USDA Natural Resources
Conservation Service

Ecological site R065XY011NE
Sandy 14-17" PZ

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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:** None. Rills are not expected on this site.

2. **Presence of water flow patterns:** None. Water flow patterns are not expected on this site.

3. **Number and height of erosional pedestals or terracettes:** None. Erosional pedestals or terracettes are not expected.

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. Multi-year drought and/or wildfire can increase bare ground to 10 percent for up to two years following the disturbance.

   Bare ground is exposed mineral soil that is not covered by vegetation (basal and/or foliar canopy), standing dead vegetation, gravel/rock, and visible biological crust (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 areas and depositional areas are not expected on this 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):** 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.

   Surface erosion by water rarely occurs due to rapid infiltration, but surface may be 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 and may 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 A-horizon should be 3 to 10 inches (10-25 cm) thick, with the deeper A-horizon occurring on interdunes and nearly level landscape positions. Soil colors range from grayish brown, dark grayish brown, to dark gray (values of 4 to 5) when dry and very dark grayish brown, dark grayish brown, or very dark brown (values of 2 to 3) when moist. Structure is typically granular.

   Dunday is the major soil series correlated to this ecological site.

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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 species (rhizomatous, warm-season tall- and midgrasses and tufted perennial cool season grasses) with fine and coarse roots positively influences infiltration.

    The expected composition of the plant community is 80 to 90 percent perennial grasses and grass-likes, 5 to 10 percent forbs, and 1 to 10 percent shrubs. The perennial grass and grass-like component is made up of warm-season tallgrasses (30-75%); warm-season midgrasses (2-10%), cool-season grasses (5-15%); warm-season shortgrasses (5-10%); and grass-likes (2-10%).

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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. Compaction layers should not 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, warm-season, tallgrass, 570--1425 #/ac, 30-75%, 2 species minimum: sand bluestem, prairie sandreed, switchgrass.

    Phase 1.2

1. Native, perennial, warm-season, tallgrass, 480-800 #/ac, 30-50%, 2 species minimum: sand bluestem, prairie sandreed, switchgrass.

Phase 1.3
1. Native, perennial, warm-season, tallgrass, 480-880 #/ac, 30-55%, 2 species minimum: sand bluestem, prairie sandreed, switchgrass.
2. Native, perennial, cool-season grass, 160-480 #/ac, 10-30%, 1 species minimum: needle and thread, Indian ricegrass, prairie Junegrass.

Sub-dominant: Phase 1.1
1. Native, perennial, cool-season grass, 95-285 #/ac, 5-10%, 1 species minimum: needle and thread, Indian ricegrass, prairie Junegrass, western wheatgrass.

Phase 1.2
1. Native, perennial, cool-season grass, 80-240 #/ac, 5-15%, 1 species minimum: needle and thread, Indian ricegrass, prairie Junegrass, western wheatgrass.
2. Native, perennial, warm-season shortgrass, 80-240 #/ac, 5-15%, 1 species minimum: blue grama, sandhill muhly.

Other: Minor - Phase 1.1
1. Native, perennial, warm-season shortgrass, 95-190 #/ ac, 5-10%: blue grama.
2. Native, perennial and annual forbs, 95-190#, 5-10%: forbs present vary from location to location.
3. Native, perennial, warm-season midgrass, 38-190 #/ac, 2-10%: little bluestem, sand lovegrass, sand dropseed.
4. Grass-likes, 38-190 #/ac, 2-10%: sedges.
5. Shrubs, 19-190 #/ac, 1-10%: sand sagebrush, prairie sagewort, brittle pricklypear, plains pricklypear, rose, soapweed yucca.

Minor - Phase 1.2
1. Native, perennial, warm-season midgrass, 80-160 #/ac, 5-10%: sand lovegrass, little bluestem, sand dropseed.
2. Native, perennial and annual forbs, 80-160 #/ac, 5-10%: forbs present vary from location to location.
3. Shrubs, 16-160 #/ac, 1-10%: sand sagebrush, prairie sagewort, brittle pricklypear, plains pricklypear, rose, soapweed yucca.
4. Grass-likes, 0-80 #/ac, 0-5%: sedges.

Minor - Phase 1.3
1. Native, annual and perennial forbs, 16-160 #/ac, 1-10%: forbs present vary from location to location.
2. Native, perennial, warm-season midgrass, 0-160 #/ac, 0-10%: sand lovegrass, little bluestem, sand dropseed.
3. Shrubs, 16-80 #/ac, 1-5%: sand sagebrush, prairie sagewort, brittle pricklypear, plains pricklypear, rose, soapweed yucca.
4. Native, perennial, warm-season shortgrass, 0-80 #/ac, 0-5%: blue grama.
5. Grass-likes, 0-80 #/ac, 0-5%: sedges.

Trace - Phase 1.2
1. Non-native, cool-season grass, 0-32 #ac, 0-2%: cheatgrass.

Trace - Phase 1.3
1. Non-native, cool-season grass, 0-32 #ac, 0-2%: cheatgrass.

Additional: The Reference Community (1.1) includes seven functional/structural groups which are in order of relative abundance native, perennial, warm-season tallgrass; native perennial, cool-season grass; native perennial, warm-season shortgrass=forb; native, perennial, warm-season midgrass=grass-like; shrubs.

The At-Risk Community (1.2) includes eight functional/structural groups which are in order of relative abundance native, perennial, warm-season tallgrass; native, perennial, cool-season grass=native, perennial, warm-season shortgrass;

native, perennial, warm-season midgrass=native forb; shrub; grass-likes; non-native, cool-season grass.

The Excessive Litter Community (1.3) includes eight functional/structural groups which are in order of relative abundance native, perennial, warm-season tallgrass; native, perennial cool-season grass; forb; native perennial, warm-season midgrass; forb; shrub; native, perennial, warm-season shortgrass=grass-like; non-native, cool-season grass.

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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 and shrubs have few dead stems. The exception is the potential of up to 15 percent mortality of warm-season bunch grasses during multi- year drought cycles.

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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 70 percent and at a depth of 0.25 to 0.50 inch (0.65-1.3 cm). Litter cover during and following drought can range from 40 to 50 percent.

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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 1,900 pounds per acer on an air dry weight basis. Low and high production years should yield 1,600 and 2,500 pounds per acre respectively.

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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 (cheatgrass and Japanese/field) and common mullein are known invasives that have the potential to be dominant or co-dominant on the site. Consult the state noxious weed and state watch lists for potential invasive species on each ecological site.

    NOTE: Invasive plants (for the purposes of the IIRH protocol) are plant species that are typically not found on the ecological site or should only be in trace or minor categories under the natural disturbance regime and have the potential to become a dominant or codominant species on the site if their establishment and growth are not actively controlled by natural disturbances or management interventions. Species listed characterize degraded states AND have the potential to become a dominant or co-dominant species.

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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.
