

Ecological site R036XY114CO Mountain Pinyon

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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. Rills will frequently start the ends of water flow patterns or below exposed bedrock where the water can accumulate to cause erosion. The number of rills will depend on the slope. The higher the slope the greater the number of rills that will be associated with it.

 - Presence of water flow patterns:** Water flow patterns are expected. They frequently form around exposed bedrock where the water flows. Usually not enough water flows, they tend to be short and disconnected with debris dams. 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 15-20% bare ground. Surface and sub-surface rock are inherent to this site.
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5. **Number of gullies and erosion associated with gullies:** A few gullies are found may be found on this site. The gullies start where enough water accumulates in the rills and where runoff of the rock outcrops is rapid. Gullies will be shallow (<20 inches) in depth due to the shallow nature of the soils found on this site. Erosion will expose more bedrock. Gullies will widen after bedrock is reached. Gullies may be 4 or more feet wide. The steep the slope the more potential, there is for gullies to form.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None. The trees on this site generally intercept the wind and prevent most wind generated soil 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):** Stability class rating anticipated to be 3-6 in the interspaces at soil surface. Aggregate stability can be quite variable depending on soil texture, biological crusts and organic matter.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** SOM ranges from 0.5-3%. Surface soils are very shallow to shallow. Surface texture ranges from fine sandy loam to loam. Sometimes the soil surface can have gravels and cobbles in it. The A-horizon (soil surface) ranges from 0-7 inches in depth. It is typically described as weak fine and medium subangular blocky structure parting to weak fine and medium granular. The A horizon is expected to be more developed under the plant canopies. Use the specific information for the soil you are assessing 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:** 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):** A compaction layer is not expected, as this site has 20 inches or less of soil. However, soils with an abrupt horizon, strong subangular blocky structure, hard calcium carbonate layers and unweathered parent material may be mistaken for 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: trees (Pinyon pine, Utah juniper,)>

Sub-dominant: cool season bunchgrass (needle-and-thread, native bluegrasses, Indian ricegrass, prairie junegrass, bottlebrush squirreltail) = shrubs (Big sagebrush, black sagebrush, serviceberry, mountain mahogany, antelope bitterbrush, Gambel's oak) > forbs (buckwheat, locoweeds, cryptantha, Hood's phlox, scarlet globemallow, skyrocket gilia, arrowleaf balsamroot, hairy goldaster, penstemons, asters, daisy, stemless goldenweed) >

Other: cool season rhizomatous grass (Western wheatgrass)> cryptogams > sedges (Elk sedge)= warm season short bunchgrass (Blue grama)

Additional:

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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.
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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.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Tree canopy cover 0-15%: 800-1000 lbs./ac.; Tree canopy cover 15-30%: 500-800 lbs./ac.; Tree canopy cover > 30%: 100-500 lbs./ac. Production figures are for total annual vegetation.
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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, annual weeds, other noxious weeds.
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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.
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