

Ecological site R029XY051NV LOAMY SLOPE 16+ 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): 029X–Southern Nevada Basin and Range

The Southern Nevada Basin and Range MLRA (29) represents the transition from the Mojave Desert to the Great Basin. It is cooler and wetter than the Mojave. It is warmer and typically receives more summer precipitation than the Great Basin. This area is in Nevada (73 percent), California (25 percent), and Utah (2 percent). It makes up about 26,295 square miles (68,140 square kilometers). Numerous national forests occur in the area, including the San Bernardino, Angeles, Sequoia, Inyo, Humboldt-Toiyabe, and Dixie National Forests. Portions of Death Valley National Monument, the Nuclear Regulatory Commission's Nevada Test Site, the Hawthorne Ammunition Depot, and the Nellis Air Force Range in Nevada and the China Lake Naval Weapons Center in California also are in this MLRA. The northeast part of the Paiute Indian Reservation and the southern third of the Walker River Indian Reservation are in the part of this MLRA in Nevada, and the Lone Pine, Fort Independence, and Big Pine Indian Reservations are in the part in California.

Physiography:

The entire area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The area of broad, nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by sloping fans and pluvial lake terraces. The mountains are uplifted fault blocks with steep side slopes and not well dissected due to limited annual precipitation. Most of the valleys in this MLRA are closed basins or bolsons containing sinks or playa lakes.

Geology:

The mountains are dominated by Pliocene and Miocene andesite and basalt rocks, Paleozoic and Precambrian carbonate rocks prominent in some areas. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments (Pliocene and Miocene) are in the western and eastern thirds of this MLRA. The valleys consist mostly of alluvial fill and playa deposits at the lowest elevations in the closed basins.

Climate:

The average annual precipitation is 3 to 12 inches (75 to 305 millimeters) in most of this area. It may be as high as 29 inches (735 millimeters), on the higher mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Summers are dry, but sporadic storms are common in July and August.

Water Resources:

Water resources are scarce. Ground water and surface water sources are limited. Streams are small and intermittent. Quality of surface water is naturally degraded as streams cross area of valley fill effected by dissolved salts. Irrigation water may raise the levels of dissolved salts and suspended sediments causing contamination.

Soils:

Dominant soil orders include Entisols and Aridisols.

Ecological site concept

The Loamy Slope 16+ P.Z. site occurs on straight to convex mountain sideslopes on all exposures. This site is restricted to northerly aspects at the lower elevations of its occurrence. Slopes range from 2 to 75 percent, but slope gradients of 15 to 75 percent are typical. Elevations are 7,000 to about 10,000 feet. The soils are from residuum and colluvium derived from volcanic rocks. These soils are typically well drained.

Associated sites

R029XY027NV	MAHOGANY THICKET This site is on mountain sideslopes on all aspects. Slopes range from 15 to 50 percent. Elevations are 6,400 to about 10,000 feet. Soils are moderately deep and well drained. The available water capacity is low to moderate. Permeability is slow to moderate. These soils are typically modified with high volumes of rock fragments throughout the soil profile.
R029XY043NV	MAHOGANY SAVANNA This site is on mountain summits, crests, and sideslopes. Slopes range from 15 to 50 percent. Elevations are 5,800 to about 10,000 feet. The soils are typically shallow to moderately deep and are well drained. There typically are high amounts of stones or boulders on the soil surface.
R029XY052NV	CLAYPAN 16+ P.Z. This site is on straight to convex mountain summits, ridges, and sideslopes on all exposures. This site is restricted to northerly aspects at the lower elevations of its occurrence. Slopes range from 8 to 50 percent. Elevations range from 5,800 to about 10,000 feet. The soils have formed in residuum and colluvium. They are shallow to very deep with a layer restrictive to root development close to the soil surface.
R029XY053NV	MOUNTAIN RIDGE 16+ P.Z. This site is on high elevation, wind blown, mountain ridges and summits on all exposures. Slopes range from 8 to over 50 percent. Elevations are 7,000 to over 10,000 feet. The soils formed in residuum from volcanic rocks. The soils are shallow to very shallow to bedrock and well drained.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. vaseyana</i>
Herbaceous	(1) <i>Achnatherum lettermanii</i> (2) <i>Poa fendleriana</i>

Physiographic features

The Loamy Slope 16+ P.Z. site occurs on straight to convex mountain sideslopes on all exposures. This site is restricted to northerly aspects at the lower elevations of its occurrence. Slopes range from 2 to 75 percent, but slope gradients of 15 to 75 percent are typical. Elevations are 7,000 to about 10,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Mountainside (3) Mountain
Runoff class	Medium to very high
Elevation	2,134–3,048 m
Slope	2–75%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is arid, characterized by cold, moist winters and warm, dry summers. Average annual precipitation is 16 to over 20 inches. Mean annual air temperature is 43 to 48 degrees F. The average growing season is about 60 to 90 days. There is no climate station associated with this site.

Table 3. Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	

Precipitation total (average)	508 mm
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Influencing water features

Influencing water features are not associated with this site.

Soil features

The soils associated with this site are from residuum and colluvium derived from volcanic rocks. These soils are typically well drained. Water intake rates are moderate and available water holding capacity is moderate. Runoff is low to high and the potential for sheet and rill erosion is moderate. The soils are usually moist in winter and spring and dry in summer and fall, except for 10 to 20 days between July and October due to convection storms. The soil moisture regime is aridic bordering on xeric and the soil temperature regime is mesic.

Soil series associated with this site include: Foxvire, a coarse-loamy, mixed, superactive Pachic Haploryoll, Kiote, a loamy-skeletal, mixed superactive Vitrandic Argicryolls and Aridic Haploxerolls. The soils are typified by a thick mollic epipedon.

Table 4. Representative soil features

Parent material	(1) Colluvium–volcanic rock
Surface texture	(1) Gravelly loam (2) Very gravelly loam (3) Very cobbly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	183–213 cm
Surface fragment cover <=3"	20–25%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	11.94–12.95 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–7
Subsurface fragment volume <=3" (Depth not specified)	20–60%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Where management results in abusive grazing use by livestock or feral horses, Letterman's needlegrass and other palatable grasses and forbs decrease while rabbitbrush, snowberry and mountain big sagebrush increase. Species likely to invade this site are annuals. Singleleaf pinyon and Utah juniper readily increase on this site where it occurs adjacent to these woodlands.

Fire Ecology:

Presettlement fire return intervals in mountain big sagebrush communities varied from 15 to 25 years. Plants are readily killed in all seasons, even light severity fires. Mountain big sagebrush is highly susceptible to injury from fire. It is often top-killed by fire and will not resprout. Common snowberry has high resistance to fire. It is a rhizomatous species with rhizomes buried 2 to 5 inches (5 to 12.5 cm) deep in mineral soil. After fire has killed the top of the plant, new growth sprouts from these rhizomes. This rhizomatous growth response is highly variable and depends on conditions at specific sites. Regeneration from buried seed is favored by fires of low severity and short duration that remove little of the soil organic level. Aboveground parts of Utah serviceberry may be killed or consumed under fire conditions with sufficient flame lengths. Utah serviceberry may be slightly harmed by fire, depending on moisture conditions, but is generally considered to be fire tolerant. Utah serviceberry sprouts from the root crown following fire. Soil moisture is important to aid sprouting. Perennial needlegrasses tend to be among the least fire resistant bunchgrass due to the densely tufted stems. Little specific information is available on adaptations of Letterman's needlegrass to fire. It is morphologically similar to Columbia needlegrass, which is only slightly to moderately damaged by fire. Season of burn affects the plant's ability to survive a fire. Post fire regeneration is through seeding and tillering. Muttongrass is unharmed to slightly harmed by light-severity fall fire. Muttongrass appears to be harmed by and slow to recover from severe fire. Mountain brome is likely to be top-killed by fire, although the coarse stems and broad leaves may be more fire-resistant than fine-leaved bunchgrasses. Mountain brome is most susceptible to fire damage when it is actively growing in spring and early summer. Fire generally top-kills dry grasses. The rhizomatous, dense growth of spike fescue may lessen the impact of fire on this species. Western needlegrass is moderately damaged by fire. The recovery time is between 3 and 5 years. Needlegrasses are damaged by burning due to the dense plant material that can burn slowly and long, charring to the growing points. Late summer and early fall fires are the least harmful.

The reference plant community is dominated by mountain big sagebrush, Letterman's needlegrass and muttongrass. Potential vegetative composition is about 50 percent grasses, 15 percent forbs, and 35 percent shrubs and trees. Approximate ground cover (basal and crown) is 25 to 35 percent.

State and transition model

State 1: Reference State

Community Phase 1.1

- Mountain big sagebrush dominant
- Perennial native bunchgrass sub-dominant
- Perennial native forbs and other native shrubs present

Community Phase 1.2

- Mountain big sagebrush and other shrubs decrease
- Perennial bunchgrasses increase

1.1B

Community Phase 1.3

- Mountain big sagebrush increases
- Perennial bunchgrass decreases

1.3A

T1A

State 2: Current Potential State

Community Phase 2.1

- Mountain big sagebrush dominant
- Perennial native bunchgrass sub-dominant
- Perennial native forbs and other native shrubs present
- Annual non-native species present

Community Phase 2.2

- Mountain big sagebrush and other shrubs decreases
- Perennial bunchgrasses increases
- Annual non-native species stable to increasing

2.1B

Community Phase 2.3

- Mountain big sagebrush increases
- Perennial bunchgrass decreases
- Annual non-native species are stable to increasing

2.3A

Figure 1. DRAFT STM

State 1: Representative of the reference conditions prior to Euro-American settlement in the west.

1.1A: fire or other disturbance that removes sagebrush canopy

1.1B: absence of disturbance and natural regeneration over time

1.2A: absence of disturbance and natural regeneration over time

1.3A: fire or other disturbance that removes sagebrush canopy

T1A: introduction of non-native species

State 2: Representative of the current potential with the presence of non-native annuals. Non-native annuals have the ability to significantly change disturbance regimes and nutrient cycling dynamics.

2.1A: fire or other disturbance that removes sagebrush canopy

2.1B: absence of disturbance and natural regeneration over time, may be coupled with inadequate rest and recovery from defoliation

2.2A: absence of disturbance and natural regeneration over time

2.3A: fire or other disturbance that removes sagebrush canopy

Figure 2. DRAFT STM LEGEND

Animal community

Livestock Interpretations:

This site has limited value for livestock grazing, due to the steep slopes. Grazing management should be keyed to perennial grass production. Letterman's needlegrass begins growth early in the year and remains green throughout the relatively long growing season, thus, making it valuable forage for livestock. Muttongrass is excellent forage for domestic livestock especially in the early spring. Muttongrass begins growth in late winter and early spring, which makes it available before many other forage plants. Mountain brome is one of the most important forage grasses in the quaking aspen zone. Mountain brome is ranked as excellent forage for both cattle and horses and good for domestic sheep. Domestic sheep will graze mountain brome only when it is fairly succulent. Domestic livestock commonly graze spike fescue on spring range. Spike fescue is a highly nutritious, productive, and palatable grass. It is fairly palatable for cattle and domestic sheep in the spring; however, as spike fescue matures in summer it becomes unpalatable and is grazed sparingly. Western needlegrass has a spreading and deeply penetrating root system, which makes it resistant to trampling. Pine needlegrass provides a palatable and nutritious feed for livestock during the spring and early summer. Mountain big sagebrush is eaten by domestic livestock but has long been considered to be of low palatability, and a competitor to more desirable species. Attentive grazing management is required due to steep slopes and erosive soil surface condition. Common snowberry is considered important browse for many types of livestock. It is especially important to domestic sheep and cattle. Common snowberry is highly palatable to cattle. It plays a critical role in permitting cattle to meet their protein requirements during the latter half of the growing season. Domestic sheep also utilize common snowberry for browse and it is considered fair to good forage. It has no forage value for horses. Utah serviceberry provides good browse for domestic sheep and domestic goats. In the spring, Utah serviceberry provides fair forage for cattle and good to excellent browse for domestic sheep and goats. Utah serviceberry provides good forage late in winter and in early spring, because it leafs out and blooms earlier than associated species.

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:

Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer and elk. Common snowberry is considered important browse for many types of wildlife. Bighorn sheep use common snowberry regularly during the summer. Forage value to elk is fair. Common snowberry is important as both cover and food for bird and small mammal populations. These include sharp-tailed, ruffed, and blue grouse, wild turkey and, several non-game species of bird including the kingbird, western flycatcher, and western bluebird. Among small mammals that rely on common snowberry are fox squirrels, desert cottontails, and pocket gopher. Utah serviceberry is a very important species for mule deer in the Great Basin. Porcupines and desert bighorn sheep also use Utah serviceberry. Utah serviceberry fruit is preferred by many birds. It can be an important winter food for birds since berries stay on the shrub throughout the winter. In Nevada, sage grouse eat the fruit of Utah serviceberry. Letterman's needlegrass provides valuable forage for many species of wildlife. It is consumed by mule deer and is most palatable early in the season before the foliage becomes coarse and wiry. Deer and elk make heavy use of muttongrass, especially in early spring when other green forage is scarce. Depending upon availability of other nutritious forage, deer may use muttongrass in all seasons. Muttongrass cures well and is an important fall and winter deer food in some areas. Mountain brome seedheads and seeds provide food for many birds and small mammals. Pronghorn antelope will consume mountain brome primarily in the spring. The palatability of mountain brome is excellent for deer, particularly during the late spring and early summer. Spike fescue is frequently browsed by mule deer and elk. Spike fescue provides some cover for smaller mammals and birds. Western needlegrass provides valuable forage for many species of wildlife. Pine needlegrass provides a palatable and nutritious feed for wildlife during the spring and early summer.

Hydrological functions

Runoff is low to high and the potential for sheet and rill erosion is moderate. Permeability is moderate to moderately rapid.

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 hiking and has potential for upland and big game hunting.

Other products

Native peoples used big sagebrush leaves and branches for medicinal teas, and the leaves as a fumigant. Bark was woven into mats, bags and clothing. Common snowberry fruit fruits were eaten fresh and also dried for winter use by Native Americans. Common snowberry was also used on hair as soap, and the fruits and leaves mashed and applied to cuts or skin sores as a poultice and to soothe sore, runny eyes. Tea from the bark was used as a remedy for tuberculosis and sexually transmitted diseases. A brew made from the entire plant was used as a physic tonic. Arrowshafts and pipestems were made from the stems. Utah serviceberry fruits were used by Native Americans and early European explorers in North America for food and medicine.

Other information

Utah serviceberry has been used to revegetate big game winter range and for surface stabilization. It grows slowly from seed and therefore transplanting may be more successful than seeding for revegetation projects. Letterman's needlegrass has been used successfully in revegetating mine spoils. This species also has good potential for erosion control. Mountain brome is an excellent native bunchgrass for seeding alone or in mixtures in disturbed areas, including depleted rangelands, burned areas, roadways, mined lands, and degraded riparian zones.

Inventory data references

NASIS data used for abiotic narratives and tables.

Type locality

Location 1: Nye County, NV

Township/Range/Section	T2N R49E S36
Latitude	37° 58' 56"
Longitude	116° 26' 39"
General legal description	Section 36, T2N. R49E. MDBM. About 3½ miles west of Eden Creek Ranch, north slopes of Kawich Peak, Kawich Range, Nye County, Nevada.

Other references

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

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

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

Contributors

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Approval

Kendra Moseley, 2/20/2025

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	12/01/1983
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- Number and extent of rills:** Rills are none to rare. A few can be expected on steeper slopes recently subjected to summer convection storms or rapid spring runoff.
- Presence of water flow patterns:** Water flow patterns are none to rare, but can be expected in areas recently subjected to summer convection storms, usually on steeper slopes. Flow patterns are short (<1 m) and stable.
- Number and height of erosional pedestals or terracettes:** Pedestals are rare. Occurrence is usually limited to areas of water flow patterns.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is \pm 10-20%.
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5. **Number of gullies and erosion associated with gullies:** Gullies are none.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None
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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.
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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 4 to 6 on most soil textures found on this site.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically subangular blocky. Soil surface colors are dark grayish brown and soils are typified by a mollic epipedon. Organic matter of the surface 2 to 3 inches is typically 2 to 5 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants (i.e., Letterman's needlegrass and muttongrass) slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.
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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. Subangular blocky sub-surface horizons or subsoil argillic horizons are not to be interpreted as compacted layers.
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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: Deep-rooted, cool season, perennial bunchgrasses > tall shrubs (i.e., mountain big sagebrush)
- Sub-dominant: shallow-rooted, cool season, perennial bunchgrasses > associated shrubs > deep-rooted, cool season, perennial forbs > fibrous, shallow-rooted, cool season, perennial and annual forbs
- Other: evergreen trees
- Additional:

-
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 (<20%) have dead centers.
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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (\pm 25-35%) and depth of litter is <1/2 inch.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (thru June) \pm 1100 lbs/ac; Favorable years + 1300 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 and annual mustards.
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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 drought years.
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