

Ecological site R035XY003UT Alkali Bottom (Greasewood)

Accessed: 05/12/2025

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

Indicators

- Number and extent of rills:** Very minor rill development in sparsely vegetated areas. Rills present should be widely spaced, and not connected. Rill development will increase following large storm events, but rills heal within a few years through frost heaving. Rill development may increase where the site is adjacent to other sites that produce large amounts of runoff (i.e. steeper sites, slickrock, etc.)
- Presence of water flow patterns:** Few throughout the site. Flow patterns are usually sinuous and wind around perennial plant bases. They may be long (10 to 20 feet), and less than one foot wide, and spaced from 5 to 15 feet apart. They are stable with only minor evidence of deposition. Evidence of flow will increase somewhat on slopes greater than 3 percent. This site is periodically inundated with runoff water due to its physiographic location. During very high flow events in adjacent channels (lotic, wash, etc.), this site may act as a filter and trap sediment, sometimes up to a foot or more.
- Number and height of erosional pedestals or terracettes:** Plants may show very minor pedestalling where they are adjacent to water flow patterns, 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.
- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20- 30% Ground cover is based on the first raindrop impact, and bare ground is the opposite of ground cover. Ground cover + bare ground = 100%. Poorly developed biological soil crust that is interpreted as functioning as

bare ground and therefore would be susceptible to raindrop splash erosion should be recorded as bare ground.

5. **Number of gullies and erosion associated with gullies:** Present, but rare. They would usually be expected in the lowest part of the site where water flows concentrate and/or in locations where there are concentrated flows into the site from an adjacent site or watershed. Gullies should show some signs of active erosion often with steep side walls but the bottoms would be mostly stabilized with perennial vegetation. Gullies may show more indication of erosion as the slope gets greater than 3 percent, or as influenced by adjacent steep sites or watersheds that may be providing concentrated flow patterns.

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. If present they have muted features and are mostly stabilized with vegetation or with biological crust.

7. **Amount of litter movement (describe size and distance expected to travel):** Due to the natural periodic concentration of runoff in this site, water flow patterns would be expected to be common with associated visible evidence of litter movement. Often litter from adjacent sites or watershed s contribute to litter noted on site. Litter removal may occur in water flow patterns with deposition occurring at points of obstruction, especially following large storm events. Litter movement is expected to increase with slopes over 3 percent.

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 2 or 3 under plant canopies and a rating of 2 to 3 in the interspaces using the soil stability kit test. The average should be 2-3. Surface texture varies from loamy sand to silty clay loam. Vegetation cover, litter, 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 3 to 11 inches deep. Structure is typically weak fine to medium granular. Color is typically light brownish gray (2.5Y6/2) reddish brown (5YR5/4). 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 are expected to break raindrop impact and splash erosion. Spatial distribution of vascular plants slows runoff somewhat by obstructing surface flows to help create sinuous flow patterns that dissipate energy and allow time for some infiltration. With the physiographic location of the site being in channels, bottoms, floodplains, alluvial flats, stream terraces and valley floors, this site is one of the terminal accumulation sites for runoff water. As such, infiltration is naturally facilitated; however the amount of sodium in the soil will reduce the infiltration and facilitate puddling on the surface. 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.

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 sites lower placement (bottoms etc.), it accumulates fine particles such as silts and clays. The associated blocky and massive structures formed from these soil textures often

confer naturally occurring hard layers in the soil subsurface. These should not be considered to be 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: Plant community 50-100 years following a disturbance: Sprouting Shrubs (i.e. Greasewood, rabbitbrush) > Perennial Bunch Grasses (i.e. Alkali sacaton, Bottlebrush squirreltail)

Sub-dominant: Plant community 50-100 years following a disturbance: Perennial Forbs (i.e. Shrubby seepweed) >= non-sprouting shrubs = rhizomatous grasses > annual forbs

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. Crested wheatgrass, Intermediate wheatgrass, etc.)

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

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

Additional: Assumed disturbance regime includes insects, very infrequent fire, and flooding that kills the non-sprouting shrub species.

Temporal variability is caused by fires, droughts, insects, etc. and spatial variability is caused by adjacency to other sites that produce runoff, soil pH levels, and topography.

Following a recent disturbance such as fire, drought, or insects that removes the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community until the sprouting shrubs come back. 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.

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) drought that affects groundwater levels, up to 20% of the greasewood plants may die. Some mortality of bunchgrass and other shrubs may also occur during severe droughts. There may be partial mortality of individual bunchgrasses and other shrubs during less severe drought.

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.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 600-700 #/acre on an average year.

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:** Russian thistle, halogeton, mustard, filarie, other native and non-native annual forbs and cheatgrass.

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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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