USDA Natural Resources
Conservation Service

Ecological site R102CY058NE
Loamy Upland

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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.

Author(s)/participant(s)	Original Authors: Stu McFarland, Nadine Bishop (08/01/2013). Version V Authors: Nadine Bishop, Emily Helms, Jeff Nichols
Contact for lead author	jeffrey.nichols@usda.gov
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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:** None. Rills are not expected on this site.

2. **Presence of water flow patterns:** Typically, none. Water flow patterns may occur on steeper slopes (greater than 20 percent). When they occur, water flow patterns will be barely visible and discontinuous.

3. **Number and height of erosional pedestals or terracettes:** Typically, none. Erosional pedestals or terracettes may be present on steeper slopes (greater than 20 percent), becoming more common as slopes become steeper, but with no exposed roots. Drought or wildfire can contribute to increased incidences pedestalled plants.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is typically 5 percent or less. Bare ground may increase up to 10 percent during and immediately after multi-year drought.

   Bare ground is exposed mineral soil that is not covered by vegetation (basal and/or foliar canopy), litter, standing dead vegetation, gravel/rock, and visible biological curst (e.g., lichen, mosses, algae).

5. **Number of gullies and erosion associated with gullies:** None. Gullies are not expected on this site.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Litter of small and medium size classes will move after average to high rainfall events. Typically, none. Litter should fall in place. On steeper slopes (greater than 20 percent) fine litter may move short distances (less than 6 inches or 15 cm) of fine especially after high precipitation events. 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 Surface Resistance to Erosion: Soil stability ratings will be 5 to 6, typically 6. Surface organic matter adheres to the soil surface. Soil surface fragments 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 A-horizon is typically 8 to 14 inches (20 to 35 cm) thick. Soil colors range from dark grayish brown very dark brown to grayish brown (hue: 10YR, value: 2, 4 or 5, chroma: 2) when dry, and black, very dark grayish brown, or very dark brown when moist (hue: 10YR, value: 2 or 3, chroma: 1 or 2).

   The structure of the A-horizon varies with soil series and ranges from weak fine granular to moderate medium subangular blocky parting to moderate fine and medium or weak fine granular; weak fine or weak fine and medium subangular blocky; weak coarse prismatic structure parting to weak coarse subangular blocky and weak fine granular.

   See Official Soils Descriptions for additional details; major soil series correlated to the site are Belfore, Dempster, Ihlen, Moody, and Nora.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community composition is approximately 75 to 90 percent perennial grasses and grass-likes, 5 to 10 percent forbs, and 5 to 10 percent shrubs which optimizes infiltration on the site. The grass and grass-like component is composed of C4, rhizomatous, tallgrasses; C4, midgrasses; C3, bunchgrasses; C3, rhizomatous grasses; C4, shortgrasses, and grass-likes. The functional/structural groups provide a combination of rooting depths and structure which positively influences infiltration.

    Invasion of introduced cool-season grasses such as Kentucky bluegrass and smooth brome may have an adverse impact infiltration and runoff. Tree encroachment may also negatively impact infiltration and runoff.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. No compaction layers are expected for 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: Phase 1.1
    1. Native, perennial, warm-season, tallgrass, 1575-2100#/ac, 45-60 percent (3 species minimum): big bluestem,

Indiangrass, switchgrass, prairie dropseed, composite dropseed.
2. Native, perennial, warm-season, midgrass, 1575-2100#/ac, 45-60 percent (2 species minimum): Little bluestem, sideoats grama.

Phase 1.2
1. Native, perennial, warm-season, midgrass (2 species minimum): Little bluestem, sideoats grama.

Sub-dominant: Phase 1.1
1. Native, perennial, cool-season (C3), bunchgrass, 175-700 #/ac, 5-20 percent (2 species minimum): Canada wildrye, needle and thread, green needlegrass, porcupinegrass, prairie junegrass, fall rosette grass, Scribner's rosette grass.

Phase 1.2
1. Native, perennial, warm-season tallgrass, (2 species minimum): sand bluestem, Indiangrass, switchgrass, prairie sandreed.
2. Native, perennial, cool-season grass (3 species minimum): Canada wildrye, needle and thread, green needlegrass, porcupinegrass, prairie junegrass, fall rosette grass, Scribner's rosette grass.
3. Native, cool-season (C3) rhizomatous grass (1 species minimum): western wheatgrass

Other: Minor - Phase 1.1
1. Native, perennial, cool-season (C3), rhizomatous grass, 175-350 #/ac, 5-10 percent (1 species minimum): western wheatgrass.
2. Grass-likes, 175-350 #/ac, 5-10 percent: heavy sedge, sun sedge, Mead's sedge, other sedges.
3. Native forb, 175-350 #ac, 5-10 percent: forbs present vary from location to location.
4. Shrubs, 175-350 #/ac, 5-10%: leadplant, Jersey tea, prairie rose, smooth sumac, western snowberry.
5. Native, perennial, warm-season (C4) short grasses, 0-350#/ac, 0-10 percent: blue grama, buffalograss.

Minor - Phase 1.2
1. Native, perennial, warm-season (C4) short grasses: blue grama, buffalograss.
2. Native forb: forbs present vary from location to location.
3. Native shrub: leadplant, Jersey tea, prairie rose, smooth sumac, western snowberry.
4. Grass-likes: heavy sedge, sun sedge, Mead's sedge, other sedges.

Additional: The Big Bluestem – Little Bluestem Reference Community (1.1) includes eight F/S groups which include in order of relative abundance, native, perennial, warm-season (C4), tallgrass; native, perennial, warm-season (C4), midgrass; native, perennial, cool-season (C3), bunchgrass; native, perennial, cool-season (C3), rhizomatous grass; grass-likes = native forbs = shrubs and native, perennial, warm-season (C4), shortgrass.

The Little Bluestem – Sideoats Community (1.2) includes eight F/S groups which include in order of relative abundance, native, perennial, warm-season (C4), midgrass; native, perennial, warm-season (C4), tallgrass; native, perennial, cool-season (C3), bunchgrass; native, perennial, cool-season (C3), rhizomatous grass; native, perennial, warm-season (C4), shortgrass = native forbs = shrubs; and grass-likes.

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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 75 to 85 percent and at a depth of 0.50 to 1.0 inch (1.3-2.6 cm). Kentucky bluegrass excessive litter can negatively impact the functionality of this site.

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 3,500 pounds per acre in a year with normal precipitation and temperatures. Low and High production years should yield 2,400 and 4,300 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 (cheatgrass and Japanese/field), musk thistle, Canada thistle, plumeless thistle, spotted and diffuse knapweed, sulphur cinquefoil, absinth wormwood, leafy spurge, and eastern redcedar are known invasives that have the potential to become dominant or co-dominant on the site
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    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 climatic 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.