

## Ecological site R028AY306UT Upland Gravelly Loam (Bonneville Big Sagebrush)

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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

- Number and extent of rills:** No rills present. Very minor rill development may occur in sparsely vegetated areas. If rills are present, they should be widely spaced and not connected. Rill development may increase following large storm events, but should begin to heal during the following growing season. Frost heaving will accelerate recovery. Rill development will increase as site becomes steeper.
- Presence of water flow patterns:** Water flow patterns will be short (2-5') and meandering; interrupted by plants and exposed rocks. Some evidence of erosion or deposition associated with flow patterns. Where slopes exceed 10%, water flow patterns may be longer (5-10').
- Number and height of erosional pedestals or terracettes:** Plants may have small pedestals (1-3") where they are adjacent to water flow patterns, but without exposed roots. Terracettes should be few and stable. Terracettes should be small (1-3") and show little sign of active erosion. Some plants may appear to have a pedestal but rather than be formed by erosion, the only place litter accumulates and soil collects is at plant bases forming the appearance of a pedestal.
- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 10 to 30 % (10 – 15 % on slopes up to 25 % and 15 – 30 % on slopes from 25 % up) Very few if any bare spaces of greater than 1 square foot.

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5. **Number of gullies and erosion associated with gullies:** Number of gullies and erosion associated with gullies: None to very few. Any gullies present should show little sign of active erosion and should appear stable having perennial plants growing in the bottom and on the sides.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Very minor evidence of active 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 and/or biological crust. Gravel or desert pavement protects the site from wind scour.
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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. Very 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 leaves, stems, and small twigs may accumulate in soil depressions adjacent to plants. Woody stems are not likely to move. On steep slopes (>30%), litter will move downhill to next obstruction.
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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 (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values for both plant canopy and interspaces, if different): 80 to 90% of this site should have soil surfaces that are stabilized by organic matter both de-compositional and incorporated (Stability Class 4). This should be observable in that water flow patterns are not scoured to where the surface is visibly smoother than soil surfaces in non flow pattern areas.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure and SOM content (include type and strength of structure, and A- horizon color and thickness for both plant canopy and interspaces, if different): The A horizon is varies from 5 to 18 inches thick. Color is a grayish brown gravelly loam (typical mollic colors). Structure should be granular.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses and shrubs equally important for increasing infiltration and reducing runoff. Litter plays a role in increasing infiltration and decreasing runoff. Plants provide microhabitat for seedlings, catch litter and soil, and slow raindrops and runoff. Vascular plants and/or well-developed biological soil crusts (where present) 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 any 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. Shrubs catch snow, slow wind evaporation, and provide microhabitat for seedling establishment.
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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):** Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): There should be no compaction layer. The amount of gravel can make it hard to use a probe to determine this.
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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: bluebunch wheatgrass, Slender wheatgrass, bonnevillie big sagebrush

Sub-dominant: Saskatoon serviceberry, antelope bitterbrush, Western wheatgrass, nevada bluegrass

Other: other grasses > other shrubs, forbs

Additional: Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: », >, = to indicate much greater than, greater than, and equal to): Assumed fire cycle of 20-40 years. Perennial bunchgrasses > non-sprouting shrubs > rhizomatous grasses > sprouting shrubs » annuals > invaders such as Cheatgrass brome For example, Dominants: Bonneville big sagebrush, Bluebunch wheatgrass; Sub-dominants: Slender Wheatgrass, Western wheatgrass, Antelope bitterbrush. The perennial bunchgrass about 30 to 60 %; non-sprouting shrub 10 to 20 % (composition by biomass) functional groups are expected on this site.

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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 either the shrubs or grasses. Some mortality of bunchgrass and other shrubs may occur during very severe (long-term) droughts. There may be partial mortality of individual bunchgrasses and shrubs during less severe drought. Long-lived species dominate site. Open spaces from disturbance are quickly filled by new plants through seedlings and reproductive reproduction (tillering).
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14. **Average percent litter cover (%) and depth ( in):** Litter cover includes litter under plants. Most litter will be fine litter. Depth should be scattered in the interspaces and up to 1/2" under canopies. Litter cover may increase to 35-45% following years with favorable growing conditions. Excess litter may accumulate in absence of disturbance. Vegetative production may be reduced if litter cover exceeds 45%.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Expected annual production (this is TOTAL above-ground production, not just forage production): 950 – 1100 lb./acre on slopes 20 to 45 % and 1000 to 2000 lb./acre on slopes less than 20 % under normal growing conditions.
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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:** Cheatgrass, halogeton, green rabbitbrush, annual forbs, broom snakeweed, Utah juniper, purple threeawn, medusahead rye.
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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually and/or asexually, except in drought years. Density of plants indicates that plants reproduce at level sufficient to fill available resource. Within capability of site there are no restrictions on seed or vegetative reproductive capacity.
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