

## Ecological site R035XY218UT Semidesert Sandy Loam (Blackbrush)

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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

1. **Number and extent of rills:** Rills are not present in the reference state on the gentler slopes. Few rills present on slopes exceeding 10% and likely to form below adjacent exposed bedrock or water flow patterns where sufficient water accumulates to cause erosion. Rills present should be small, less than 6 feet in length. The number of rills can increase immediately following large storm events but should not persist more than one or two seasons due to coarse soil textures and frost-heave recovery.

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2. **Presence of water flow patterns:** The occurrence of water flow patterns is rare (0-3% cover) on all slopes in the reference state, and are typically less than 3 feet long. As slopes increase (>10%) water flow pattern occurrence (3-8%) and length (3-5ft) also increases. An increase in water flow patterns is also expected after disturbance events such as precipitation events and increased wildlife use, which increases the percent of bare ground and erosion potential.

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3. **Number and height of erosional pedestals or terracettes:** Plants may show little pedestalling, up to 4 inches for shrubs. Terracettes should be absent or few. Pedestals that occur are usually associated with natural wind erosion. Interspaces between well developed biological soil crusts may resemble pedestals but they are actually a characteristic of the crust formation.

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4. **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 ranges from 5 to 45%, depending upon community phase. Plant community phases 1.1, 1.2, and 1.5 typically have the most biological crust development and the least bare ground, while community phases 1.3 and 1.4 have minimal biological crust development and more bare ground due to disturbance recovery periods. Most bare ground is associated with water flow patterns. Areas with well developed biological soil crust should not be counted as bare ground. Areas with poorly developed biological soils crust 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 can have up to 20% 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%.

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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 may have accumulated (such as areas below exposed bedrock). Gully development is expected to be limited to steep slopes, show little sign of accelerated erosion, and 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. Wind caused deposition at the base of shrubs and trees is stabilized by biological soil crusts, when present or litter. Increased wind generated soil movement can occur after severe (multi-year) drought or severe wind events.. Areas that are invaded with scattered Utah juniper are more susceptible to blowouts, which may persist for long periods due to the aggressive competitive nature of the juniper, which limits immediately adjacent plant growth. Coppice mounding around perennial vegetation is common, especially around blackbrush plants. Increased wind generated soil movement can occur after severe wind events.

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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 (<¼ inch in diameter) may be moved up to 2-3 ft and usually occurs in water flow patterns and rills, with deposition occurring at obstruction. Sites with well developed crust cover such as plant community 1.3, may exhibit litter being trapped by the crust pinnacles. The majority of litter accumulates at the base of plants or in soil depression adjacent to the plant. Woody stems (those greater than ¼ 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 sand to very fine sandy loam. As sites depart from the reference state to a state dominated by invasive annuals soil surfaces textures are expected to become siltier.

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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 5 inches. Structure is weak thin platy. Color is a yellowish red (5YR5/6) to a reddish brown (5YR5/4). An ochric (light colored) epipedon typically extends to a depth of 4 inches. 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. e 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:** Vascular plants and/or any well developed biological soil crusts will break raindrop impact and splash erosion. Spatial distribution of vascular plants and interspaces between well developed biological soil crusts (where present) provide detention storage and surface roughness that slows runoff allowing time for infiltration. Interspaces between plants and any well developed biological soil crusts (where present) may serve as water flow patterns during episodic runoff events, with natural erosion expected in severe storms. When perennial grasses decrease, reducing ground cover and increasing bare ground, runoff is expected to increase and any associated 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. A few soils have bedrock at about 30+ inches. Naturally occurring soil horizons may be harder than the surface because of an accumulation of clay or calcium carbonate and should not be considered as 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: 100-200 lbs/ac season perennial grasses (e.g. Indian ricegrass and needleandthread)  
150-200 lbs/acre Blackbrush

Sub-dominant: 50-100 lbs/ac warm season perennial grasses (e.g. Galleta, blue grama, and dropseeds)  
10-20 lbs/acre other shrubs (e.g. Mormontea, Fourwing Saltbush, and Shadscale)

Other: Other forbs, shrubs, grasses, and trees (e.g. Utah Juniper)

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) should be present but are variable based on plant community and state. In the reference state biological crust cover is characterized by cyanobacteria, pinnacled lichen, and moss with little continuity. Typically moss and lichen clumps will be concentrated under the plant canopy and cyanobacteria will be found in the interspaces.

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

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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 mortality or decadence apparent in either shrubs or grasses. During and following drought blackbrush may appear dead, due to leaf drop and many plant may die during a multi-year drought. Some (up to 20%) perennial bunch grass mortality is expected during severe drought
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14. **Average percent litter cover (%) and depth ( in):** Litter cover (including under plants) ranges from 15-20%, nearly all of which should fine litter. Variability is due to the herbaceous production differences from one year to the next. Depth is generally 1 leaf thickness in the interspaces and up to ¼ inch under plant canopies. Litter can increase up to over 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):** Annual production ranges from 250-400 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 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 sexually or asexually in most years, except in drought years.
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18. **Supporting Data:** NRCS (Dana Truman/Ashley Garrelts) 2006-2008 ESD data from Arches and Canyonlands National Parks.
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