Ecological site R029XY042NV
COARSE SILTY 5-8 P.Z.

Last updated: 2/20/2025
Accessed: 05/11/2025

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 in 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 Coarse Silty 5-8 P.Z. site occurs on inset fans, alluvial flats, fan skirts and fan remnants on all exposures. Slopes range from 2 to 15 percent, but slope gradients of 0 to 8 percent are typical. Elevations are 3000 to 7000 feet. The soils are typically very deep and well drained to somewhat excessively drained. Surface soils are typically moderately coarse to coarse textured. The soils are moderately to very strongly alkaline and calcareous throughout

the profile.

Associated sites

R029XY016NV	**LOAMY UPLAND 5-8 P.Z.** This site occurs on piedmont slopes, alluvial fans and alluvial plains of all exposures. Slopes range from 0 to 50 percent, but slope gradients of 2 to 15 percent are typical. Elevations are 4200 to about 6000 feet. The soils of this site are moderately deep to deep and well drained. Some soils may have a restrictive layer below the main plant rooting depth. Water intake rates are moderate, available water capacity is very low to moderate, and runoff is medium.
R029XY017NV	**LOAMY 5-8 P.Z.** This site occurs on piedmont slopes, fan skirts, inset fans, fan remnants and alluvial plains on all exposures. Slopes range from 0 to 30 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 3100 to 7000 feet. The soils associated with this site are typically very shallow to very deep and well drained. Some soils have a restrictive layer below the main plant rooting depth (at soil depths greater than 14 inches). Surface layers are usually gravelly or very gravelly and have less than 20 percent clay. Surface soils are moderately to strongly alkaline, non-saline to slightly saline, and non-sodic to very slightly sodic.
R029XY020NV	**SILTY 5-8 P.Z.** This site occurs on alluvial flats, fan skirts, and inset fans on all exposures. Slopes range from 0 to 8 percent, but slope gradients of 0 to 2 percent are typical. Elevations are 3500 to about 7000 feet. The soils are very deep and moderately well drained. Surface soils are typically very fine sandy loams to silt loams. The surface layer of these soils will normally develop a vesicular crust, inhibiting water infiltration and seedling emergence.
R029XY046NV	**SANDY LOAM 5-8 P.Z.** This site occurs on inset fans and on axial-stream floodplains of basin floors. Slopes range from 0 to 15 percent, but slope gradients of 0 to 8 percent are typical. Elevations are 4400 to about 7000 feet. The soils of this site are typically deep to very deep and well to excessively well drained. These soils have coarse textured surfaces (sandy loams, loamy sands). Water infiltration is moderate to moderately rapid, available water capacity is low. The soils have an ochric epipedon.
R029XY059NV	**SHALLOW SILTY 5-8 P.Z.** This site occurs on lake plains and lake plain terraces of basin floors. Slopes gradients of 0 to 4 percent are most typical. Elevations are 3500 to about 6500 feet. The soils associated with this site have formed in alluvium over lacustrine deposits derived from mixed rock sources. The soils are very deep and are well drained. Permeability is slow and available water holding capacity is low to moderate. These soils have the potential for formation of gullies, especially in areas near shallow drainageways.
R029XY079NV	**DROUGHTY LOAM 5-8 P.Z.** This site occurs on inset fans, fan piedmont slopes, and fan skirts. Slope gradients of 0 to 8 percent are typical. Elevations are 4200 to 6000 feet. The soils associated with this site are very shallow to very deep alluvium derived primarily from volcanic rock sources. Soil textures throughout the soil profile are loams to gravelly loams. Some soils may have a restrictive layer below the main plant rooting depth.

Similar sites

R029XY059NV	**SHALLOW SILTY 5-8 P.Z.** ATCO dominant shrub
R029XY046NV	**SANDY LOAM 5-8 P.Z.** More productive site; ATCA2-KRLA2 codominant shrubs
R029XY017NV	**LOAMY 5-8 P.Z.** ATCO dominant shrub
R029XY020NV	**SILTY 5-8 P.Z.** Less shrub diversity; KRLA2 dominant plant

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Krascheninnikovia lanata*

Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

The Coarse Silty 5-8 P.Z. site occurs on inset fans, alluvial flats, fan skirts and fan remnants on all exposures. Slopes range from 2 to 15 percent, but slope gradients of 0 to 8 percent are typical. Elevations are 3000 to 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Inset fan
Runoff class	Very low to low
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare
Elevation	3,000–7,000 ft
Slope	2–15%
Water table depth	72 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 5 to 8 inches. Mean annual air temperature is 51 to 56 degrees F. The average growing season is about 130 to 170 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	139-162 days
Freeze-free period (characteristic range)	181-190 days
Precipitation total (characteristic range)	6-7 in
Frost-free period (actual range)	134-167 days
Freeze-free period (actual range)	179-192 days
Precipitation total (actual range)	6-7 in
Frost-free period (average)	151 days
Freeze-free period (average)	186 days
Precipitation total (average)	7 in

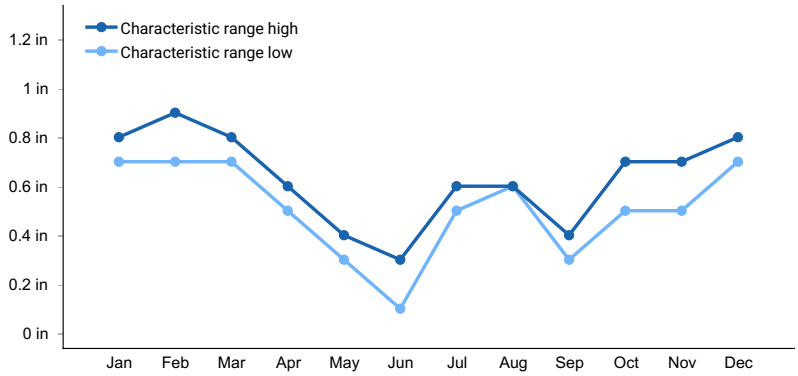


Figure 1. Monthly precipitation range

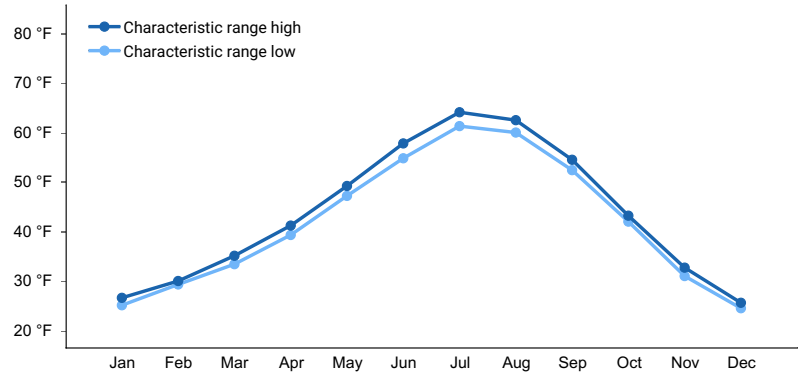


Figure 2. Monthly minimum temperature range

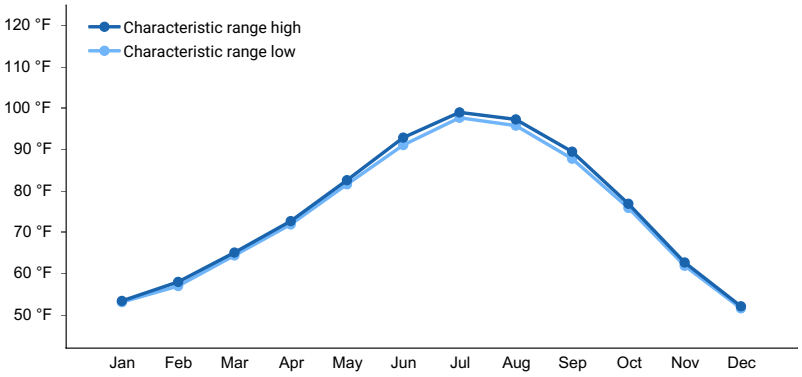


Figure 3. Monthly maximum temperature range

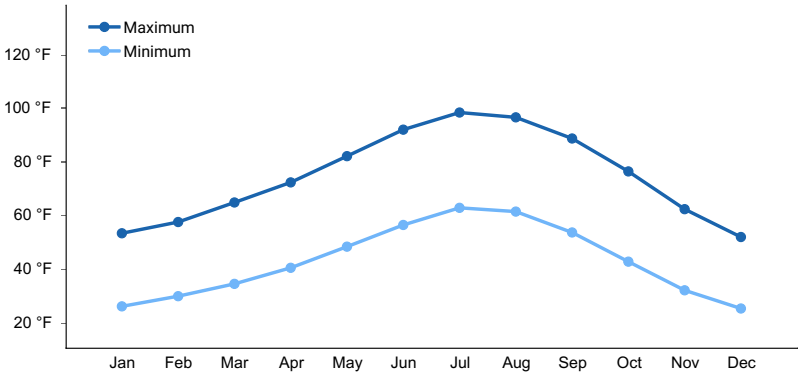


Figure 4. Monthly average minimum and maximum temperature

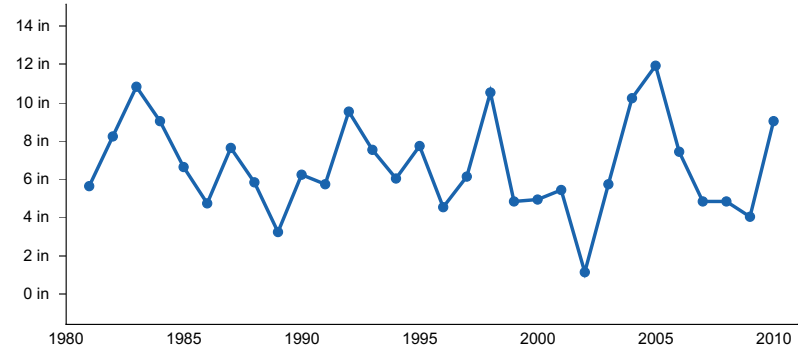


Figure 5. Annual precipitation pattern

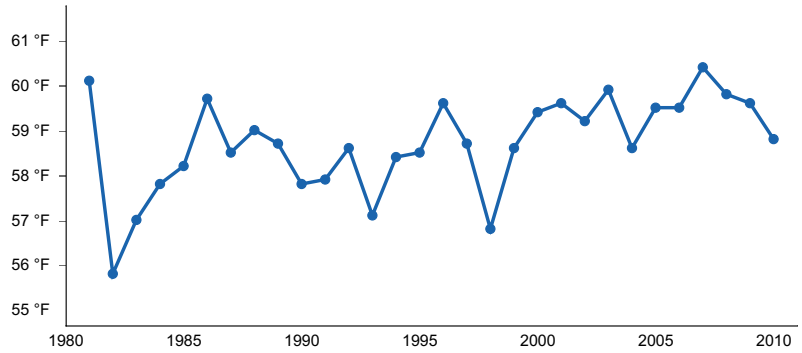


Figure 6. Annual average temperature pattern

Climate stations used

- (1) HIKO [USC00263671], Hiko, NV
- (2) PAHRANAGAT WR [USC00265880], Alamo, NV

Influencing water features

This site receives additional moisture as run-in from higher landscapes.

Soil features

The soils are typically very deep and well drained to somewhat excessively drained. Surface soils are typically moderately coarse to coarse textured. These soils have moderate to moderately rapid permeability and low to very low runoff. The soils are moderately to very strongly alkaline and calcareous throughout the profile. The coarse surface textures provide rapid water infiltration and enhance the effective moisture supply. Available water capacity is low to moderate. Sheet and rill erosion potential is slight. Soil series associated with this site include Cliffdown, Escalante, Gardenvalley, Geer, and Jolan.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Fine sandy loam (2) Very gravelly sandy loam (3) Gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	72–84 in
Surface fragment cover <=3"	2–30%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	2.4–6.6 in
Calcium carbonate equivalent (0-40in)	15–40%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	7.9–9.6

Subsurface fragment volume <=3" (Depth not specified)	5–40%
Subsurface fragment volume >3" (Depth not specified)	0–7%

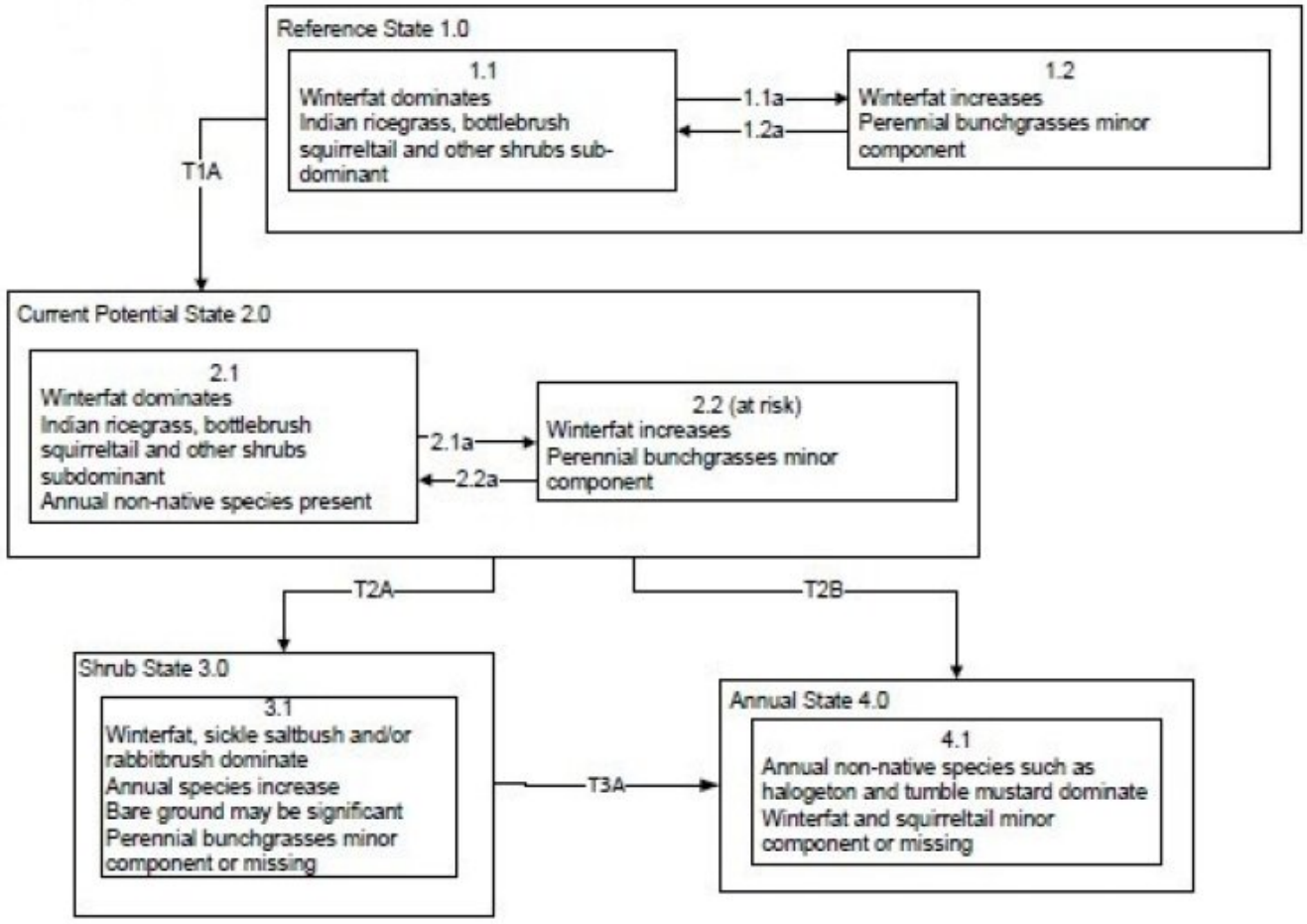
Ecological dynamics

Where management results in abusive livestock use by cattle and /or feral horses, winterfat, fourwing saltbush, and Indian ricegrass decrease. With further site degradation, halogeton, Russian thistle and annual mustards invade the interspace areas between shrubs. These annual species, particularly halogeton, can become dominant on disturbed sites. The soils of this site are susceptible to wind erosion.

Fire Ecology:
Prior to the invasion of exotic annuals, fire was an uncommon component of salt-desert shrub communities. Salt-desert communities dominated by winterfat produced little fine fuel. The introduction of annual grasses, including the highly flammable cheatgrass (*Bromus tectorum*), into these communities has altered fuel loads and fuel distribution. After wet years when annual grass production is high, salt-desert shrub communities are susceptible to fire. Fire drastically alters the community composition because salt-desert shrubs are not adapted to periodic fire. Winterfat is either killed or top-killed by fire, depending on fire severity. Severe fire can kill the perennating buds located several inches above the ground surface and thus kills the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the aboveground portions of winterfat and thus does not cause high mortality. Budsage is killed by fire. Fire top-kills or kills fourwing saltbush, depending upon ecotype. Fourwing saltbush may sprout after top-kill. Fourwing saltbush probably establishes primarily from seed after fire, with some populations also regenerating vegetatively. Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas. Galleta is a rhizomatous perennial which can resprout after top-kill by fire. Bottlebrush squirreltail's small size, coarse stems, and sparse leafy material aid in its tolerance of fire. Postfire regeneration occurs from surviving root crowns and from on- and off-site seed sources. Frequency of disturbance greatly influences postfire response of bottlebrush squirreltail. Undisturbed plants within a 6 to 9 year age class generally contain large amounts of dead material, increasing bottlebrush squirreltail's susceptibility to fire.

Community Phase 1.1 - The reference plant community is dominated by an open stand of perennial grasses and scattered shrubs. The plant community is dominated by Indian ricegrass and winterfat. Other important species on this site include galleta, bud sagebrush, and fourwing saltbush. Potential vegetative composition is approximately 55 percent grasses, 5 percent forbs, and 40 percent shrubs. Approximate ground cover (basal and crown) is 15 to 30 percent.

State and transition model



Reference State 1.0 Community Phase Pathways
1.1a: Drought and/or excessive herbivory favors as decrease in perennial bunchgrasses. Fire was infrequent but would be patchy due to low fuel loads.
1.2a: Time and lack of disturbance and/or release from drought

Transition T1A: Introduction of non-native species such as cheatgrass and halogeton.

Current Potential State 2.0 Community Phase Pathways
2.1a: Drought and/or inappropriate grazing management
2.2a: Time and lack of disturbance and/or release from drought

Transition T2A: Inappropriate grazing management in the presence of non-native species (3.1)

Transition T2B: Catastrophic fire and/or multiple fires, inappropriate grazing management and/or soil disturbing treatments (4.1)

Transition T3A: Catastrophic fire and/or multiple fires, inappropriate grazing management and/or soil disturbing treatments (4.1)

Animal community

Livestock Interpretations:
This site is suited to livestock grazing.
Grazing management should be keyed to perennial grass production. Indian ricegrass has good forage value for domestic sheep, cattle and horses. It supplies a source of green feed before most other native grasses have produced much new growth. When actively growing, galleta provides good to excellent forage for cattle and horses and fair forage for domestic sheep. Although not preferred, all classes of livestock may use galleta when it is dry. Domestic sheep show greater use in winter than summer months and typically feed upon central portions of galleta tufts, leaving coarser growth around the edges. Galleta may prove somewhat coarse to domestic sheep. Bottlebrush squirreltail is very palatable winter forage for domestic sheep of Intermountain ranges. Domestic sheep

relish the green foliage. Overall, bottlebrush squirreltail is considered moderately palatable to livestock. Winterfat is an important forage plant for livestock, especially during winter when forage is scarce. Abusive grazing practices have reduced or eliminated winterfat on some areas even though it is fairly resistant to browsing. Effects depend on severity and season of grazing. Budsage is palatable and nutritious forage for domestic sheep in the winter and spring although it is known to cause mouth sores in lambs. Budsage can be poisonous or fatal to calves when eaten in quantity. Budsage, while desired by cattle in spring, is poisonous to cattle when consumed alone. Fourwing saltbush is one of the most palatable shrubs in the West. Its protein, fat, and carbohydrate levels are comparable to alfalfa. It provides nutritious forage for all classes of livestock. Palatability is rated as good for domestic sheep and domestic goats; fair for cattle; fair to good for horses in winter, poor for horses in other seasons.

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:
Winterfat is an important forage plant for wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents. Winterfat is a staple food for black-tailed jackrabbit. Mule deer and pronghorn antelope browse winterfat. Winterfat is used for cover by rodents. It is potential nesting cover for upland game birds, especially when grasses grow up through its crown. Budsage is palatable, nutritious forage for upland game birds, small game and big game in winter. Budsage is browsed by mule deer in Nevada in winter and is utilized by bighorn sheep in summer, but the importance of budsage in the diet of bighorns is not known. Bud sage comprises 18 – 35% of a pronghorn’s diet during the spring where it is available. Chukar will utilize the leaves and seeds of bud sage. Budsage is highly susceptible to effects of browsing. It decreases under browsing due to year-long palatability of its buds and is particularly susceptible to browsing in the spring when it is physiologically most active. Fourwing saltbush provides valuable habitat and year-round browse for wildlife. Fourwing saltbush also provides browse and shelter for small mammals. Additionally, the browse provides a source of water for black-tailed jackrabbits in arid environments. Granivorous birds consume the fruits. Wild ungulates, rodent and lagomorphs readily consume all aboveground portions of the plant. Palatability is rated good for deer, elk, pronghorn and bighorn sheep. Indian ricegrass is an important forage species for several wildlife species. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species. Bottlebrush squirreltail is a dietary component of several wildlife species.

Hydrological functions

Rills and waterflow patterns are none to rare.
A few waterflow patterns may be evident in areas subjected to summer convection storms. Where flow patterns are observed, they are short in length and stable. Pedestals are rare with occurrence typically limited to areas within water flow patterns. Gullies are rare in areas of this site that occur on stable landforms. Where this site occurs on inset fans, gullies and head-cuts associated with ephemeral channel entrenchment may occur. If observed, gullies and head-cuts should be healing or stable. Shrub canopy and associated litter break raindrop impact. Medium to coarse textured surface soils have moderate to rapid infiltration and medium to slow runoff.

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

Fourwing saltbush is traditionally important to Native Americans. They ground the seeds for flour. The leaves, placed on coals, impart a salty flavor to corn and other roasted food. Top-growth produces a yellow dye. Young leaves and shoots were used to dye wool and other materials. The roots and flowers were ground to soothe insect bites. Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used seed as a reserve food source.

Other information

Winterfat adapts well to most site conditions, and its extensive root system stabilizes soil. However, winterfat is intolerant of flooding, excess water, and acidic soils. Fourwing saltbush is widely used in rangeland and riparian improvement and reclamation projects, including burned area recovery. It is probably the most widely used shrub for restoration of winter ranges and mined land reclamation. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation.

Inventory data references

NASIS data used for abiotic narratives and tables.

Type locality

Location 1: Nye County, NV	
Township/Range/Section	T2S R53E S15
General legal description	NE¼ Section 15, T2S. R53E. MDBM. About 2½ mile north of Queen City Summit on west side of NvHwy 375, Railroad Valley area, Nye County, Nevada. This site also occurs in Esmeralda, Lincoln, and Mineral Counties, 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

GD/GKB/VWM

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)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare.

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2. **Presence of water flow patterns:** Water flow patterns are none to rare. A few waterflow patterns may be evident in areas subjected to summer convection storms. Where flow patterns are observed, they are short in length and stable.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare with occurrence typically limitec to areas within 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 ± 50%; surface rock fragments to ±15%; shrub canopy 15 to 25%; basal area for perennial herbaceous plants <5%.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None to rare. If observed, wind scoured spots are isolated and very small in aerial extent (<50ft2); Wind scouring may be common after severe wildfires.

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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 1 to 3 on most soil textures found on this site. Soils having thin surface sand sheet have lower stability values. (To be field tested.)

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface soil structure is typically thin or thick platy. Soil surface colors are light browns or grays and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Shrub canopy and associated litter break raindrop impact. Medium to coarse textured surface soils have moderate to rapid infiltration and medium to slow runoff.

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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. Massive sub-surface 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: Salt desert shrubs (winterfat & bud sagebrush) = deep-rooted, cool season, perennial bunchgrasses (Indian ricegrass)

    Sub-dominant: shallow-rooted bunchgrasses = rhizomatous grasses = deep-rooted, perennial, forbs = fibrous, shallow-rooted, perennial forbs =annual forbs

    Other: warm season bunchgrasses

    Additional:

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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; mature bunchgrasses commonly (±15%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces 20-30% and depth < ¼ in.

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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 (February thru May) ± 450 lbs/ac; Favorable years ± 700 lbs/ac and unfavorable years ± 300 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 halogeton, Russian thistle; annual mustards, and cheatgrass.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Reduced growth and reproduction occur during drought years.
