USDA Natural Resources
Conservation Service

Ecological site R035XB201AZ
Mudstone/Sandstone Hills 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:** A few rills occur throughout site (1-10% cover) at infrequent intervals, mostly in exposed areas. Rills may be 8 or more feet in length and are likely to form below adjacent exposed bedrock or areas where surface rock fragments are less than 15%. The number of rills and extent will increase on slopes greater than 35%, or sites with a decrease of herbaceous cover and/or immediately following high intensity storm events.

2. **Presence of water flow patterns:** The occurrence of water flow patterns is frequent (5-10% cover) and occur throughout the site interspersed throughout the larger rock fragments. These water flow patterns are typically less than 6 feet long. As slope increase (>15%) water

flow pattern occurrence and length increases. A temporary increase in water flow patterns in also expected following high intensity storm events.

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3. **Number and height of erosional pedestals or terracettes:** Some slight pedestalling (1-2" inch) can occur at the base of plants and rocks as a result of natural wind and water erosion in the reference state; however, terracettes are uncommon and occur only in flow paths. On steeper slopes (>35%), pedestalling and terracettes can be at moderate amounts with no exposed roots.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20 to 40% bare ground depending on rock and gravel cover. Bare areas are moderate in size, but are rarely connected.

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5. **Number of gullies and erosion associated with gullies:** Gullies can occur in deeper soil with less rock cover with occasional headcuts on steeper slopes. There are numerous large drainages on this site that are stable; lined with bedrock and intermittent vegetation.

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Most herbaceous and fine woody litter will be transported and concentration by wind and water in flow pathways and around obstructions, while a very small percentage stays in place. Coarse woody litter (>1/4" diameter) 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):** This site should have an average soil stability rating of 4 throughout the site. Surface texture varies from sandy loam to gravelly/cobbly clay loam.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface varies from 2 to 4 inches. Structure is generally weak thin platy. Color is reddish brown (2.5YR 5/4). The A horizon will show minimal difference in structure

and depth between interspaces and under plant canopies.

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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 a relatively even distribution of mostly perennial grasses and low shrubs across the landscape. Canopy and basal cover are dominated by warm season grasses and evergreen shrubs. Both plant cover values (especially basal) decrease during a prolonged summer drought. This type of plant community along with surface rock cover and slopes are somewhat 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. These soils are not easily compacted due to cover of rock fragments and the volume of rock fragments in the subsurface horizons of the profile.

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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: Evergreen shrubs (25-35%)> Warm season colonizing grasses (15-20%) = Cool season bunch grasses (15-20%)

    Sub-dominant: Deciduous shrubs (5-15%)> Warm season bunch grasses (5-10%), forbs (5-10%)

    Other: Cacti (0-3%).

    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 to 15% of grasses and shrubs die off. During and after drought years there can be from 10 to 25% 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):** Within plant interspaces litter ranges from 0 to 10 % cover with no real depth, while under some shrub canopies it ranges from 20 to 40% cover with depths from 1/8 to 1/2 inches thick. Litter amounts increase during the first few years of drought, then decrease in later years.

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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 300 to 400 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:** Non-native species that can invade and establish on this site are cheatgrass and Russian thistle. Native species such as James' galleta, broom snakeweed, rabbitbrush and Mormon tea are native to the site but can increase with disturbance.

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17. **Perennial plant reproductive capability:** All plants native to this site are adapted to the climate and are capable of producing seeds, stolons and rhizomes except during the most severe droughts.
