USDA Natural Resources
Conservation Service

Ecological site R029XY057NV
LOAMY ASH INFLUENCED SLOPE 12-14 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 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 Loamy Slope 12-14 P.Z. site is on summits and sideslopes of hills. Slopes range from 8 to 50 percent. Elevations are 5,000 to about 8,000 feet. The soils formed in residuum or colluvium from volcanic rocks with a component of volcanic ash. These soils are typically shallow to bedrock and the underlying parent material is usually highly fractured.

Associated sites

R029XY030NV	**LOAMY 12-14 P.Z.** This site is on fan remnants. Slopes range from 4 to 30 percent. Elevations are 6,800 to about 7,300 feet. The soils formed in alluvium from a variety of parent materials. These soils are deep and have slow permeability, low available water capacity and are well drained. The soil surfaces are usually gravelly and the soil profile may be gravelly throughout.
R029XY081NV	**SHALLOW CALCAREOUS HILL 10-14 P.Z.** This site is on summits and sideslopes of hills, mountains, fan remnants, and rock pediments on all aspects. Slopes range from 4 to 75 percent, but slope gradients of 15 to 50 are typical. Elevations are 4,400 to about 8,800 feet. The soils are very shallow to shallow to bedrock or duripan and well drained.
F029XY065NV	**PIMO-JUOS/ARTRW8** This site is on sideslopes and summits of hills and low mountains on all aspects. Slopes range from 4 to over 50 percent, but slope gradients of 30 to 50 percent are typical. Elevations are 5,500 to about 7,200 feet. This site is on shallow, rocky hills and is associated with areas of rock outcrop (ignimbrites, volcanic tuffs, etc.). The soils associated with this site are shallow and well drained. These soils are skeletal with 35 to over 50 percent gravels, cobbles or stones, by volume, distributed throughout their profile. Available water capacity is very low to low, but trees and shrubs extend their roots into fractures in the bedrock allowing them to utilize deep moisture. There are high amounts of rock fragments (gravels, cobbles, stones and some boulders) at the soil surface which occupy plant growing space, yet help to reduce evaporation and conserve soil moisture.

Similar sites

R029XY030NV	**LOAMY 12-14 P.Z.** More productive site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata*
Herbaceous	(1) *Pseudoroegneria spicata ssp. inermis*

Physiographic features

The Loamy Slope 12-14 P.Z. site is on summits and sideslopes of hills. Slopes range from 8 to 50 percent. Elevations are 5,000 to about 8,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill
Runoff class	Very high
Elevation	5,000–8,000 ft
Slope	8–50%
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 10 to 14 inches. Mean annual air temperature is 50 to 54 degrees F. The average growing season is about 100 to 130 days. No climate station is available.

Table 3. Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	
Precipitation total (average)	14 in

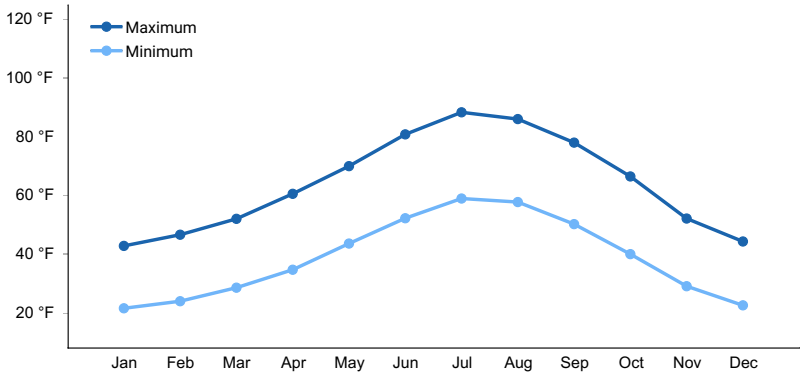

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils formed in residuum or colluvium from volcanic rocks with a component of volcanic ash. These soils are typically shallow to bedrock and the underlying parent material is usually highly fractured. The soils are moderately permeable, and available water capacity is very low. The soils are well drained. Potential for sheet and rill erosion is moderate. The soils have a argillic horizon from two to eight inches. 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.

The soil series associated with this site is Gabbvally a loamy-skeletal, mixed, superactive, mesic Lithic Xeric Haplargid.

Table 4. Representative soil features

Parent material	(1) Residuum–volcanic rock (2) Colluvium–volcanic rock
Surface texture	(1) Very stony loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	6–14 in
Surface fragment cover <=3"	20–25%
Surface fragment cover >3"	14–35%
Available water capacity (0-40in)	1.3–1.4 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5

Soil reaction (1:1 water) (0-40in)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	30–43%
Subsurface fragment volume >3" (Depth not specified)	5–15%

Ecological dynamics

Where management results in abusive livestock use, big sagebrush, rabbitbrush, galleta, bottlebrush squirreltail and Sandberg's bluegrass increase while beardless wheatgrass, needlegrasses, and Indian ricegrass decrease. Species most likely to invade this site are annuals such as cheatgrass and various mustards. In the absence of periodic wildfire, singleleaf pinyon and Utah juniper readily invade this site where it occurs adjacent to these woodland areas. If juniper-pinyon canopies are allowed to close, they can eliminate understory vegetation.

Fire Ecology:
The fire return interval for Wyoming big sagebrush communities ranges from 10 to 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. Presettlement fire return intervals in mountain big sagebrush communities varied from 15 to 25 years. Mountain big sagebrush is highly susceptible to injury from fire. It is often top-killed by fire and will not resprout. Fire effects on Stansbury cliffrose are variable. Fire may kill or severely damage plants. Late-season fire also increases the risk of mortality. Stansbury cliffrose is a weak sprouter that is generally killed by severe fire. Burning Beardless wheatgrass may remove most of the aboveground biomass but does not usually result in plant mortality. Beardless wheatgrass is generally favored by burning. Burning stimulates flowering and seed production. However, season of burning affects mortality. 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. Needle and thread is top-killed by fire. It may be killed if the aboveground stems are completely consumed. Needle and thread is classified as slightly to severely damaged by fire. Needle and thread sprouts from the caudex following fire, if heat has not been sufficient to kill underground parts. Recovery usually takes 2 to 10 years. 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. Muttongrass is unharmed to slightly harmed by light-severity fall fires. Muttongrass appears to be harmed by and slow to recover from severe fire.

The reference plant community is dominated by big sagebrush and beardless wheatgrass. Other important species associated with this site are Thurber's needlegrass, and Stansbury's cliffrose. Potential vegetative composition is about 50 percent grasses, 10 percent forbs, 40 percent shrubs, and less than 5 percent trees. Approximate ground cover (basal and crown) is 20 to 30 percent.

State and transition model

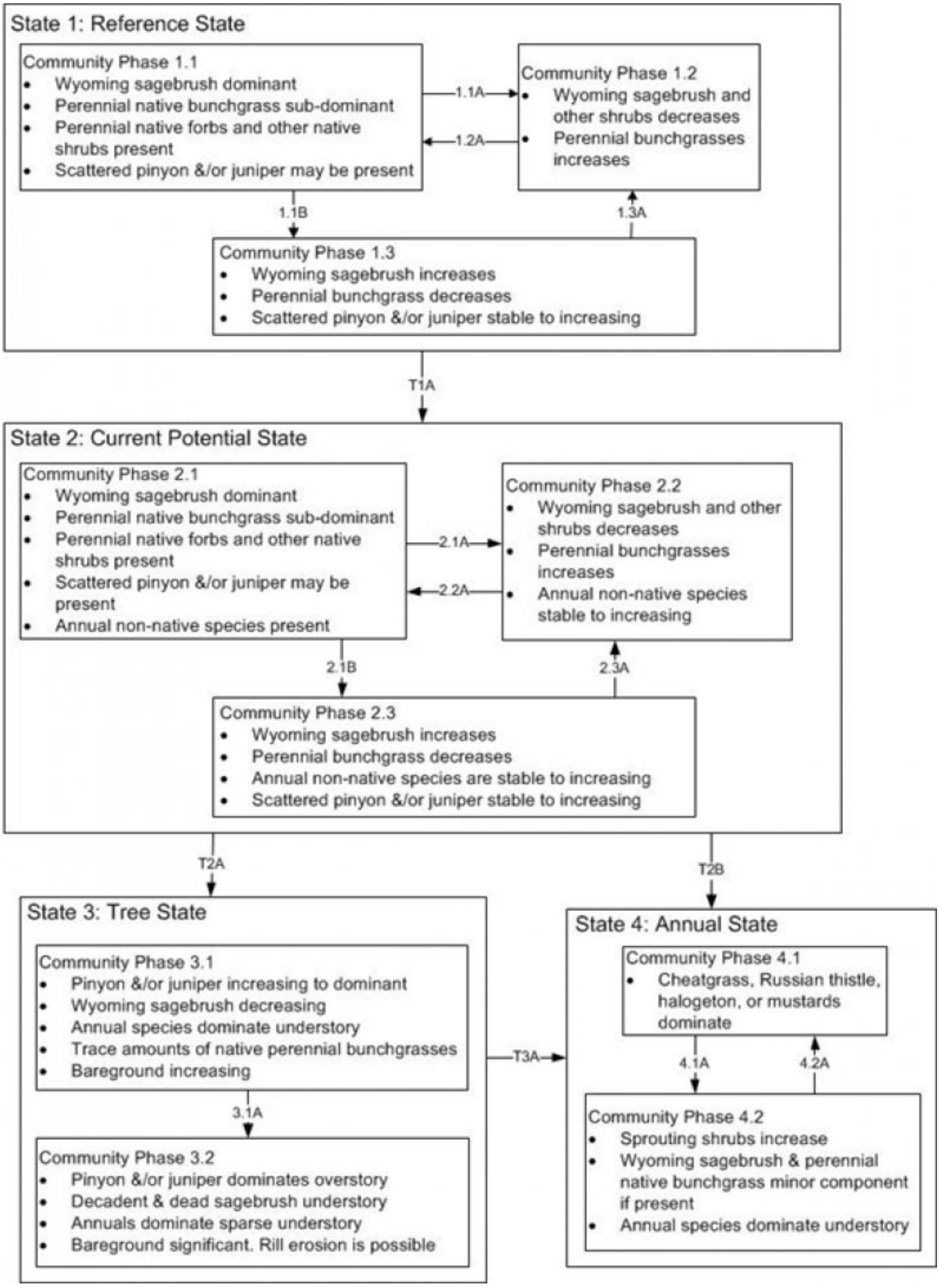

Figure 2. DRAFT STM

Figure 3. DRAFT STM LEGEND

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to beardless wheatgrass production. Wheatgrass is considered one of the most important forage grass species on western rangelands for livestock. Although wheatgrass can be a crucial source of forage, it is not necessarily the most highly preferred

species. 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. Needleandthread provides highly palatable forage, especially in the spring before fruits have developed. Needlegrasses are grazed in the fall only if the fruits are softened by rain. Indian ricegrass is highly palatable to all classes of livestock in both green and cured condition. It supplies a source of green feed before most other native grasses have produced much new growth. 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. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available. 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. Stansbury cliffrose is an important browse species for livestock, especially in the winter.

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:
Wyoming big sagebrush is preferred browse for wild ungulates. Pronghorn usually browse Wyoming big sagebrush heavily. Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer and elk. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Open Wyoming sagebrush communities are preferred nesting habitat. Meadows surrounded by sagebrush may be used as feeding and strutting grounds. Sagebrush is a crucial component of their diet year-round, and sage-grouse select sagebrush almost exclusively for cover. Leks are often located on low sagebrush sites, grassy openings, dry meadows, ridgetops, and disturbed sites. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities. Stansbury cliffrose is an important browse species for mule deer, pronghorn, game birds, and songbirds. Wild ungulates use it heavily in winter. Beardless wheatgrass is an important forage species for several wildlife species. Thurber needlegrass is valuable forage for wildlife. Needleandthread is moderately important spring forage for mule deer, but use declines considerably as more preferred forages become available. Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat large amounts of shattered Indian ricegrass seed lying on the ground. 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.

Hydrological functions

Runoff is very high, and permeability is moderate.

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. Triterpenoids extracted from Stansbury cliffrose have been shown to have inhibitory effects on HIV and Epstein-Barr virus. Native Americans used the inner bark for making clothing and ropes, and the branches for making arrows. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.

Other information

Stansbury cliffrose is recommended for wildlife, roadside, construction, and mine spoils plantings; and for restoring pinyon-juniper woodland, mountain brushland, basin big sagebrush grassland, black sagebrush, and black greasewood communities. It can be established on disturbed seedbeds by broadcast seeding, drill seeding, or transplanting. Fall or winter seeding is recommended. Needleandthread is useful for stabilizing eroded or degraded sites.

Inventory data references

NASIS data used for abiotic narratives and tables.

Type locality

Location 1: Nye County, NV	
Township/Range/Section	T2S R53E S12
Latitude	37° 47′ 17″
Longitude	117° 57′ 54″
General legal description	Section 12, T2S. R53E. MDBM. Quinn Canyon Range, north of Queen City Summit, 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

1. **Number and extent of rills:** Rills are none to rare. Rock fragments armor the soil surface.

2. **Presence of water flow patterns:** Water flow patterns are none to rare. A few can be expected on steeper slopes in areas recently subjected to summer convection storms or rapid spring snowmelt. Waterflow patterns are short (<1 m) and stable.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are 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 is ± 10 to 20 percent. Rock fragments greater than 60 percent.

5. **Number of gullies and erosion associated with gullies:** Gullies are none.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual and 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.

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 brown and soils are typified by a mollic epipedon. Organic matter of the surface 2 to 3 inches is typically 1 to 3 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 (i.e., beardless wheatgrass) 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. Subangular blocky sub-surface horizons or subsoil argillic horizons are not to be interpreted as compacted layers.

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 and Wyoming 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 percent of total woody canopy; some of the mature bunchgrasses (greater than 20 percent) have dead centers.

14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (± 20-30 percent) and depth of litter is

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) ± 500 lbs/ac; Favorable 700 lbs/ac; Unfavorable 350 lbs/acre

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 annual mustards, and cheatgrass. Singleleaf pinyon and Utah juniper can increase and eventually dominate the site.

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.