

Ecological site R036XY408CO Basin Shale

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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

1. **Number and extent of rills:** None to slight on low slopes (<15%). Very minor rill development may occur as slope increases. Rills can be more defined on slopes ranging from 15-25%, especially following intense storms. If rills are present, they should be widely spaced and not connected.

2. **Presence of water flow patterns:** Water flow patterns will be very short if present and narrow. They should be interrupted by plants and possible bedrock. Flow patterns may be around surface rock and perennial plant bases and show minor evidence of erosion. Flow paths becoming more apparent on slopes exceeding 15%.

3. **Number and height of erosional pedestals or terracettes:** May have slight pedestalling on the plants' down slope side. Terracettes should very few, if at all. Frost heaving of shallow rooted plants should not be considered an indicator of erosional pedestaling. Pedestals may occur more frequently on steeper slopes wind exposed slopes.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Expect 15-30% bare ground. Exposed bedrock and sometimes gravel are on this site. When they are present; they are considered rock. Extended drought can cause bare ground to increase.

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind scouring is possible where surface roughness (rock and/or fragments) is lacking and occurs regardless of season.
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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter from grasses and perennial and annual forbs) movement is extensive due to the windswept nature of this site and with summer thunderstorms. More persistent larger woody litter from shrubs is expected to remain in place except during large events.
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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):** Soil surface textures are silty clay loam. These soils have a water erosion hazard of slight or moderate. Litter accumulation and cryptogamic crusts reduce erosion.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface texture is usually a silty clay loam. Soils are shallow and occasionally moderately deep. The A-horizon is 3-9 inches in depth. Structure is weak/moderate fine granular or moderate medium platy structure to strong very fine granular structure.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants slow runoff and increase infiltration. Low basal and canopy cover with inherent interspaces between plants allow for some overland flow, providing a lost opportunity for infiltration to occur.
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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. Subsurface argillic horizons commonly found on this site should not be interpreted as compaction. Also, most soils have bedrock at approximately 10 to 25 inches.
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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: Perennial grasses (western wheatgrass, galleta, squirreltail, Indian ricegrass> non-sprouting shrubs (Black Sagebrush)>
- Sub-dominant: forbs> sprouting shrubs (winterfat)
- Other:
- Additional: 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. Crested wheatgrass and Russian wildrye etc.) The perennial grass/non-sprouting shrub functional groups are expected on this site. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions. Disturbance regime includes drought, insects, and fire. Assumed fire cycle of 50-70+ years. Following a recent disturbance such as fire or drought 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 would reflect a functional 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):** Typically minimal. Expect slight shrub and grass mortality/decadence due to wind desiccation, during and following drought or lack of disturbance.
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14. **Average percent litter cover (%) and depth (in):** 5-15% litter between plant interspaces and under the shrubs at < 0.25 inch depth.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 300 lbs. /ac. low precipitation years; 400 lbs. /ac. average precipitation years; 600 lbs. /ac. above average precipitation years. After extended drought or the first growing season following wildfire, production may be significantly reduced by 100 - 200 lbs. /ac. or more.
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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, tumble mustard.
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17. **Perennial plant reproductive capability:** The only limitations are wind, weather-related, wildfire, natural disease, inter-species competition, wildlife, and insects that may temporarily reduce reproductive capability.
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