USDA Natural Resources
Conservation Service

Ecological site EX043B23A110
Dense Clay (DC) Absaroka Lower 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	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Due to the wide slope range associated with this site, the number and extent of rills will vary from none on slope < 9% to common on slopes > 25%. If present, will be at the upper end of the slope range for this site (>15%) and will be short (<3 ft) and widely spaced relative to slope distance (8-10 feet). Minor rill development may be observed following major thunderstorm or spring runoff events, but they should heal during the next growing season.

2. **Presence of water flow patterns:** Due to the wide slope range associated with this site, water flow patterns vary from barely observable on slopes of < 9% and from broken and irregular in appearance to continuous on slopes > 25%

3. **Number and height of erosional pedestals or terracettes:** Not evident on slopes < 9%. Erosional pedestals will be present with terracettes present at debris dams on slopes >9%. Perennial vegetation shows little evidence of erosional pedestalling (2 to 3% of individual plants). Plant roots are covered and litter remains in place around plant crowns. Terracettes should be absent or, if present, stable.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 30-60%, occurring in small openings (2-3 ft) throughout the site. Animal activity (i.e. burrows) may occasionally result in isolated bare patches up to 5' in diameter.

5. **Number of gullies and erosion associated with gullies:** Active gullies restricted to concentrated water flow patterns. A few gullies may be present in landscape settings where they transport runoff from areas of greater water flow such as exposed bedrock. These gullies will be limited to slopes exceeding 20% slope and adjacent to sites where this runoff accumulation occurs. Any gullies present should show little sign of accelerated erosion and should be stabilized with perennial vegetation.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None. No evidence of wind generated soil movement is expected.

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7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement occurs on slopes < 9%. Fine litter in the interspaces may move up to 3 ft following a significant run-off event. Coarse litter generally does not move.

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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):** Plant cover and litter is at 30% or greater of soil surface and maintains soil surface integrity. Soil Stability Index ratings range from 3 (interspaces) to 6 (under plant canopy), but average values should be 4 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon. Soil Organic Matter of less than 1% is expected. Field indicators of departure from the reference condition include exposure of subsoil as evidenced by excessive pedastalling and/or surface disturbance.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Relative composition for this site is 50% grasses, 10% forbs and 40% woody plants. Sparse plant canopy, slow infiltration rates, and the high amount of bare ground contribute to very slow to slow infiltration rates, the amount of bare ground and steepness of slopes results in a naturally high runoff rate on slopes > 25%, even in HCPC.

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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):** No compaction layer should be present, but soil crusting in dry conditions is typical.

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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: Shrubs (1 Species)

    Sub-dominant: Short Stature, Cool Season Grasses (1 Species)
    Mid Stature, Cool Season Grasses (1 Species)
    Rhizomatous Cool Season Grasses (1 species)

    Other: Forbs

Additional: 12a. Community 1.1 Perennial Shrubs > Mid Stature Grasses > Rhizomatous Cool Season Grasses = Short Stature Grasses
12b. Functional/Structural groups not expected- annual grasses
12c. Number of Functional/Structural groups: 4 Groups
12d. Species number in Dominate and sub-dominate F/S groups: 4 species

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Some plant mortality and decadence is expected, typically associated with shrub component.

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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 5-25% of total canopy measurement with total litter (including beneath the plant canopy) from 10-40% expected. Herbaceous litter depth is typically very shallow, ranging from 1-5mm. Woody litter can be up to a couple inches (4-6 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 150-450 lb/ac (300 lb/ac average); Metric: 68-204 kg (136 kg average).

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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:** Bare ground greater than 70% is the most common indicator of a threshold being crossed. Birdfoot sagebrush, Sandberg bluegrass, Woody aster, Annuals, Exotics, and Species found on Noxious Weed List

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17. **Perennial plant reproductive capability:** May be Limited due to effective moisture and seed to soil contact. Western Wheatgrass will commonly reproduce by underground rhizomes and not by seed production, especially in drought years.
