USDA Natural Resources
Conservation Service

Ecological site R035XY121UT
Desert 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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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Very minor rill development, increasing as slope steepens. Rill development will increase following large storm events, but rills heal within a few months due to the very sandy soil textures

2. **Presence of water flow patterns:** Flow patterns will occur more often on soils with more structure (fine sandy loams), and less often on soils with less structure (sands). Flow patterns are usually sinuous and wind around perennial plant bases and show very minor evidence of erosion due to sandy texture of soil. They are expected to be short (3 to 6 feet), narrow (less tha 1 foot), and somewhat widely spaced (> 15 feet). They are typically stable with only minor evidence of deposition. Evidence of flow will increase somewhat with greater slopes.

3. **Number and height of erosional pedestals or terracettes:** Rare. If they occur, pedestalled plants show very minor pedestalling caused by wind erosion, but there should never be any exposed roots. Terracettes should be very few and stable, occurring behind pieces of woody litter blocking water flow patterns.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 40 – 50% bare ground. Ground cover is based on the first raindrop impact, and bare ground is the opposite of ground cover. Any well developed biological crusts present should not be recorded 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.

5. **Number of gullies and erosion associated with gullies:** None to very few. Some 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 steeper slopes 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.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Slight wind generated soil movement is normal. Wind caused blowouts and deposition are mostly stable or have healed over. Coppice mounding around perennial vegetation is common, especially around blackbrush plants.

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place, accumulating at the base of plants. Some redistribution of fine litter caused by water movement. Very minor fine litter removal may occur in flow patterns or rills with deposition occurring at points of obstruction. Some grass leaves and small twigs (grass stems) may accumulate in soil depressions adjacent to plants. Woody litter is not likely to move.

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 plant canopies and a rating of 3 to 4 in the interspaces using the soil stability kit test. The average should be a 4. Surface texture is fine sandy loam to gravelly loam. Surface texture is gravelly fine sand to fine sand loamy fine sand. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizon is typically 2 to 6 inches deep. Structure is typically weak platy. Color is typically yellowish red (5YR5/6-8). 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.

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. Where present, interspaces between plants and any well developed biological soil crusts 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.

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 20+ 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

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: Cool season Perennial grasses (Indian ricegrass) = non-sprouting shrubs (Blackbrush)

Sub-dominant: Warm season perennial grasses (Spike dropseed, Sand dropseed) sprouting shrubs (Mormontea) > forbs > 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 drought, insects, and very infrequent fire. Spatial variability is caused by differing soil textures, etc.
Following a recent disturbance such as drought or insects that removes the blackbrush, forbs, perennial grasses (herbaceous species) and sprouting shrubs may dominate the community. If a disturbance has not occurred for an extended period of time, woody species may continue to increase crowding out the perennial herbaceous understory species. In either case, 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 average to above average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. During severe (multi year) droughts, up to 20% of the blackrush stems may die. Some mortality of bunchgrass and other shrubs may occur during very severe (long term) droughts. There may be partial mortality of individual bunchgrasses and other shrus during less severe droughts. Because woody stems may persist for many years, blackbrush will normally have dead stems within the plant canopy. Blackbrush will drop it’s leaves when water stressed.

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14. **Average percent litter cover (%) and depth (in):** Litter cover (including under plants) Depth should be 1-2 leaf thickness in the interspaces and up to 1/4” under canopies. Litter cover may increase up to 20% 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 10-15% following seasons with above average production with a 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):** 400 - 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, Broom snakeweed & introduced annual forbs (Filarie, 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. Blackbrush reproduction is naturally very episodic and no young plants may be apparent.