

## **Ecological site R035XY109UT Desert Loam (Shadscale)**

Accessed: 04/20/2024

### **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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Date	09/11/2008
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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

### **Indicators**

1. **Number and extent of rills:** A few rills occur throughout the site. Rills may be 8 or more feet in length but may become longer as slope increases. Rills are most likely to form below adjacent exposed bedrock or where water flow patterns converge and sufficient water accumulates to cause erosion. Rills will be more apparent immediately following large storm events.

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2. **Presence of water flow patterns:** Frequent and occur throughout the site. Interspaces between well developed biological soil crusts appear to be depression water storage areas but actually direct the water flow patterns across areas covered with biological soil crust during high intensity precipitation events. Evidence of flow will increase somewhat with slope. Water flow patterns are somewhat sinuous and wind around perennial plant bases. They are long (>20 feet), narrow (<6 inches), and not widely spaced (5-10 feet), and often converge creating drainage networks.

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3. **Number and height of erosional pedestals or terracettes:** Minor pedestalling may form at the base of plants as a result of natural wind or water erosion, occurring more frequently near water flow patterns. Exposed roots are very rare. Terracettes are rare and occur behind debris dams in water flow patterns. Well developed biological crusts may appear pedestalled, but this is 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):** 2-195%. Bare ground is often associated with water flow patterns and rills. 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. Ground cover + Bare ground = 100%.

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5. **Number of gullies and erosion associated with gullies:** Few. Any gullies present should show little sign of accelerated erosion and should be stabilized with perennial vegetation on the slopes, gully bottoms may be active, especially following a large storm event. Gullies may show slightly more indication of erosion as slope increases, or as the site occurs adjacent to other sites where runoff accumulation occurs (i.e. exposed bedrock, small watersheds, etc.).

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Slight wind generated soil movement is normal. Any wind caused blowouts and deposition are mostly stable or have healed over. Fresh wind generated deposition may be common following severe 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. Some litter (leaves, small stems) may accumulate in soil depressions located near plants. Woody litter is usually not expected to be moved from the base of shrubs. Some redistribution of fine litter is caused by both wind and water. Minor fine litter removal may occur in flow patterns or rills with deposition occurring at points of obstruction. Fine litter may be removed from the site by wind action. Litter movement is expected to increase with slope.

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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 underneath plant canopies and a rating of 3 in the interspaces using the soil stability test kit. The average should be a 3. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion. Surface texture is loam to very fine 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 horizon is typically 4 to 12 inches deep. Structure is typically moderate very fine granular to weak thin platy parting to weak fine granular. Color is typically reddish brown (5YR5/4) to (2.5YR5/4) to pale brown (10YR6/3). 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 biological soil crusts are expected to intercept raindrops reducing splash erosion. Plants and biological soil crusts are usually distributed in sufficient density to slow runoff allowing time for infiltration. Natural erosion would be expected in severe thunder storms or heavy spring runoff. 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. Due to this site's lower placement on gently sloping mesas, benches, floodplains, alluvial fans, fan and stream terraces, pediments and valley floors, it tends to accumulate fine particles such as very fine sands, silts and clays. The associated structure is moderate very fine granular to weak thin platy parting to

weak fine granular. 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: non-sprouting shrubs (Shadscale, winterfat, brigham tea, bud sagebrush) > warm season perennial sod forming grasses (Galleta) > = cool season perennial bunchgrasses (Indian ricegrass)

Sub-dominant: perennial and native annual forbs (globemallow) > sprouting shrubs (rabbitbrush)> Biological soil crusts

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. Siberian Wheatgrass, Forage kochia etc.)

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

Forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

Additional: Temporal variability is caused by very infrequent fires, droughts, insects and other pathogens, or large precipitation events. Spatial variability is caused by variation in rock fragments contained in the soils, topography, etc. Following a recent disturbance such as drought or insects that removes the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community. These conditions reflect a community phase within 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 near average or above average precipitation, there should be very little recent plant mortality and decadence in either the shrubs or grasses. During severe (multi year) drought, many of the Shadscale plants will die. Some mortality of perennial grass and other shrubs may also occur during severe droughts. There may be partial mortality of individual grasses and shrubs during less severe drought. Shadscale may appear dead during droughts, but is actually in a dormant stage with partial leaf shedding.

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14. **Average percent litter cover (%) and depth ( in):** Litter cover (including under plants) nearly all of which should be fine litter. Depth should be 1 leaf thickness in the interspaces and up to ¼" under canopies. Litter cover may increase to 3-10% on some years due to increased production of plants.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 226-526 #/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, Halogeton and Russian thistle.

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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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