USDA Natural Resources
Conservation Service

Ecological site R067AY146WY
Sands (Sa)

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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:** Typically, none. Rills may be present on slopes of 15 percent or greater. Rills will be short and disconnected.

2. **Presence of water flow patterns:** Typically, none. Water flow patterns may be present on slopes of 15 percent or greater. When present, they will be no longer than 2 to 4 inches (5.1-10.1 cm), less than 6 inches (15.25 cm) wide, and discontinuous. Water flow patterns, when present, are often associated with animal activity.

3. **Number and height of erosional pedestals or terracettes:** Typically, none. Bunch grasses may be slightly pedestalled (0.5 inch/1.25 cm) with no exposed roots. This would typically occur on north and west aspects of slopes exceeding 10 percent and where bunchgrasses are more common. Drought or wildfire can contribute to increased incidences of 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 15 to 20 percent or less. Bare ground patches are not connected and are less than 6 inches (15 cm) across, unless associated with disturbance such as burrowing animals. Multi-year drought and/or wildfire can increase bare ground to 25 to 30 percent for up to two years following the disturbance.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Typically, none. Occasional areas associated with concentrated animal activity (livestock trailing and burrowing animals) may exhibit wind scoured areas with accompanying deposition. These areas are typically are present on less than 1 percent of the site.

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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.

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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):** Some series on this site typically have little organic matter in the surface horizon, and the structure is single grain sand. Soil aggregate stability will be difficult to measure on these soils, with stability ratings of 2 to 3.

   Surface erosion by water rarely occurs due to rapid infiltration, but the surface is susceptible to wind erosion when vegetative cover is reduced due to multi-year drought, wildfire, or multi-year heavy grazing.

   Biological crusts may be present (up to 10 percent of the surface) and serve to provide resistance to erosion.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface layer ranges from 4 to 10 inches (10.1-25.4 cm) deep. Some soils have little organic matter in the A-horizon. Soil colors vary with soil series from grayish brown, pale brown, or dark grayish brown (values of 4 to 6) when dry and dark grayish brown or very dark grayish brown (values of 4 to 5) when moist. Structure in the soil surface can be granular parting to single grain to single grained.

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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 with fine and coarse roots positively influences infiltration.

    The expected composition of the plant community is 80 to 95 percent perennial grasses and grass-likes, 0 to 10 percent forbs, and 0 to 10 percent shrubs.

    In the 12-14” PZ, the perennial grass and grass-like component is made up of tall, warm-season, rhizomatous grasses (30-60%); cool-season bunch grasses (10-35%); mid, warm season grasses (5-20%), short, warm-season grasses (5-15%); and grass-likes (0-5%).

    In the 15-17” PZ, the perennial grass and grass-like component is made up of tall, warm-season, rhizomatous grasses (30-60%); cool-season bunch grasses (10-35%); mid, warm season grasses (5-25%), short, warm-season grasses (5-15%); and grass-likes (0-5%)

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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. A compaction layer should not be present on this site.

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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: 12-14" PZ: Community 1.1:
1. Native, C4, tall, rhizomatous grasses – 390-780 #/ac (30-60%): 2 species minimum

15-17" PZ: Community 1.1:
1. Native, C4, tall, rhizomatous grasses – 450-900 #/ac (30-60%): 2 species minimum

Sub-dominant: 12-14" PZ: Community 1.1:
2. Native, C3, bunch grasses – 130-390 #/ac (10-35%), 1 species minimum
3. Native, C4, mid-grasses – 65-260#/ac (5-20%), 1 species minimum
4. Native, C4, short grasses 65-195 #/ac (5-15%), 1 species minimum

15-17" PZ: Community 1.1:
2. Native, C3, bunch grasses– 150-525 #/ac (10-35%), 1 species minimum
3. Native, C4, mid-grasses – 75-375 #/ac (5-15%)1 species minimum

Other: 12-14" PZ: Community 1.1:
Minor:
5. Shrubs, cacti, vines – 65-130 #/ac (5-10%)
6. Native, Perennial and Annual Forbs – 65-130 #/ac (5-10%)
7. Grass-0-55 #/ac: 0-65 #/ac (0-5%)

15-17" PZ Community 1.1:
4. Native, C4, short grasses – 75-225 #/ac (5-15%)
5. Shrubs, cacti, vines – 75-150 #/ac (5-10%)
6. Native, Perennial and Annual Forbs – 75-150 #/ac (5-10%)
7. Grass-likes – 0-75 #/ac: (0-5%)

Additional: 12-14" PZ: Community 1.1:
12a. Relative Dominance:
Native, C4, tall and mid grasses > Native, C3, bunch grasses > Native, C4, Mid-grasses > C4, short grasses > Native, Perennial and Annual Forbs = Shrubs, cacti, vines > Grass-likes.

12b. F/S Groups not expected for the site: Introduced annual grasses, perennial introduced and naturalized grasses, trees.

12c. Number of F/S Groups: 7

12d. Species number in Dominant and Sub-dominant F/S Groups: 5

15-17" PZ Community 1.1:
12a. Relative Dominance:
Native, C4, tall and mid grasses > Native, C3, bunch grasses > Native, C4, Mid-grasses = C4, short grasses > Shrubs, cacti, vines = Native, Perennial and Annual Forbs > Grass-likes.

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12c. Number of F/S Groups: 7

12d. Species number in Dominant and Sub-dominant F/S Groups: 5

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 of up to 10 percent mortality in the 15-17" PZ and up to 15 percent mortality in the 12-14" PZ of mid and short, warm-season bunch grasses during multi-year drought cycles.

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. Litter depth is expected to be 0.25-0.50 inch (0.65-1.3 cm). Litter cover during and following drought can range from 30 to 40 percent and 5 to 15 percent following wildfire.

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 750 to 1750 pounds per acres (air dry basis) Average annual production is 1,300 pounds per acre under normal precipitation and weather conditions.

    In the15-17" Precipitation Zone, annual production ranges from 1000 to 2000 pounds per acre (air dry basis). Average annual production is 1,500 pounds per acre under normal precipitation and weather conditions.

    No significant reduction is expected the growing season following wildfire.

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, common mullein, crested wheatgrass, fringed sagewort, hairy gold aster, sand sagebrush (when at levels exceeding that expected in the reference state), 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.

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.