

Ecological site R028AY307UT Upland Gravelly Loam (Wyoming 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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| Approved by | Shane A. Green |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

1. **Number and extent of rills:** None to few. Any rills present should be short in length (less than 1.5 feet long) and follow the surface micro-features. If rills are present they should be widely spaced and not connected. Old rills will weather quickly because of loamy surface textures. Frost heaving will accelerate recovery. A slight increase in rill formation may be caused by major disturbance events such as severe thunderstorms.

2. **Presence of water flow patterns:** Flow patterns around perennial plants bases will show minor evidence of erosion. They will be short (1 to 3 feet long) and look stable. There will be slight evidence of deposition. Where slopes exceed 10 % water flow patterns may increase to lengths of 5 to 10 feet.

3. **Number and height of erosional pedestals or terracettes:** Plants should show slight (1/8 – 1/2 in.) pedestalling. Pedestalling on the down slope side of plants may appear to be greater than this and will be more visible as slopes increase. Terracettes should be small (1 to 3 inches) until slopes are greater than 20 % where they will be visible at a distance. At this point the terracettes should look stable and have little to no evidence of soil being re-deposited.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 15 to 40 % (15 – 25 % on slopes up to 25 % and 25 – 40 % on slopes from 25 % up). Very few if any bare spaces will be greater than 1.5 square feet.

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5. **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:** Slight wind generated soil movement is normal. Wind caused blowouts are very rare and are mostly stable and have healed over or started to do so. Increased wind generated soil movement can occur after severe wind events but will normally not be visually apparent.
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7. **Amount of litter movement (describe size and distance expected to travel):** A little redistribution can be caused by both wind and water. Very fine to fine litter movement may occur in water flow patterns with deposition occurring at points of obstruction. Fine litter may be removed from the site by wind action. On slopes greater than 25 % litter may be moved down hill to the next point of 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):** 80 to 90% of this site should have soil surfaces that are stabilized by organic matter both de-compositional and incorporated (Stability Class 3.5 - 5). 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):** The A horizon is varies from 5 to 16 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:** When perennial plant community is intact it will maintain the organic granular structure, soil porosity, and sinuous water flow paths that allow water to infiltrate at a rate that will not lend itself to water leaving the site except in the case of severe thunder storms. If the plant community has been degraded then the site will show longer and/or smoother than expected water flow patterns, with increased numbers of and/or longer rills, with a more platy structure making it likely that more water will leave the site.
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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):** 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, Wyoming big sagebrush
- Sub-dominant: slender wheatgrass, Western wheatgrass
- Other: other grasses, forbs, other shrubs
- Additional: Assumed fire cycle of 50-60 years. Perennial bunchgrasses > non-sprouting shrubs > rhizomatous grasses >

sprouting shrubs » annuals > invaders such as Cheatgrass brome For example, Dominants: Wyoming big sagebrush, Bluebunch wheatgrass; Sub-dominants: Slender Wheatgrass, Western wheatgrass. The perennial bunchgrass about 40 to 55 %; forbs 10 to 20 %; shrub 20 to 40 % (composition by biomass) functional groups are expected on this site.

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):** 15 to 35 % of the ground surface should have a litter covering that is within 1 inch or less of the soil surface. Excess litter may accumulate in the absence of grazing and/or disturbance which if it becomes greater than 45% it will often reduce live vegetative cover and reproduction.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 650 – 950 lb./acre on slopes 20 to 30 % and 800 to 1100 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:** As ecological condition deteriorates due to outside disturbances, perennial bunch grasses decrease while less desirable plants like Low rabbitbrush, and Prickly pear increase along with invasive plants like Cheatgrass brome and Utah juniper. When the historic climax plant community is burned, Wyoming big sagebrush will decrease while perennial grasses, forbs and Low rabbitbrush increase markedly. Broom snakeweed and Purple threeawn increase to a much lesser extent. If the site is burned too frequently Cheatgrass brome, Halogeton, Broom snakeweed and Russian thistle are most likely to invade this site and eventually dominate it.
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17. **Perennial plant reproductive capability:** All plants should have the ability to reproduce either by seed and/or vegetative tillers in all years, except after prolonged extreme drought years. Within capability of site there are no restrictions on seed or vegetative reproductive capacity.
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