

Ecological site R035XY230UT Semidesert Shallow Sandy Loam (Shadscale)

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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

- Number and extent of rills:** A few rills occur throughout site in the reference state (1-3% cover). Rills may be 6 or more feet in length and are most likely to form below adjacent exposed bedrock or water flow patterns where sufficient water accumulates to cause erosion. The number of rills may increase immediately following episodic storm events, but should not persist more than one or two seasons due to coarse soil textures and frost-have recovery.
- Presence of water flow patterns:** The occurrence of water flow patterns is frequent (5-10% cover) and occur throughout the site; however they may be masked by surface rock fragments. These water flow patterns are typically less than 5 feet long. As slope increase (>10%) water flow pattern occurrence (8-12% cover) and length (5-8ft) increases. An increase in water flow patterns is also expected after disturbance events such as episodic precipitation events.
- Number and height of erosional pedestals or terracettes:** Minor pedestalling (1 inch) forms at base of plants as a result of natural wind erosion in the reference state; however terracettes are rare.
- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** In the reference state bare ground is fairly uncommon (15-30%) and similar throughout all plant community phases. Bare ground is associated with water flow patterns; cyanobacteria cover, and plant interspaces.

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. This site has about 5-50% surface rock cover. 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:** Active gullies are generally nonexistent; however stable gullies may occur in landscape settings where increased runoff from adjacent sites may accumulate (such as areas below exposed bedrock). Such gully development is expected to be limited to slopes exceeding 15% and adjacent to sites where runoff accumulation occurs. Any gullies present should show little sign of accelerated erosion and should be stabilized with perennial vegetation.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Slight wind generated soil movement is normal; however due to the abundance of surface rock fragments on some of the sites, wind erosion is typically limited to large wind events.
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7. **Amount of litter movement (describe size and distance expected to travel):** Most litter accumulates under or adjacent to plant bases, with some redistribution caused by water movement and wind. Fine litter (<1/4 inch in diameter) may be moved up to 2-3 feet and usually occur in water flow patterns and rills, with deposition occurring at obstruction. Woody stems (those greater than 1/4 inch in diameter) are not likely to move under normal conditions.
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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 loam to loam to gravelly/channery sandy loam.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface varies from 0 to 4 inches. Structure is fine granular. Color is reddish brown (2.5YR4/4). The A horizon does not differ between interspaces and under 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:** Distribution of perennial grasses, forbs, shrubs, and any biological soil crusts (when present), in conjunction with rock fragments intercept raindrops reducing splash erosion. Due to surface rock fragments, plants and/or biological soil crusts are limited in how much they can effectively slow runoff and allow time for infiltration. However, when perennial grasses and shrubs decrease, reducing ground cover and increasing exposed bare ground and rock fragments, runoff is amplified and infiltration reduced.
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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; high percentages of cobbles, channers, and gravel may be found in all soil horizons and 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: 5-10% cool season perennial grasses (e.g. Indian ricegrass)

10-20% warm season perennial grasses (e.g. galleta)

5-15% sprouting shrubs (e.g. shadscale and mormontea)

Sub-dominant: 0-5% rhizomatous shrubs (e.g. Cutler mormontea)

Other: Other shrubs, forbs, and grasses

Additional: Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions. Biological crusts (lichen, moss, and cyanobacteria) may or may not be present and characterized as light cyanobacteria in the interspaces with moss and lichen pinnacles occurring under the shrub canopy.

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 mortality or decadence apparent in shrubs; however, shadscale die offs have been associated with historical periods of high soil moisture (Simonin, 2001). During and following drought shadscale may appear dead, due to leaf drop and many plants may die during a multi-year drought. All age classes of perennial grasses should be present under average growing conditions with age class expression likely subdued during years of below average precipitation. The reference state includes a mix of plants of various ages with some plants being dead or showing characteristics of decadence.
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14. **Average percent litter cover (%) and depth (in):** Litter cover (including under plants) ranges from 10-15 %, nearly all which should be fine litter, and concentrated under the plant canopy. Variability is due the herbaceous production differences from one year to the next. Depth is generally 1 leaf thickness in the interspaces and up to 1/4 inch under the plant canopies. Litter can increase up to 20% immediately following leaf drop or after favorable conditions increase native annual forb production.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 300-450 lbs/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:** Known invasives species include cheatgrass (*Bromus tectorum*), broom snakeweed (*Gutierrezia sarothrae*), tansy mustard (*Descurainia pinnata*), Halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*).
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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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18. **Supporting Data::** NRCS (Ashley Garrelts/Dana Truman) 2006-2008 data from Canyonlands National Park. Simonin, Kevin A. 2001. *Atriplex confertifolia*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/>. Accessed July 30, 2008.
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