

Ecological site R036XY306UT Upland Loam (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
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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 rare. Flow patterns typically flow around perennial plant bases and show no evidence of erosion. They are short (less than 8 feet long), stable, and not connected.

3. **Number and height of erosional pedestals or terracettes:** 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 20 to 60%. Plant community phases 1.2 and 1.1, which have the highest occurrence of perennial bunch grasses, have the least occurrence of bare ground., while community phase 1.3, which is dominated by perennial shrubs, has the most. 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. This

site can have up to 5% surface rock cover. Ground cover is based on first raindrop impact, and bare ground is the opposite of ground cover. Ground cover + bare ground = 100%.

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 areas are not.

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 (<¼ inch in diameter) may be moved up to 2-3 ft with deposition occurring at obstruction. Sites with well developed crust cover such as plant community 1.3, may exhibit litter being trapped by the crust pinnacles. The majority of litter accumulates at the base of plants or in soil depression adjacent to the plant. Woody stems (those greater than ¼ inch in diameter) are not likely to move under normal conditions.

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 an erosion rating of 5 to 6. 10 to 20% may have a rating of 3 to 5. Surface texture varies from sandy clay loam to sandy loam.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface depth varies from 2 to 3 inches and structure is typically coarse platy parting moderate granular. The dry surface color is dark yellowish brown (10YR5/5) to brown (10YR4/3). There is little difference in the soils under the plants when compared to soils in 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:** Bare spaces are small, rounded in shape, and are unconnected. The presence of perennial grasses, shrubs, and any well developed biological soil crusts (moss, pinnacled lichen, and light cyanobacteria) will break raindrop impact and splash erosion. The spatial distribution of vascular plants, non-vascular communities (when present), and interspaces provide detention storage and surface roughness that slows down runoff, allowing time for infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Some soils have increase in clay content at 3 to 9 inches that could be mistaken for a compaction layer.

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: cool season perennial grasses (e.g. Indian ricegrass, bluegrass, and needleandthread) > non-sprouting shrubs (e.g. Big Sagebrush)

Sub-dominant: warm season perennial grasses (e.g. Galleta and blue grama) > forbs

Other: Biological soil crusts, other shrubs and grasses.

Additional: 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. In the reference state biological crust cover is characterized by cyanobacteria, pinnacled lichen, and moss with some continuity. Typically moss and lichen clumps will be concentrated under the plant canopy and cyanobacteria will be found in the interspaces.

Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in 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 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 3-10%, nearly all of which should be fine litter. Variability is due to the herbaceous production differences from one year to the next. Depth is generally 1 leaf thickness in the interspaces and up to ¼ inch under plant canopies. Litter can increase up to 20% immediately following leaf drop or after favorable conditions increase native annual forb production.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 800-1200 in communities 1.1 and 1.2, 300-800 lbs/acre in community 1.3.
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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*), annual stickseed (*Lappula* sp.), annual *Cryptantha* (*Cryptantha* sp.), Russian thistle (*Salsola tragus*), Single Needle Pinyon (*Pinus edulis*), and Utah Juniper (*Juniperus osteosperma*).
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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in all years, except in extreme drought years.
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18. **Supporting Information:** NRCS (Dana Truman) 2005/2006 ESD data from Natural Bridges National Monument.

