

ment asking the user to compare the range of total discounted values of additional returns to the cost of the burn. The user is advised that if the total discounted value of additional returns (considering its range) per acre is greater than the cost of the burn per acre, the burn is economically feasible. At this point changes may be made in any of the user inputted data for an additional session.

Availability

The software package "Economic Evaluation of Controlled Burning of Tobosagrass in the Texas Rolling Plains," comes on a 5 1/4 inch diskette and contains its own documentation, which can be printed by the user. The program is written in BASIC for an IBM personal computer (PC, XT, or AT) or compatible with at least 64K of memory.

The Department of Agricultural Economics of Texas Tech

University is in charge of distribution of the program, and will provide it free of charge to interested parties who send to the authors a 5 1/4 inch diskette along with a stamped self-addressed container suitable for returning the formatted diskette. Agencies in other states may choose to distribute and support the program locally or direct their clientele to this office for acquisition.

References

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Intensive Grazing—Precautions

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Many ranchers facing financial difficulties are closely following developments in new grazing management techniques designed to increase livestock production and improve overall ranch management efficiency. There are many new intensive grazing methods commonly referred to by various names such as Short Duration Grazing, The Savory Grazing Method, Cell Grazing Method, Time Controlled Grazing, and even Mob Stocking. Most of these intensive grazing methods employ some form of time control of livestock rotation among pastures.

Current literature contains a lot of controversial and misleading information on these grazing methods. This contributes to the difficulties in understanding what application these grazing methods have in solving the problems facing today's livestock producers. The following is a summary of precautions that should be considered before implementing any intensive grazing method.

Increased Planning and Management Are Required

One of the most important steps before implementing a new grazing method is to review **all available** options to improve the ranch. An operator should know the financial health of the existing operation and go through a step-by-step, in-depth planning process before deciding if a new grazing method will improve the ranch operation. Appropriate goals must first be developed to guide the actions. **Warning: Today's ranchers have no business building new water developments or fences until they push a pencil or do a computer analysis to determine if these new improvements will pay for themselves.** Wasting dollars and time are not in the cards for most livestock operators today.

Ranchers should apply a cash flow analysis to their operation and determine the weakest link. Possible weak links are poor animal nutrition, a poor breeding program, or an

inadequate livestock-marketing system. For example, genetics, affecting milking ability, calving difficulties, fertility, or resistance to disease may need more attention than the operator's current grazing method. Another common weak link is human resource management. If a rancher decides that a more intensive grazing plan is going to improve ranch profitability, he must be prepared to spend much more time operating, monitoring, controlling, and replanning than before.

Without this preliminary planning, unwanted problems may result, such as depressed animal gains, inadequate feed in the rotation, overgrazing, inadequate nutrition or spending too many dollars on construction projects to be cost effective.

Ranchers must have a thorough understanding of what time-controlled grazing means and its relationship to overgrazing. It needs to be emphasized that time control is determined by plants and not calendar dates. With intensive grazing (more livestock in smaller pastures), you can now graze the corners of the pasture. Mismanagement cannot be afforded here either. Also, if any early spring pasture should only be grazed for 2 to 3 days, the manager cannot go off and leave the animals on this pasture for 4 to 8 days. This could lead to depressed animal performance and overgrazing. An operator will need to closely monitor each pasture for overgrazed plants, the optimum deferment, litter on the soil, and then move livestock accordingly. Time control is very important to insure that all plants receive adequate deferment before they are regrazed to insure their health and vigor. Drought may change the entire pattern of grazing followed the year before, including number of animals grazed.

Motivation and attitude are very important. Ranchers should have the will, desire, and time to properly plan their change in management. **Caution: Do not overlook the proper training and background information necessary to successfully run an intensive grazing plan.**

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Stocking Rate

Stocking is one of the most controversial areas related to intensive grazing. A desirable goal would be to increase stocking rate while maintaining or improving range condition. Other goals may be to graze the same number of stock with expected improved animal performance, or to maintain the same number of animals but graze less land. The latter goal would allow a rancher to expand another area of the ranch operation; e.g., leasing out, sale to reduce debt, or even fee fishing or hunting.

The key question relative to stocking rate is, "Can your rangeland sustain a higher stocking rate under a new intensive rotational grazing plan?" Increased livestock distribution and improved efficiency of forage harvest may allow higher stocking or improved range condition under a rotational grazing plan than continuous grazing. An operator should increase livestock numbers slowly when implementing a new system, and carefully monitor individual range plants and livestock performance. **Remember: Increasing livestock numbers prior to increasing the feed supply is a Real Danger.**

Yearly forage production on rangeland can vary from 50 to as much as 300% or more between wet and dry years in some areas. **Remember: Stocking rates need to consider the inevitable drought.**

Overgrazing and Over-Resting

Common questions which ranchers should address when considering a new grazing system include: Are there accessible areas of my range where livestock don't normally graze? Is there unused forage on portions of my ranch such as an over-rested crested wheatgrass field? Would increasing stocking density be the best approach to improving utilization of the whole pasture?

It is important to understand how controlling time while grazing can improve rangelands. Research has shown that grazing systems which reduce the length of time animals spend grazing growing perennial grasses is more important to the health and vigor of the plant system than the amount of forage removed (Burlison and Hewitt 1982). Intense, shorter periods of grazing yields vigorous grass plants as compared to continuous, heavy grazing; thus, control the time rather than the number of livestock. Also, when stocking density is increased, livestock generally increase their use of less desirable range plants. Use of these less desirable plants, which are competing for nutrients and space with the more desirable species, has been shown (Mueggler 1972) to benefit the desirable species.

A point which needs to be clarified is the difference between heavy grazing and overgrazing. For example, a small pasture within the rotation schedule may only be grazed by the whole herd for 3 days out of the entire year. These pastures could be heavily grazed, but because of the long period of non-use, may not be overgrazed. For example, how much damage is done when rangelands are mowed for wild hay one day out of the entire year? This is an example of time-control defoliation. Operators must also start thinking about what happens to the underground one-half of the plants (crowns, roots, rhizomes) during the period of grazing. Healthy roots mean more forage next year. Also, levels

of wildlife and insect grazing on plant species should be considered when selecting a grazing plan and determining stocking rates.

Herd Effect

Herd effect is the impact of animal herds on the vegetation and soil through concentrated hoof action. Herd effect, in this case, isn't grazing and shouldn't be confused with stocking density. **Precaution: Ranchers must realize that each soil type at different times of the year will respond differently to herd effect.** Herd effect should also be time controlled so that soil compaction or soil surface movement does not lead to watershed damage. High intensity rain storms and heavy winds can easily move loosened, disturbed soils. Other soils may seal over and cap, and hoof action can sometimes be used to churn up these capped soils to allow better rainfall infiltration and improve conditions for seed germination.

Dense clubmoss (*Selaginella densa*) accounts for more than 80% of the ground cover in some areas of the Northern Mixed Prairie (Dolan and Taylor 1972). This low-growing plant reduces available soil moisture for desirable forage species and also inhibits the establishment of grass seedlings. Concentrating livestock on range dominated with dense clubmoss helps break up the clubmoss mats and increases available soil moisture and seedling growth. **Remember: Plan carefully where you want the herd effect, and control the time that hoof action is needed to solve a specific problem. Carefully monitor this effort and be prepared to change before too much herd effect defeats the original purpose.**

Know Your Vegetation

Operators should understand that not all plants react the same way to grazing. Some grass species may increase growth because of grazing (i.e., tillering), while others may stop or severely delay growth after their growing points (apical meristems) have been removed. Cattle will also select certain grass plants while ignoring others.

When planning new pastures, try not to cross fence seeded pastures with native range, or poor condition portions of a pasture with good condition range, or areas where plants furnish high nutrition during different seasons such as summer or winter. If the poorer condition areas can be economically fenced, separate them from the better range condition areas; the overgrazed poor condition areas can then be given more rest to promote plant improvement.

Animal Performance

In order to maintain maximum animal performance, livestock should not be stressed during movement, and forage intake should not be depressed. It is especially important to monitor individual pastures and move livestock before they run short of feed. **Operators must be flexible with their rotation schedules.** Lack of flexibility in rotating animals will likely result in the failure of any grazing plan. Flexibility and good understanding of predicting forage production will greatly reduce the chances of depressed animal gains. Livestock should be allowed to drift into the next pasture during rotation. Training livestock to move with the reward of new fresh feed is one way of reducing movement stress.

Animal Behavior

Increased livestock handling can cause interesting behavior responses. For example, cattle may lose their group habits and generally become much easier to handle. However, behavior problems can also occur. For example, an older cow may become confused with a new array of fences crossing her favorite old trail to some water hole. One operator in Mexico noticed a confused cow that just "hung around" the grazing cell center and chewed on the trees, while the other cows grazed in the far ends of the pasture. There may be such a thing as intensive grazing "smart" cows and intensive grazing "dumb" cows. Culling would be a solution in this case.

Water and Mineral Requirements

Ranchers should be prepared to provide more water for livestock and improve water developments to withstand an increase in physical pressure from concentrated numbers of livestock watering at each tank. Several operators in Montana have reported increased daily consumption of water (over 30 gallons per animal per day) and mineral supplement by their cattle when they initiated an intensive grazing program.

Monitoring Vegetation

As stated before, because intensive grazing may result in increased livestock numbers, a vegetation monitoring program should be implemented. Individual tagged plants can be measured and even photographed to determine utilization levels and regrowth patterns. These plants can be used as indicators to prevent overgrazing. During the rapid growth phase, plants should have enough deferment to regrow and look similar to ungrazed plants. A good series of tagged plants can document key plant responses to grazing. A quick look at a pasture may not provide the real information needed to adjust numbers or length of stay in certain pastures. **Remember: Be flexible, monitor the vegetation and animals, control the grazing, and replan when needed.**

Rancher Training

Before an operator initiates an intensive grazing plan, he should consider obtaining appropriate training. This training should consist of a formal introduction to better ranch management and intensive rotational grazing techniques. Schools and workshops are offered to help people get started in the right direction. Assistance is available through various agencies such as the Soil Conservation Service, local extension service, and also private firms. Neighbors might spend time training together and use a team approach to help solve problems and develop new ideas to better their ranch management.

Summary

A ranch that is considering a change in management should first review all available options, identify its weak link(s), set goals, and receive the necessary training. Ranchers also need to realize that it takes much more effort and time than just opening and closing a lot of gates to increase livestock production and cash flow; it takes increased efficiency, flexibility, and becoming more involved to make an intensive rotational grazing method work. This must be coupled with common sense and business-like ranch management. Remember to go through a thorough cost effective planning process first. **A DULL PENCIL IS BETTER THAN A SHARP MIND.**

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Cool, Clear. . . (continued from pg. 167)

THIS SEEMS TO BE A NEGATIVE APPROACH TO problem solving, assuming that it would even work. Can't we do better? Can't we as private citizens, professional land managers, and agency heads tackle water quality and related problems in a straightforward manner? Why must we always have to scheme and poke one another to get off dead center?

There are planning processes and resource management plans in both BLM and the Forest Service that are logical tools to improve public rangeland management. Why are we not developing better plans? Why are we not implementing the plans that are on line? Is there a faint lack of backbone in today's professional resource managers? Are we so con-

cerned with science and technique that we have allowed all-important implementation abilities to atrophy?

Good range conservationists and agency administrators are dime a dozen. Range cons and administrators with verve to accomplish are invaluable commodities. They not only know what's good for resources, they learn **how** to do it.

Water quality is not an entity to be plucked and mused separately. It is a direct reflection of land management quality. As Grandpa once said, what happens on the ridge is retold in the creek. He also said that the most important trait for people who talk a lot is to know when to duck. So I'll bow out now.