USDA Natural Resources
Conservation Service

Ecological site R035XY203UT
Semidesert Bouldery Fan (Blackbrush)

Accessed: 05/05/2024

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)	Paul Curtis (BLM), Randy Beckstrand (BLM), Dana Truman (NRCS), Robert Stager (BLM), Shane A. Green (NRCS)
Contact for lead author	shane.green@ut.usda.gov
Date	09/11/2008
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None to very rare. Due to the bouldery characteristic of this site, traditional rill identification is hampered. However, the overall stony surface is expected to be resistant to rill formation and accelerated erosion in general.

2. **Presence of water flow patterns:** Some flow patterns wind around large exposed boulders and perennial plant bases. They are short and stable and there is minor evidence of deposition. On gently sloping (< 6 % slopes) locations within the site, water flow patterns are infrequent and usually less than 3 feet. Longer water flow patterns may be found on steeper slopes.

3. **Number and height of erosional pedestals or terracettes:** Pedestals or terracettes are very few. They may naturally occur where the water flows around the gravel, rock or boulders. Pedestals and terracettes are associated with water flow patterns. Interspaces between well developed biological soil crusts may resemble pedestals but they are actually a characteristic of the crust formation.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10 – 25% bare ground. This site has 30-80% of the surface covered with large rock fragments. Ground cover is based on the first raindrop impact, and bare ground is the opposite of ground cover. Well developed biological crusts should not be recorded as bare ground. 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. Gully formation is prevented by numerous large boulders on the surface.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None. Site is protected from wind erosion by numerous large boulders on the surface.

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water movement. Very minor fine litter removal may occur in flow patterns and rills with deposition occurring at points of obstruction. The majority of litter accumulates at the base of plants and rocks. Some grass leaves and small twigs (grass stems) may accumulate in soil depressions adjacent to plants. Woody stems not likely to move.

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 throughout the site using the soil stability test kit. Surface texture is gravelly loam. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion.

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 very fine granular. Color is typically reddish brown (5YR5/3). 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.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Vascular plants and well developed biological soil crusts will break raindrop impact and splash erosion. Spatial distribution of vascular plants and well developed biological soil crusts (where present) provide detention storage and surface roughness that slows runoff allowing time for infiltration. Interspaces between plants and well developed biological soil crusts (where present) may serve as water flow patterns during episodic runoff events, with natural erosion expected in severe storms. When perennial grasses decrease, reducing ground cover and increasing bare ground, runoff is expected to increase and any associated infiltration reduced.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Naturally occurring soil horizons may be harder than the surface because of an accumulation of clay or calcium carbonate and should not be considered as compaction 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: non-sprouting shrubs (blackbrush) >= warm season grasses (Galleta, Black grama, Bush muhly) Note: Be cognizant that production and presence of black grama, bush muhly and to a certain degree, blue grama grasses are

often subdued during times of drought or low precipitation years. They may still be present but not obvious due to this adaptive characteristic.

Sub-dominant: sprouting shrubs (Mormontea) > Perennial bunch grasses (Desert needlegrass) > 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 it's 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 is caused by very rare fires, droughts, insects or other pathogens, etc. and spatial variability is caused by slope, aspect and topography.
Following a recent disturbance such as drought or insects 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 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 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) droughts, up to 20% of the blackbrush stems may die. Some mortality of bunchgrass and other shrubs may occur during very severe (long term) droughts. There may be partial mortality of individual bunchgrasses and other shrubs during less severe droughts. Because woody stems may persist for many years, blackbrush will normally have dead stems within the plant canopy. Blackbrush will drop it's leaves when water stressed.

---

14. **Average percent litter cover (%) and depth (in):** Litter cover (including under plants) Depth should be 1 leaf thickness in the interspaces and up to 1/8" 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 3-6% following seasons with above average production with a high production of biomass.

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 400 - 450 #/acre on an average year

---

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 and introduced annual forbs are most likely to invade this site.

---

17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually in most years, except in drought years. Blackbrush reproduction is naturally very episodic and no young plants may be

apparent.