Ecological site R025XY062OR
SILTY SWALE
8-11 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.

MLRA notes

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

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 (915 to 2,300 meters) on rolling plateaus and in gently sloping basins. It is more than 9,840 feet (3,000 meters) on some steep mountains. The average annual precipitation in most of this area is typically 11 to 22 inches (215 to 1,247 millimeters). It increases to as much as 49 inches (1,245 millimeters) 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 swales and stream terraces of ephemeral streams. Slopes are less than 6 percent. Soils at this site are typically very deep, well drained and formed in volcanic ash and loess over mixed alluvium. The soil profile typically has a dark surface horizon (mollic epipedon), a horizon of clay accumulation (argillic horizon), and less than 25 percent rock fragments by volume. Important abiotic factors contributing to the presence of this site include increased available seasonal soil moisture and the absence of flooding or ponding. The reference plant community is dominated by basin big sagebrush, bluebunch wheatgrass and basin wildrye.

Associated sites

R025XY014NV	**LOAMY 10-12 P.Z.** PSSP and ACTH7 dominant grass, occurs on upper fan remnants, soils characterized by a mollic epipedon and a duripan
R025XY012OR	**LOAMY 11-13 PZ** PSSP and FEID dominant grass, occurs on lava plateaus, soils characterized by a mollic epipedon and greater than 35% clay in the particle size control section
R025XY007OR	**SILTY SWALE 11-13 PZ** LECI4 and LETR5 dominant grass, occurs on lava plateaus, soil characterized by a seasonal high water table and redoximorphic features 90-135cm

Similar sites

R025XY003NV	**LOAMY BOTTOM 8-14 P.Z.** occurs on run-in landscape positions, not associated with perennial streams, no water table. Occurs in the Piedmont Slope land resource unit.
R025XY028ID	**LOAMY BOTTOM 12-16** occurs on terraces and floodplains of alluvial flats. Soils are moderately well or well drained with a seasonal high water table. Occurs on Dissected High Lava Plateau land resource unit.

Table 1. Dominant plant species

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

Physiographic features

This site is on stream terraces of ephemeral streams and in drainages of narrow swale areas. Slopes are less than 6 percent. Elevations range from 4,000 to 4,600 feet (1,219 to 1,402 meters).

Table 2. Representative physiographic features

Landforms	(1) Lava plateau > Stream terrace (2) Swale
Runoff class	Medium
Flooding frequency	None
Ponding frequency	None
Elevation	1,220 – 1,400 m
Slope	0 – 10 %
Water table depth	250 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.

Mean annual precipitation is 9 inches (23 cm), with the highest rainfall occurring in May 1.4 inches (3.6 cm) and the lowest in August 0.3 inches (0.76 cm). Averages snowfall is around 28 inches (71 cm) per year. Air temperatures average 26 degrees F in January (coldest) and 66 degrees F in July (warmest).

*The above and below data is averaged from the Danner, Rome ST AP, MC Dermitt 26 N, and Mcdermitt climate stations, National Soil Information System (NASIS) and, the Western Regional Climate Center.

Table 3 Representative climatic features

Frost-free period (characteristic range)	70-110 days
Freeze-free period (characteristic range)	80-120 days
Precipitation total (characteristic range)	230-250 mm
Frost-free period (actual range)	60-120 days
Freeze-free period (actual range)	70-130 days
Precipitation total (actual range)	200-280 mm
Frost-free period (average)	50 days
Freeze-free period (average)	100 days
Precipitation total (average)	230 mm

- (1) DANNER [USC00352135], Jordan Valley, OR
- (2) ROME ST AP [USW00094107], Jordan Valley, OR
- (3) MC DERMITT 26 N [USC00355335], Jordan Valley, OR
- (4) MCDERMITT [USC00264935], Jordan Valley, NV

Influencing water features

Influencing water features are not associated with this ecological site.
Where this site is associated with ephemeral streams the soils may experience brief periods of increased subsurface soil moisture, but this site does not experience endosaturation, flooding, or ponding.

Wetland description

N/A

Soil features

Soils associated with this site are very deep, well drained, and formed in volcanic ash and loess over mixed alluvium. The soil profile has a dark surface horizon (mollic epipedon), a horizon of clay accumulation (argillic horizon) from about 5 to 29 inches (12 to 73cm), and less than 25 percent rock fragments by volume.
These soils have 20 to 35 percent clay in the particle size control section and some pedons have relict redoximorphic features throughout the soil profile. These redoximorphic features are not an indicator of a present-day water table. They formed under different climatic and geomorphic conditions.
Representative soil components include Wisher.

Table 4. Representative soil features

Parent material	(1) Alluvium – volcanic rock (2) Volcanic ash (3) Loess
Surface texture	(1) Ashy silt loam
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	130 – 180 cm
Soil depth	130 – 180 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	12.95 – 18.8 cm
Soil reaction (1:1 water) (Depth not specified)	6.6 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

An ecological site is the product of all the environmental factors responsible for its development and it has a set of key characteristics that influence a site's resilience to disturbance and resistance to invasives. Key characteristics include 1) climate (precipitation, temperature), 2) topography (aspect, slope, elevation, and landform), 3) hydrology (infiltration, runoff), 4) soils (depth, texture, structure, organic matter), 5) plant communities (functional groups, productivity), and 6) natural disturbance regime (fire, herbivory, etc.) (Caudle et al. 2013). Biotic factors that influence resilience include site productivity, species composition and structure, and population regulation and regeneration (Chambers et al. 2013).

This ecological site is dominated by deep-rooted cool season, perennial bunchgrasses and long-lived shrubs (50+ years) with high root to shoot ratios. The dominant shrubs usually root to the full depth of the winter-spring soil moisture recharge, which ranges from 1.0 to over 3.0 m (Dobrowolski et al. 1990). Root length of mature sagebrush plants was measured to a depth of 2 meters in alluvial soils in Utah (Richards and Caldwell 1987). These shrubs have a flexible generalized root system with development of both deep taproots and laterals near the surface (Comstock and Ehleringer 1992).

Bluebunch wheatgrass, a densely tufted native perennial, dominates this site in reference conditions. Maximum rooting depth of bluebunch wheatgrass ranges from 4 to 6 feet. This allows bluebunch to access soil moisture deeper in the soil profile and persist through prolonged drought periods. The subdominant grass with basin wildrye. Basin wildrye does not tolerate long periods of inundation; rather, it prefers cycles of wet winters and dry summers and is most commonly found in deep soils with high water holding capacities or seasonally high water tables (Ogle et al 2012, Perryman and Skinner 2007). Perennial grasses generally have shallower root systems than the shrubs, but root densities are often as high as or higher than those of shrubs in the upper 0.5 m but taper off more rapidly. Differences in root depth distributions between grasses and shrubs result in resource partitioning in these shrub/grass systems.

In many basin big sagebrush communities, changes in fire frequency occur with fire suppression, livestock grazing and off-highway vehicle (OHV) use. Few, if any, fire history studies have been conducted on basin big sagebrush; however, Sapsis and Kauffman (1991) suggest that fire return intervals in basin big sagebrush are intermediate between mountain big sagebrush (15 to 25 years) and Wyoming big sagebrush (Artemisia tridentata ssp. wyomingensis) (50 to 100 years). Fire severity in big sagebrush communities is described as "variable" depending on weather, fuels, and topography.

This ecological site has moderatly low resilience to disturbance and resistance to invasion. The introduction of annual species (cheatgrass) may cause an increase in fire frequency and eventually lead to the elimination of sagebrush. Other potential invasive species include rubber rabbitbrush, annual mustards, poverty weed, whitetop, thistle, annual kochia, and pigweed.

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	**Dominant, perennial, deep rooted grasses**			493-740	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	493-740	–
	basin wildrye	LECI4	*Leymus cinereus*	185-370	–
3	**Sub-dominant perennial grasses/grasslikes**			73-174	
	Sandberg bluegrass	POSE	*Poa secunda*	25-74	–
	beardless wildrye	LETR5	*Leymus triticoides*	12-37	–
	squirreltail	ELEL5	*Elymus elymoides*	12-25	–
	Idaho fescue	FEID	*Festuca idahoensis*	12-25	–
	sedge	CAREX	*Carex*	12-25	–
4	**All other perennial grasses**			22-78	
	beardless wildrye	LETR5	*Leymus triticoides*	11-34	–
	sedge	CAREX	*Carex*	0-22	–
	squirreltail	ELEL5	*Elymus elymoides*	11-22	–
	Idaho fescue	FEID	*Festuca idahoensis*	0-22	–
Forb					
5	**All perennial forbs**			45-90	
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	11-22	–
	fleabane	ERIGE2	*Erigeron*	11-22	–
	buckwheat	ERIOG	*Eriogonum*	11-22	–
	lupine	LUPIN	*Lupinus*	11-22	–
	phlox	PHLOX	*Phlox*	0-11	–

	milkvetch	ASTRA	*Astragalus*	0-11	–
Shrub/Vine					
6	**Dominant, shrubs**			56-112	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	56-112	–
7	**All other shrubs**			22-67	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	11-22	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	11-22	–
	spiny hopsage	GRSP	*Grayia spinosa*	11-22	–
	horsebrush	TETRA3	*Tetradymia*	11-22	–

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 1.4 plant community composition

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

Table 9. Community 2.1 plant community composition

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

Table 10. Community 2.2 plant community composition

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

Table 11. Community 2.3 plant community composition

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

Table 12. Community 3.1 plant community composition

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

Table 13. Community 3.2 plant community composition

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

Table 14. Community 4.1 plant community composition

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

Animal community

This site offers 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 products

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 bank protecting vegetation should be considered during all seasons, particularly in the fall and winter for spring high flow periods.

Other information

The soils in this site have excellent water holding capacity 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 plants may be needed to fully restore the site potential.

Inventory data references

Old SS Manuscripts, Range Site Descriptions, etc.

References

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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	08/17/2026
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):**

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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:

    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):**

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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):**

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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:**

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17. **Perennial plant reproductive capability:**
