

Ecological site R036XY310CO Sandy Foothills

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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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Approved by	Rachel Murph, State Rangeland Management Spec., USDA NRCS Colorado
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None to very rare. Any rills present should be short in length (less than 6 feet long) and only occur where increased runoff occurs on lower part of steeper slopes and areas below exposed bedrock. Old rills should be weathered and muted in appearance. An increase in rill formation may be seen after disturbance events such as recent fire or thunderstorms.

2. **Presence of water flow patterns:** None to Slight. If present, short (less than 6-8 feet long) and usually disconnected with numerous debris dams. They are stable. Flow patterns typically flow around perennial plant bases and show no evidence of erosion. They are more evident after recent thunderstorms.

3. **Number and height of erosional pedestals or terracettes:** None. Plants should show no signs of pedestalling. Terracettes occur very rarely.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** In the reference state bare ground ranges from 15 to 30%. Areas with well-developed biological soil crust should not be counted as bare ground. Areas with poorly developed biological soils crust 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 rare. Any gullies present are sparsely located

across the landscape and are usually caused by run-in water from adjacent sites that are dominated by exposed bed rock or dissected slopes. If present gullies have been re-stabilized by perennial vegetation.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Minor evidence of wind generated soil movement, slight deposition at the base of shrubs is acceptable; however blowouts or excessive deposition should not occur.
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7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water and wind movement. Fine litter (<1/4 inch in diameter) may be moved up to <1 ft. with deposition occurring at obstruction. The majority of litter accumulates at the base of plants or in soil depression adjacent to the plant. Woody stems (those greater than 1/4 inch in diameter) are not likely to move under normal conditions.
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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):** Soil surface textures are loamy sand to fine sandy loam. Soil stability values are 1-3 with no canopy cover and 2-4 under canopy. There is little water erosion and light to moderate wind erosion with the reference plant community in place.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface texture is generally a loamy fine sand, fine sandy loam or a very fine sandy loam. Soil surface depth varies from 3 to 12 inches and structure is typically weak fine granular to weak medium platy structure. There is little difference in the soils under the plants when compared to soils in the interspaces.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bare spaces are small, rounded in shape, and are unconnected. The diverse grass, forb, shrub functional/ structural groups and any well-developed biological soil crusts (moss, pinnacled lichen, and light cyanobacteria) (when present), reduce raindrop impact and slows overland flow providing increased time for infiltration.
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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
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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 (needle-and-thread, Indian ricegrass) > Perennial Native Forbs >

Sub-dominant: non-sprouting shrubs (Wyoming big sagebrush)>= Native Warm Season Rhizomatous Grasses (blue grama, galleta)

Other:

Additional: Factors contributing to temporal variability include wildlife use, drought, and insects. Factors contributing to special variability include soil texture, depth, rock fragments, slope, aspect, and micro-topography. These groups are based on community phase 1.1 of the reference community which is generally considered the reference plant community

for this ecological 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. Biological crusts (lichen, moss, and cyanobacteria) should be present but are variable based on plant community and state.

Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Typical minimal. During years with average to above average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. Some mortality of bunchgrass and other shrubs may occur during very severe (long term) droughts.
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14. **Average percent litter cover (%) and depth (in):** Litter cover (including under plants) ranges from 15-25%, nearly all of which should be fine litter. Depth is generally 1 leaf thickness in the interspaces and up to ¼ inch under plant canopies. Litter can be variability due to the herbaceous production differences from one year to the next with climatic fluctuations. Litter can increase immediate following leaf drop or after favorable conditions increase native annual forb production. Litter will also decline during and following extended drought.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 600 lbs. /ac. low precipitation years, 1000 lbs. /ac. average precipitation years, 1200 lbs. /ac. above average precipitation years. After extended drought or the first growing season following wildfire, production may be significantly reduced by 400 - 600 lbs. /ac. or more.
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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:** Known invasive species include cheatgrass (*Bromus tectorum*), broom snakeweed (*Gutierrezia sarothrae*), tansy mustard (*Descurainia pinnata*), Russian thistle (*Salsola tragus*), twoneedle pinyon (*Pinus edulis*), and Utah juniper (*Juniperus osteosperma*)
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17. **Perennial plant reproductive capability:** The only limitations are weather-related, wildfire, natural disease, inter-species competition, wildlife, and insects that may temporarily reduce reproductive capability.
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