

Ecological site R035XY136UT Desert Stony Loam (Shadscale-Bud Sagebrush)

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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.

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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- Number and extent of rills:** Very rare. Any rills should be 6 to 10 feet in length. Rills are most likely to form below adjacent exposed bedrock or where water flow patterns converge where sufficient water accumulates to cause erosion. Overall, rills are not active.
- Presence of water flow patterns:** Frequent and occur throughout area. Flow patterns are short and sinuous and wind between the surface rocks and plant bases. They are short (up to 8 feet), narrow (under 6 inches wide), and spaced 7 to 15 feet apart.
- Number and height of erosional pedestals or terracettes:** Rare. Any pedestalled plants may show very minor (<.5 inch) pedestalling on their down slope side, or adjacent to water flow patterns. Terracettes should be few where debris and litter obstructs water flow patterns.
- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10 – 20%. (Soil surface is typically covered by up to 60% rock). Ground cover is measured as first raindrop impact, bare ground is the inverse of cover. Ground cover + bare ground = 100%. Poorly developed biological soil crusts that are interpreted as functioning as bare ground (therefore they would be susceptible to raindrop splash erosion) should be recorded as bare ground.

5. **Number of gullies and erosion associated with gullies:** Very few gullies may be present. If present, their length often extends from exposed bedrock or other areas of water flow accumulation until gully reaches a stream or an area where water and sediment accumulate. They may be wide and shallow and armored with very large rocks.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of wind generated soil movement. Wind caused blowouts and deposition are not present.
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7. **Amount of litter movement (describe size and distance expected to travel):** Some relocation by wind, and some down slope redistribution caused by water. Fine litter removal may occur in flow patterns with deposition occurring at points of obstruction, accumulating at plant or rock bases, especially following large storm events. Litter movement will increase with slope.
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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 or 5 under plant canopies and a rating of 3 to 4 in the interspaces using the soil stability kit test. The average should be a 4. Surface texture is very cobbly sandy loam to very gravelly sandy clay loam. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface is approximately 3 inches deep. Structure is typically massive to weak medium platy to moderate medium granular. Color is typically light red (2.5YR6/6) to very pale brown (10YR7/3). The A horizon would be expected to be more strongly developed under plant canopies. It is important if you are sampling to observe the A horizon under plant canopies as well as the interspaces. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Distribution of vascular plants are expected to intercept raindrops reducing splash erosion. Vegetation distribution helps create sinuous water flow patterns along with any surface rock to reduce or eliminate runoff and erosion in all but the most extreme storm events. Plants have even distribution across the site. Spatial distribution of well developed biological soil crusts intercept raindrops reducing splash erosion and provide areas of surface detention to store water allowing additional time for infiltration. When perennial grasses and shrubs decrease, reducing ground cover and increasing bare ground, runoff is expected to increase and any associated infiltration reduced.
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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. There may be layers of calcium carbonate or other naturally occurring hard layers found in the soil subsurface. These should not be considered to be compaction 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: Non-sprouting shrubs (Shadscale, Bud sage) > Warm season perennial grasses (Galleta)
- Sub-dominant: Cool season perennial bunchgrasses (Indian ricegrass) >= sprouting shrubs (Torrey Mormontea, Bigelow

sage) > native perennial and annual forbs (Woolly milkvetch) > Biological soil crusts

Other: Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state (e.g. Siberian Wheatgrass, Forage kochia etc.)

Biological soil crust is variable in its expression where present on this site and is measured as a component of ground cover.

Forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

Additional: Temporal variability factors include drought, insects, wildlife browsing, and very infrequent fire. Spatial variability factors include soil depth, texture, rock fragment size and amounts, elevation, etc.

Following a recent disturbance such as drought or insects that removes the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community. These conditions could reflect a functional community phase within the reference state.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with near average or above average precipitation, there should be very little recent plant mortality and decadence in either the shrubs or grasses. During severe (multi year) drought, many of the Shadscale plants will die. Some mortality of perennial grass and other shrubs may also occur during severe droughts. There may be partial mortality of individual grasses and shrubs during less severe drought. Shadscale may appear dead during droughts, but is actually in a dormant stage with partial leaf shedding.
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14. **Average percent litter cover (%) and depth (in):** Litter cover (including under plants) nearly all of which should be fine litter. Depth should be 1 leaf thickness in the interspaces and up to ¼” under canopies. Litter cover may increase to 7-15% on some years due to increased production of plants.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 450-500 #/acre 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:** Cheatgrass, Russian thistle, and other introduced annual forbs are most likely to invade this site.
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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually in all years, except in drought years.
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