

## **Ecological site R035XC308AZ Limestone/Sandstone Hills 10-14" 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 may form due to loamy surface textures, moderate permeability, very rapid runoff, and steep slopes, but they are not likely in most areas due to extensive surface cover of rock fragment armor and the large amount of rock fragments in the soil profile.

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2. **Presence of water flow patterns:** Water flow patterns may be common due to moderate permeability, shallow depth of bedrock, very rapid runoff and steep slopes. There will be more water flow patterns in steeper areas and in areas adjacent to large expanses of rock outcrop.

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3. **Number and height of erosional pedestals or terracettes:** Some pedestals and terracettes may form, but they will be very short.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 0-3%. Areas with greater cover of rock fragments and/or rock outcrop will have less bare ground. Drought may cause an increase in bare ground. This site has only 1 inch of available water capacity, so the potential to produce plant cover is very low, except in areas where plants have access to water in bedrock cracks.

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

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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):** Herbaceous, fine woody and some coarse woody litter will be transported in water flow pathways. Most coarse woody litter will remain under shrub and tree canopies. There may be more litter movement in areas that are adjacent to large expanses of rock outcrop.
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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 surface textures are mostly loam and very fine sandy loam. All surface horizons contain a significant amount of rock fragments (gravel and/or cobbles). Most soils have 40-80% cover of rock fragments (mostly gravels and cobbles with some stones.) When well vegetated or covered with rock armor, the soils have a high resistance to both water and wind erosion.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is usually granular (weak fine) or subangular blocky (weak to moderate, fine to medium). There are a few areas with platy (weak, moderate to thick) structure. Surface thickness range is 2-4 inches. Color is variable depending upon 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 a relatively even distribution of both shrubs and grasses across the landscape, except in areas with a lot of rock outcrop. There are usually a few forbs and possibly a few trees. Canopy cover range is 25-35% and is almost evenly split between shrubs and grasses. Basal cover range is 5-20%; higher basal cover values usually occur on sites with more grass. There may be a 1% cover of cryptogams. The plant cover (especially basal cover) is reduced by the large amount of large rock fragments and/or bedrock ground cover. Both cover values decrease during a prolonged drought. This type of plant community is slightly to 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. These soils are not easily compacted due to extensive cover of rock fragment armor and the high volume of rock fragments in the surface horizons of the profile. Inclusions without a significant amount of rock fragments are easily compacted, at least 2-4 inches. A few areas have a naturally platy surface structure.
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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: shrubs >
- Sub-dominant: cool season bunchgrasses >
- Other: Minor: warm season bunchgrasses >cacti = forbs = trees
- Trace: Agave family
- Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All plant functional groups are adapted to survival except in the most severe droughts. Severe winter droughts affect shrubs and trees the most. Severe summer droughts affect grasses the most.
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14. **Average percent litter cover (%) and depth (in):** Litter consists of a combination of herbaceous and woody. 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):** 300-400 pounds per acre (dry weight) in drought years, 400-550 pounds per acre in median years, 550-650 pounds per acre in wet years.
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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:** Wyoming big sagebrush is native to the site, but has the potential to increase and dominate after heavy grazing. Broom snakeweed, Douglas rabbitbrush, pricklypear cactus (*Opuntia*), and cholla cactus (*Cylindropuntia*) are natives that have the potential to increase and dominate the site after a sagebrush fire and heavy grazing. Cheatgrass, red brome, and redstem filaree are exotic annuals that are becoming endemic to the site regardless of management or fire frequency. They may become dominant plants on the site after a sagebrush fire, even with conservative or no grazing.
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17. **Perennial plant reproductive capability:** All plants native to the site are adapted to the climate and are capable of producing seeds, stolons and rhizomes except during the most severe droughts.
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