

Ecological site R077BY009NM Gravelly

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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:** Rills not present on slopes < 10% and gravel cover > 50%. A few short rills where slope increases. After wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances rills may double in number on slopes greater than 10% after high-intensity summer thunderstorms.
- 2. Presence of water flow patterns:** Water flow patterns short 1 to 3 meters and discontinuous on slope < 10%. They may increase in length on steeper slopes to 5 to 10 meters. Should only be present following intense storm events. Numerous obstructions alter flow paths. Flow pattern length and numbers may double after wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances.
- 3. Number and height of erosional pedestals or terracettes:** Pedestals less than .5 inches high. And terracettes 1 to 2 inches high. These would be in water flow patterns on slopes greater than 10%. Wind caused pedestals are rare and only would be on the site following after wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances. Slightly more pedestals would be expected on slopes ranging greater than 10% after high-intensity summer thunderstorms. These would show signs of healing within 1 year after severe storm event.
- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10% with bare ground less than 8 to 10 inches in diameter in the intervals between natural disturbance events. Bare ground would be expected to increase to 80% or more the first year following wildfire and then decrease to pre fire levels within 2 to 5 years. High percent of surface rock cover accounts for relatively low expected bare ground.

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5. **Number of gullies and erosion associated with gullies:** Drainages where present are stabilized with native veg. No signs of active erosion. After high-intensity summer thunderstorms or after wildfire, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances gully formation would be accelerated for a year or two. Evidence of healing within 1 year of event and continuing after that.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind erosion is minimal to non existent when the site is in a vegetated condition. Significant wind erosion would only be present following high-intensity summer thunderstorms, after wildfire, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances. After rain events, exposed soil surfaces form physical crusts that tend to reduce wind erosion.
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7. **Amount of litter movement (describe size and distance expected to travel):** Evenly distributed across site. Litter movement consists primarily of redistribution of fine litter (herbaceous plant material) in flow patterns for distances of not more than 5 feet. Litter movement over 5 feet may occur after wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances. Amounts and size of material moved may increase after high-intensity summer thunderstorms.
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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):** Moderate to high resistance to erosion. Stability class rating at 2 to 3 in interspaces at soil surface. Under plant shrub or grass plant canopy values will be 4 to 5. These values would be the same for surface and subsurface. Values should be at the high range for fine textured soils. Soils with a surface layer of very coarse sand to fine gravel have no potential for stabilization.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Average Soil Organic Matter (SOM) 1 to 3%. Soil is deep. The soils of the site are deep and excessively drained. The surface layer is sand or loamy sand about 4 to 7 inches thick. The underlying layer of sand extends to a depth of 60 inches or more. The soils have rapid permeability. The available water-holding capacity is low. The plant-soil-water-air relationship is fair to good. Because of the surface texture and rapid drying of the surface, is unprotected by plant cover and organic residue, it becomes wind blown and hummocks or dunes are formed around shrubs.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grasses should be uniformly distributed and runoff from sites is generally low. The growth habit of dominant species (black grama, bush muhly) promotes water interception and infiltration as compared to bunchgrass or shrub sites. Surface runoff is slow and available water holding capacity is high. Diverse grass, forb, shrub functional/structural groups and diverse root structure/patterns reduces raindrop impact slows overland flow providing increased time for infiltration to occur. Extended drought reduces short and mid bunchgrasses causing decreased infiltration and increased runoff. This situation will self correct in 2 to 5 years following disturbance unless a threshold has been crossed.
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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. Compaction layers are present only after surface activities such as livestock grazing and recreational vehicle use during periods when the soil is moist. There are no soil profile features in the top 9 inches of the soil profile that would be mistaken for a management induced soil compaction layer.

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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: Warm season short bunchgrass > Warm season mid bunchgrass > Cool season mid bunchgrass >

Sub-dominant: Cool season short coarse grasses > minor component: Forbs = Shrubs

Other:

Additional: After wildfires the functional/structural dominance changes to the herbaceous components with a slow 10-20 year recovery of the non resprouting shrubs (e.g., mimosa and sumac). Resprouting shrubs tend to increase if fine fuels and fire frequency is not adequate to reduce the resprouting component. High human or herbivore impacts, extended drought, or combinations of these factors tends to increase shrub functional/structural groups at the expense of the herbaceous groups and biological crust.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Typically minimal. Expect short/mid bunchgrasses mortality/decadence during or following drought. Most of the perennial plants in this community are long lived, especially the perennial forbs and shrubs and trees. After moderate to high intensity wildfires, all of the non-resprouting shrubs would die as would a small percentage of the herbaceous understory species. Extended droughts would tend to cause relatively high mortality in short lived species such as bristle grass. Shrub mortality would be limited to severe with multiple year droughts. Combinations of wildfires and extended droughts would cause even more mortality for several years following the fire than either disturbance functioning by itself would cause.
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14. **Average percent litter cover (%) and depth (in):** After wildfires, high herbivore impacts, extended drought, or combinations of these disturbances, litter cover and depth decreases to none immediately after the disturbance (e.g., fire) and dependent on climate and plant production increases to post-disturbance levels in one to five growing seasons. If invasive grasses (e.g., love grass) dominates the plant community or is a major component of the shrub understory, litter cover can increase to 70-100% and depth can increase to 1-3." This situation contributes to more frequent fire return intervals and significantly fewer opportunities for desirable perennial plant reproduction and biological crust recovery. This would be a WIDE departure from the reference condition.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** (Low Production 249 lbs./ac.) (Average RV Production 519lbs./ac.) (High Production 792 lbs./ac.) After wildfires, high herbivore impacts, extended drought, or combinations of these disturbances, can cause production to be significantly reduced (100-200 lbs per ac. the first growing season following a wildfire) and recover slowly under below average precipitation regimes.
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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:** Love grass, Russian thistle, kochia, and other nonnative annuals may invade following extended disturbance. Fourwing saltbush and shad scale are native to this site but should not dominate. Pinion and Juniper are the greatest threat to dominate this site in the long term after disturbance (primarily following wildfire

exclusion but also includes high human or herbivore impacts and extended drought). Pinion and Juniper are most likely to retain dominance if allowed to alter natural fire regime (this alteration may require poor land management combined with years of wet winter-spring; dry summer-fall conditions). Any of these invaded communities represent a departure from the reference state.

17. **Perennial plant reproductive capability:** All plant species should be capable of reproduction depending on water regime. All plants should be vigorous, healthy and reproductive depending on disturbance (e.g., drought). Plants should have numerous seed heads, vegetative tillers etc. The only limitations are weather-related effects, wildfire, and natural disease that may temporarily reduce reproductive capability.
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