

Ecological site DX034A01X122 Loamy Green River Basin (Ly GRB)

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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:** Not common, but can be present, particularly at the upper end of the slope range or after heavy thunderstorms. When present, rills are short (<3 ft), shallow (<1 inch), and widely spaced (>20 ft) relative to slope distance.
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2. **Presence of water flow patterns:** Water patterns can be present, but are very small and not connected beyond 2 gaps in the plant canopy.

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3. **Number and height of erosional pedestals or terracettes:** Existing pedestals are blunt and not active, less than 2 inches (5cm) and typically found at the drip line of the shrub canopy or bases of bunchgrasses on upper end of the slope range. It is typical to find biological soil crusts, lichens, and mosses at margins of perennial plants. Terracettes are not present.
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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is typically <30%. Higher bare ground is expected directly following a sagebrush killing disturbance, but returns to <30% within 2 years post-disturbance. Canopy gaps comprise <20% of the ground surface, and are primarily in the 1-2 foot category (>70%). No canopy gaps >6 feet should be present.
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5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present on this site.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Minimal wind scour or deposition may be present with wind scour found in canopy gaps and deposition found on the leeward side of shrubs. It is only occasional and does not occur as repeating pattern across the landscape, but is localized to exposed topography.
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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move only in small amounts (to leeward side of shrubs) due to wind. Large woody debris from sagebrush will show no movement except for minimal debris damming after large rain or snowmelt events on slopes >6%.
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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 Stability Index ratings are highly variable. Values of 6 are typical when sample include soil biological crusts, but are often 1 when a sandy loam cap exists on the site. When consistent values of 6 are encountered, it is important to consider if the soil surface has degraded to the argillic subsurface layer (higher clay content will result in higher soil stability). Overall, the biotic component (plants and soil biological crusts) provide stability for this site.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil organic matter (SOM) <2% is common. Color and structure are poor indicators of SOM in Aridisols (dry, arid soils with thin surfaces and salt and/or clay close to the surface) because SOM potential is low. Typically soil surface consists of an A-horizon of 3-12 inches (7-30 cm) thick with weak to medium sub-angular blocky or sometimes granular or platy structure that is brown to grayish brown (i.e. 10YR 5/3 or 5/2) in color. Field indicators of departure from the reference condition include exposure of subsoil as evidenced by excessive pedestalling and/or surface disturbance.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The reference state consists of 45-60% grasses, 5-10% forbs, and 5-45% shrubs composition by dry weight. The sagebrush canopy is evenly distributed with cover ranging from 5-25%. When sage canopy is at the high end, herbaceous understory diminishes in the plant interspaces, but desirable bunchgrasses can still be found in the interspaces of sage canopy as well as litter to reduce runoff potential. Infiltration is moderate to moderately rapid infiltration rates resulting in minimal runoff. Basal cover is typically less than 5% for this site and does very little to effect runoff on this 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):** No compaction layer should be present. A coarse, dry subsurface (sandy clay loam) will often refuse a probe, causing misidentification of a compaction layer. Most soil profiles must be described by hand dug holes.
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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: 1.1) sagebrush
1.2) mid-size, cool season bunchgrasses=sagebrush
1.3) mid-size, cool season bunchgrasses
- Sub-dominant: 1.1) mid-size, cool season bunchgrasses
1.2) rhizomatous grasses=short, cool season bunchgrasses
1.3) sprouting shrubs
- Other: 1.1) rhizomatous grasses=short, cool season bunchgrasses>perennial forbs>sprouting shrubs>>annual forbs
1.2) perennial forbs=sprouting shrubs>annual forbs
1.3) rhizomatous grasses=short, cool season bunchgrasses>sagebrush>perennial forbs>annual forbs
- Additional: Biological soils crusts (lichens and mosses) are important to function/structure of this site. After shrub killing events like insect outbreaks, extended periods of saturated soils, or severe drought (>3 years of below average effective precipitation), sagebrush may be temporarily reduced with a relative increase in sprouting shrubs.
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence can be observed and is typically associated with shrub component. It is common to find dead matter accumulated in bunchgrasses such as Indian ricegrass, but live plant matter quantity should exceed standing dead except for in times of severe drought. Sagebrush canopy will often have occasional dead branches (<10%), except after insect outbreaks, extended periods of saturated soils, or severe drought.
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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 15-35% of total canopy measurement (first hit LPI) with total litter (including beneath the plant canopy) 30-65% expected. Herbaceous litter depth is typically very shallow, approximately 1-2mm. Coarse woody litter can be up to a couple inches in diameter (4-6cm), but is sporadically distributed.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 300-700 lb/ac (500 lb/ac average); Metric: 336-785 kg/ha (560 kg/ha average).
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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:** Bare ground greater than 50% is the most common indicator of a threshold being crossed. Greasewood commonly invades this site when adjacent to a drainage bottom. Annual invasive species such as cheatgrass and halogeton can occur on disturbed sites. Alyssum, flixweed (tansymustard), kochia, Russian thistle, and

lambquarter are introduced annuals that can become weedy after disturbances.

17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years. Thickspike wheatgrass will commonly reproduce by underground rhizomes and rarely by seed production.
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