

Ecological site R035XY238UT Semidesert Shallow Hardpan (Utah Juniper-Pinyon)

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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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Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- Number and extent of rills:** A. On more gentle slopes (< 10 %): Common and occur throughout site. Rills may be 6 to 10 feet in length. Sides of rills may be up to 3 inches deep. B. On steeper slopes (> 10 %): Common. Occur throughout the site. Rills may extend down entire slope. An increase in rill formation may be seen after disturbance events such as recent fire or thunderstorms in adjacent landscape settings where increased runoff may accumulate (such as areas below exposed bedrock).
- Presence of water flow patterns:** Frequent and occur throughout area, and wind between plant bases. Interspaces between well developed biological soil crusts appear to be water depression storage areas but actually serve as water flow patterns across areas covered with biological soil crust during episodic precipitation events. Evidence of flow will increase with slope.
- Number and height of erosional pedestals or terracettes:** Pedestals may form at the base of plants that occur on the edge of rills. Larger rills and gullies may remove soil from the base of trees exposing roots that resemble pedestals. Interspaces between well developed biological soil crusts resemble pedestals and may be up to 2 inches high. Terracettes are present. Debris dams of small to medium sized litter (up to 2 inches in diameter) may form in water flow patterns, rills, and gullies. These debris dams may accumulate smaller litter (leaves, grass and forb stems).
- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 37 %. Most bare ground is associated with water flow patterns, rills, and gullies. The soil surface is

dominated by biological soil crust at 17 to 43 %. Areas with well developed biological soil crusts should not be counted as bare ground. Poorly developed biological soil crusts that are interpreted as functioning as bare ground (therefore they would be susceptible to raindrop splash erosion) should be recorded as bare ground. Ground cover is based on first raindrop impact, and bare ground is the opposite of ground cover. Ground cover + bare ground = 100%.

5. **Number of gullies and erosion associated with gullies:** Few. On steeper slopes and areas below and adjacent to sites with concentrated water flow (such as exposed bedrock), gullies may increase. Length is short. Gullies are shallow and wide and may be armored with stones and vegetation. Gullies may remove soil from the base of trees exposing roots. Any gullies present should show little sign of accelerated erosion.
6. **Extent of wind scoured, blowouts and/or depositional areas:** Minor evidence of wind generated soil movement. Wind scoured (blowouts) and depositional areas are rarely present. Trees and shrubs break the wind, and biological soil crust covering the soil reduces the potential for wind erosion.
7. **Amount of litter movement (describe size and distance expected to travel):** Most litter accumulates at base of plants and exposed rocks. Woody stems from trees not moved unless present in water flow pattern, rill, or gully. On steeper slopes of 15 percent, woody stems may be washed from site. Large rills may remove accumulated litter from under trees.
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 a soil stability rating of 4 or 5 under the plant canopies using the soil stability kit test, and a rating of 3 to 4 in the interspaces. The average should be a 4. Surface texture is fine sandy loam. Biological soil crusts, vegetation cover, and litter reduce erosion.
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizon is 4 inches deep. Structure is weak fine granular. Color is light brown (7.5YR6/4). Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Spatial distribution of well developed biological soil crusts intercept raindrops reduce splash erosion and provide areas of surface detention to store water allowing additional time for infiltration. Crowns of trees and accumulating litter at base of trees appear to create a micro-topography that may enhance development of water flow patterns below the drip line of the canopy. Perennial grasses obstruct water flow patterns creating sinuosity.
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. The shallow depth (8 to 20 inches) to an petrocalcic hardpan should not be considered compaction.
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: Dominance by average annual production: Perennial grasses > Trees (Juniper > Pinyon) > Non-sprouting shrubs.

Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state (e.g. Crested wheatgrass, Intermediate wheatgrass, etc.)

Sub-dominant: Forbs

Other: Following a recent disturbance such as fire, drought, or insects that removes the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community. If a disturbance has not occurred for an extended period of time, woody species may continue to increase crowding out the perennial herbaceous understory species. In either case, these conditions would reflect a functional community phase within the reference state.

Additional: Dominants — Utah juniper, Two-needle pinion, Wyoming sagebrush, blue grama, James' galleta. Sub Dominants — Mormontea, Indian ricegrass, squirreltail and other shrubs and forbs. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Several standing dead trees may be present on the site and approximately 20% of the trees and shrubs can show evidence of decadence. In drought tree mortality may increase with the first sign being a yellowish to reddish leaf color.
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14. **Average percent litter cover (%) and depth (in):** Variability may occur due to weather.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 610 to 1700 lbs/ac
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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:** Cheatgrass, rabbitbrush and annual mustards are most likely to invade or increase on this site.
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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually in most years, except in drought years.
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