

Ecological site R028AY138UT Desert Shallow Loam (Shadscale)

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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)	V. Keith Wadman (NRCS Ret.), Shane A. Green (NRCS)
Contact for lead author	shane.green@ut.usda.gov
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Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** Slight rill development will be evident in the reference community on slopes <15%. Rill development on these slopes will be relatively short (<6') and widely spaced (8 to 10 feet). Steeper slopes (15% to 50% plus) will exhibit increased rill lengths (15 to 20 feet) with more narrow spacings (2 to 8 feet). Rill development may be more apparent where run-on from adjacent upland sites or exposed bedrock concentrate flows. Evidence of rills will decrease in the months following major weather events. Potential rill development may be affected by significant concentrations (20% - 60%, typically 35%) of coarse fragments on the soil surface.
- 2. Presence of water flow patterns:** Some evidence of water flow is evident throughout the reference community. Flow patterns increase in both size and development as slope increases. Flow patterns are normally <20 feet long, follow natural contours, and are typically spaced 10 to 15 feet apart. Steeper slopes may show minor root exposure around perennial grass clumps and surface coarse fragments show some evidence of movement or redistribution. Increased flow activity will be observed following significant weather events.
- 3. Number and height of erosional pedestals or terracettes:** Minor evidence of pedestals or terracettes caused by water erosion will typically be evident in the reference community and may increase as slope steepens. 1 – 3 inches of depositional mounding in perennial grass clumps, Shadscale canopies and biological soil crusts are normal and may not be erosion caused.
- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 20% - 40% in the reference community. Ground cover (the inverse of bare

ground) typically includes: coarse fragments – 35% to 60%; plant canopy – 20% to 30%; litter – 10% to 20%, and biological soil crusts – 2% to 5%.

5. **Number of gullies and erosion associated with gullies:** Developed gully channels are a normal component of desert environments. Gullies associated with reference areas on this site will typically have stable, partially vegetated sides and bottoms with little evidence of head-cutting. Evidence of disturbance will be more significant as slopes increase or following major weather events. Gullies conveying runoff from higher elevation rocky or naturally eroding areas exhibit erosion characteristics consistent with the condition of those areas.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of wind generated soil movement is present in reference communities. Slight mounding around Indian ricegrass bunches, James galleta clumps, Shadscale canopies and biological soil crusts is a normal characteristic of this site.
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7. **Amount of litter movement (describe size and distance expected to travel):** Some litter movement down slope from source of origin is common in reference communities but most litter resides in place within or under plant canopies. Movement of fine materials ($< \frac{1}{2}$ ") may move (3' – 6') on slope $< 20\%$, movement of larger materials ($\frac{1}{2}$ " to 1") is normal on slopes $> 20\%$. Some litter accumulation is observed behind obstructions.
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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):** This site should have a soil stability rating of 4 to 5. Surface textures are typically very stony loams containing 35 to 60% coarse fragments.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface is 2 – 3 inches deep and structure is weak fine granular. The A-horizon color is typically 10YR 5/3. Soils have an Ochric epipedon that extends 2 inches into the soil profile. It is normally deeper and better developed under plant canopies.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Soil surface is 2 – 3 inches deep and structure is weak fine granular. The A-horizon color is typically 10YR 5/3. Soils have an Ochric epipedon that extends 2 inches into the soil profile. It is normally deeper and better developed under plant canopies.
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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):** None. Bedrock occurs at 17 inches.
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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: Dominant: Non-sprouting shrubs (e.g. Shadscale and Bud sage) 30 – 40%, >> warm season perennial grasses (e.g. James galleta and Blue grama) 10 – 20%, > cool season grasses (e.g. Indian ricegrass and Bottlebrush squirreltail) 5 – 15%.

Sub-dominant: Sub-dominant: Sprouting shrubs (e.g. Nevada jointfir and Winterfat) 3 - 5% > Cool season grasses (e.g. Sandberg and Nevada bluegrasses) 3 - 5%.

Other: Others: Shrubs (e.g. Low rabbitbrush and Four-wing saltbush) 1-3%, perennial forbs (e.g. Gooseberryleaf globemallow and Carpet phlox) 3-5%, biological crusts (e.g. lichens, mosses, cyanobacteria) trace%.

Additional: Moss and lichen communities will normally be found under plant canopies while the cyanobacteria will be found throughout the site. Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with average to above-average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. During severe (multi-year) drought or insect infestations up to 80% of the shadscale may die. There may be partial mortality of individual bunchgrasses and other shrubs during severe drought.
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14. **Average percent litter cover (%) and depth (in):** Litter cover ranges from 10 to 15% with a spike when Bud Sage drops its leaves. Depth varies from $\frac{1}{4}$ - $\frac{1}{2}$ inch with depth increasing near plant canopies.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 100 – 200 pounds on an average year.
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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:** Annual bromes and Halogeton are likely to invade this site.
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17. **Perennial plant reproductive capability:** All perennial plant species have the ability to reproduce in most years except drought years.
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