Ecological site EX046X01B040 Loamy Steep 15-19" PZ Frigid Rocky Mountain Front Foothills

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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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Composition (Indicators 10 and 12) based on	Annual Production

Indicators

 Number and extent of rills: Slopes on this site are often less than 40 percent and, more commonly, 15 to 20 percent. The soil surface is well-covered by plant material. There will be no rills on slopes less than 20 percent. Rills will be uncommon on slopes greater than 20 percent. These rills typically occur as a result of high intensity summer storms on southfacing slopes. They will be short and inconspicuous.

- 2. **Presence of water flow patterns:** Water flow patterns may be expressed on the steepest south facing slopes. They will be rare, short, and disconnected.
- 3. **Number and height of erosional pedestals or terracettes:** This site is extremely resistant to wind and water erosion. No pedestals or terracettes will be present within the Reference State.
- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): Bare ground in the Reference State will be zero to five percent. The reference state will have high current year foliar cover as well as high litter amounts, resulting in very low bare ground counts even in drought years.
- 5. Number of gullies and erosion associated with gullies: No gullies will be present in the Reference State.
- 6. Extent of wind scoured, blowouts and/or depositional areas: The soil surface is well covered with plant materials (both living and dead), protecting the site from wind erosion. No wind scoured, blowouts, or depositional areas will be present in the Reference State.
- 7. Amount of litter movement (describe size and distance expected to travel): Litter movement is limited to extreme weather events. Under normal conditions, herbaceous litter movement will be rare and travel no more than two or three inches.
- 8. Soil surface (top few mm) resistance to erosion (stability values are averages most sites will show a range of values): The Reference State is extremely stable and covered with dense root mats. Soil Stability ratings will be five or six under plant canopies and in plant interspaces. The A horizon will be six to eight inches thick.
- Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): The soil structure at the surface is typically strong to medium-fine granular. A Horizon should be six to 10 inches thick with a dark color, when wet, has a Value of three

(3) or less, and a Chroma of three (3) or less. These colors suggest high soil organic matter content.

Local geology may affect the color, so it is important to reference the Official Series Description (OSD) for the characteristic range.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Evenly distributed across the site, bunchgrasses improve infiltration while rhizomatous grass protects the surface from runoff forces. Infiltration of the Loamy ecological site is well drained but has a slow infiltration rate. An even distribution of mid stature grasses (65 percent of site production), cool season rhizomatous grasses (less than 10 percent) and shortgrasses (less than 10 percent of site production), forbs and shrubs (15 percent) across the landscape.

The variable root types and depths of the Reference State ensures moderate to rapid infiltration

- 11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): A compaction layer is not present in the reference condition. The soil profile may contain an abrupt transition to an argillic horizon, which can be misinterpreted as compaction. However, the soil structure will be fine to medium subangular blocky, where a compaction layer will be platy or structureless (massive).
- 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: Tall to Midstatured, cool season, perennial bunchgrasses (rough fescue, bluebunch wheatgrass and green needlegrass)

Sub-dominant: cool season midgrasses (Idaho fescue) = cool season rhizomatous grasses (thickspike and western wheatgrass) > forbs >= shrubs > warm season decreasers (plains muhly) > warm season increasers

Other:

- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Mortality in herbaceous species is not evident. Species with bunch growth forms may have some natural mortality in centers is three percent or less.
- 14. Average percent litter cover (%) and depth (in): Litter is comprised primarily of herbaceous material from rough fescue plants. It is highly variable in depth but provides consistent cover across the site. Averages are 40 to 60 percent and approximately 0.25 inches deep. Areas exist where rough fescue litter is deeper near bases of the plant.
- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): Production of the Reference State is variable due to variation in soils and Relative Effective Annual Precipitation across the LRU Low: 1225 lbs/acre or 1373 kg/hectare Median: 1760 lbs/acre or 1973 kg/hectare High: 2195 lbs/acre or 2460 kg/hectare
- 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: Invasive species on this ecological site include (but not limited to) cheatgrass, field brome, spotted knapweed, yellow toadflax, leafy spurge, salsify, dandelion, sweet clover, North Africa grass, crested wheatgrass, smooth brome, Kentucky bluegrass. This list is not comprehensive

Native species such as Rocky Mountain juniper, broom snakeweed, rabbitbrush spp., blue grama, Sandberg's bluegrass, purple threeawn, lupine, larkspur, and lesser spikemoss can, when their populations are significant enough to affect ecological function, indicate site condition invasion.

17. **Perennial plant reproductive capability:** In the reference condition, all plants are vigorous enough for reproduction either by seed or rhizomes in order to balance natural mortality with species recruitment.