USDA Natural Resources
Conservation Service

Ecological site R035XB210AZ
Loamy Upland 6-10" p.z.

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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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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** No rills on slopes <5%. A few minor rills may form on slopes greater than 5% due to moderate permeability and moderate runoff characteristics of the soils.

2. **Presence of water flow patterns:** Water flow patterns are infrequent, short (1 to 2 meters), and poorly developed. They may become more common on steeper slopes due to slow to moderate permeability and medium runoff characteristics of the soils.

3. **Number and height of erosional pedestals or terracettes:** Pedestals of ½” to 1” are rare to infrequent and often associated with water flow patterns. Terracettes are absent. Both may be more developed and common during a drought, due to moderate wind erosion hazard of the soils. High wind erosion hazard occurs on the soils with a surface texture of loamy sand or sandy loam.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 30-40%. Soils have an average available water capacity of 7-9 inches, which makes the site moderately productive. There should be a moderate amount of bare ground. Drought may cause an increase in bare ground.

5. **Number of gullies and erosion associated with gullies:** None

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6. **Extent of wind scoured, blowouts and/or depositional areas:** No blowouts are present on this site. Some small mounding around plant bases common, especially during droughts, due to high wind erosion hazard of the soil

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7. **Amount of litter movement (describe size and distance expected to travel):** Most herbaceous litter will be transported by wind and in water flow pathways, while a small percentage stays in place. Fine woody litter and duff will accumulate under shrub canopies.

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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 aggregate stability ratings should average 3-4 under plant canopy and 2-3 in the interspaces. Soil surface textures range from sandy loam to clay loam, but most textures are fine sandy loam, sandy clay loam and loam. There is usually less than 10% cover of rock fragments on the surface, but some surface horizons can be gravelly. When well vegetated, soils have a moderate resistance to water erosion and moderate to high resistance to wind erosion.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil structure is mostly granular (weak to moderate, very fine and fine) with some platy (weak, thin and medium) and sub angular blocky (weak, fine to medium). Surface thickness ranges from 2-8 inches, but is mostly 2-4 inches. Color is typically reddish brown to brown, but can vary depending on parent material.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by mid and short grasses, shrubs, forbs with a trace of cacti and yucca. Canopy cover averages 30-40% (70% grasses, 25% shrubs, 5% forbs). Basal plant cover averages 10-20% (10-15% grasses, 2-3% shrubs, 1-2% forbs). Both cover values decrease during a prolonged drought. This type of plant community is moderately effective at capturing and storing precipitation.

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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. Due to loamy and clay loam textures, most of the soils can be compacted when wet, if there are no rock fragments in surface horizons. Some surface horizons are naturally platy.

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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: warm season bunchgrasses(20-40%)

    Sub-dominant: shrubs(15-25%) >= warm season colonizing grasses(15-25%) > cool season bunchgrasses(10-15%) >>

    Other: forbs(1-5%) > cacti(Trace)

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or**

decadence): In a normal year up to 10% of grasses and shrubs die off. During and after drought years there can be up to 20% die off of shrubs and grasses. Severe winter droughts affect shrubs and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.

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14. **Average percent litter cover (%) and depth (in):** Average percent litter cover 20 - 35% and depth 1/8”inch. Within plant interspaces litter ranges from 5 to 15 % cover with no real depth, while under shrub canopies it ranges from 25 to 50% cover with depths from 1/8 to 1/4 inch thick.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Average annual production on this site is expected to be 500 to 600 lbs/ac. in a year of average annual precipitation.

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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:** Mormon tea, broom snakeweed, prickly pear and Whipple cholla cactus are all native to the site, but have the ability to increase and dominate the area after disturbances. Russian thistle and cheatgrass are exotic annuals that have the ability to increase and dominate the site after ground disturbance.

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17. **Perennial plant reproductive capability:** All plants native to this site are adapted to the climate and are producing seeds, stolons and rhizomes in all but the most severe droughts.
