USDA Natural Resources
Conservation Service

Ecological site R036XY325CO
Semidesert Loam

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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)	Original written by Steve Myers and Scott Woodall (12/15/2004). Revised by Jake Owens (2/12/2012). Owens used R035XY209UT reference sheet and revised it to match this site. The R035XY209UT reference sheet was prepared by V. Keith Wadman (NRCS Ret.), F.E. Busby (USU), Paul Curtis (BLM), Dana Truman (NRCS), Robert Stager (BLM), Shane A. Green (NRCS) Revised and updated by Suzanne Mayne-Kinney on 2/2/2017.
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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None to few. Any rills present should be somewhat short in length (less than 6 feet long) and are very shallow which follow the surface micro-features. An increase in rill formation may be seen after disturbance events such as recent fire or thunderstorms in adjacent landscape settings where increased runoff may accumulate (such as areas below exposed bedrock). Such rill development should usually be limited to slopes exceeding 20%.

2. **Presence of water flow patterns:** Flow patterns wind around perennial plant bases and show little to slight evidence of erosion. They are short, stable and usually disconnected. There is minor evidence of deposition. On gently sloping (< 10 % slopes) locations within the site, water flow patterns are infrequent and usually less than 3 feet. Longer water flow patterns may be found on steeper slopes (> 20 %). Numerous small debris dams maybe obvious after rainfall events.

3. **Number and height of erosional pedestals or terracettes:** Plants should show little or no pedestalling. Terracettes should be absent or few. Pedestals that occur may be found on steeper slopes (> 20 %) and usually associated with water flow patterns. Loss of plant cover can result in well-developed biological soil crust forming. This interspaces between well-developed biological soil crusts may resemble pedestals but they 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):** 10–15% bare ground is common. Ground cover is based on the first raindrop impact, and bare ground is the opposite of ground cover. Well-developed biological soil crusts 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. Extended drought can cause bare ground to increase.

5. **Number of gullies and erosion associated with gullies:** None to 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 slopes exceeding 20% 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:** Very minor evidence of wind generated soil movement Wind scoured (blowouts) and depositional areas are rarely present.

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water movement. Minor litter removal may occur in flow patterns and rills with deposition occurring at points of obstruction. The majority of litter accumulates at the base of plants. Some grass leaves and small twigs (grass stems) may accumulate in soil depressions adjacent to plants. Woody stems are 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 5 to 6 under vegetation canopies and a ratio of 2 to 4 in the interspaces. The average should be a 4. 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):** The surface layer is light brown to reddish brown fine sandy loams or loam, 2 to 10 inches thick. The A horizon is weakly developed, but 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. Refer to soil survey for more detailed information about your specific site.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Vascular plants and 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 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.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Naturally occurring soil horizons may be harder than the surface because of an accumulation of clay (soil texture change) 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: Perennial grasses (Indian ricegrass, Galleta) = non-sprouting shrubs (Wyoming big sagebrush) >

    Sub-dominant: sprouting shrubs (Winterfat, Fourwing saltbush) = annual forbs

    Other:

    Additional: 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. Crested wheatgrass and Russian wildrye etc.) The perennial grass/non-sprouting shrub functional groups are expected on this site. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions. Disturbance regime includes drought, insects, and fire. Assumed fire cycle of 50-70+ years. Following a recent disturbance such as fire or drought that removes the woody vegetation, forbs and perennial grasses (herbaceous species) 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 would reflect a functional 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):** All age classes of perennial grasses should be present under average to above average growing conditions with age class expression likely subdued during below average years. Slight decadence in the principle shrubs could occur near the end of the fire cycle or during and following an extended drought. Expect more decadence on bunchgrasses with lack of disturbance. In general, a mix of age classes may be expected with some dead and decadent plants present.

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14. **Average percent litter cover (%) and depth (in):** (10-20%). Variability may occur due to weather. Litter cover declines during and following a drought as the plants are not producing the litter.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 400 lbs./ac, low precipitation years, 600 lbs./ac/ average precipitation years, 800 lbs./ac above average precipitation years. After extended drought or the first growing season following a wildfire, production may be significantly reduced by 200-400 lbs./ac.

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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:** Green rabbitbrush, Cheatgrass, Purple Threeawn, Broom snakeweed & introduced annual forbs (Filaree, Russian thistle, sticktight).

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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually

in most years. The only limitations are weather-related, wildfire, natural diseases and insects. Low green rabbitbrush sprouts vigorously following fire.