R-750

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RANGE CONDITION . . . A GUIDE TO GRAZING MANAGEMENT

DUAINE L. DODDS
Grassland Management Specialist

DR. HAROLD GOETZ
Chairman, Botany Department, NDSU

SOIL FORMATION and **VEGETATION DEVELOPMENT** originally took place at about the same time. They are the product of the parent material, climate, living organisms and the landscape topography all acting together over a long period of time. A change in any one factor from place to place on the landscape resulted in soils developing with different characteristics. Vegetation development, like soil formation, varies from place to place. The potential plant community on a particular soil or range site is determined primarily by the **NATURE OF THE SOIL** and the **CLIMATE** of the area.

SOIL & VEGETATION DEVELOPMENT FACTORS

- CLIMATE
- LIVING ORGANISMS
- PARENT ROCKS
- TOPOGRAPHY
- TIME

Soil formation and vegetation development is a very slow process. Thousands of years were required for bare rock to break down to provide a suitable place for plants to grow. But, given a long enough time, rock breaks down through a process of **CHEMICAL** and **PHYSICAL WEATHERING,** providing a more suitable home for flowering plants to grow and reproduce (Fig. 1). Initially, only the lowest forms of plant life may grow and survive. Gradually, as soils develop over time, a series of different plant communities invade and grow on a site. This is referred to as **PLANT SUCCESSION.**

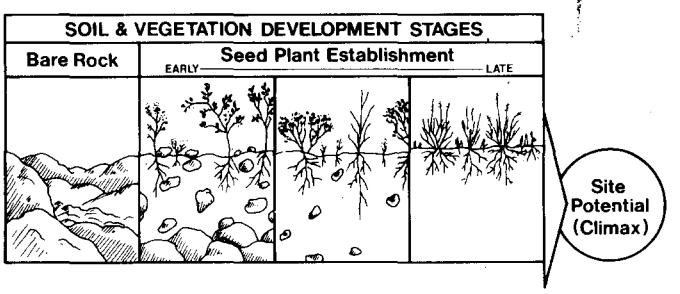

Fig. 1 — Soil and vegetation development stages

— PLANT SUCCESSION —

The process of vegetation development whereby an area is occupied gradually by a series of different, more stable plant communities

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North Dakota State University Fargo, North Dakota 58105

Plant succession is an orderly change of plant communities. It's a process where one group of plants replaces another. It is controlled by the rate of soil development. Succession takes place gradually over time and continues until the final plant community is utilizing the full productive potential of the site. Like soil formation, the end product of plant succession is determined by climatic factors. This is the point at which there will no longer be a change from one vegetation type to another because both soil and vegetation have developed to their maximum potential for the site.

Plant succession which begins on bare rock is referred to as **PRIMARY SUCCESSION** (Fig. 1). Man, through his actions, often disturbs the orderly vegetation development sequence of primary succession. Through his actions he alters the vegetation or causes a deterioration in the level of vegetation development. The plant community is set back to some earlier stage of development. If the cause of the site disturbance is corrected, the plant community will regenerate itself and develop to the maximum potential for the site. Plant succession induced by the actions of man is referred to as **SECONDARY SUCCESSION** (Fig. 2).

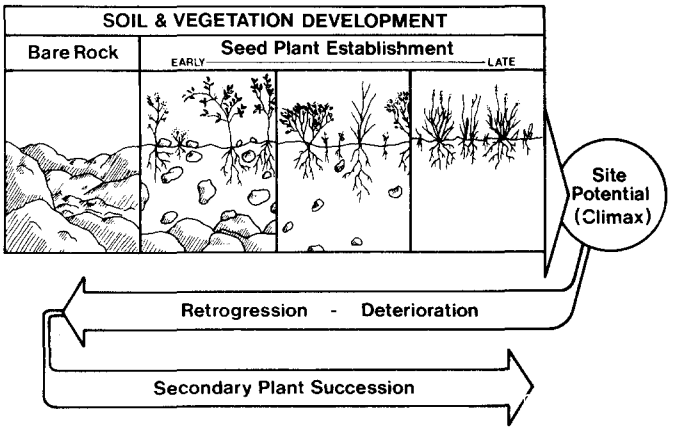

Fig. 2 — Vegetation development as influenced by site disbance.

A soil and its vegetation developed to its fullest potential is in balance with its environment. They are at **CLIMAX.**

A climax plant community is a community that is best adapted to environmental conditions of a particular range site. Different range sites are distinguished from one another by the plant communities they will support. Different range sites must:

1. **Possess differences in the kind of plants or plant groups that are dominant on the site or,**
2. **Possess differences in the proportion or the number of different kind of plants or plant groups dominant in the plant community or,**
3. **Possess differences in total productivity.**

These differences between range site plant communities are influenced by differences in soil, topography, climate and other environmental influences. Such factors as soil texture, topsoil depth, water table depth, soil salinity and land slope or relief are often used to identify different range sites in the absence of the natural or climax plant community.

The dividing line between different range site plant communities is usually not distinct. Sometimes there may be abrupt changes in soil, topography and/or plant-soil-water relationships causing a sharp or distinct vegetation change. Plant communities usually change gradually from one site to another due to a gradual change in environmental conditions.

RANGE CONDITION or the "state of health" of plant communities relates the current productivity of native range vegetation to the potential productivity of a particular range site. It represents the degree to which the kind and/or proportion of plant species has changed or departed from the site potential or climax plant community. Climatic conditions, especially the amount and distribution of precipitation throughout the growing season, and the intensity of grazing use over time have a major influence on the kinds and number of plants actively growing on range sites.

Four range site condition classes are used to describe the "state of health" or condition of range site vegetation — **EXCELLENT, GOOD, FAIR** and **POOR** (Table 1). This system of range condition classification compares the percent (%) composition by weight of decreaser and increaser species in the present plant community with the potential or climax plant community on different range sites.

CLIMAX PLANT COMMUNITY — The highest stage of plant community development that is capable of supporting itself under the prevailing climatic and soil conditions.

Table 1 — Range Condition Classes

CONDITION CLASS	CHARACTERISTICS
Excellent	76 to 100 percent of the vegetation is a mixture of desirable decreaser and increaser plants in allowable proportions similar to the original or climax plant community. Legumes and desirable forbs may be present.
Good	51 to 75 percent of the vegetation is a mixture of desirable decreaser and increaser plants in allowable proportions similar to the original or climax plant community. Some legumes and forbs may be present.
Fair	26 to 50 percent of the vegetation is a mixture of desirable decreaser and increaser plants in allowable proportions similar to the original or climax plant community. Legumes may be present, but most forbs are increasers and invaders.
Poor	Less than 25 percent of the vegetation is a mixture of desirable decreaser and increaser plants in allowable proportions similar to the original or climax plant community. Increaser and invader plants make up the major portion of the vegetation.

Using species composition as an index to range condition classification recognizes that range plants respond differently to grazing livestock. Some range plants are more resistant to close grazing; others are quite sensitive. Range plants are classed as **DECREASERS, INCREASERS** and **INVADERS** based on their response to prolonged periods of heavy or close use by livestock (Table 2).

Table 2 — Range Plant Grazing Response Classification

GRAZING RESPONSE	DESCRIPTION
Decreaser	Plant species of the original or climax vegetation that will decrease in relative amounts with continued overuse.
Increaser	Plant species of the original or climax vegetation that increase in relative amounts, for at least a time, under overuse.
Invader	Plant species that were absent or present in very small amounts in undisturbed portions of the original or climax vegetation which become more abundant following disturbance or continued overuse.

Decreaser plants are usually very palatable to livestock. They are sometimes called "ice-cream" plants because they are often the first plants grazed by livestock. They are usually the dominant and most productive plants growing on a range site.

Increaser plants become more abundant on a range site as the plants less resistant to grazing decrease. Plants which increase in the plant cover often are less palatable to livestock, although some increasers such as blue grama grass and buffalograss are very well liked by livestock. Under continued close grazing increaser plants may become very abundant and/or eventually decrease in abundance.

Invader plants are not abundant on range sites in high condition. They cannot compete successfully with the major plant species for soil moisture, soil nutrients, light, growing space and other needs. Invader plants are opportunists. They move into a range site plant community in greater numbers after species of the potential or climax plant community have been weakened by overuse. Invader plants may be annual weedy grasses and forbs, perennial grasses and forbs or woody plants.

The theoretical relationship between decreaser, increaser and invader plants as range condition deteriorates or improves is shown in figure 3. Note that as range condition deteriorates from excellent to poor condition there are fewer and fewer decreaser plants in the grassland stand. As the higher producing decreaser plants become less, increaser type grasses, sedges etc. become more abundant. If the increaser plants are weakened due to close use, then invader plants such as weedy grasses, forbs, shrubs and/or less palatable plants become a major part of the native grassland vegetation.

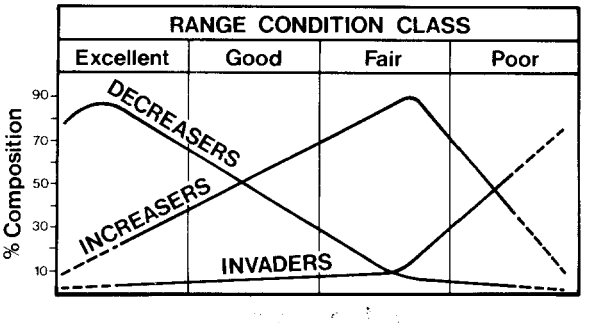

Fig. 3 — Relationship of range condition class to grassland composition.

A change in range condition from the site potential or climax plant community is referred to as range deterioration. It is a process whereby a range site plant community becomes successively occupied by a different plant community of a lower order of development. Range deterioration in real[illegible] is plant

succession operating in reverse. The plant community best adapted to the site is being replaced by lower value plants. If the cause of the deterioration is eliminated the plant community will eventually return to the site potential through a process known as **SECONDARY PLANT SUCCESSION.**

Range condition, under various levels of grazing management, may remain constant or steady with little or no change, it may improve or it may decline. This is referred to as **RANGE CONDITION TREND**. Several indicators of improving range condition include successful reproduction of high value plants,

RANGE CONDITION TREND

The direction of change in range condition

accumulation of plant residue on the soil surface, improved vigor or health of the vegetation and standing vegetation and surface litter protecting the soil against erosion by wind and/or water. Range condition trend is usually determined at two points in time, usually at 5-year intervals. A major cause of low range conditions on farms and ranches is the number of livestock grazing a particular pasture unit (Fig. 4). The number of animal units grazing a particular pasture must be in balance with the potential forage available for livestock use during the growing season.

Livestock grazing can be managed to influence range condition. Observing grazing management principles and practices such as date of grazing readiness, degree of utilization on key management species, proper stocking rates, uniform grazing distribution, periodic deferment from grazing, use of grazing systems to compliment the native range resource etc. will influence the kinds and numbers of range plants growing in your pastures. The point on the range condition class scale — Excellent, Good, Fair and Poor, that producers try to maintain native grassland vegetation is a personal decision. Since weather conditions, especially precipitation, is highly variable from year to year, managing for excellent condition may be impractical in actual practice. Set your goal high and strive to maintain native grasslands in **GOOD CONDITION.**

To accomplish this goal learn to identify 10 to 15 native grasses common to your area and their growth characteristics (see Circular R-741 entitled "North Dakota Grasses and Sedges). Observe their growth patterns from year to year and possible changes in abundance over time to determine how well major grassland plants are performing under the present system of grazing management.

Assistance in determining the present condition class of native grasslands can be obtained from your local Soil Conservation District. The present condition class will indicate how well you're doing and indicate the starting point for future grazing management to reach your desired range condition class goal.

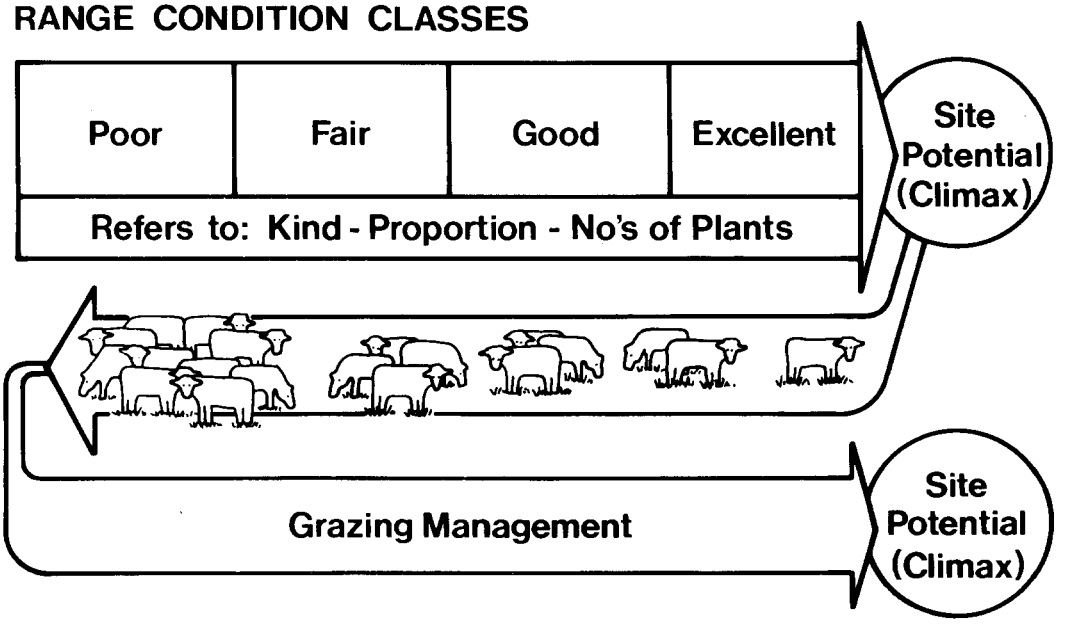

Fig. 4 — LIVESTOCK NUMBERS INFLUENCE RANGE CONDITION

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