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A rapid assessment technique to evaluate rangeland health

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Introduction Land managers are constantly searching for more efficient methods to assess the condition of rangelands . The concept of rangeland health was advanced as an alternative to range condition (NRC 1994) and is defined as , "The degree to which the integrity of the soil , vegetation , water , and air , as well as the ecological processes of the rangeland ecosystem are balanced and sustained (Pellant et al . 2005) ." It can be assessed using quantitative measures (Herrick et al . 2005) and with a qualitative , rapid assessment protocol (Pellant et al . 2005) . Qualitative assessments can be used to help prioritize land for restoration and more intensive monitoring .

Materials and methods This technique , which is currently being applied in a number of countries including the US , Mexico , China and Mongolia , utilizes 17 indicators that are rated (Table 1) according to their departure from an expected condition as described in a Reference Sheet . These indicators include a range of biotic and soil based elements that address the integrity of the plant community , soil erosion , and water function . The Reference Sheet facilitates consistent application of the process on each ecological site by integrating all available sources of data and knowledge to a single range of reference conditions for each indicator . An ecological site is a kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management . The product of this qualitative assessment is **not** a single rating of rangeland health , but three components called attributes (Table 1) .

Table 1 Attributes of rangeland health and the rating categories for each attribute (and indicator) .

Soil/Site Stability		Hydrologic function		Integrity of the Biotic Community	
Ratings reflect the degree of departure from expected values of each attribute/indicator per the Reference Sheet					
Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight	

Results The outputs from this assessment provide a preliminary evaluation of the attributes of rangeland health at the ecological site or its equivalent , level . The results can be used to communicate fundamental ecological concepts to a wide variety of audiences . Monitoring site selection can be improved using the assessment results and early warnings of potential problems and opportunities in areas that are potentially at risk of degradation or where resource problems currently exist can be identified . Caution must be exercised to ensure that this technique is used appropriately to identify independently the cause(s) of resource problems and follow-up management actions .

Conclusions This protocol will continue to evolve as our understanding of ecological dynamics of global rangelands continues to grow . The use of a qualitative protocol , supplemented by quantitative studies , provides managers with a starting point to better describe and ultimately manage rangelands .

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