Short Duration Grazing and the Savory Grazing Method in Perspective

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The primary objective of most grazing management practices is to maximize livestock and/or wildlife production per unit area of rangeland. But in order to satisfy this objective, management practices must insure that the forage resource is maintained over time. Currently, considerable controversy exists concerning the relative merits of short duration grazing systems in general and specifically the Savory Grazing Method as viable grazing management concepts. The primary objective of this presentation is to establish a balance between traditional concepts of range and ranch management and those associated with the Savory Grazing Method. We hope to satisfy this objective by first reviewing some of the basic principles of grazing management and then addressing points of controversy in an open and direct manner. First, let's review some of the basic principles.

Rangeland Productivity

Rangeland productivity, relative to salable livestock products, is primarily a function of three factors: (a) amount of forage produced; (b) forage quality; and (c) the efficiency by which the forage is harvested (Heitschmidt et al. 1982). The primary objective of essentially all grazing management practices is centered around the manipulation of these factors. For example, common methods of management used to increase quantity and quality of forage produced include irrigation, fertilization, and seeding of more productive species. Fencing and strategic location of water facilities and mineral boxes are common methods of management that enhance efficiency of harvest.

But in many instances, the relative increase in production that is attainable from the application of present technology to native rangeland, does not economically justify the implementation of such practices as irrigation and fertilization. Thus, various grazing management systems are often utilized as a method for increasing productivity. But just as the relative success of irrigation and fertilization is related to these three factors, so is the relative success of any grazing system; only the method differs.

Basic Principle of Grazing Management

All systems of grazing management are centered around the basic principle of grazing management which is the *control of frequency and severity of defoliation of individual plants*. Scientific research has repeatedly documented the adverse effects that frequent and severe defoliation of plants have on entire rangeland ecosystems. But to understand these effects, one must evaluate both the short-term and long-term response of an individual plant to defoliation.

Basically, the short-term or immediate responses of an individual plant to any defoliation event may be limited to three. First, it may flourish which conceptually may be perceived as an increase in size or number of plants. Secondly, it may die or at least decline in vigor. Thirdly, it may not respond in either a positive or negative manner.

As a result of these basic short-term responses, the competitive abilities of individual plants are altered. For example, a major difference in competitive abilities may result if one plant species is grazed and another is not grazed. These relative changes in the ability of plants to compete for a given resource results in a change in their relative abundance. One goal of any grazing management scheme is to prevent this shift in species composition toward less desirable species.

The major factor controlling frequency and severity of defoliation regardless of type of grazing system is grazing pressure. Grazing pressure is defined as the animal unit to forage unit ratio (Soc. Range Manage. 1974). Severity and frequency of defoliation will always increase as grazing pressure increases. But the relationship between grazing pressure and frequency and severity of defoliation is extremely complex in any rangeland because: livestock are selective grazers and forage preference and availability vary between the growing season and the dormant season. Basically, these factors create a situation whereby grazing pressure varies between plant species. Thus, the most preferred plants will generally be defoliated more frequently and severely than the less preferred plants. This is true regardless of type of grazing system.

Role of Grazing Systems

How is the frequency and severity of defoliation controlled in various types of grazing systems? Again for the sake of simplicity, let us limit our discussion of grazing systems to three basic types: continuous (1-herd, 1-pasture); deferred rotation (multi-herd, multi-pasture); and short duration (1-herd, multi-pasture).

Under continous grazing schemes stocked with a single class of livestock, rate of stocking is the principal factor

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controlling frequency and severity of plant defoliation since grazing pressure can only be manipulated by stocking rate. This is also the case in the deferred rotation type systems. However, a period of rest is periodically scheduled to insure that the grazed plants have an opportunity to regain or maintain their vigor. But under any type of short duration grazing system, considerably greater control of frequency and severity of defoliation is afforded in that stocking rate, stocking density, and length of graze/rest (time) are all variables that can be manipulated to control defoliation of individual plants. Since a major portion of the success of all grazing systems is directly related to their ability to control defoliation, it follows that short duration grazing offers the greatest potential for increasing rangeland productivity.

Points of Controversy

Accepting the fact that the Savory Grazing Method employs short duration grazing would thus suggest that rangeland productivity should increase utilizing the Savory Grazing Method. Then why is there a controversy? Why has SGM caused such widespread controversy and polarization among persons involved with range management? Although the answer to this question is complex, it is our opinion that it centers around three points of which stocking rate is the major point of contention.[1] In our opinion much of the controversy stems from some basic misunderstandings as to how stocking rate can be substantially increased with the Savory Grazing Method.

To understand this point, one must first understand what the Savory Grazing Method is. We suggest that it is basically a method of ranch management that utilizes short duration grazing as *the* method of grazing management. It follows then that the Savory Grazing Method is comprised, and its success depends upon, both a biological and a managerial component and much of the controversy results in differences in opinions as to the relative effect that each of these components have on a ranching operation, particularly with relation to its financial success and failures. But the controversy is further clouded and confused by some of the basic misconceptions associated with just the biological aspects of stocking rate.

Stocking Rate

The widespread suggestion that rate of stocking should, must, and/or can be doubled (Savory and Parsons 1981) with SGM is indeed most unfortunate. As discussed earlier, it should be readily apparent that frequency and severity of defoliation will always increase with stocking rate because grazing pressure will always increase *unless* total available forage also increases.

Relative to the possibility that short duration grazing can increase forage production, Savory and Parsons (1980) suggest that this will generally happen as a result of the principle of physical animal impact. They state that: "The one ecological principle which was really revolutionary and thus hard for trained people to accept (because it was contrary to their teaching) was that physical animal impact is not detrimental to deteriorating arid ranges but is in fact desirable to hasten the advance of plant succession. This is achieved through hoof action, which improves water penetration by breaking-up surface capping algae, lichen and moss communities, and allows for greater grass seedling success."

Although some physical animal impact may be beneficial and thus desirable, there is little if any scientific evidence suggesting that it is as important as controlling frequency and severity of defoliation. In fact, there is an abundance of literature suggesting that the amount of physical animal impact attained at rates of stocking much above "normal", deters plant succession by reducing the amount of protective plant cover. Blackburn et al. (1982) concluded from a comprehensive review of the scientific literature, that: "Livestock grazing affects watershed hydrologic properties by removing protective plant cover and by trampling. Reductions in the vegetation cover may: (a) increase the impact of raindrops, (b) decrease soil organic matter and soil aggregates, (c) increase surface crusts, (d) decrease infiltration rates, and/or increase erosion. Resultant impacts may include increased overland flow, reduced soil water content, and increased erosion."

Thus, based on the scientific evidence, we suggest that physical animal impact will most likely not dramatically enhance forage production if rate of stocking is excessive. Furthermore, it is our opinion that the entire physical animal impact component of the concept of "herd effect" has little scientific basis as a means of significantly increasing forage production. Failure to unconditionally adopt the principle of physical animal impact as a biologically tenable principle begins to limit one's imagination as to the degree that rangeland productivity can be realistically increased. There is no doubt that this is the major point of the entire stocking rate controversy.

The concept that increased rates of stocking can result in increased forage quality is valid to a certain degree. It has repeatedly been shown that live plant tissue is of higher nutritional value to an animal than dead or senesced tissue. Thus theoretically, overall forage quality could be increased in a short duration grazing system if frequency and severity of defoliation at the higher grazing pressures accompanying increasing levels of stocking, enhanced plant growth. This is certainly possible during the active growing season since the most important factor influencing amount of live tissue at any instant in a rangeland is vegetation growing conditions. But it is doubtful that forage quality can be enhanced in any grazing system during the periods of dormancy.

Furthermore, it should be noted that total forage intake of range livestock is normally bulk limited. Thus, the effect of any increase in forage quality caused by short duration grazing would most likely be an enhancement of individual animal performance rather than carrying capacity.

More efficient use of the forage already available is probably the major reason that stocking rate can, in certain instances, be immediately increased when implementing a short duration system including those employing SGM. Just as relative grazing pressure may vary between plants, because of animal selectivity, it may also vary between areas in a pasture. By utilizing short duration grazing and thus increasing stocking density, livestock distribution will be enhanced which will improve the ability of the livestock to search all areas of a pasture and more effectively utilize all available forage. In addition, grazing pressure will become more uniform throughout the pasture and thus control of the frequency and severity of defoliation of all plants will be enhanced.

Furthermore, we believe that the concepts associated with "herd effect" are more closely related to livestock distribution than to physical animal impact. We ask, how much can

[1] The other two points are explained in the last paragraph under Management.

one improve livestock distribution, and thus efficiency of harvest, without a "herd"? Can you expect to increase stocking rate more by subdividing a 40-acre pasture stocked with 1 cow, or by subdividing a 10,000 acre pasture stocked with 250 cows?

But it must be emphasized that to attain a high level of stock density in a short duration grazing system, does not necessarily require a high rate of stocking. Stocking density is a function of both number of animal units (stocking rate) and size of pasture. The statement by Savory and Parsons (1980) that "length of time spent in each paddock (pasture) of the grazing cell, and the level of stocking density, will influence the severity and frequency of bite on the plants and the recovery growth period" is absolutely correct. But this should not be construed to mean that stocking rate does not have a significant effect; *it does and it will aways be a major factor controlling the frequency and severity of defoliation of individual plants.* It is within this framework that we address the concept of "overgrazing while understocked."

Overgrazing While Understocked

The idea that many rangelands throughout the world are overgrazed but understocked is certainly a valid concept. But forwarding the idea that all patch grazing patterns are indicative of overgrazing while understocked is dangerous. Patch grazing patterns are a direct function of grazing pressure which may be controlled in a short duration grazing system by adjusting stocking rate, stocking density, and length of graze/rest. But if only stocking rate is adjusted to increase grazing pressure in order to eliminate all patch grazing patterns, a situation may develop whereby the entire range is overgrazed rather than just patches of the range. An inadequate understanding of the interaction effects between stocking rate, stocking density, grazing pressure, and patch grazing will produce more overgrazed rangelands than any other factor.

Management

Misconceptions concerning the relative effects of the managerial component of the Savory Grazing Method upon its success or failure have also been a contributing factor in the controversy. However, it is our opinion that the basic point of contention is not whether proper management decisions are essential to successfully double stocking rate with the Savory Grazing Method, but rather the question is can "proper" management decisions over-ride the biological and physical laws of nature? Obviously, the answer to this question is NO! *However, this answer does not eliminate the possibility of doubling rate of stocking in conjunction with the Savory Grazing Method.* There is little doubt that as managerial control intensifies, in most instances, so does the probability of success. Thus the real questions is how much does the managerial component of the Savory Grazing Method contribute to its success or failure? The real answer is: that depends upon how good your management was prior to adopting the managerial concepts associated with the Savory Grazing Method.

Two other minor but significant points of controversy are related to some misunderstandings as to the meaning of such terms as system and method (Savory & Parsons 1980) and pasture and paddock (Steger 1982), and the lack of proper recognition of the contributions that many indviduals have made in developing the conceptual and practical aspects of short duration grazing. Although neither of these points of controversy have any bearing upon the success or failure of the Savory Grazing Method, we do believe they are contributing factors which should be addressed.

Terminology

With regards to the controversy surrounding terminology, we and others simply object to the insinuation by some that the use of the terms systems and pasture in conjunction with the Savory Grazing Method reflects a lack of understanding of the Method. We personally consider this to be a rather minor point contributing to the controversy in that the biological processes governing the success or failure of short duration grazing systems do not change when one uses the terms method and paddock as opposed to system and pasture. In fact, based upon the definitions found in Websters Third New International Dictionary of the English Language (1971), we believe that the Savory Grazing Method should appropriately be referred to as either the Savory Method of short duration grazing or the Savory Method of ranch management.

Recognition

Just as the controversy over terminology has no affect on the biology of short duration grazing, neither does the point of controversy concerning recognition. Still, the controversy does exist and clarification of the issue is important.

The basic principles of short duration grazing were recorded as early as 1777 by James Anderson, a Scotchman who wrote:

> . . . As every kind of animal delights most to feed upon fresh plants that have newly sprung up from a bare surface, in which there is no decayed or rotted stalks of any kind; there can be little doubt but that, if cattle that are intended to be fatted were always supplied with a constant succession of this kind of food, they would be brought forward in flesh as quickly as nature of that food could in any case do it. To obtain this constant supply of fresh grass, let us suppose that a farmer who has any extent of pasture ground should have it divided into fifteen or twenty divisions, nearly of equal value, and that, instead of allowing his beasts to roam indiscriminately through the whole area at once, he collects the whole number of beasts that he intends to feed into one flock, and turns them all into one of these divisions; which, being quite fresh, and of a sufficient length for a fullbite, would please their palate so much as to induce them to eat it greedily, and fill their bellies before they thought to roam about, and thus destroying it with their feet. And if the number of beasts were so great as to consume the best part of the grass of one of these inclosures in one day, they might be allowed to remain there no longer; giving them a fresh park every morning, so as that the same delicious repast might be again repeated. And if there were just so many parks as they required days to make the grass of these fields advance to proper length after being eaten bare down, the first field would be ready to receive them by the time they had gone over all the other; so that they might thus be carried round in a constant rotation. . . —(from Voisin 1959).

Voisin (1959) further elaborated on the principles of short duration grazing in his book, *Grass Productivity.* He included detailed discussions of the importance of variable rest periods consistent with the growth rate of the vegetation, the "time" factor, the use of cell fencing design, etc. Thus, it is obvious that many contributed to the conceptual development of the underlying concepts of short duration grazing.

Still, we do believe that Savory should be properly recognized for his contribution in adapting the underlying concepts of short duration grazing to arid rangeland situations. Furthermore, we believe that he and Parsons should be prop-

erly credited for the contributions that they make to the ranching industry through their instruction at the Holistic Ranch Management School. Although the holistic management concept is not new, they have made a significant contribution by developing a methodical planning scheme incorporating flexibility into ranch management.

And finally, despite the fact that the principles of short duration grazing are not new, ranchers and range scientists do owe a debt of gratitude to Savory because he made us aware of the potential benefits of shurt duration grazing. Without such an advocate, the potential of short duration grazing may have lain idle for another decade.

Concluding Remarks

Proponents of the Savory Grazing Method have repeatedly suggested that those individuals who do not unconditionally endorse SGM do not understand SGM. Furthermore, many of these proponents apparently believe that those individuals who do not unconditionally endorse SGM, unconditionally oppose SGM. This is most unfortunate in that it is *not true* and it impedes progress in the general field of range management and more specifically grazing management by alienating people, our most important resource for advancing the art and science of range management.

Although the controversies associated around the use of certain terms and proper recognition of the relative contribution of many to the development of short duration grazing systems are unfortunate, it is imperative that we understand they do not alter the basic biological principles of grazing management. Realistically the only point of controversy is rate of stocking which is related to differences in opinion of the conceptual validity of the principle of physical animal impact. We simply suggest that proponents of SGM tend to underestimate the negative impacts of heavy rates of stocking and overestimate the positive impacts of grazing livestock on arid rangelands.

Finally, this basic conclusion should not be construed to mean that we believe the Savory Method of short duration grazing cannot prove successful on any given ranch. Success is a relative term. But if successful, we doubt that it will be primarily because of the benefits of physical animal impact. Rather, we believe that the success will result primarily because of improved livestock distribution (herd effect), improved control of the frequency and severity of defoliation of individual plants, and the benefits derived by intensifying managerial inputs.

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Editor's Note: We don't usually publish verbatim talks given at annual SRM meetings. We make an exception this time because the authors did not want anyone to suggest that the text had been changed.

As *Rangelands* serves as a forum for the presentation and discussion of facts, ideas, and philosophies pertaining to the study, management and use of rangelands, we think it appropriate and proper in this case to publish verbatim the paper given in Albuquerque. One exception—80 slides were used in the presentation there. The authors preferred to leave out all slides *rather than use only a few.*

For further information on this subject please refer to Allan Savory's article in this issue.