USDA Natural Resources
Conservation Service

Ecological site R034BY239UT
Semidesert Shallow Sandy Loam (Utah Juniper/Two-Needle 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.

Author(s)/participant(s)	Robert Stager (BLM), Randy Beckstrand (BLM), V. Keith Wadman (NRCS Ret.), Dana Truman (NRCS), Paul Curtis (BLM), Shane A. Green (NRCS). Contributors to 2/2008 revisions included Shane Green and Dana Truman (NRCS), Kim Allison, Ann Marie Aubrey, Lynn Jackson, Pam Riddle, Daryl Trotter and David Williams (BLM), Mike Duniway and Jeff Herrick (ARS). Modified for this site by V. Keith Wadman.
Contact for lead author	shane.green@ut.usda.gov
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Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills may form immediately following large storm events but should not persist more than one or two winters. There should be very few on slopes <6%. On slopes >6%, rills may be 5-10 feet in length. Rills are most likely to form below adjacent exposed bedrock or water flow patterns where sufficient water accumulates to cause erosion.

2. **Presence of water flow patterns:** None to few. If present, they should be short (3-6') on slopes <6%, increasing in frequency and length (up to 5-10') with slope. waterflow patterns located below exposed bedrock should be narrow (<1-1½') but may be long. They should be widely spaced (15-20 yrds) on slopes <6%, increasing in frequency (every 10-15yrds) with slope. Waterflow patterns should dissipate where the slope flattens.

3. **Number and height of erosional pedestals or terracettes:** Occasional terracettes may be associated with accumulation behind woody Utah juniper litter. Well developed biological crusts may appear pedestalled, but are actually a characteristic of the crust formation.

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

bare ground): 35-55%, in non-bedrock areas. Some bare ground is associated with water flow patterns. 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. 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:** No active gullies. Some stable gullies may be present in landscape settings where increased runoff may accumulate (such as areas below exposed bedrock). Such gully development is expected to be limited to slopes exceeding 15%. Any gullies present should show little sign of accelerated erosion and should be stabilized with perennial vegetation and biological soil crusts.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** There should be very little evidence of active wind scoured, blowout or depositional areas. Wind caused deposition found at the base of shrubs and trees should be stabilized by biological soil crusts or litter.

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7. **Amount of litter movement (describe size and distance expected to travel):** There may be movement of fine litter outside of the stable waterflow patterns of up to 2-4'on slopes <6% and 5-10' on steeper slopes . Fine litter may be redistributed in the stable waterflow patterns following large storm events, depositing where the slope flattens or behind obstructions. Woody litter should not move from beneath the plant.

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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 4-5 throughout the site. Surface texture varies from fine sandy loams to channery sandy loams.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface (A horizon) is 0 to 2 inches deep. Structure is weak fine blocky parting to single grain. Color is brown (7.5YR5/4 or 4/4). 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:** Distribution of vascular plants and/or biological soil crusts (where present) intercept raindrops preventing, but not eliminating, reduction of infiltration due to physical crusting. Plants and/or biological soil crusts usually have sufficient cover to slow runoff allowing time for infiltration. Shrubs, trees, and perennial grasses and associated plant litter provide barriers to flow.

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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 4 to 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: Biological soil crusts* codominate with trees (e.g Utah juniper) and non-sprouting, drought-deciduous shrubs (e.g. alderleaf mountain mahogany, black sagebrush). Black sagebrush cover declines relative to tree cover in areas with more rock outcrop.

    Sub-dominant: Cool-season bunchgrasses (e.g. Indian ricegrass), Warm-season bunchgrasses (e.g. Galleta). Non-drought-deciduous shrubs.

    Other: Annual and perennial 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

    Additional: Factors contributing to temporal variability include wildlife use of the palatable dominant shrubs and forbs; drought and insects (though these have minimal direct impacts on the dominant plants). Factors contributing to spatial variability include texture, depth and coarse fragment content, slope, aspect, and degree of topographic heterogeneity which may contributing to water redistribution and concentration.

    Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state.

    *Biological soil crusts are an important component on many soils of this ecological site except on very fine textured surfaces (clay loams) and where rock fragment cover is high. At least 1/4 of the soil surface not protected by plant litter or rock should support lichens, mosses or dark cyanobacterial crusts.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with average to above-average precipitation, there should be very little recent mortality or decadence apparent in trees, shrubs, or grasses. During severe (multi-year) drought up to 20% of the perennial vegetation may die. Individual bunchgrass and shrub mortality may occur during these severe droughts, particularly on the shallower and coarser soils associated with this site. Because woody stems may persist for many years, Utah juniper (especially older trees) and black sagebrush will normally have dead stems within the plant canopy.

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14. **Average percent litter cover (%) and depth (in):** Litter cover (including under plants) of the non-bedrock areas, nearly all of which should be fine litter. Depth should be 1 leaf thickness in the interspaces, up to ¼" under shrub canopies and 1½" under trees. Litter cover may increase up to 30% immediately following leaf drop. Litter redistribution following natural extreme runoff events can reduce litter cover by concentrating it in low-lying areas. Litter cover may increase to 20-30% followings seasons with high production of annuals.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 250-450 #/acre on 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: Cheatgrass, Russian thistle, alyssum and other introduced annual forbs have potential.

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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. Blackbrush reproduction is naturally very episodic and no young plants may be apparent.
