USDA Natural Resources
Conservation Service

Ecological site EX043B23A123
Loamy Calcareous (LyCa) 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:** Rills are normally not present. Some very minor rill development may occur in sparsely vegetated areas. Any rills present should be less than 1/2 inch deep, widely spaced (15 to 20 feet), and not connected. They should average < 4 feet in length. A slight increase in rill development may also be observed following large storm events or spring runoff periods, but should heal within the next year. Rill development may also increase where the site is adjacent to other sites that produce large amounts of runoff (i.e. steeper sites).

2. **Presence of water flow patterns:** Barely observable but may be occurring on steeper slopes (10-25%). Any flow patterns present should be sinuous and wind around perennial plant bases. Generally short (<5 ft), < 1 foot wide, and spaced from 10 to 20 feet apart if present on steeper slopes. They should be stable with only minor evidence of deposition.

3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent, or rare if occurring. In that rare occurrence, plants may show very minor pedestalling where they are adjacent to water flow patterns, but there should be no exposed roots. A few minor terracettes may be present in similar situations on steeper slopes, however they should be stable and occur behind litter blocking water flow patterns.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 25 to 35% occurring in small patch-like areas throughout site. Bare ground openings should not be greater that 1 foot in size and should not be connected.

5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Rare to non-existent. No evidence of wind generated soil movement. Wind scoured (blowouts) and depositional areas are not present.

7. **Amount of litter movement (describe size and distance expected to travel):** The majority of litter accumulates in place at the base of plant canopies. Slight movement of the finest material (< 1/8 inch) may move 1 to 2 feet in the direction of prevailing winds or downslope if being transported by water. Little accumulation is observed behind obstructions. Large woody debris from sagebrush will show no movement except for minimal debris damming after large rain or snowmelt events on slopes >9%.

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 60% or greater of soil surface and maintains soil surface integrity. Soil stability class is anticipated to be 3.0 or greater on average. Ranging from 1 in interspaces and up to 6 under plant canopy.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil data is limited for this site. A-horizons vary in depth from 1 to 12 inches with OM of 1-2%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of, on average, 75% grasses, 10% forbs, and 15% shrubs. This, with an evenly distributed canopy and litter, with deep healthy rooted native grasses enhancing infiltration, limits the runoff potential to little or no effect on this site.

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 or soil surface crusting should be present. A dry subsurface will often refuse a probe, causing misidentification of a compaction layer. Soil profiles must be described by hand dug holes.

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: Mid-stature cool season bunchgrasses

    Sub-dominant: perennial shrubs > cool season rhizomatous grasses

    Other: short stature bunchgrass and grass-likes > perennial forbs

    Additional: Community 1.1 = Perennial Cool-Season bunchgrasses > Shrubs > Rhizomatous Wheatgrasses>Perennial Forbs

    Community 1.2 = Rhizomatous Wheatgrasses> Perennial Cool-Season bunchgrasses > Shrubs > Perennial Forbs

12b. F/S Groups not expected for the site: Annual Grass
12c. Number of F/S Groups: 6 groups
12d. Species number in Dominate and Sub-dominate F/S Groups: 8 species

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence can be observed and is typically associated with shrub component. It is common to find dead matter accumulated in bunchgrasses, but live plant matter quantity should exceed standing dead except for in times of severe drought. Sagebrush canopy will often have occasional dead branches, but it should not exceed 30% and shouldn't be found on most plants.

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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 5 to 25% of total canopy with total litter including beneath the plant canopy can reach up to 70%. Herbaceous litter depth typically ranges from 3-10 mm, with woody littler varying between 4-6 cm. Woody litter can be up to a couple inches in diameter (4-6cm), but is sporadically distributed.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Community 1.1 =Total normal or average production is estimated at 525 lbs. with a low of 300 lbs. and ranging to 625 lbs.

    Community 1.2 =Total normal or average production is estimated at 375 lbs. with a low of 275 lbs. and ranging to 550 lbs.

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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:** Blue grama, Sandberg bluegrass, Threadleaf sedge, Threeawn, Fringed sagewort, Prickly pear cactus, Broom snakeweed and Rubber rabbitbrush; Alyssum, Blue mustard, Annual false crested wheatgrass, as well as other Annuals, and then Exotics and species found on the noxious weed list including but not limited to: Cheatgrass, Spotted knapweed, Bull thistle.

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17. **Perennial plant reproductive capability:** All species are capable of reproducing except in severe drought years. Thickspike and western wheatgrass will commonly reproduce by underground rhizomes and not by seed production.
