

## **Ecological site R036XC302UT Upland Dissected Slope (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.

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Approval date	
Composition (Indicators 10 and 12) based on	Foliar Cover

### **Indicators**

1. **Number and extent of rills:** Rills frequently occur throughout the site and typically extend down entire slopes

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2. **Presence of water flow patterns:** The presence of water flow patterns is very common and typically they occur throughout site, following the microtopography. Interspaces between well developed biological soil crusts appear to be water depression storage areas but can serve as water flow patterns across areas covered with biological soil crust during episodic precipitation events. Flow patterns will be more visible as slope increases.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals 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. Well developed biological soil crusts appear pedestaled and may be up to 2 inches high. Terracettes are present, forming behind 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 small 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):** Bare ground in the reference state varies between the two community phases, when site is in good condition and in community phase 1.1 bare ground is fairly uncommon (2-8 % cover). Most bare ground is associated with water flow patterns, and rills. In community phase 1.2 bare ground is more common (25-50% cover) due to decreased cover by biological soil crusts, and decreased cover in understory plant canopies. 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%.

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5. **Number of gullies and erosion associated with gullies:** Few gullies actually exist on this site, in the reference condition and are associated with steeper slopes and microtopography when present. Gully length is short and they will remove soil from the base of trees exposing roots.

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  6. **Extent of wind scoured, blowouts and/or depositional areas:** The occurrence of wind scoured, blowout, and/or depositional areas are none to very few. Trees and shrubs impede the wind, and biological crusts reduce the potential for wind erosion; however when the site is in community phase 1.2 the opportunities for wind erosion are greatly increased.

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  7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water movement and wind. Fine litter (<1/4 inch in diameter) may be moved up to 2-3ft and usually occurs in water flow patterns rills, and gullies, with deposition occurring at obstruction. Sites with well developed crust cover may exhibit litter trapped by the crust pinnacles. The majority of litter accumulates at the base of plants or in soil depressions adjacent to the plant. Woody stems (those greater than 1/4 inch in diameter) only move when located in rills, and gullies. On steeper slopes (> 20 %), woody stems may be washed from site, while large rills 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 a soil stability rating of 4 or 5 under the plant canopies, and a rating of 3 to 4 in the interspaces. The average should be a 4. The surface texture is loamy. Vegetation cover, litter, 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 is 1-2 inches deep, structure is weak fine granular, and the surface color is typically a dark yellowish brown (10YR4/4). The A horizon would be expected to be more strongly developed under plant canopies. It is important if you are sampling to observe the A horizon under plant canopies as well as the interspaces. 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/or well developed biological soil crusts (where present) 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.

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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):** There is no compaction layer in the reference state. There may be layers of calcium carbonate accumulation 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: 10-25% Cover by Trees (e.g. Pinyon and Utah Juniper)

10-15% Cover by Evergreen Shrubs (e.g. Roundleaf Buffaloberry and Green Mormontea)

40-60% Cover by Biological Soil Crusts (e.g. Lichen, Moss, Cyanobacteria)

Sub-dominant: 10-20% Cover by Perennial Grasses (e.g. Indian Ricegrass and Bottlebrush Squirreltail)

5-10% Cover by other Shrubs (e.g. Utah Serviceberry and Long Flower Snowberry)

Other: Other forbs, shrubs, and grasses. Developed biological crusts are common, but are highly variable and do not necessarily drive the ecological dynamics for this ecological site.

Additional:

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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 and roundleaf buffaloberry. Several standing dead trees may be present on the site and approximately 20% of the trees and shrubs can show evidence of decadence. All age classes of perennial grasses should be present under average growing condition. 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):** Litter cover (including under plants) ranges from 12-20%. Most litter, however, accumulates below and to the side of live plants, and thus percent litter will be just slightly above percent canopy cover. Typically litter under shrubs is 1 leaf thickness, but is expected to increase during drought, when shrubs experience leaf drop. Litter under trees may be up to 1 inch deep.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 250-400 lbs/acre in an average year.
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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:** Known invasive species include cheatgrass (*Bromus tectorum*), broom snakeweed (*Gutierrezia sarothrae*), tansy mustard (*Descurainia pinnata*), annual stickseed (*Lappula* sp.), annual *Cryptantha* (*Cryptantha* sp.), and Russian thistle (*Salsola tragus*).
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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in all years, except in extreme drought years.
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18. **Supporting Data:** NRCS (Dana Truman) 2005-2006 ESD data from Natural Bridges National Monument

