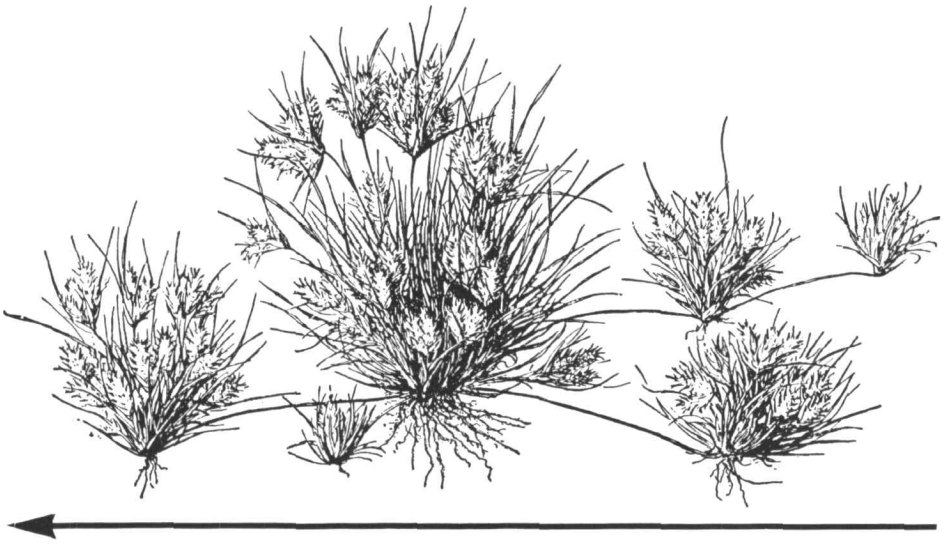

A New Approach for Range Condition Assessment Is Needed

Walter H. Schacht

THE TASK GROUP on Unity in Concepts and Terminology was established in 1989 by the Society for Range Management to evaluate the methodology and terminology of rangeland condition assessment. The Task Group (1991) developed new concepts which significantly differ from traditional methods of determining the status of rangelands. The Task Group's goal was to develop a new approach which would more adequately reflect the conservation status of rangelands for regional or national reporting purposes, and more adequately meet the needs of multiple use management objectives. The proposed approach has the management objectives of (1) conserving, to the extent practicable, the long-term potential of the site to produce vegetation and (2) producing in the shorter term those combinations of goods and services desired in the management of the land. Similar to the current method used to determine range condition, assessment of long-term and short-term productivity is to be site specific (by range or ecological site). This new approach to assessment of rangelands, however, requires an abandoning of the classical "climax" model on which range condition determination is currently based. While there is not general agreement in the range discipline as to an alternative theory or model (Joyce 1993), the Task Group has attempted to develop an approach for assessing rangeland which appears to be more reliable and meaningful than the currently used method.

Range management, as an applied ecology discipline, is based on a model explaining how ecosystems function. The model, or set of concepts, is ultimately used as a guide to collect meaningful data and to assemble this information in such a way to make management decisions. The traditional concepts of range condition used by the Soil Conservation Service and others are predominantly based on the "successional" or "climax" model largely developed by Clements in the first part of the century. The successional approach to range management supposes a given rangeland has a single persistent state (i.e., climax) in the absence of major disturbances (e.g., improper grazing). Succession towards climax is a steady, continuous process. It is also assumed that retrogressive changes caused by such things as improper grazing result in unstable states which can be reversed in an orderly, predictable fashion by proper grazing management.

RANGE SCIENTISTS, however, have accumulated substantial empirical evidence where the assumptions of the range succession model do not hold. Vegetation changes in response to grazing have often been found to be discontinuous, irreversible, and (or) inconsistent. When livestock have been removed from arid and semiarid rangeland, the vegetation has often not changed at all or has not changed in the direction predicted by the model. Anyone working on rangeland dominated by mesquite and (or) pricklypear cactus has certainly observed the persistence of these troublesome species even when stocking rates are reduced or when the range is destocked.

Alternative models (e.g., multiple stable states and state-and-transition models) have been developed from the existing knowledge of range ecosystems to describe temporal changes in plant communities (Westoby et al. 1989, Friedel 1991, Laycock 1991). Most commonly, these

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Author is assistant professor, Range Management, Angelo State University, San Angelo, Texas.

(Caudle continued) use the climax range condition concept understand that vegetation can follow numerous pathways and occur in an infinite variety of proportions and amounts during secondary succession... even on the same type of range site. However, experience has shown that these successional pathways can be characterized by predictable patterns of species association and community structure.

Some of the disenchantment with the climax concept of determining range condition comes from those who have attempted to use it in situations where it does not apply. Climax range condition was never intended for use on Mediterranean-type annual grasslands where historic climax plant communities have been permanently replaced by annual plant communities. Short-term, seasonal events can cause dramatic shifts in species composition and production many times in a single growing season on these areas.

CLIMAX CONDITION should never be used on areas where introduced species have become established through seeding or invasion to the point of dominating the site. They were not a part of the natural plant community and should not be compared to climax vegetation. Annual grasslands and sites dominated by introduced species should be evaluated using forage quality and forage production value ratings.

Many people confuse the meaning of range condition and attempt to tie it to vegetative production or forage quality. These are forage condition factors which can change in a matter of days depending on rainfall, temperature, or other short-term conditions. Range condition does not relate directly to herbage yield, ground cover, or forage quality.

Some critics of the climax range condition concept recommend using soil erosion rate as the primary factor for evaluating range condition. This is not practical or acceptable because of the extremely fragile nature of most rangeland soils. By the time erosion becomes apparent, the soil, water, animal, and plant resources will have been irreversibly damaged or destroyed on most range sites.

Even though the climax plant community concept has many critics, there is no consensus among scientists, resource managers, or others in the range discipline concerning an acceptable alternative method for evaluating rangeland vegetation.

Are we being asked to abandon a technically sound method of determining range condition in order to pacify the critics of livestock grazing and resource management policies on public lands? Has this become a political and social issue rather than a resource management problem?

Rather than abandoning the concept of climax range condition that has served us so well and is still a valid concept, why don't we do a better job of educating the general public about climax vegetation, succession, and ecological range condition? Changing a few words and phrases will not satisfy our critics. I seriously doubt that adopting a more "politically correct" concept will appease them, and it certainly won't improve the management of our resources.

(Schacht continued) models are based on the assumptions that each range site has more than one potential stable state or "climax," each state is a relatively stable plant community with distinct characteristics, and there is a set of discrete "transitions" between states. "Transitions" between states are triggered either by natural events (e.g., drought, fire) or by factors relating to management actions (e.g., grazing, accelerated erosion), or a combination of the two (Westoby 1989). Furthermore, change out of transition to one of the possible stable states depends on events occurring during transition. It is assumed that movement from one stable state to another occurs only when a "threshold" is crossed, i.e., when some critical event or series of critical events (devastating wildlife, overgrazing) takes place. Once the threshold is crossed, a completely different plant community can develop and be relatively stable. The shift to another stable plant community (e.g., grassland to woodland) is considered irreversible on a practical time scale without substantial intervention by the range manager, e.g., with herbicides or heavy machinery.

MESQUITE INVASION of the Rio Grande Plains, as described by Archer (1989), appears to serve as an example of the alternative models. It is assumed that the stable state for the Rio Grande Plains prior to the 1800's was a grassland or a savannah. With European settlement, however, the stable state was shifted to a mesquite woodland, which could be either a transitional or stable state. Woody plant (e.g., mesquite) invasion into grasslands was probably caused by overgrazing, fire suppression, and climatic change. With overgrazing, less frequent fires, and modifications of the soil, grasses are no longer favored and woody plants no longer suppressed. Density and longevity of woody plants increase as do the vegetative propagules and soil seed bank of woody plants. Therefore, succession to grassland or savannahs cannot readily occur, even without grazing, because woody plants are established and have a tremendous regenerative potential. A single event or a series of events (series of droughts killing woody plant seedlings, excessive browsing, pathogenic "diebacks") would need to occur to rid the area of woody plant dominance and allow for development of another relatively stable plant community, such as a grassland. Many authors suggest that community change within one of these stable states might be orderly and predictable (successional steps) but changes from one stable state to another are episodic as influences of biotic and abiotic factors act intermittently.

Based on this example and numerous others, it is apparent that there is more than one stable state for many range sites. Therefore, for management purposes, it is not only necessary to identify possible stable states for each range site but it is also critical to identify and understand the factors which can force a stable community (e.g., grassland) into a transitional phase and eventually move toward another stable state (e.g., woodland). With this knowledge, the practicality of managing for various plant communities can be more intelligently and predictably determined than under the climax model. Based on this type of reasoning, the Task Group suggests that it is for the manager to determine which of the possible plant communities is the "desired plant community" (which can include introduced species) based on what is realistic in terms of the manager's capabilities and goals, site potential, and economic considerations. The success of the management program could then be assessed in terms of vegetation trend toward or away from the desired plant community.

THE DESIRED PLANT community should not only meet the short-term production goals of the manager but it must also conserve the long-term potential of the site to produce vegetation. Conservation of the ability of a site to produce vegetation is the key to the concept of sustainability of resource use and the fundamental goal of the management of renewable resources. Therefore, a Site Conservation Rating method is included in the approach which will indicate whether the productive capability of a given site is being maintained. The rating is largely based on a plant community's effectiveness in protecting a site from accelerated erosion.

While much field and theoretical work needs to be done before the proposed approach can be used for range condition assessment, it is important for managers to realize that this new approach is a step in the right direction. In a practical sense, the proposed changes provide improved methodology for inventory and evaluation, more adequately meet the needs of multiple use management objectives, and more frequently reflect the conservation status of rangelands for regional or national reporting purposes.

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