

Ecological site R036XY287CO Stony Foothills

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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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Approved by	Rachel Murph, State Rangeland Management Spec., USDA NRCS Colorado
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- Number and extent of rills:** Some rills are inherent to the site. They are common and are short and disconnected due to the rock fragments on the soil surface. In exposed areas, rills may be 6 to 10 feet in length.
- Presence of water flow patterns:** Water flow patterns are expected. They frequently form around rock fragments and plant bases. Usually, they tend to be short and disconnected with debris dams. The areas between the rocks, plants and cryptogams may serve as small areas where water will pool, until it infiltrates the soil. As slopes get steeper, flow paths are more frequent and evident, runoff is more rapid. Intense summer storms can cause water flow patterns to be more evident after storms.
- Number and height of erosional pedestals or terracettes:** Short pedestals are expected at the base of the plants, there should not be exposed roots. When a large amount of well-developed biological crusts present, they can give the appearance of being pedestals. Terracettes and/or debris dams can form in the smaller water flow patterns.
- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Expect 10-20% bare ground. Soil surface is typically covered 15 to 65 percent surface fragments.
- Number of gullies and erosion associated with gullies:** None to few. On steeper slopes and areas below and adjacent to sites with concentrated water flow (such as exposed bedrock), gullies may increase. Length is short and is usually interrupted by large rock fragments. Gullies are shallow and wide and armored with large stones. Gullies may

remove soil from the base of trees exposing roots.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None. The trees and shrubs on this site generally intercept the wind and prevent most wind generated soil erosion. Also, rock fragments present on this site helps to reduce the potential for wind erosion.
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7. **Amount of litter movement (describe size and distance expected to travel):** Litter for the most part stays in place. There can be some redistribution by water movement of the fine litter in the rills and water patterns. Most litter accumulates at the base of the plants on this site. Woody litter movement on this site is unusual. Litter movement is more evident on the steeper slopes and also, may be greater following intensive rainstorms.
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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 an erosion rating of 3 to 5 under the plant canopies, and a rating of 2 to 4 in the interspaces. The average should be a 3 or 4. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion. This site can have cryptogamic crusts which help to stabilize the soil surface.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil organic matter content ranges from 0.5-2%. Soils are moderately deep to deep in depth. The surface soils of this site range from very cobbly/very gravelly loam, and stony loam. Soils are filled with gravels, cobbly, channery and/or stone filled. Soil structure is weak medium and fine subangular blocky structure parting to weak fine granular. The soil surface (A horizon) ranges from 3 to 14 inches in depth. Refer to soil survey for more detailed information about your specific site.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The presence of trees, perennial grasses and forbs, and shrubs will breakup raindrop impact and splash erosion. The spatial distribution of the plants, biological crusts and interspaces will provide small pockets for water storage and surface roughness that slows down runoff, allowing time for infiltration. The tree and shrub canopy is effective in intercepting rain drops and preventing splash erosion on the reference state. But, with increased tree canopy, understory canopy is reduced, increased bare soil and litter accumulates under trees, it can forms micro-topography that can help water accumulate which can cause more rapid runoff.
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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: Tree (Pinyon, Utah Juniper)>

Sub-dominant: cool season bunchgrasses (Muttongrass, Indian ricegrass, prairie junegrass, squirreltail, needle-and-thread,) > shrubs (Big sagebrush, black sagebrush, mountain mahogany, Mormontea) > forbs (Penstemons, stemless goldenweed, cryptantha, buckwheat, scarlet globemallow, scarlet gilia, asters, daisy, phlox) >

Other: warm season short bunchgrass (Galleta) > cool season rhizomatous (Western wheatgrass) > cryptogams

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** A mix of young, middle aged and old pinyon and Utah juniper are expected to be found on this site. In years with average or above average precipitation, shrubs, grasses and forbs should have little mortality or decadence. Tree mortality, especially pinyon, can be expected under severe and/or extended drought and subsequent insect infestations. Under a dense tree canopy, understory has increased decadence and mortality.

14. **Average percent litter cover (%) and depth (in):** 15-30% litter cover at 0.25-2.0 inch depth, depending upon tree canopy. Most litter is at the base and under the canopy of the plants.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 400 lbs. /ac. low precipitation years, 600 lbs. /ac. average precipitation years, 800 lbs. /ac. above average precipitation years. After extended drought or the first growing season following wildfire, production may be significantly reduced by 200 - 350 lbs. /ac. or more.

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, annual weeds, other noxious weeds.

17. **Perennial plant reproductive capability:** All plants have the ability to reproduce in most years. Limitations are weather related, wildfire, natural disease, inter-species competition, and insects may temporarily reduce reproductive capability. Increased tree canopy will result in decreased understory reproductive capability.
