

Ecological site R047XA560UT High Mountain Gravelly Loam (mountain 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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| Date | 10/15/2011 |
| Approved by | Kendra Moseley |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

- Number and extent of rills:** None to very few. Due to the surface coarse fragments on this site, traditional rill formation is reduced. The overall gravelly to channery surface is expected to be resistant to rill formation and accelerated erosion in general. Small rills may be observed directly following spring runoff events or after severe thunderstorms but they appear to be within the sites natural limits.
- Presence of water flow patterns:** Due to the steep slopes, some flow patterns are present and tend to be sinuous and wind around rock fragments and perennial plant bases. They show some evidence of erosion with fines and litter depositing against the uphill side of gravel, rocks and plants. During episodic precipitation events e.g. thunderstorms, these sites are expected to shed large volumes of water to adjacent ecological sites.
- Number and height of erosional pedestals or terracettes:** Pedestals may form at the base of plants that occur on the edge of primary flow patterns and rills. Interspaces between any well developed biological soil crusts resemble pedestals and may be up to 2 inches high. Terracettes are present. Debris dams of small to medium sized litter (up to 2 inches in diameter) may form in water flow patterns, rills, and gullies. These debris dams may accumulate smaller litter (leaves, grass and forb stems).
- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20 – 40%. Most bare ground is associated with water flow patterns, rills, and gullies. Soil is covered by up to 30 percent rock fragments. Any 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:** Very few gullies present. Where present, their length may extend down slope until they reach a stream or other area where water and sediment accumulate. They should be wide and shallow and armored with large rocks.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.
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7. **Amount of litter movement (describe size and distance expected to travel):** Due to the sites slopes being between 5 to 60 percent, some down slope redistribution of any incident litter caused by water is expected. Deposition would likely occur at points of obstruction such as on the uphill side of gravel, rocks and plants, especially following major storm events. Fine litter is moved with moderate to heavy precipitation events and spring runoff. Gullies may remove accumulated litter from under shrubs.
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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 an erosion rating of 4 or 5. 10 to 20% may have a rating of 3 to 4. The average should be a 4. Surface textures are typically gravelly or cobbly loams. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The Crandall series soil surface is 5 inches deep. Structure is weak fine granular. Color is dark brown (7.5YR 2.5/2). The A horizon would be expected to be more strongly developed under shrub canopies. It is important if you are sampling to observe the A horizon under 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.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Spatial distribution of plants and/or well developed biological soil crusts (where present) intercept raindrops reducing splash erosion and provide areas of surface detention to store water allowing additional time for infiltration. Crowns of shrubs and accumulating litter at base of shrubs appear to create a micro-topography that may enhance development of water flow patterns below the drip line of the canopy. Significant increases in shrub canopy reduces understory vegetation causing an associated increase in runoff.
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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. There may be layers of calcium carbonate, gravel, cobbles or other naturally occurring hard layers found in the soil subsurface. These should not be considered to be compaction layers.
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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: Dominance by average annual production: Non-sprouting shrubs (mountain big sagebrush, mountain

snowberry)> Cool season perennial grasses (bluebunch wheatgrass, Letterman needlegrass).

Sub-dominant: Sprouting shrubs (green rabbitbrush, alderleaf mountain mahogany) > Grasses/grasslikes (Geyer sedge, muttongrass).

Other: Biological soil crust is variable in it's expression where present on this site and is measured as a component of ground cover.

Additional: Following a recent disturbance such as fire that removes woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community for a time. Sprouting shrubs would be the first to recover with non-sprouting shrubs lagging behind. If a disturbance such as fire has not occurred for an extended period of time, these woody species will continue to increase reducing the perennial herbaceous understory species. These conditions would reflect functional community phases 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):** In general, a mix of age classes may be expected with a few dead and decadent plants present.

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14. **Average percent litter cover (%) and depth (in):** Litter cover 30-40%. Depth is highly variability due to slope and the stability of the soil surface.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 500-800 #/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:** Potential invaders on this site are cheatgrass, Russian thistle, alyssum and mustard species.

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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.
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