Factors to Consider in the Evaluation of Vegetation Condition[1]

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In recent years the concepts of range condition and trend have received so much attention that most of you are thoroughly familiar with the general principles of judging the range. Many of you are acquainted with the different schools of thought and with different methods that have been developed by individual workers or groups of workers.

Most of us will agree that range evaluation should have an ecological basis. Of course, with this approach, we immediately come into contact with principles and processes, of which succession is one of the most important. And succession leads us to a consideration of the "top", the optimum, or the climax condition. Right here we have disagreement.

Even the ecologists do not agree on what is the climax (Whittaker, 1953). And not all range men are convinced that climax should be synonymous with "top" range condition. Hence we have a perennial question: Should we wait and hope that the ecologists will get together, or should we formulate our own definitions of top condition for the various range types?

If we formulate our own definitions of top condition, where shall we draw the line on broad plant communities or range types? Whittaker (1953) has stated that ". . . . climax vegetation is a pattern of populations corresponding to the pattern of environmental gradients, and more or less diverse according to diversity of environments and kinds of populations in the pattern." This means essentially that every site has its own potential. It means, for example, in the ponderosa pine type of the Rocky Mountains, that dry rocky ridge tops, wet meadows, shrub covered slopes, and bunchgrass communities are different populations in the overall pattern of the ponderosa pine-Douglas fir climax of the region. These populations are present because of diversities in the broad climax.

How shall we develop condition and trend standards for these distinct populations? Shall we develop standards for the type as a whole? Or shall we follow the rule that each meadow, ridge top, or other community depicts a site that is capable of developing its own topographic, physiographic, edaphic or biotic climax? A study of the many methods range men have developed shows that one or the other of these practices has been followed, depending upon background, training, facilities for work, and extent of territory under supervision.

What does this lack of uniformity in approach mean? It indicates at least that joint discussion by those who advocate or use different methods might point the way to more consistent study in the future.

The pattern of factors used for measuring and recording range

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condition and trend seems to have grown out of the efforts of a multitude of ecologists and range investigators. By common consent we have accepted certain criteria as being more reliable than others. Parker (1954) has enumerated those most frequently used: density, composition; vigor of desirable forage species, amount of litter coverage, current erosion, and soil stability. These are important. But they represent only a few of the environmental factors and forces that affect growth, structure, and reproduction of plants and plant communities.

Billings (1952) lists 17 factors and 43 factor subdivisions in his discussion of the holocoenotic environment. In a diagrammatic scheme, he indicates how these factors interact on one another and on the vegetation itself. It is apparent that we are not using or measuring all available factors in the formulation of range condition standards. And we are largely ignoring their interactions. Likewise, it is obvious that we cannot and should not use all of them. But the question remains: Are we using the factors that should be used?

Are we standardizing our criteria into a stereotyped pattern by our emphasis on density, composition, and vigor as factors relating to vegetation and our use of litter, erosion, and stability as factors relating to soil? These are quantitative characteristics. But there are others, such as number of individual plants, height, weight, volume and frequency. The significance of these has been discussed by Ahlgren (1947), Crocker and Tiver (1948), Hanson (1950), Brown (1954), and many other investigators. But full use of these criteria is seldom made in connection with range condition studies. They have not been sufficiently considered in the interpretation of ecological processes on the range.

Likewise, the qualitative characteristics of plant communities have been neglected as factors to consider in evaluation of range condition. Hanson (1950) lists the principal qualitative characteristics as follows: kinds of species, stratification above and below the soil surface, periodicity (phenology), vitality, life forms, and sociability or association of species.

A complete description of a plant community must deal with many, if not all of these characteristics. Available time, facilities, training of personnel, and other limitations probably always will limit the number of these factors that can be selected for detailed study and use. However, the research worker has an obligation to consider as many factors as possible in the development of range condition standards. Failure to consider the multiple factor complex operating on the range can lead to excessive simplification in the practice of judging range condition. Then, when divergences due to local influences in a range type are encountered there is a loss in confidence in the entire method.

A sound method of judging the range must have an ecological basis. It must recognize the structural characteristics of plant communities, characteristics which are susceptible to measurement as well as qualitative description. It must recognize the dynamics of vegetation and therefore range trend, which can be measured in terms of change in structure and yield over varying periods of time. It must recognize the physical environment which includes climatic, edaphic, pyric, and biotic factors including animals and man. And it must recognize practical use of the multiple products of the land on a sustained yield economy. A sound method should include the important factors in the following groups:

Ecological principles and processes.—There is a need for more knowledge of the order in which successional stages occur and of the causes that speed up, delay, or deflect their normal progress. We need to make increased application of that knowledge in judging range condition.

Environmental factors. — We need to integrate site characteristics into our judging schemes so they will be of greater use to individual range managers. This will require closer attention to the local effects of physiographic, edaphic and biotic forces.

Production criteria. — Yields of forage by range condition classes need more attention in order that productivity may be tied directly to animal output and rancher income. From the standpoint of range improvement we need to place greater emphasis on yields of litter and organic matter by nonforage plants.

Multiple use.—Any system of judging range, which does not include consideration of all products of the land, is incomplete. We must include measurement or evaluation of factors which affect stream flow, siltation, water yield, wildlife production, and recreational values.

In recent years we have come a long way in our development of range standards. We still have a long way to go. But our presence here in this panel group to discuss the factors that must be considered is an indication that we are making progress.

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