

## **Ecological site R035XY314UT Upland Shallow Sand (Pinyon-Utah Juniper)**

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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.

Author(s)/participant(s)	Robert Stager (BLM), Randy Beckstrand (BLM), Dana Truman (NRCS), Paul Curtis (BLM), Shane A. Green (NRCS)
Contact for lead author	shane.green@ut.usda.gov
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Approved by	Shane A. Green
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Composition (Indicators 10 and 12) based on	Annual Production

### **Indicators**

1. **Number and extent of rills:** A. On more gentle slopes (< 10 %): Rare to Common and occur most likely to form below adjacent exposed bedrock or water flow patterns where sufficient water accumulates to cause erosion. Rills may be 10 or more feet in length. Sides of rills may be up to 4 inches high. B. On steeper slopes (> 20 %): Common. Occur throughout the site. Rills may extend down entire slope. Rills increase immediately following episodic storm events, and they heal rapidly due to the coarse soil textures.

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2. **Presence of water flow patterns:** Frequent and occur throughout area on gentle slopes (<10 %). Interspaces between well developed biological soil crusts appear to be depression water storage areas but can serve as somewhat stable water flow patterns across areas covered with biological soil crust during episodic precipitation events. Flow patterns become more visible on steeper slopes

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3. **Number and height of erosional pedestals or terracettes:** Few. Pedestals form at base of plants that occur on the edge of rills or water flow patterns. On steep slopes (>20 %), gullies may remove soil from base of trees exposing roots that resemble pedestals. Interspaces between well developed biological soil crusts resemble pedestals and may be up to 3 inches high. Terracettes are common. 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).

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not**

**bare ground):** 25 – 35 %. 0 to 5% rock fragments. Most bare ground is associated with water flow patterns, rills, and gullies. Areas with well developed biological soil crusts should not be counted as bare ground. Areas with 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.

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5. **Number of gullies and erosion associated with gullies:** None to few on gentle slopes (< 10 %). On steeper slopes and areas below adjacent exposed bedrock, gullies may be numerous. Length often extends from exposed bedrock until gully reaches a stream or an area where water and sediment accumulate. Gullies may remove soil from base of trees exposing roots, but they are often limited in depth by shallow bedrock.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None to very few. Trees break the wind and reduce the potential for wind erosion.

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7. **Amount of litter movement (describe size and distance expected to travel):** On gentle slopes (< 10 %) most litter accumulates at base of plants. Woody stems from trees are usually not moved unless present in water flow pattern, rill, or gully. On steep slopes (> 20 %), woody stems may be washed from site. Gullies may remove accumulated litter from under trees.

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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 erosion rating of 3 or 4 under the plant canopies, and a rating of 2 to 3 in the interspaces. The average should be a 3. Surface texture is loamy fine sand. Vegetation cover, litter accumulation and biological soil crusts reduce erosion.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizon is approximately 2 inches deep. Structure is single grain. Color is very pale brown (10YR7\4). The A horizon does not differ between interspaces and underneath plant canopies. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Spatial distribution of plants and well developed biological soil crusts (where present) intercept raindrops preventing 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. Significant increases in Pinyon-juniper canopy reduces understory vegetation with an associated increase in runoff.

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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, although bedrock is found within 20 inches of soil surface. In addition, there may be layers of calcium carbonate or other naturally occurring hard layers found in the soil subsurface. These should not be considered to be compaction layers.

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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: Trees (pinion=juniper) > Sprouting shrubs = Non-sprouting shrubs > Cool season perennial grasses

Sub-dominant: Warm season perennial grasses = Forbs

Other: 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 and Russian wildrye etc.)

Biological soil crust is variable in its expression where present on this site and is measured as a component of ground cover.

Additional: Disturbance regime includes drought, insects, and very infrequent fire. Following a recent disturbance such as fire or drought 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, Pinyon and Juniper may continue to increase crowding out the perennial herbaceous understory species. In either case, these conditions could reflect a functional community phase within the reference state.

Dominants—Mountain big sagebrush, Utah Juniper, Pinyon Pine (two needle), Indian ricegrass. Sub Dominants—Mormontea, manzanita, Blue grama, Needleandthread. This site can have scattered ponderosa pine on it when this site is associated with rock outcrops and cliffs from the extra runoff it would receive from being in these landscape positions. 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):** Community is made up of young, mid, and old aged juniper and pinyon trees. Several standing dead trees may be present on the site and approximately 30% of the trees can show evidence of decadence. All age classes of perennial grasses should be present under average growing conditions with age class expression reduced under below average conditions, or on sites with high (usually 65% or greater) similarity index (late seral to historic climax). 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):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 300-400 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:** Annual forbs and grasses are most likely to invade 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. Low green rabbitbrush sprouts vigorously following fire.

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