USDA Natural Resources
Conservation Service

Ecological site R067AY120WY
Limy Upland (LiU)

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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:** None. Rills are not expected on the site.

2. **Presence of water flow patterns:** Typically, none. Water flow patterns may be present on slopes of 10 percent or greater. Water flow patterns may occur during extreme precipitation events and will be less than 12 inches long, less than 6 inches wide, and discontinuous.

3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is typically less than 5 percent, and patches less than 2 to 3 inches (5.1 to 7.6 cm) in diameter. Multi-year drought can cause bare ground to increase to 10 to 15 percent.

5. **Number of gullies and erosion associated with gullies:** None. Gullies should not be present on this site.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Small scoured sites may be observed

7. **Amount of litter movement (describe size and distance expected to travel):** Litter should fall in place. Slight amount of movement of fine litter from water is possible, but not normal. Litter movement from wind is not expected.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 to 6, normally 6. Surface organic matter adheres to the soil surface. Soil surface peds will typically retain structure indefinitely when dipped in distilled water.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface layer ranges from 3 to 12 inches (7.6 to 30.5 cm) thick. Soil surface structure is fine to medium granular. Soil colors are highly variable and may be gray, grayish brown, very pale brown, brown, or light brownish gray (values of 4 to 7) when dry and very dark grayish brown, dark brown, dark grayish brown, or yellowish brown (values of 3 to 5) when moist.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The functional/structural groups provide a combination of rooting depths and structure which positively influences infiltration. Combination of shallow and deep rooted species (mid & tall rhizomatous and tufted perennial cool season grasses) with fine and coarse roots positively influences infiltration.

    The expected composition of the plant community is 75-90 percent perennial grasses and grass-likes, 5-15 percent forbs, and 0-10 percent shrubs.

    In the 12-14” PZ, the perennial grass and grass-like component is made up of tall and mid, warm-season, grasses (15-35%); cool-season grasses (20-40%); mid, warm season grasses (10-20%), short, warm-season grasses (5-15%); and grass-likes (10-15%).

    In the 15-17” PZ, the perennial grass and grass-like component is made up of cool-season grasses (20-40%); warm-season, mid and tall grasses (15-35%), short, warm-season grasses (20-25%); and grass-likes (10-15%)

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. A compaction layer is not expected on this site.

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: 12-14” PZ - Community 1.1:
    1. Native, C3 grasses – 200-400 #/ac (20-40%): 2 species minimum
    2. Native, C4, mid and tall grasses – 150-350 #/ac (15-35%), 2 species minimum

    15-17” PZ - Community 1.1:
    1. C3 grasses – 250-500 #/ac (20-40%): 2 species minimum
    2. Native, C4, mid and tall grasses – 188-438 #/ac (15-35%), 2 species minimum

    Sub-dominant: 12-14” PZ - Community 1.1:
    3. Native, C4, short grasses – 200-250 #/ac (20-25%), 1 species minimum

4. Grass-likes – 100-150 (10-15%), 1 species minimum
5. Native, Perennial and Annual Forbs – 50-150 #/ac (5-15%), 5 species minimum

15-17" PZ - Community 1.1:
3. Native, C4, short grasses – 250-313 #/ac (20-25%), 1 species minimum
4. Grass-likes – 125-188 (10-15%), 1 species minimum
5. Native, Perennial and Annual Forbs – 63-188 #/ac (5-15%), 5 species minimum

Other: 12-14" PZ - Community 1.1:
6. Minor:Shrubs, Vines, Cacti – 0-100 #/ac: (0-10%)

15-17" PZ - Community 1.1:
6. Shrubs, Vines, Cacti – 0-125 #/ac: (0-10%)

Additional: 12a. Relative Dominance:
Community 1.1: Native, C3 grasses = Native, C4, Mid and tall grasses > C4, short grasses > Grass-likes > or = Native, Perennial and Annual Forbs > Shrubs, cacti, vines.
12b. F/S Groups not expected for the site: Introduced annual grasses, perennial introduced and naturalized grasses, trees.
12c. Number of F/S Groups: 6
12d. Species number in Dominant and Sub-dominant F/S Groups: 11

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little evidence of decadence or mortality. Bunch grasses have strong, healthy centers with less than 3 percent mortality and shrubs have few dead stems. The exception is the potential for increased mortality of mid and short, warm-season bunch grasses during multi-year drought cycles.

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14. **Average percent litter cover (%) and depth (in):** Plant litter cover is evenly distributed throughout the site and is expected to be 35 to 50 percent. Litter depth is expected to be 0.25 to 0.50 inches (0.65-1.30 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** In the 12-14" precipitation zone, annual production ranges from 600 to 1200 pounds per acres (air dry basis). Average annual production is 1,000 pounds per acre under normal precipitation and weather conditions.

    In the15-17" Precipitation Zone, annual production ranges from 750 to 1750 pounds per acre (air dry basis). Average annual production is 1,250 pounds per acre under normal precipitation and weather conditions.

    No significant reduction is expected the growing season following wildfire.

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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:** Annual bromes, sixweeks fescue, common mullein, Russian thistle, kochia, pricklypear cacti, fringed sagewort, and others as they become known.

See:
Colorado Department of Agriculture Invasive Species Website:
https://www.colorado.gov/pacific/agconservation/noxious-weed-species
Wyoming Weed and Pest Council Website: https://wyoweed.org/
Nebraska Invasive Species website: https://neinvasives.com/plants.

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17. **Perennial plant reproductive capability:** All perennial species exhibit high vigor relative to recent weather conditions. Perennial grasses should have vigorous rhizomes or tillers; vegetative and reproductive structures are not stunted. All perennial species should be capable of reproducing annually.
