USDA Natural Resources
Conservation Service

Ecological site R035XY139UT
Desert Stony Loam (Blackbrush)

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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)	Robert D. Stager (BLM), Shane A. Green (NRCS), Dana Truman (NRCS), Randy Beckstrand (BLM), Paul Curtis (BLM)
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:** Rare. Any rills are most likely to form below adjacent exposed bedrock or where water flow patterns converge to produce sufficient water accumulates to cause erosion.

2. **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 10 feet), narrow (under 6 inches wide), and spaced 7 to 15 feet apart.

3. **Number and height of erosional pedestals or terracettes:** Very 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.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10 – 50%. (Soil surface is typically covered by 30-80% 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:** None to very rare. If present, concentrated flows from adjacent sites (such as exposed bedrock) are the cause. Length may extend from exposed bedrock until gully reaches a stream or an area where water and sediment accumulate, and gullies 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:** Very minor evidence of wind generated soil movement Short coppice dunes may accumulate, especially under Blackbrush plants. Wind caused blowouts are not present.

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7. **Amount of litter movement (describe size and distance expected to travel):** Some down slope redistribution caused by water. Some fine litter removal may occur in flow patterns and rills with deposition occurring at points of obstruction, accumulating at plant or rock bases, especially following major storm events. Litter movement will increase with slope. Wind removes most fine (grass) litter.

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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 5 to 4 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 fine sandy loam to very gravelly sandy clay loam.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface is typically 3 inches deep. Structure is typically weak medium platy to moderate or weak medium or fine granular. Color is typically yellowish red (5YR5/6) 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 is expected to intercept some raindrops reducing splash erosion somewhat. Vegetation distribution along with surface rocks help create sinuous water flow patterns to reduce or eliminate runoff and erosion in all but the most extreme storm events. Plants have even distribution across the site. Where present, 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 (Blackbrush) > Warm season perennial bunchgrasses (Galleta)

Sub-dominant: sprouting shrubs (Torrey jontfir, Bigelow sage) >= Cool season perennial bunchgrasses (Indian ricegrass, Squirreltail) > native perennial and annual forbs > 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 insects, drought, and very infrequent fire. Spatial variability factors include amount and size of rock fragments, slope, etc.
Following a recent disturbance that removes the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community. If a disturbance has not occurred for an extended period of time, woody species may continue to increase crowding out the perennial herbaceous understory species. In either case, these conditions reflect a community phase within the reference state.

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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 up to 20% of the blackbrush stems may die. Some mortality of bunchgrass and other shrubs may also occur during severe droughts, particularly on the shallower and coarser soils associated with this site. There may be partial mortality of individual bunchgrasses and other shrubs during less severe drought. Because woody stems may persist for many years, blackbrush will normally have dead stems within the plant canopy. Blackbrush will drop its leaves when water stressed.

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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 up to 20% immediately following leaf drop. Litter redistribution following natural extreme runoff events can reduce litter cover by concentrating it in low-lying areas. Litter cover may increase to 10-15% followings seasons with above average production due to a high production of annuals.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 200-300 #/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. Blackbrush reproduction is naturally very episodic and no young plants may be apparent.
