

Ecological site R035XY206UT Semidesert Gravelly Loam (Utah Juniper-Pinyon)

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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 increase immediately following large storm events but should not persist more than one or two winters due to frost-heave recovery. There should be very few on slopes < 6%. On slopes >6%, rills may be 5-10 feet in length. Rills are most likely to form below adjacent exposed bedrock or water flow patterns where sufficient water accumulates to cause erosion.

2. **Presence of water flow patterns:** Interspaces between vegetation and/or well developed biological soil crusts can serve as somewhat stable water flow patterns below run-off generating areas (exposed bedrock, areas with very shallow soils). If present, these waterflow patterns should be narrow (<1-1½') but can be very long. These waterflow patterns should be widely spaced (15-20 yrds) on low slopes (< 6%), increasing in frequency (every 10-15yrds) with slope. Otherwise, there should be none to few and short (3-6') water flow patterns on low slopes (< 6%), increasing in frequency and length (up to 5-10') with slope. Waterflow patterns should dissipate where the slope flattens.

3. **Number and height of erosional pedestals or terracettes:** Shrubs and trees that occur on the edge of water flow patterns and rills on steeper slopes (>6%) may be pedestalled, but there should be no exposed roots. Occasional terracettes may be associated with accumulation behind woody juniper litter. Well developed biological crusts may appear pedestalled, but 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):** 20 – 30 %. Most bare ground is associated with water flow patterns, rills, and gullies. Areas with well

developed biological soil crusts should not be counted 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. Ground cover is based on first raindrop impact, and bare ground is the opposite of ground cover.

5. **Number of gullies and erosion associated with gullies:** None to rare. On areas below adjacent to sites with concentrated water flow (such as exposed bedrock), gullies may occur. Gullies may remove soil from the base of trees exposing roots.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None to very few. Trees break the wind and reduce the potential for wind erosion.

7. **Amount of litter movement (describe size and distance expected to travel):** There may be movement of fine litter outside of the stable waterflow patterns of up to 2-4' on low slopes (< 6%) and 5-10' on steeper slopes. Fine litter may be redistributed in the stable waterflow patterns following large storm events, depositing where the slope flattens or behind obstructions. Woody litter should not move from beneath the plant.

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 to 6 throughout the site using the soil stability kit test. The average should be a 5. Surface texture is gravelly loam to stony fine sandy loam. 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 is typically 1 to 9 inches deep. Structure is typically strong to weak fine granular to weak thin platy. Color is typically gray (5YR5/1) to brown (7.5YR5/2) to yellowish brown (10YR5/4). 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:** Spatial distribution of perennial plants and well developed biological soil crusts (where present) intercept raindrops preventing splash erosion and provide areas of surface detention to store water allowing additional time for infiltration. Crowns of trees and accumulating litter at base of trees appear to create a micro-topography that may enhance development of water flow patterns below the drip line of the canopy. Significant increases in Pinyon-juniper canopy reduces understory vegetation and increases runoff.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. There may be layers of calcium carbonate or other naturally occurring hard layers found 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: trees (juniper > pinion) >= non sprouting shrubs (blackbrush, fourwing saltbush) >= warm season perennial grasses (galleta, blue grama) = cool season perennial grasses (indian ricegrass, needle and thread). These groups are co-dominant on this site.

Sub-dominant: forbs (globemallow, rock goldenrod) > 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. Crested wheatgrass, Russian wildrye, etc.) Biological soil crust is variable in it's 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: Factors contributing to temporal variability include wildlife (deer) use of the palatable sub dominant shrubs and forbs, drought and insects (though these have minimal direct impacts on the dominant plants (blackbrush and juniper)). Factors contributing to spatial variability include texture, coarse fragment (rock/gravel) content, slope, aspect, and degree of topographic heterogeneity (contributing to water redistribution and concentration).

Following a recent disturbance such as drought or pathogens that removes the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community. 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 trees, shrubs, or grasses. During severe (multi-year) drought up to 20% of the blackbrush stems may die. There may be partial mortality of individual bunchgrasses and other shrubs during drought. Some bunchgrass and shrub mortality may occur during severe droughts, particularly on the shallower and coarser soils associated with this site. Because woody stems may persist for many years, juniper (especially older trees) and blackbrush will normally have dead stems within the plant canopy. Blackbrush will drop its leaves when water stressed.
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14. **Average percent litter cover (%) and depth (in):** Average litter cover (including under plants) can be less (as low as 5%) in low (10-15%) tree cover or more (as high as 20%) in high (15-20%) tree cover sites. Nearly all should be fine litter. Depth should be 1 leaf thickness in the interspaces, up to ¼" under shrub canopies and ¼ to 1½" under trees. Litter redistribution following natural extreme runoff events can reduce litter cover by concentrating it in low-lying areas. Litter cover may increase by 5 to 10% followings seasons with 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):** 500-550 #/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:** Few invasives capable of dominating this site. Cheatgrass, Broom snakeweed, and Mustard may invade the community.
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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. Low green rabbitbrush sprouts vigorously following fire.
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