

Ecological site R025XD008NV

Fine Frigid Floodplain

ARCA13/CACU7/LETR5

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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

MLRA Notes 25—Owyhee High Plateau This area is in Nevada (56 percent), Idaho (30 percent), Oregon (12 percent), and Utah (2 percent). It makes up about 27,443 square miles. MLRA 25 is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. The western boundary is marked by a gradual transition to the lower and warmer basins of MLRA 24. The boundary to the south-southeast, with MLRA 28B, is marked by gradual changes in geology marked by an increased dominance of singleleaf pinyon and Utah juniper and a reduced presence of Idaho fescue. The boundary to the north, with MLRA 11, is a rapid transition from the lava plateau topography to the lower elevation Snake River Plain. Physiography: All of this area lies within the Intermontane Plateaus. The southern half is in the Great Basin section of the Basin and Range province. This part of the MLRA 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 half of the area lies within the Columbia Plateaus province. This part of the MLRA forms the southern boundary of the extensive Columbia Plateau basalt flows. Most of the northern half is in the Payette section, but the northeast corner is in the Snake River Plain section. Deep, narrow canyons draining into the Snake River have been incised into this broad basalt plain. 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 Humboldt River crosses the southern half of this area. Geology: The dominant rock types in this MLRA are volcanic. They include andesite, basalt, tuff, and rhyolite. In the north and west parts of the area, Cretaceous granitic rocks are exposed among Miocene volcanic rocks in mountains. A Mesozoic igneous and metamorphic rock complex dominates the south and east parts of the area. Upper and Lower Paleozoic calcareous sediments, including oceanic deposits, are exposed with limited extent in the mountains. Alluvial fan and basin fill sediments occur in the valleys. Climate: 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. Rainfall occurs in spring and sporadically in summer. Precipitation occurs mainly as snow in winter. The precipitation is distributed fairly evenly throughout fall, winter, and spring. The amount of precipitation is lowest from midsummer to early autumn. The average annual temperature is 33 to 51 degrees F. The freeze-free period averages 130 days and ranges from 65 to 190 days, decreasing in length with elevation. It is typically less than 70 days in the mountains. Water: The supply of water from precipitation and streamflow is small and unreliable, except along the Owyhee, Bruneau, and Humboldt Rivers. Streamflow depends largely on accumulated snow in the mountains. Surface water from mountain runoff is generally of excellent quality and suitable for all uses. The basin fill sediments in the narrow alluvial valleys between the mountain ranges provide some ground water for irrigation. The alluvial deposits along the large streams have the most ground water. Based on measurements of water quality in similar deposits in adjacent areas, the basin fill deposits probably contain moderately hard water. The water is suitable for almost all uses. The carbonate rocks in this area are considered aquifers, but they are little used. Springs are common along the edges of the limestone outcrops. Soils: 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, aridic bordering on xeric, or xeric moisture regime. Soils with aquic moisture regimes are limited to drainage or spring areas, where moisture originates or runs on and through. These soils are of a very limited extent throughout the MLRA. They generally are well drained, clayey or loamy, and shallow or moderately deep. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam with ashy texture modifiers in some areas. Argillic horizons occur on the more stable landforms. They are exposed nearer the soil surface on convex landforms, where ash and loess deposits are more likely to erode. Soils that formed in carbonatic parent material in areas that receive less than 12 inches of precipitation are characterized by calcic horizons throughout the profile, while soils in areas that receive more than 12 inches of precipitation do not have calcic horizons in the upper part of the profile. Soils that formed on stable landforms at the lower elevations are dominated by ochric horizons. Soils that formed at the middle and upper elevations are characterized by mollic epipedons. Soils in drainage areas at all elevations that receive moisture running on or through them are characterized by thicker mollic epipedons. Biological Resources: This MLRA supports shrub-grass vegetation. Lower elevations are characterized by Wyoming big sagebrush associated with bluebunch wheatgrass, western wheatgrass, and Thurber's needlegrass. Other important plants include bluegrass, squirreltail, penstemon, phlox, milkvetch, lupine, Indian paintbrush, aster, and rabbitbrush. Black sagebrush occurs but is less extensive. Singleleaf pinyon and Utah juniper occur in limited areas. With increasing elevation and precipitation, vast areas characterized by mountain big sagebrush or low sagebrush/early sagebrush in association with Idaho fescue, bluebunch wheatgrass, needlegrasses,

and bluegrass become common. Snowberry, curl-leaf mountain mahogany, ceanothus, and juniper also occur. Mountains at the highest elevations support whitebark pine, Douglas-fir, limber pine, Engelmann spruce, subalpine fir, aspen, and curl-leaf mountain mahogany. Major wildlife species include mule deer, bighorn sheep, pronghorn, mountain lion, coyote, bobcat, badger, river otter, mink, weasel, golden eagle, red-tailed hawk, ferruginous hawk, Swainson's hawk, northern harrier, prairie falcon, kestrel, great horned owl, short-eared owl, long-eared owl, burrowing owl, pheasant, sage grouse, chukar, gray partridge, and California quail. Reptiles and amphibians include western racer, gopher snake, western rattlesnake, side-blotched lizard, western toad, and spotted frog. Fish species include bull, red band, and rainbow trout.

LRU notes

Land Resource Unit (LRU): D – High Elevation Forests and Shrublands This LRU is representative of mountains and hills. It includes the Jarbidge, Independence, Mahogee, Ruby, East Humboldt, Santa Rosa, Raft River, Grouse Creek, Owyhee Mountains, and other minor ranges. Lithology of mountain ranges is dominantly volcanic (rhyolite) with areas of igneous intrusions, metamorphic deposits, and calcareous marine deposits. The topography is mountainous with high relief, narrow ridges, broad backslopes and narrow valleys. The highest ranges in this LRU experienced Pleistocene glaciation. Aspect is an important driving factor in this LRU. Vegetation patterns and resulting soil patterns on the landscape are heavily influenced by north-south aspects. The area is dominated by bedrock-controlled landforms. Elevations are greater than 5900 feet (1800 to 2350 meters) with individual peaks as high as 11,000 feet. Median slope value is 23 and 75 percent of slope values are greater than 11 percent (n=5293).

Ecological site concept

This site occurs on flat to very low sloping axial primary and secondary floodplains associated with perennial or ephemeral streams on mountains and uplifted lava plateaus on all exposures. Slopes are generally less than 5 percent with elevations around 6,500 feet. The soils associated with this site are formed in alluvium from mixed and volcanic parent material. The soils are deep to very deep and are moderately well drained. The surface horizon is fine textured and is ten centimeters thick or less to subsoil. Sub surface soils are clayey textured with abrupt boundaries and active shrink/swell, sometimes creating cracking to the surface. Soils are often pachic mollic and frigid in temperature. The representative plant community is dominated by silver sagebrush, Cusick's Indian paintbrush, potentilla, beardless wildrye, and various sedges. Upland species such as Idaho fescue and prairie junegrass increase as you move further away from associated streams. Potential plant composition is 55 percent grasses, 20 percent forbs, and 25 percent shrubs. Ground cover is nearly 100 percent with high densities of grasses and a persistent litter layer occupying plant interspaces from previous years growth. This site receives additional moisture from adjacent upland sites as flow in, as well as ground water tied to adjacent streams.

Associated sites

R025XY079NV	STREAMBANK Can dissect site; typically courser soil textures, occurs in areas of more/constant disturbance from flood events; sand/gravel bars.
R025XY006NV	DRY MEADOW Adjacent site, typically disconnected from ground water. Receives flow in moisture; typically less clayey in subsoil, less shrub densities if present.
R025XY003NV	LOAMY BOTTOM 8-14 P.Z. Can occur on adjacent, higher stream benches; indicative of more depth to ground water.
R025XY005NV	WET MEADOW Occurs closer to stream; shallower depth to ground water, more persistent water.

Similar sites

R025XY049NV	WET CLAY BASIN Occurs on a different landscape/landform at lower elevations. Soil is controlled by a higher clay content and ephemeral ground water from springs or adjacent lakes/playas. Vegetation is largely comprised of warm season grasses. This site is typically found to a lesser extent.
R025XY048NV	CLAY BASIN Occurs on a different landscape/landform at lower elevations. Soil is controlled by a higher clay content and perennial ground water from springs or adjacent lakes/playas. Vegetation is largely comprised of warm season grasses; ARCA13 is not present. This site is typically found to a lesser extent.
R025XY005NV	WET MEADOW Largely sedges and rushes, longer duration/constant ground water above 50cm, no shrubs.
R025XY006NV	DRY MEADOW Moisture dominated by flow in moisture; sub soils less clayey. Depth to groundwater typically >100cm and profile saturated <20 consecutive days.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia cana</i>
Herbaceous	(1) <i>Leymus triticoides</i> (2) <i>Castilleja cusickii</i>

Physiographic features

The Fine Frigid Floodplain site occurs on flat to very low sloping axial primary and secondary floodplains and stream terraces in mountain and plateau landscapes. This site is associated with perennial or ephemeral streams on all exposures. Slopes are up to 10 percent but slopes less than 5 percent are most common. Elevations range from 5000 to 8000 feet.

Table 2. Representative physiographic features

Slope shape across	(1) Linear
Slope shape up-down	(1) Linear

Landforms	(1) Mountains > Flood plain (2) Hills > Flood plain (3) Lava plateau > Flood plain (4) Intermontane basin > Flood plain (5) Lava plateau > Stream terrace (6) Mountains > Stream terrace
Runoff class	Negligible to low
Flooding frequency	Very rare to rare
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Rare to occasional
Elevation	1,520 – 2,440 m
Slope	0 – 10 %
Water table depth	100 – 250 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	0 – 10 %

Water table depth	Not specified
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Climatic features

The Fine Frigid Floodplain site occurs in the semi-arid region of the northern great basin characterized by cold, moist winters and hot, dry summers. Precipitation on this site typically ranges from 12 to 15 inches, falling mainly as snowfall. Mean annual air temperature is less than 45 degrees F.

Table 4 Representative climatic features

Frost-free period (characteristic range)	10-40 days
Freeze-free period (characteristic range)	30-80 days
Precipitation total (characteristic range)	310-380 mm
Frost-free period (actual range)	0-50 days
Freeze-free period (actual range)	10-90 days
Precipitation total (actual range)	310-380 mm
Frost-free period (average)	30 days
Freeze-free period (average)	50 days
Precipitation total (average)	330 mm

- (1) CONTACT [USC00261905], Jackpot, NV
- (2) WILD HORSE RSVR [USC00269072], Deeth, NV

Influencing water features

The Fine Frigid Floodplain site is heavily reliant on adjacent perennial or ephemeral streams as a source of persistent ground water. The high clay content of subsoil horizons retains high levels of moisture late into the summer, and often have a water table within 100cm of the soil surface, with saturation above 50cm for at least 20 consecutive days in spring or early summer.

Soil features

The soils are formed in alluvium from mixed and volcanic parent material. The soils are deep to very deep and are moderately well drained. Available water content is moderate. The surface horizon is often silty clay loam textured and is ten centimeters thick or less to subsoil. Sub soils often have a clay texture with abrupt textural boundaries with high shrink and swell, creating cracks on the surface. Subsoil horizons are occasionally stratified with rock fragments and course textured inclusions. The high clay content of subsoil horizons retains high levels of moisture late into the summer, and often have a water table within 100cm of the soil surface, with saturation above 50cm for at least 20 consecutive days in spring or early summer. Soils are often pachic mollic and frigid in temperature.

The soil series associated with this site is: Silverstate.

Table 5. Representative soil features

Parent material	(1) Alluvium – volcanic and sedimentary rock
Surface texture	(1) Silty clay loam
Family particle size	(1) Fine
Drainage class	Moderately well drained
Permeability class	Slow to very slow
Depth to restrictive layer	150 cm
Soil depth	150 cm
Surface fragment cover $\leq 3"$	0 – 10 %
Surface fragment cover $> 3"$	0 – 10 %
Available water capacity (0-101.6cm)	13.97 – 21.08 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.1 – 7.8
Subsurface fragment volume $\leq 3"$ (Depth not specified)	20 – 30 %

Subsurface fragment volume >3" (Depth not specified)	0 – 10 %
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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 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 shallow to medium rooted cool season perennial bunch and rhizomatous grasses, moderate lived, deep rooted shrubs, and mesic forb species. The dominant shrubs typically have a fibrous root system at a shallow to moderate depth, and a tap root which penetrates deeper into the clayey subsoil horizons. This site is highly controlled by the depth to and amount of water present within the soil profile. Increased depth to ground water causes this site to shift from mesic forbs and sedges to upland grasses and forbs with increased shrubs. The high clay content and proximity to streams typically excludes upland shrubs from the site.

Historically, this site was converted into hay and pasture land by homesteaders due to its high soil moisture giving it the ability to produce more palatable forage than surrounding sites in larger amounts. Low slopes and depth to ground water decreasing below 50cm in late summer allowed farming implements to better utilize this site.

This site is highly resistant to invasion by non-native species. The high-water content of the soil and relatively high precipitation, paired with moderate to high production/cover, exclude many of the common invasive species in the area, including cheatgrass brome, Russian and spotted knapweed, and common mustard species. Disturbance by anthropogenic forces and irregular/rare flooding events allow non native species to become established. Some of these include desirable forage species such as timothy and orchard grass, but also includes mesic invasive species such as Canada thistle, leafy spurge, white top, or common tansy.

Natural disturbance regimes that this site experience include periodic ponding and irregular to rare flooding in early spring. This site is resistant to disturbance from fire due to its higher moisture content, and resilient to it due to its dominate fine fuel load and sprouting shrubs.

Shrub growth is highly controlled by ground water level and persistence of water within the soil profile throughout the year. Silver sagebrush tolerates increased water within the soil profile, while other species such as basin big sagebrush and antelope bitterbrush are excluded. Water loss due to evaporation is lower than adjacent sites due to thick litter layer insulating the soil surface.

State and transition model

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Shrub/Vine					
1				224-448	
	sedge	CAREX	<i>Carex</i>	280-392	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	168-280	–
	beardless wildrye	LETR5	<i>Leymus triticoides</i>	112-224	–
	Cusick's Indian paintbrush	CACU7	<i>Castilleja cusickii</i>	56-224	–
Forb					
2				56-224	
Grass/Grasslike					
3				280-560	

Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.3 plant community composition

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

Physiographic and Soils Features were gathered from NASIS database.

Type locality

Location 1: Elko County, NV	
Township/Range/Section	T47N R54E S19
General legal description	Elko County, Nevada; about 1 mile northwest of Iron Mountain; about 1300 feet south and 500 feet west of the northeast corner of sec. 19, T. 47 N., R. 54 E.

Contributors

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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	09/18/2026
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:
