USDA Natural Resources
Conservation Service

Ecological site R024XY020NV
DROUGHTY LOAM 8-10 P.Z.

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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	PNovak-Echenique
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns are none to rare but can be expected on steeper slopes in areas subjected to summer convection storms or rapid snowmelt. Generally up to 20 ft apart and short (<10 ft. long) with numerous obstructions that alter the flow path. Flow pattern length and numbers may double after wildfires, high levels of natural herbivory, extended drought, or combinations of these disturbances if summer convection storms occur.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare and usually occur in water flow paths. Wind pedestals are rare and would only occur after wildfires, after high levels of herbivory, extended drought, or combinations of these disturbances. Frost heaving of shallow rooted plants should not be considered a "normal" condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 20-50% depending on amount of rock fragments. Lower slopes are expected to have less bare ground than steeper slopes. Bare ground would expect to increase to 80% or more the first year following wildfire. Multi-year droughts can also increase bare ground.

5. **Number of gullies and erosion associated with gullies:** None.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind erosion is minimal. Moderate wind erosion can occur after major disturbances such as wildfires, high levels of natural herbivory, extended drought or combinations of these disturbances. After rain events, exposed soil surfaces form a physical crust that tends to reduce wind erosion.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 3 to 6 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically fine granular. Soil surface colors are light and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is typically less than 1 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., Thurber""s needlegrass and Indian ricegrass] slow runoff and increase infiltration. Shrub canopy (especially sagebrush) and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site. Loss of sagebrush after a severe wildfire reduces snow accumulation in the winter, reducing the depth of soil water recharge negatively affecting recovery and growth and reproduction of deep-rooted perennial forbs and grasses.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compacted layers are none. Platy, subangular blocky, prismatic, or massive sub-surface horizons or subsoil argillic horizons are not to be interpreted as compacted layers.

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: Reference Plant Community: Deep-rooted, cool season, perennial bunchgrasses > tall shrubs (Wyoming big sagebrush)

    Sub-dominant: Associated shrubs > shallow-rooted, cool season, perennial bunchgrasses > deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, perennial and annual forbs.

    Other: Microbiotic crusts

    Additional: After wildfires, the functional/structural dominance changes to the herbaceous components with a slow 10-20 year recovery of the non-resprouting shrubs (big sagebrush). Resprouting shrubs (spiny hopsage, horsebrush, rabbitbrush) tend to increase until sagebrush reestablishes. High levels of natural herbivory, extended drought or combinations of these factors can increase shrub functional/structural groups at the expense of the herbaceous groups

and biological crusts.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Most of the perennial plants are long-lived. Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 25% of total woody canopy; some of the mature bunchgrasses (to 20%) have dead centers. Extended drought would cause a relatively high mortality of short-lived species such as bottlebrush squirreltail and Sandberg bluegrass.

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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces (± 20%) and depth of litter is <½ inch. After wildfires, high levels of natural herbivory, extended drought, or combinations of these disturbances, litter cover and depth decreases to none. Depending on climate and vegetative recovery, litter will increase to pre-fire levels in one to five growing seasons.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (end of June) ± 500 lbs/ac; Favorable years ± 700 lbs/ac and unfavorable years ± 300 lbs/ac. Spring moisture significantly affects total production.

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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 include cheatgrass, halogeton, Russian thistle, annual mustards, and knapweeds. Cheatgrass is the greatest threat to dominate the site after disturbance (primarily wildfires). Exotic mustards and Russian thistle may dominate soon after disturbance but are eventually replaced by cheatgrass.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years. Only limitations to reproductive capability are weather related, natural disease or herbivory, insect infestations, or combinations of all of the disturbances.
