sagebrush in the overstory and bluebunch wheatgrass in the understory.

Associated sites

R025XY012OR	LOAMY 11-13 PZ
R025XY021OR	CLAYPAN SOUTH SLOPES 11-13 PZ
R025XY032OR	NORTH SLOPES 11-13 PZ
R025XY038OR	CLAYPAN NORTH SLOPES 11-13 PZ

Similar sites

R025XY012OR	LOAMY 11-13 PZ slopes less than 15 percent
R025XY043ID	LOAMY 11-13 soils with calcic horizon below 50cm

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata subsp. tridentata</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i>

Physiographic features

This ecological site is associated with volcanic tableland landscapes. It is commonly on south facing plateau and canyon side slopes. Slopes range from 12 to 70 percent with elevations of 2,700 to 5,000 feet (823 to 1,524 meters). This site has high runoff.

Table 2. Representative physiographic features

Landforms	(1) Tableland > Plateau (2) Canyon
Runoff class	High
Flooding frequency	None
Ponding frequency	None
Elevation	820 – 1,520 m
Slope	10 – 70 %
Water table depth	250 cm
Aspect	W, SE, S, SW

Climatic features

The climate associated with this site is defined by hot dry summers and cold snowy winters. This site is characterized by less than 120 freeze-free days annually. Mean annual precipitation is 11 inches (28 cm), with effective precipitation between 11 to 13 inches (28 to 33 cm). Averages snowfall is between 25 to 50 inches (63 to 127 cm) per year.

The above data is averaged from the Danner, Rockville, and MC Dermitt climate stations, the Western Regional Climate Center (wrcc.dri.edu) and NASIS.

Table 3 Representative climatic features

Frost-free period (characteristic range)	40-110 days
Freeze-free period (characteristic range)	100-150 days
Precipitation total (characteristic range)	250-330 mm
Frost-free period (actual range)	20-140 days
Freeze-free period (actual range)	70-160 days
Precipitation total (actual range)	130-380 mm
Frost-free period (average)	90 days
Freeze-free period (average)	130 days
Precipitation total (average)	280 mm

- (1) DANNER [USC00352135], Jordan Valley, OR
- (2) ROCKVILLE 5 N [USC00357277], Adrian, OR
- (3) MC DERMITT 26 N [USC00355335], Jordan Valley, OR

Influencing water features

This site is not influenced by adjacent wetlands, streams or run-on. No water table present.

Wetland description

N/A

Soil features

These soils are formed in residuum, colluvium, alluvium and loess derived from volcanic rock. Soils are moderately deep to hard bedrock and well drained. Surface textures range from gravelly to stony loam. The soil profile is characterized by a dark surface horizon (mollic epipedon) and layer of clay accumulation (argillic horizon) 8 to 13 inches (20 to 33cm) from the soil surface.

Representative soil components associated with this ecological site include Lithgow, Perla, and Ruclick.

Table 4. Representative soil features

Parent material	(1) Colluvium – volcanic rock (2) Loess
Surface texture	(1) Gravelly, ashy loam
Family particle size	(1) Fine (2) Fine-loamy
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	50 – 100 cm
Soil depth	50 – 100 cm
Surface fragment cover <=3"	10 – 20 %
Surface fragment cover >3"	20 – 30 %
Available water capacity (0-101.6cm)	10.16 – 15.24 cm
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 7.2
Subsurface fragment volume <=3" (12.7-101.6cm)	20 – 30 %
Subsurface fragment volume >3" (12.7-127cm)	10 – 20 %

Ecological dynamics

The reference plant community is dominated by basin big sagebrush with an understory of bluebunch wheatgrass. The site has low resilience to disturbance and resistance to invasion. Resilience is a system's capacity to regain its structure, processes, and function following stressors or disturbance (e.g. drought or fire). Resistance is the capacity of the system to retain its structure, processes, and function despite stressors or disturbances (including pressure from invasive species) (Chambers 2014). Resilience increases with elevation, aspect, increased precipitation and increased nutrient availability (Stringham et al. 2015); where greater resource availability and more favorable environmental conditions exist for plant growth and reproduction (Chambers 2014).

This ecological site's lower effective precipitation (aridic to aridic bordering xeric soil moisture regime southern aspect) limits site productivity, resulting in more open space for establishment of invasive annual grasses. Since the site occurs on south aspects, it receives more solar insolation and thus is slightly drier and warmer than its non-aspect counterpart. Timing of precipitation also favors invasive annual grasses that are particularly well adapted to cool wet winters and warm dry summers; beginning growth and utilizing resources prior to native species breaking dormancy. The site's warm soil temperature regime (mesic to mesic near frigid) gives the site low resistance to disturbance (Chambers 2014b). Furthermore, the increased solar insolation received by the site due to its southerly aspect makes this site warmer than its non-aspect counterpart and reduces overall site resistance.

Herbivory has historically occurred on the site at low levels of utilization. Native herbivores include pronghorn antelope, elk, mule deer, sage grouse, lagomorphs and rodents. Livestock grazing has become prevalent across this site. Overutilization of resources due to grazing (from livestock, wildlife, and feral horses) can degrade the site and decrease forage availability and quality. This will lead to a decrease in perennial bunch grasses and an increase of invasive species (Williamson, 2020). Annual and perennial invasive species compete with desirable plants for moisture and nutrients.

Wildfire frequency across this site has historically been low. Sagebrush evolved with low intensity wildfire that left a mosaic of burned and unburned patches (Baker, 2006). Annual species such as cheatgrass and medusahead can be troublesome invaders on this site after wildfire, preventing perennial grass and shrub re-establishment. Invasive, annual plant communities increase wildfire frequency and intensity (Haubensak, 2009). This could cause the dominate shrub population to shift away from scabland sagebrush to a shrub population with quicker establishment.

High annual precipitation will increase the total plant production. Higher wildfire frequency following annual plant production can be expected due to a larger fuel load (Pilliod, 2017). Extended periods of drought significantly impact this site because of the grasses and shrubs that

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				572-1143	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	527-1054	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	11-22	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	11-22	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	11-22	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	11-22	–
Forb					
2				34-67	
	buckwheat	ERIOG	<i>Eriogonum</i>	3-7	–
	phacelia	PHACE	<i>Phacelia</i>	3-7	–
	wild onion	ALAS2	<i>Allium ascalonicum</i>	3-7	–
	phlox	PHLOX	<i>Phlox</i>	3-7	–
	milkvetch	ASTRA	<i>Astragalus</i>	3-7	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	3-7	–
	lupine	LUPIN	<i>Lupinus</i>	3-7	–
	fleabane	ERIGE2	<i>Erigeron</i>	3-7	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	3-7	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	3-7	–
Shrub/Vine					
3				67-135	
	basin big sagebrush	ARTRT	<i>Artemisia tridentata</i> ssp. <i>tridentata</i>	45-90	–
	rabbitbrush	CHRY9	<i>Chrysothamnus</i>	11-22	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	11-22	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

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

Hydrological functions

The soils are in hydrologic group C. The soils of this site have moderately high runoff potential.

Other products

This site is suited to use by cattle, sheep and horses in late spring, summer and fall under a planned grazing system. Use should be postponed until the soils are firm enough to prevent trampling damage and soil compaction.

Inventory data references

Old SS Manuscripts, Range Site Descriptions, etc.

Type locality

Location 1: Malheur County, OR

References

Haubensak K. and D'Antonio C. 2009. Effects of fire and environmental variable on plant structure and composition in grazed salt desert shrublands of the Great Basin (USA). *Journal of Arid Environment*. Elsevier. 643–650.

Michael J. Falkowski and Jeffrey S. Evans. January 2017. Mapping Tree Canopy Cover in Support of Proactive Prairie Grouse Conservation in Western North America. *Rangeland Ecology and Management* 70:15–24.

Pilliod, D.S. and J.L. Welty. 2017. Refining the cheatgrass–fire cycle in the Great Basin: Precipitation timing and fine fuel composition predict wildfire trends. *Ecology and Evolution*. Wiley.

Williams, C.J. and F.B. Pierson. 2018. Effectiveness of prescribed fire to re-establish sagebrush steppe vegetation and ecohydrologic function on woodland-encroached sagebrush rangelands, Great Basin, USA: Part I: Vegetation, hydrology, and erosion responses.

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Contributors

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Approval

Kendra Moseley, 4/25/2024

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)	
Contact for lead author	
Date	08/31/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):

5. Number of gullies and erosion associated with gullies:

6. Extent of wind scoured, blowouts and/or depositional areas:

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

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):

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:

Sub-dominant:

Other:

Additional:

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

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):

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:
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17. Perennial plant reproductive capability:
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