USDA Natural Resources
Conservation Service

Ecological site R064XY039NE
Shallow Clay

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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	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Typically, none. Rills may occur on slopes greater than 15 percent. When they do occur, they are discontinuous.

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

3. **Number and height of erosional pedestals or terracettes:** A few pedestalled plants may occur, typically on slopes greater than 15 percent, with no exposed roots.

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 on north and east facing slopes and typically 10 percent or less on south and west facing slopes. Bare ground patches are typically less than 2 to 3 inches (5.1 to 7.6 cm) in diameter.

5. **Number of gullies and erosion associated with gullies:** Typically, none. Limited head cutting may form after heavy precipitation events. Existing gullies should be stabilized with good vegetative cover.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None. Wind scoured areas and 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 size classes generally move short distances (less than 6 inches or 15.25 cm), some medium size class litter will move very short (less than 3 inches or 8.5 cm) distances. Litter debris dams are occasionally present.

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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 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 3 to 8 inches (7.6 to 20.3 cm) thick. Colors range from brown, reddish gray, to light brownish gray (values of 5 to 6) when dry and dark grown, dark grayish brown, to dark reddish brown (values of 4) when moist. Structure should typically be fine granular at least in the upper A-horizon. Soils will be slightly to moderately alkaline. Some series will have an impervious shale layer at 10 to 20 inches (25.4 to 50.8 cm).

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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 annual bromes may have an adverse impact infiltration and runoff.

    Relative composition is approximately 80 percent grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs or trees. The grass component is composed of C3, rhizomatous grasses (20-40%), C3, bunchgrasses (10-25%), C4, mid-grasses (10-25%), C4, short grasses (5-15%), C4, tallgrasses (3-10%), and grass-likes (1-5%).

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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, the B-horizons 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, C3, rhizomatous grass, 320-640 #/ac, 20-40% (1 species minimum): thickspike Wheatgrass, western wheatgrass.
    2. Native, perennial, C3, bunchgrass, 160-400 #/ac, 10-25%, (1 species minimum): bluebunch wheatgrass, green needlegrass, needle and thread, prairie Junegrass, Sandberg bluegrass, squirreltail.
    3. Native, perennial, C4, midgrass, 160-400 #/ac, 10-25%, (2 species minimum): little bluestem, sideoats grama, plains muhly.

    Phase 1.2
    1. Native, perennial, C4, shortgrass, 120-360 #/ac, 10-30%, (1 species minimum): blue grama, buffalograss, hairy

grama, Fendler threeawn.

Sub-dominant: Phase 1.1
1. Native, perennial, C4, shortgrass, 80-240 #/ac, 5-15%, (1 species minimum): blue grama, buffalograss, hairy grama, Fendler threeawn.

Phase 1.2
1. Native, perennial, C3, rhizomatous grass, 60d-240 #/ac, 5-20% (1 species minimum): thickspike Wheatgrass, western wheatgrass.
2. Native, perennial, C3, bunchgrass, 60-240 #/ac, 5-20%, (1 species minimum): bluebunch wheatgrass, green needlegrass, needle and thread, prairie Junegrass, Sandberg bluegrass, squirreltail.
3. Native, perennial, C4, tall- and midgrass, 60-180 #/ac, 5-15%, (2 species minimum): little bluestem, sideoats grama, plains muhly, big bluestem, prairie sandreed.
4. Native forbs, 60-180 #/ac, 5-15% (8 species minimum): white sagebrush, white heath aster, hairy false goldenaster, purple prairie clover, pussytoes, upright prairie coneflower, scurfpea, scarlet beeblossom, and other forbs that vary from location to location.

Other: Minor - Phase 1.1
1. Native, perennial, C4, tallgrass, 48-160 #ac, 3-10%: big bluestem, prairie sandreed.
2. Native forbs, 80-160#/ac, 5-10%: forbs present will vary from location to location.
3. Shrubs, 32-160 #/ac, 2-10%: shrubs present will vary from location to location.
4. Native, grass-likes, 16-80 #/ac, 1-5%: sedges.

Minor - Phase 1.2
1. Native grass-likes, 60-120 #/ac, 5-10%: sedges;
2. Shrubs, 24-120 #/ac, 2-10%: shrubs present vary from location to location.
3. Non-native, C3 grass, 0-60 #/ac, 0-5%: cheatgrass, Kentucky bluegrass, smooth brome, field brome.

Trace - Phase 1.1
1. Native, coniferous trees, 0-16 #/ac, 0-1%: Rocky Mountain Juniper, eastern redcedar

Trace - Phase 1.2
1. Native, coniferous trees, 0-12 #/ac (0-1%): Rocky Mountain Juniper, eastern redcedar

Additional: The Rhizomatous Wheatgrass-Sideoats Grama-Green Needlegrass Community or Reference Community (1.1) consists of nine F/S groups. These groups, in order of relative abundance are native, perennial, C3, rhizomatous grass; native, perennial, C3, bunchgrass = native, perennial, C4, midgrass; native, perennial, C4, shortgrass; native forbs; native, perennial, C4, tallgrass; shrubs; native grass-likes; and native, coniferous trees.

The Rhizomatous Wheatgrass-Blue Grama/Sedge Community (1.2) consists of nine F/S groups. These groups, in order of relative abundance, are native, perennial, C4, shortgrass; native, perennial, C3, rhizomatous grass; native, perennial, C3, bunchgrass = native, perennial, C4, tall- and midgrass = native forbs; native grass-likes; shrubs; non-native, C3 grass; and native, coniferous trees.

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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 40 to 60 percent and at a depth of 0.25 inch (0.65 cm).

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production is 1,600 pounds per acre in a year with normal precipitation and temperatures. Low and High production years should yield 1,200 and 2,000 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 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.