Ecological site R025XY011OR
VERY SHALLOW
8-13 PZ

Last updated: 4/24/2024
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 the summits of lava plateaus with slopes less than 15 percent. Soils associated with this site formed in volcanic ash and loess over residuum derived from volcanic parent material. These soils are shallow to bedrock and well drained with a layer of clay accumulation (argillic horizon) within 30cm of the soil surface. Important abiotic factors contributing to the presence of this ecological site include the shallow rooting depth and ashy or glassy soil texture modifier. The reference plant community is dominated by stiff sagebrush and Sandberg's bluegrass.

Associated sites

R025XY010OR	**LOAMY 8-11 PZ** Loamy 8-11 PZ
R025XY012OR	**LOAMY 11-13 PZ** Loamy 11-13 PZ

Similar sites

R025XY061OR	**SHALLOW CLAYPAN 8-11 PZ** ARAR8 dominant shrub, higher annual production.

R025XY063OR	**SKELETAL CLAYPAN 11+ PZ** ARAR8 dominant shrub, soils and landscape position do not differ from R025XY011OR

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia rigida*
Herbaceous	(1) *Poa secunda*

Physiographic features

This ecological site is associated with summits on lava plateaus. Slopes range from 2 to 20 percent, but are typically less than 15 percent. This site is well drained with slow runoff and slow permeability. Site elevation is inches 4300 to 5000 (1310 to 1524 meters).

Table 2. Representative physiographic features

Landforms	(1) Lava plateau > Plateau
Runoff class	Low to medium
Elevation	1,310 – 1,520 m
Slope	0 – 20 %
Water table depth	180 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is defined by hot dry summers and cold snowy winters. This site typically has 50 frost free-days and 104 day freeze-free period. Mean annual precipitation is 10 inches (25cm), with the highest rainfall occurring in May 1.7 inches (4.3cm) and the lowest in August 0.3 inches (0.7cm). Effective precipitation is between 8 to13 inches (20 to 33 meters). Averages snowfall is around 35 inches (89cm) per year. Air temperatures average 19 Degrees F in December (coldest) and 89 Degree F in July (warmest).

Data was provided by the Danner, Rockville, and MC Dermitt climate stations.

Table 3 Representative climatic features

Frost-free period (characteristic range)	40-90 days
Freeze-free period (characteristic range)	90-120 days

Precipitation total (characteristic range)	200-330 mm
Frost-free period (actual range)	30-90 days
Freeze-free period (actual range)	80-130 days
Precipitation total (actual range)	200-330 mm
Frost-free period (average)	50 days
Freeze-free period (average)	100 days
Precipitation total (average)	250 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 ecological site is not influenced by adjacent wetlands, streams or run-on. No water table is present.

Wetland description

N/A

Soil features

The soils associated with this site are very shallow and shallow to hard basalt or rhyolite bedrock, well drained, and formed in volcanic ash and loess over residuum. The soil profile is characterized by a light-colored surface horizon (ochric epipedon), greater than 35 percent rock fragments, and a layer of clay accumulation (argillic horizon) between 20 and 30cm. Rooting depth by is limited by hard bedrock at 30cm, but available water holding capacity is moderate due to clay content and volcanic glass in the soil profile.

Representative soil components associated with this ecological site include Cowlake.

Table 4. Representative soil features

Parent material	(1) Volcanic ash (2) Residuum – rhyolite
Surface texture	(1) Ashy, very cobbly loam
Family particle size	(1) Ashy-skeletal over loamy-skeletal
Drainage class	Moderately well drained to well drained

Permeability class	Slow to moderately slow
Depth to restrictive layer	50 cm
Soil depth	30 – 50 cm
Surface fragment cover <=3"	0 – 20 %
Surface fragment cover >3"	0 – 30 %
Available water capacity (0-101.6cm)	5.08 – 10.16 cm
Soil reaction (1:1 water) (Depth not specified)	6.6 – 10
Subsurface fragment volume <=3" (Depth not specified)	40 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

The Reference Plant Community is dominated by sandberg bluegrass and scabland sagebrush (Artemisia rigida). Subdominant species include Thurber needlegrass, Cusicks bluegrass and bottlebrush squirreltail, and Idaho fescue. Total annual production is 250 lbs/acre in a normal year, 300 lbs/acre in a favorable year, and 200 lbs/acre in a unfavorable year. Structurally, shallow rooted bunchgrasses are dominant, followed by shrubs, and perennial forbs. The dominant visual aspect of this site is scabland sagebrush with mixed grasses. Composition by weight is approximately 50 percent grasses, 10 percent forbs and 40 percent shrubs.

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. 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 (K. 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 depend on annual moisture and the shallow soil. Extended drought reduces the vigor of perennial grasses and shrubs, while extreme drought may cause plant mortality. Extreme drought could also cause a state change that will favor bunch grasses over shrubs. Runoff potential following large precipitation events is high. Decreased infiltration, increased runoff, and increased erosion often occur when sagebrush is removed by frequent wildfires (C.J. Williams, 2018).

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				112-168	
	Sandberg bluegrass	POSE	*Poa secunda*	45-67	–
	Cusick's bluegrass	POCU3	*Poa cusickii*	6-11	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	2-11	–
	squirreltail	ELEL5	*Elymus elymoides*	2-6	–
	Idaho fescue	FEID	*Festuca idahoensis*	0-3	–
Forb					
2				22-34	
	phlox	PHLOX	*Phlox*	1-2	–
	buckwheat	ERIOG	*Eriogonum*	1-2	–
	balsamroot	BALSA	*Balsamorhiza*	1-2	–
	clover	TRIFO	*Trifolium*	1-2	–
Shrub/Vine					
3				90-135	
	scabland sagebrush	ARRI2	*Artemisia rigida*	34-56	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Table 8. Community 2.1 plant community composition

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

Table 9. Community 2.2 plant community composition

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

Table 10. Community 2.3 plant community composition

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

Table 11. Community 3.1 plant community composition

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

Table 12. Community 3.2 plant community composition

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

Inventory data references

Old SS Manuscripts, Range Site Descriptions, etc.

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.

Williamson, M.A. and E. Fleishman. 2019. Fire, livestock grazing, topography, and precipitation affect occurrence and prevalence of cheatgrass (Bromus tectorum) in the central Great Basin, USA.

Contributors

C,D. Tackman, RB Williams & AV Bahn
Trevor Crandall/ Erin Hourihan

Approval

Kendra Moseley, 4/24/2024

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:**

---

17. **Perennial plant reproductive capability:**
