

Ecological site R027XY058NV

LOAMY 10-12 P.Z.

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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): 027X–Fallon-Lovelock Area

Physiography Found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus this area is characterized by isolated uplifted fault block mountain ranges trending north to south that are separated by broad, hydrologically closed basins. The entire area occurs in the rain-shadow of the Sierra Nevada mountains and is influenced by Pleistocene Lake Lahontan which reached its most recent high stand about 12,000 years ago. There is substantial evidence suggesting the western Great Basin has been the site of pluvial-interpluvial cycles for at least the past two million years. The mountains and valleys are dissected by the Humboldt, Truckee, Carson, and Walker Rivers and their tributaries, all of which terminate within MLRA 27. Extensive playas can be found throughout this area and are the result of drying of ancient Lake Lahontan. Elevation generally ranges from 3,300 to 5,900 feet (1,005 to 1,800 meters) in valleys, but on some mountain peaks it is more than 7,870 feet (2,400 meters). Geology Landforms and soils of this MLRA have been heavily influenced by fluctuating lake level over the last 40,000 years. There is a level line evident on the higher slopes marking the former extent of glacial Lake Lahontan. Almost half of this area has surface deposits of alluvial valley fill influenced by lacustrine sediment. The rest has andesite and basalt rocks of different ages. Mesozoic and Tertiary intrusives are concentrated along the western border of the area, and Lower Volcanic Rocks (17 to 43 million years old) are common on the eastern side of the area. Also, some scattered outcrops of Mesozoic sedimentary and volcanic rocks and tuffaceous sedimentary rocks are in the mountains within the interior of this MLRA. Climate The average annual precipitation is 5 to 10 inches (125 to 255 millimeters) in most of the area but is as much as 19 inches (485 millimeters) on high mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The amount of precipitation is very low from summer to midautumn. The precipitation in winter occurs mainly as snow. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 155 days and ranges from 110 to 195 days, decreasing in length with elevation. Water The amount of precipitation is very low, and water for irrigation is obtained principally from diversions on the four large rivers in the area and from water stored in the Lahontan, Rye Patch, and Weber Reservoirs. Pyramid Lake and Walker Lakes are terminal lakes for the Truckee and Walker Rivers, respectively. Much of the annual flow of both rivers is diverted for irrigation, causing lake levels to fall and levels of dissolved salts to increase causing problems for the native Lahontan cutthroat trout. Soils The dominant soil orders are Aridisols and Entisols. The soils in the area are predominantly a mesic temperature regime, aridic moisture regime, and have a mixed mineralogy. They are generally well drained, loamy or sandy, commonly skeletal, and shallow to very deep. Accumulation of salts, tufa deposits, and eolian sediments with soluble salts over lacustrine deposits influence most of the soils in the basin landforms of this MLRA. Soils on bedrock-controlled landforms are typically comprised of volcanic or tuffaceous sedimentary colluvium over residuum. Biological Resources This area supports extensive areas of salt-desert shrub vegetation. Shadscale and Bailey's greasewood are widespread, occurring both individually and together. Grasses are generally sparse, although Indian ricegrass is prominent, especially on the sandy soils. Fourwing saltbush, winterfat, spiny hopsage, wolfberry, ephedra, dalea, and bud sagebrush are common shrubs. Basin wildrye, creeping wildrye, alkali sacaton, saltgrass, black greasewood, rubber rabbitbrush, and big saltbush are important plants on saline bottom lands and terraces. A few marsh areas support cattail, bulrushes, sedges, and rushes. Big sagebrush, along with scattered Utah juniper and singleleaf pinyon, is associated with Thurber needlegrass, desert needlegrass, Sandberg bluegrass, and squirreltail on the higher elevation piedmont slopes and mountains.

Ecological site concept

The Loamy 10-12 P.Z. site occurs on mountain sideslopes. Slope gradients of less than 15 percent are typical. Elevations are 5200 to 7800 feet. The soils are moderately deep and well drained.

Associated sites

R027XY054NV	LOAMY SLOPE 10-12 P.Z. Less productive site; steeper slopes
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Similar sites

R027XY007NV	LOAMY SLOPE 8-10 P.Z. Less productive site; ACHY major grass
R027XY072NV	GRANITIC SLOPE 10-12 P.Z. Less productive site; granitic PM
R027XY073NV	GRANITIC SLOPE 12-14 P.Z. LECI4 minor grass, if present; higher elevations; granitic PM

Table 1. Dominant plant species

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

Physiographic features

The Loamy 10-12 P.Z. site occurs on mountain sideslopes. Slopes range from 8 to 75 percent, but slope gradients of 4 to 15 percent are most typical. Elevations are 5200 to 7800 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Plateau
Runoff class	High to very high
Elevation	1,590 – 2,380 m
Slope	10 – 80 %
Water table depth	180 cm

Aspect	Aspect is not a significant factor
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Climatic features

The climate is semiarid with cool, moist winters and warm, dry summers. Average annual precipitation is 10 to 12 inches. Mean annual temperatures are 42 to 53 degrees F. The average growing season is about 90 to 120 days.

There is no climate station available for this site.

Table 3 Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	310 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are moderately deep and well drained. They formed in colluvium over residuum from granitic rocks. The soils typically have a mollic epipedon and are skeletal in the control section. Soil reaction is neutral or slightly alkaline and the soils noncalcareous throughout. The available water capacity is very low and surface runoff is high to very high. Potential for sheet and rill erosion is high. The soil moisture regime is aridic bordering on xeric and the soil temperature regime is frigid. Associated soil series are Madeline and Say.

The representative soil series is Say, a fine-loamy, mixed, superactive, frigid Aridic Argixerolls. A mollic epipedon occurs from the soil surface to 23 cm and an argillic horizon occurs from 30 to 48 cm.

Table 4. Representative soil features

Parent material	(1) Residuum – granite (2) Colluvium – granite
Surface texture	(1) Loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	50 – 100 cm

Surface fragment cover <=3"	10 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	5.84 – 8.89 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)	7.2 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	10 – 30 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

Where management results in abusive grazing use by livestock or feral horses, Thurber's needlegrass composition declines and is replaced by bluegrasses and bottlebrush squirreltail as the dominant understory grasses. Cheatgrass and other annuals will often dominate the understory as big sagebrush and Douglas' rabbitbrush increase in the overstory with degraded ecological condition. Where site degradation has been fire-induced, broom snakeweed, horsebrush, and rabbitbrush often dominate the site. In the absence of periodic, natural, wildfire, singleleaf pinyon and Utah juniper commonly encroach onto this site.

Fire Ecology:

The fire return interval for Wyoming big sagebrush communities ranges from 10 to over 70 years. Fire is the principal means of renewal for decadent stands of Wyoming big sagebrush.

Wyoming big sagebrush is killed by fire and establishes after fire from a seedbank; from seed produced by remnant plants that escaped fire; and from plants adjacent to the burn that seed in.

Mountain big sagebrush is highly susceptible to injury from fire. It is often top-killed by fire and will not resprout.

Thurber's needlegrass is classified as moderately resistant, but depending on season of burn, phenology, and fire severity, this perennial bunchgrass is moderately to severely damaged by fire. Early season burning is more damaging to this needlegrass than late season burning.

Basin wildrye is top-killed by fire. Older basin wildrye plants with large proportions of dead material within the perennial crown can be expected to show higher mortality due to fire than younger plants having little debris. Basin wildrye is generally tolerant of fire but may be

damaged by early season fire combined with dry soil conditions.

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	Primary Perennial Grasses			527-785	
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	448-560	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	56-168	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	22-56	–
2	Secondary Perennial Grasses			22-112	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	6-34	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	6-34	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	6-34	–
Forb					
3	Perennial Forbs			39-118	
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	6-34	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	6-34	–
	buckwheat	ERIOG	<i>Eriogonum</i>	6-34	–
	lupine	LUPIN	<i>Lupinus</i>	6-34	–
	phlox	PHLOX	<i>Phlox</i>	6-34	–
Shrub/Vine					
4	Primary Shrubs			157-235	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	78-118	–
5	Secondary Shrubs			4-50	
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	6-34	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	6-34	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	6-34	–
	desert peach	PRAN2	<i>Prunus andersonii</i>	6-34	–
Tree					
6	Evergreen			11-67	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	6-34	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	6-34	–

Animal community

Livestock Interpretations: This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub production. Thurber's needlegrass species begin growth early in the year and remain green throughout a relatively long growing season. This pattern of development enables animals to use Thurber's needlegrass when many other grasses are unavailable. Cattle prefer Thurber's needlegrass in early spring before fruits have developed as it becomes less palatable when mature. Thurber's needlegrasses are grazed in the fall only if the fruits are softened by rain. The early growth and abundant production of basin wildrye make it a valuable source of forage for livestock. It is important forage for cattle and is readily grazed by cattle and horses in early spring and fall. Though coarse-textured during the winter, basin wildrye may be utilized more frequently by livestock and wildlife when snow has covered low shrubs and other grasses. Sandberg bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Sandberg bluegrass is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial

bunchgrasses. Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year. Wildlife Interpretations: Thurber needlegrass is valuable forage for wildlife. Basin wildrye provides winter forage for mule deer, though use is often low compared to other native grasses. Basin wildrye provides summer forage for black-tailed jackrabbits. Because basin wildrye remains green throughout early summer, it remains available for small mammal forage for longer time than other grasses. Sandberg bluegrass is desirable for pronghorn antelope and mule deer in the spring and preferable in the spring, summer, and fall for elk and desirable as part of their winter range.

Hydrological functions

Runoff is high to very high. Permeability is slow.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site is used for camping and hiking and has potential for upland and big game hunting.

Other products

Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

Other information

Basin wildrye is useful in mine reclamation, fire rehabilitation and stabilizing disturbed areas. Its usefulness in range seeding, however, may be limited by initially weak stand establishment.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Churchill County, NV	
Township/Range/Section	T25N R35E S36
General legal description	Cottonwood Canyon area, Stillwater Range, Churchill County, Nevada.
Location 2: Pershing County, NV	
Township/Range/Section	T31N R37E S30
General legal description	Klondike Pass area, East Humboldt Range, Pershing County, Nevada.

Other references

Fire Effects Information System (Online; <http://www.fs.fed.us/database/feis/plants/>).

USDA-NRCS Plants Database (Online; <http://www.plants.usda.gov>).

Contributors

GKB

Approval

Kendra Moseley, 6/03/2024

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)	Patti Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	07/19/2013
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare. A few rills can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns are none to rare but can be expected in areas subjected to summer convection storms or rapid snowmelt usually on steeper slopes.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of water flow patterns. Frost heaving of shallow rooted plants should not be considered a "normal" condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**
Bare Ground 20-50% depending on amount of surface rock fragments

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

6. Extent of wind scoured, blowouts and/or depositional areas: None. Some wind-scouring may occur after wildfires.

7. Amount of litter movement (describe size and distance expected to travel): Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Soil stability values should be 3 to 6 on most soil textures found on this site. (To be field tested.)

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Surface structure is typically moderate fine platy. Soil surface colors are browns and soils are typified by a mollic epipedon. Organic matter of the surface 2 to 4 inches is typically <1.5 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., Thurber's needlegrass, basin wildrye] slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): Compacted layers are none. Subsoil argillic horizons are not to be interpreted as compacted.

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, cool season, perennial bunchgrasses

Sub-dominant: tall shrubs (big sagebrush) > associated shrubs > shallow-rooted, cool season, perennial bunchgrasses > deep-rooted, cool season, perennial forbs > fibrous, shallow-rooted, cool season, perennial and annual forbs

Other: evergreen trees

Additional: After wildfires, deep-rooted, cool season perennial bunchgrasses, sprouting shrubs (ephedra, rabbitbrush) and forbs will dominate. Sagebrush will be removed for 5 to 10 years.

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 25% of total woody canopy; some of the mature bunchgrasses (<10%) have dead centers.

14. Average percent litter cover (%) and depth (in): Between plant interspaces ($\pm$ 25%) and litter depth is <¼ inch.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
For normal or average growing season (through June) ± 1000 lbs/ac; Favorable years ± 1200 lbs/ac and unfavorable years ± 700 lbs/ac
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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: Potential invaders include cheatgrass, bur buttercup, halogeton, Russian thistle, annual mustards, and knapweeds. Utah juniper and singleleaf pinyon can increase and eventually dominate this site.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years. Reduced growth and reproduction occur during extreme or extended drought periods.
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