USDA Natural Resources
Conservation Service

Ecological site R064XY050NE
Thin Breaks

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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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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are expected on slopes steeper than 15 percent becoming more evident as slopes increase. Rills will be 5 feet long or shorter and will be at least 6 feet apart.

2. **Presence of water flow patterns:** Typically, none. When present, water flow patterns will be barely visible and discontinuous with numerous debris dams.

3. **Number and height of erosional pedestals or terracettes:** Pedestalled plants and terracettes are not expected on gentle slopes but will occur on slopes steeper than 15 percent becoming more evident as slopes increase.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is typically 15 percent or less and bare ground patches will be 2 to 3 inches (5 to 7.5 cm) in diameter.

5. **Number of gullies and erosion associated with gullies:** Gullies may be present, typically in association with drainageways and on steeper slopes. Gullies may develop after intense rainfall events and will re-vegetate rapidl

6. **Extent of wind scoured, blowouts and/or depositional areas:** None. Wind-scoured and/or depositional areas should not be present.

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7. **Amount of litter movement (describe size and distance expected to travel):** Small size litter classes will generally move short distances (less than 6 inches or 12.5 cm), some medium size class litter will move very short distances (less than 3 inches or 6.25 cm). On the steepest slopes (greater than 30 percent) litter will travel greater distances.

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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 aggregate stability ratings should typically be 5 to 6, normally 6. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 2 to 10 inches (5.1 to 25.4 cm) thick. Soil colors are light brownish gray (value of 6) when dry and dark grayish brown (value of 4) when moist. Structure should typically be fine granular as least in the upper A-horizon. Some soils have subangular blocky structure parting to weak fine granular. Layers of exposed bedrock occur at or near the surface.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid and tall rhizomatous and tufted perennial cool season grasses) with fine and coarse roots positively influences infiltration. Invasion of introduced cool-season grasses such as Kentucky bluegrass, annual brome, smooth brome, and crested wheatgrass may have an adverse impact infiltration and runoff.

    Relative composition is approximately 65 percent grasses or grass-like plants, 10 percent forbs, 15 percent shrubs, and 10 percent trees. The grass component is composed of C4, tallgrasses (10-30%), C3 bunchgrasses (10-20%), C4, midgrasses (10-20%), C3, rhizomatous grasses (0-5%), C4, shortgrasses (0-5%) and grass-likes (2-5%).

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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. When dry, subsoil can be hard and appear to be compacted, but no platy structure will be present.

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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: Phase 1.1
    1. Native, perennial, C4 tallgrass, 250-750 #/ac, 10-30% (2 species minimum): big bluestem, spiked muhly.
    2. Native, perennial, C3 bunchgrass, 250-500 #/ac, 10-20%, (3 species minimum): Canada wildrye, green needlegrass, prairie Junegrass, needle and thread, porcupine grass.
    3. Native, perennial, C4 midgrass, 250-500 #/ac, 10-20% (3 species minimum): little bluestem, plains muhly, prairie dropseed, sideoats grama, sand dropseed.

    Phase 1.2
    1. Shrubs, 320-560 #/ac, 20-35% (7 species minimum): silver buffaloberry, American plum, skunkbush sumac, chokecherry, prairie sagewort, western snowberry, rose and other shrubs that vary from location to location.
    2. Native, perennial, C3 grass, 80-400 #/ac, 5-25% (1 species minimum): Canada wildrye, green needlegrass, needle

and thread, porcupinegrass, prairie Junegrass, western wheatgrass, thickspike wheatgrass.

Sub-dominant: Phase 1.1
1. Shrubs, 125-500 #/ac, 5-20% (2 species minimum): prairie sagewort, rose and other shrubs which vary from location to location.
2. Native trees, 25-500 #/ac, 1-20% (2 species minimum): green ash, Rocky Mountain juniper and other species vary from location to location.

Phase 1.2
1. Native trees, 160-320 #/ac, 10-20% (2 species minimum): green ash, Rocky Mountain juniper, and other species that vary from location to location.

Other: Minor - Phase 1.1
1. Native forbs, 125-250 #/ac, 5-10%: forbs present vary from location to location.
2. Grass-likes, 50-125 #/ac, 2-5%: sedges.
3. Native, perennial, C3 rhizomatous grass, 0-125 #/ac, 0-5%: western wheatgrass, thickspike wheatgrass.
4. 0-125 #/ac (0-5%): blue grama, hairy grama.

Minor - Phase 1.2
1. Native forbs, 32-160 #/ac, 2-10 %: forbs present vary from location to location.
2. Native, perennial, C4 tallgrass, 0-160 #/ac, 0-10%: spiked muhly, big bluestem.
3. Native, perennial, C4 midgrass, 32-128 #/ac, 2-8%: plains muhly, sideoats grama, prairie dropseed, little bluestem, sand dropseed.
4. Non-native C3 grass, 16-128 #/ac, 1-8%: Kentucky bluegrass, field brome, cheatgrass.
5. Grass-likes, 0-80 #/ac, 0-5%: sedges.

Trace - Phase 2.2
1. Native, perennial, C4, shortgrass, 0-32 #/ac, 0-2%: blue grama, hairy grama.

Additional: The Muhly-Bluestem/Shrubs/Green Ash Community or Reference Community (1.1) is composed of nine F/S groups. These groups, in order of relative abundance, are native, perennial, C4, tallgrass; native, perennial, C3, bunchgrass; native, perennial, C4 midgrass; shrubs; native trees; native forbs; grass-likes; native, perennial C3, rhizomatous grass; and native, perennial, C4, shortgrass.

The Shrubs/ Green Ash-Juniper Community (1.2) includes nine F/S groups. These groups include, in order of abundance, shrubs; native, perennial, C3 grass; native trees; native forbs; native, perennial, C4 tallgrass; native, perennial, C4 midgrass; non-native C3 grass; grass-likes; and native, perennial, C4 shortgrass.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Bunchgrasses have strong, healthy centers with few (less than 3 percent) dead centers. Shrubs may show some dead branches (less than 5 percent) as plants age.

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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 50 to 80 percent and at a depth of 0.25 to 0.50 inch (0.65 to 1.3 cm). Kentucky bluegrass excessive litter can negatively impact the functionality of this site.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** The representative value (RV) for annual production is 2,500 pounds per acre on an air dry basis. Low and high production years should yield 1,800 and 3,200 pounds per acre respectively.

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:** No non-native invasive species are present. Annual bromes, Kentucky bluegrass, and eastern red cedar are known invasives that have the potential to become dominant or co-dominant on this site. Consult the state noxious weed and state watch lists for potential invasive species. Note: species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants.

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.