USDA Natural Resources
Conservation Service

Ecological site R064XY011NE
Sandy 14-17" PZ

Last updated: 12/16/2024
Accessed: 05/11/2025

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)	Stan Boltz, Mitch Faulkner, Emily Helms, John Hartung, Ryan Murray, George Gamblin, Rick Peterson, Nadine Bishop, Jeff Nichols
Contact for lead author	jeffrey.nichols@usda.gov
Date	12/16/2024
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 should not be present.

2. **Presence of water flow patterns:** Typically, none. Water flow patterns may be present on slopes of 15% or greater. When present, they will be no longer than 2 to 4 inches (5.1 to 10.2 cm), less than 3 inches (7.6 cm) wide, and discontinuous. Water flow patterns, when present, are often associated with animal activity.

3. **Number and height of erosional pedestals or terracettes:** None. Pedestals or terracettes should not be present..

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 to 10 percent or less, and bare ground patches are less than 2 inches (5.1 cm) in diameter.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** None. Wind scoured areas and depositional areas

should not be present.

---

7. **Amount of litter movement (describe size and distance expected to travel):** Litter should fall in place. Slight amount of movement (less than 6 inches or 15 cm) 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 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.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 3 to 22 inches (7.6 to 50.8 cm) thick. Soil colors range from brown, grayish brown, dark grayish brown to dark gray (values of 4 to 5) when dry and brown, very dark brown, to very dark grayish brown (values of 2 to 4) when moist.

   Structure typically is granular. If conditions are other than this, refer to map unit component descriptions for the component on which the site occurs.

---

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, Kentucky bluegrass, and crested wheatgrass may have an adverse impact infiltration and runoff.

    Relative composition is approximately 85 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. The grass component is composed of C4, tall- and midgrasses (25-55%), C3, bunchgrasses (15-35%), C3, rhizomatous grasses (5-15%), C4, short grasses (5-15%), grass-likes (0-5%).

---

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 should not occur 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: Phase 1.1
    1. Native, perennial, C4, tall- and midgrasses, 400-880 #/ac, 25-55%, (3 species minimum): prairie sandreed, sand bluestem, big bluestem, switchgrass, little bluestem, sand lovegrass, sand dropseed.
    2. Native, perennial, C3, bunchgrass, 240-560 #/ac, 15-35% (1 species minimum): needle and thread, prairie Junegrass, Indian ricegrass.

    Phase 1.2
    1). Native, perennial, C4, tall- and midgrass, 280-560 #/ac, 20-40% (2 species minimum): prairie sandreed, little bluestem, sand bluestem, big bluestem, switchgrass, sand lovegrass, sand dropseed.
    2. Native, perennial, C3, bunchgrass: 350-630 #/ac, 25-45% (2 species minimum): needle and thread, prairie Junegrass, Indian ricegrass.

Phase 1.3
1. Native, perennial, C3, midgrass, 180-540 #/ac, 55-45% (1 species minimum): needle and thread, prairie Junegrass, Indian ricegrass, western wheatgrass.
2. Native, perennial, C4, tall- and midgrass, 120-300 #/ac, 10-25% (2 species minimum): prairie sandreed, little bluestem, sand bluestem, big bluestem, switchgrass, sand lovegrass, sand dropseed.

Sub-dominant: Phase 1.1
1. Native, perennial, C3, rhizomatous grass, 80-240#/ac, 5-15% (1 species minimum): western wheatgrass, thickspike wheatgrass.
2. Native, perennial, C4, shortgrass, 80-240 #/ac, 5-15% (1 species minimum): blue grama, buffalograss.

Phase 1.2
1. Native perennial, C4, shortgrass, 70-280 #/ac, 5-25% (1 species minimum): blue grama, sandhill muhly, threeawn.
2. Native, perennial, C3, rhizomatous grass, 70-210 #/ac, 5-15%, (1 species minimum): western wheatgrass.

Phase 1.3
1. Native, perennial, C4, shortgrass, 120-240 #/ac, 10-20% (1 species minimum): blue grama, sandhill muhly, threeawn.
2. Native forb, 70-180 #/ac, 5-15% (2 species minimum): Slimflower scurfpea, Cuman ragweed, and other forbs which vary from location to location.
3. Shrub, 24-180 #/ac, 2-15% (1 species minimum): prairie sagewort, and other shrubs which vary from location to location.
4. Native, perennial, C3, rhizomatous grass, 60-180 #/ac, 5-15% (1 species minimum): western wheatgrass.

Other: Minor - Phase 1.1
1. Native forb, 80-160#/ac, 5-10%: forbs present vary from location to location.
2. Shrub, 80-160, 5-10%: shrubs present vary from location to location.
3. Native grass-like, 0-80 #/ac, 0-5%: threadleaf sedge, other grass-likes.

Minor - Phase 1.2
1. Native forb, 70-140 #/ac, 5-10%: Slimflower scurfpea, Cuman ragweed, and other forbs which vary from location to location.
2. Shrub, 14-140 #ac, 1-10%: prairie sagewort, and other shrubs which vary from location to location.
3. Native grass-like, 0-70 #/ac, 0-5%: threadleaf sedge.
4. Non-native, perennial, C3 grass, 0-70 #/ac, 0-5%: crested wheatgrass, smooth brome, Kentucky bluegrass.
5. Non-native, annual, C3 grass, 0-70 #/ac, 0-5%: cheatgrass, field brome.

Minor - Phase 1.3
1. Native grass-like, 60-120 #/ac, 5-10%: threadleaf sedge.
2. Non-native, perennial, C3 grass, 0-60 #/ac, 0-5%: crested wheatgrass, smooth brome, Kentucky bluegrass.
3. Non-native, annual, C3 grass, 0-60 #/ac, 0-5%: cheatgrass, field brome.

Additional: The Reference Community (1.1) or Prairie Sandreed-Needle and Thread-Bluestem community consists of seven F/S groups. These groups, in order of relative abundance, are native, perennial, C4, tall- and midgrass; native, perennial, C3, bunchgrass; native, perennial, C3, rhizomatous grass; native, perennial, C4, shortgrass; native forb; shrub; and native grass-like.

The Prairie Sandreed-Needle and Thread-Blue Grama Community (1.2) consists of nine F/S groups. These groups, in order of relative abundance, are native, perennial, C4, tall- and midgrass; native, perennial, C3, bunchgrass; native, perennial, C4, shortgrass; native, perennial, C3, rhizomatous grass = native forb; shrubs; native grass-like = non-native, perennial, C3 grass = non-native, annual, C3 grass.

The Needle and Thread-Blue Grama-Western Wheatgrass Community (1.3) consists of eight F/S groups. Tje community

is dominated by native, perennial, C3 midgrass and native, perennial, C4 tall- and midgrass.

---

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.

---

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 0.25 to 0.50 inch (0.65 to 1.3 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 1,600 pounds per acre on an air dry weight basis. Low and High production years should yield 1,000 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, Kentucky bluegrass, smooth brome, crested wheatgrass, absinth wormwood, 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.
