USDA Natural Resources
Conservation Service

Ecological site R035XY237UT
Semidesert Shallow Gypsum (Mormontea)

Accessed: 04/26/2024

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.

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Date	10/23/2008
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Foliar Cover

Indicators

1. **Number and extent of rills:** A. On more gentle slopes (< 10 %): Very few typically occur on the site. B. On steeper slopes (> 10 %): Rills are common and occur throughout the site. Rills commonly extend down entire slope. Rills are not active, but they seem to be persistent.

2. **Presence of water flow patterns:** Frequent and occur throughout the area. They are expected to be slightly sinuous (wind around well formed crust and perennial plant bases), > 15 feet long, <1 foot wide, and not widely spaced (6-12 feet) and connected into drainage networks. Evidence of flow will increase with slope.

3. **Number and height of erosional pedestals or terracettes:** Pedestals form at the base of some plants that occur on the edge of rills and water flow patterns. On steeper slopes (>10%), gullies may remove soil from the base of shrubs exposing roots that resemble pedestals. Terracettes are not present.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 30-40%. Soil surface usually has no surface rock, but a few soils may have up to 5 percent mainly gravels gypsiferous materials. Ground cover is based on first raindrop impact, and bare ground is the opposite of ground 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:** Common. This site appears as a gullied landscape. On slopes and areas below adjacent exposed bedrock, gullies may be more numerous. Length often extends the entire slope until it reaches an area where water and sediment accumulate. Gullies typically appear active, but the shoulders are muted (truncated) and have perennial vegetation establishing on them. Gully bottoms are typically active and flow during most rainfall events.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None. While there may be some evidence of wind generated soil movement, wind caused blowouts would not be expected. Rare depositional areas may exist.

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7. **Amount of litter movement (describe size and distance expected to travel):** On gentle slopes (< 10 %) most litter accumulates at base of plants moved by wind or water. Some down slope redistribution caused by water. Some litter removal may occur in flow patterns or rills with deposition occurring at points of obstruction, especially following major storm events. Litter movement will increase with slopes > 10%.

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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 under plant canopies and biological soil crusts and a rating of 3 in the interspaces using the soil stability kit test. The average should be a 4. Surface texture is fine sandy loam to channery 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 horizon is .5 to 1 inches deep. Structure is strong to moderate thin platy. Color is brown (7.5YR5/4-6). 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 but not eliminating it. Plants are usually distributed in sufficient density to slow runoff allowing time for some infiltration. With the geomorphic location of the site being on gently sloping fans, benches, alluvial fans, upland valley plains and hillsides infiltration is somewhat reduced by slope and less plant cover. Natural erosion would be expected in severe thunder storms or heavy spring runoff. 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. The associated structure is weak to moderate thin platy in the shallow A horizon with weak medium and fine subangular blocky structure and veins and streaks of gypsum in the B and C horizons. 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 (Cliffrose, Broom snakeweed, Desert holly, Crispleaf buckwheat) >= Sprouting shrubs (Torrey mormontea) > Biological soil crusts = perennial bunch grasses (Indian ricegrass, Galleta) > Trees (Utah juniper > Pinyon)

Sub-dominant: perennial and native annual forbs (Brenda's yellow cryptantha)

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.). 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 droughts, insects and other pathogens, large precipitation events, etc. and spatial variability is caused by adjacency to other sites that produce runoff, and topography.

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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 above average precipitation, there should be very little recent plant mortality and decadence in either the shrubs or grasses. During severe (multi year) drought, up to 20% of the Torrey mormontea stems 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.

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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 1/16" under canopies.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 300-400 #/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:** Russian thistle and ragweed 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 most years, except in drought years

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